ABET
Self-Study Report
for the
Computer Engineering Program
at
The United States Naval Academy
Annapolis MD

Fall 2012

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Appendix A – Course Syllabi
Appendix A – Course Syllabi – EC 244

1. Course number and name: EC 244 Electronics/Electromechanics

2. Credits and contact hours: 4 Credits and 5 Contact Hours

3. Course coordinator’s name: AscProf Thomas E. Salem

4. Text book, title, author, and year:
   a. Electronics and Electromechanics (Custom), Jaeger & Chapman, 2011

5. Specific course information
   a. This course is intended only for students in the Computer Engineering major and introduces them to electronics and electromechanics. Topics covered include amplifiers, comparators, diodes, voltage regulation, bipolar junction transistors, metal oxide field effect transistors (MOSFETs), single- and three-phase power delivery, ideal transformers, DC motors, and AC generators. Problem solving, laboratory exercises, and circuit design are emphasized.
   b. Prereq: EE 221
   c. Required

6. Specific goals for the course
   a. Demonstrate an understanding of the basic structure and operation of diodes, bipolar junction and field-effect transistors, operational amplifiers and comparators.
   b. Demonstrate an ability to solve for voltages and currents in simple semiconductor device circuits.
   c. Demonstrate an ability to apply and implement large-signal device models, and understand their use in switching and digital circuits.
   d. Demonstrate an ability to design basic logic gates using transistors.
   e. Demonstrate the ability to design, simulate, build, prototype, test, debug and troubleshoot basic electronics circuits in a laboratory environment.
   f. Demonstrate an understanding of AC power in single-phase and three-phase circuits and have the ability to make basic power calculations.
   g. Demonstrate an understanding of transformers and synchronous machines and use circuit analysis and power calculations to make performance calculations.
   h. Demonstrate an ability to prototype power circuits in the lab, use measurement equipment to collect data, and then use the data to make basic calculations regarding circuit performance.

7. Brief list of topics to be covered
   a. Op-Amp Amplifier Circuits
   b. Frequency Response and Element Variations
   c. Semiconductor Concepts
   d. Diode Characteristics - Ideal and Real
   e. Diode Models and Circuits
f. Diode Circuits - AC to DC conversion
g. Voltage Regulation and Power Supply Concepts
h. BJT - NPN Structure and Operation
i. BJT - Biasing and Circuit Models
j. BJT - Circuit Analysis
k. MOSFET - NMOS Structure and Operation
l. PMOS - Structure and Operation
m. NMOS - Biasing and Circuit Models
n. Digital Logic Gates
o. Digital Logic Gates   NMOS - NOT
p. NMOS - NAND and NOR
q. CMOS - Structure and Operation
r. CMOS - NOT
s. CMOS - NAND and NOR
t. MOS Memory
u. Mechanical and Electromagnetic Fundamentals
v. Single-Phase AC Power Concepts
w. Three-Phase Circuit Configurations (wye, delta)
x. Three-Phase Power
y. Three-Phase Circuit Analysis
z. Transformers – Ideal
aa. Transformers - Real
bb. AC Machinery Fundamentals
cc. Synchronous Machines
Appendix A – Course Syllabi – EC 262

1. Course number and name: EC 262 Digital Systems

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: AstProf Hau T. Ngo

4. Text book, title, author, and year:
   c. Other supplemental materials
      i. DE2 supplementary notes
      ii. Sheybot supplementary notes

5. Specific course information
   a. Fundamentals in realizing a digital system. Topics covered include Boolean algebra, Karnaugh mapping, flip-flops, state diagrams for system minimization and analysis of sequential and logic function circuits, binary arithmetic, decoders, encoders, multiplexers, and demultiplexers, as well as counter and register design. An introduction to complex programmable logic device (field programmable gate array) systems is provided with applications to projects.
   b. Prereq: None
   c. Required

6. Specific goals for the course
   a. Specific outcomes of instruction.
      The students will be able to
      i. Apply their knowledge of Boolean algebra to perform combinational logic circuit analysis and design.
      ii. Convert between decimal, binary, octal, and hexadecimal number systems and perform computations involving signed binary number systems.
      iii. Analyze and design sequential logic circuits using state-machine design techniques.
      iv. Incorporate logic devices such as adders, multiplexers, decoders, counters and complex programmable logic devices (CPLDs) in combinational and sequential circuit designs and demonstrate design functionality through simulation or experimental implementation.
      v. Demonstrate the ability to design, construct, test, and debug logic circuits in a laboratory environment.
      vi. Demonstrate the ability to properly record and report laboratory work
      vii. Work in a team setting to accomplish engineering tasks.
      viii. Demonstrate the ability to use computer-based simulation tools to design, analyze, and implement logic circuits.
b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other
outcomes are addressed by the course.
   i. Outcomes a, b, c, e, g, j, k.

7. Brief list of topics to be covered
   a. Numbering systems
   b. Switching algebra
   c. Combinational circuits
   d. Karnaugh map
   e. Sequential circuits
   f. Finite state machines
   g. VHDL
Appendix A – Course Syllabi- EC361

1. Course number and name: EC361 Microcomputer-Based Digital Design

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: Ryan Rakvic

4. Text book, title, author, and year:
   a. Pic16F87X Data Sheet, Microchip, 2001
   b. DataFormatsAndArithmeticOperations, Cameron, 2005
   c. PIC16Programming, Cameron, 2005
   d. TimingPrograms, Cameron, 2005
   e. StepperMotors, Cameron, 2005
   f. Pulse Width Modulation, Cameron, 2005
   g. Asynchonous Serial Communication, Cameron, 2005
   h. Memory Types and Decoding, Cameron, 2005
   i. Hamming Codes, Cameron, 2005

5. Specific course information
   a. A principles-based foundation to the concepts and techniques used in analyzing and designing traditional and microprocessor-based digital systems. The student will acquire a detailed understanding of the system bus; the architecture and interfacing of various processor, memory, and input-output elements; the instruction set; and assembly-language programming. Emphasis is on concepts that will have long-term value. This course is supported by a continually updated laboratory
   b. A principles-based foundation to the analysis and design of systems using microprocessors. The student will acquire a detailed understanding of the architecture and instruction set of a representative microcontroller, assembly-language programming of that microcontroller, and the use of interrupts. The student will design and build circuits with both digital and analog components and will learn to use timers, asynchronous serial communications, parallel communications, analog-to-digital and digital-to-analog converters, and pulse-width modulators. The derivation and use of design equations to achieve desired behavior is emphasized.
   c. Prereq: EC262 or EE313 or EE332.
   d. Required

6. Specific goals for the course
   a. Demonstrate how to embed a high-speed microcontroller with on-chip peripheral devices within a larger system
   b. Be able to program a microprocessor using assembly language
   c. Demonstrate the ability to properly record and report laboratory work
   d. Work in a team setting to accomplish engineering tasks
7. Brief list of topics to be covered
   a. Stored Processing
   b. Introduction to PIC
   c. Instructions
   d. High-level to Assembly
   e. Interrupts
   f. Timers
   g. Stepper Motor
   h. Analog to Digital
   i. Pulse Width Modulation
   j. (A)synchronous Serial I/O
   k. Memory
Appendix A – Course Syllabi- EC362

1. Course number and name: EC362 Computer Architecture

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: Ryan Rakvic

4. Text book, title, author, and year:

5. Specific course information
   a. This course covers organization, structure, and design of computers, starting with a review of the history of computers. Design topics include: complex and reduced instruction set design; data addressing; design of central processing units, registers, and arithmetic logic units; circuits to handle interrupts, resets, and other exceptions; horizontal and vertical microprogramming; data busses; memory system design; input/output system design; paging and segmentation; and cache design. A study of computer arithmetic covers two's complement addition and subtraction; Booth's and Robertson's algorithms for signed multiplication; restoring and non-restoring division; square root extraction; and floating-point hardware.
   b. Prereq: EC262.
   c. Required for Computer Engineers and Elective for Electrical Engineers.

6. Specific goals for the course
   a. Demonstrate how to design a high-speed microprocessor with a Hardware Description Language
   b. Understand all aspects of a modern microprocessor and surrounding components
   c. Demonstrate the ability to properly record and report laboratory work
   d. Work in a team setting to accomplish engineering tasks

7. Brief list of topics to be covered
   a. Architecture vs organization; ISA (MIPS, SPARC, 80x86)
   b. Performance metrics; response time/throughput; CPU performance
   c. MIPS instruction set (by example): RISC architectures
   d. Adder types and Design
   e. Integer multiplier, floating point addition/multiplication
   f. Single-cycle CPU; hardwired controller
   g. Multi-cycle CPU; microprogramming
   h. Pipelining: datapath & control
   i. Branch Prediction, Superscaler & dynamic pipelining
   j. Cache design: direct-mapped, set-associative, fully associative
   k. Bus design: arbitration schemes, asynchronous vs synchronous
   l. I/O interfacing: polling, interrupts, DMA
m. Multiprocessors: UMA vs NUMA, message passing, SIMD/MIMD/SPMD, network topologies (1 hour)
Appendix A – Course Syllabi – EC 404

1. Course number and name: EC 404 Operating Systems

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: Major Christopher B. Mayer

4. Text book, title, author, and year:
   a. Required
      i. Operating System Concepts with Java, Silberschatz, Galvin & Gagne, 2010
      ii. Java How to Program: Late Objects, Dietel, 2009
   b. Optional and/or Recommended
   c. Additional Internal Supplements – None

5. Specific course information
   a. This is an introductory course covering fundamental concepts and principles of computer operating systems with emphasis on process management including threads, memory management, file system structures, I/O management, system protection, security and distributed computing. Students will engage in a number of programming projects. The first four weeks of the course is devoted to learning the object-oriented Java programming language.
   b. Prereq: None, but SI204 is recommended. The student is expected to have a general understanding of computer architecture and be comfortable with at least one high-level programming language. Some experience with data structures will also be helpful.
   c. Elective

6. Specific goals for the course.
   a. Students shall be able to…
      i. Describe the differences between processes and threads, execute scheduling algorithms for them, and compare the performance of the scheduling algorithms.
      ii. Recount and explain the importance of the bookkeeping and data needed to manage processes, threads, files, and the memory hierarchy of a modern computer.
      iii. Be able to detect deadlock situations using graph-based algorithms and the Banker’s Algorithm and explain why deadlock does or doesn’t exist.
      iv. Employ various data structures and programming techniques to control access to shared variables and critical sections of programs.
      v. Describe various memory models of modern computing systems and convert logical memory addresses for processes into physical memory locations using page tables and translation look-aside buffers.
vi. Explain the benefits and drawbacks of virtual memory and execute and compare the performance of various page replacement algorithms.

vii. Under the contiguous, linked, and indexed allocation schemes, be able to find disk block and byte of the block that is the nth byte of a file.

viii. Schedule the movement of a hard drive’s read/write head under various algorithms and compare the performance of each algorithm.

b. Nine of the eleven ABET Outcomes are addressed by the course. The missing Outcomes are #s 4 and 6. The Outcomes addressed by the course are…

i. (O1) an ability to apply knowledge of mathematics, science, and engineering

ii. (O2) an ability to design and conduct experiments, as well as to analyze and interpret data

iii. (O3) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

iv. (O5) an ability to identify, formulate, and solve engineering problems

v. (O7) an ability to communicate effectively

vi. (O8) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

vii. (O9) a recognition of the need for, and an ability to engage in life-long learning

viii. (O10) a knowledge of contemporary issues

ix. (O11) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

7. Brief list of topics to be covered
   a. Java programming language
   b. Operating System Structures
   c. Processes
   d. CPU Scheduling
   e. Process Synchronization
   f. Deadlocks
   g. Main Memory and Paging
   h. Virtual Memory
   i. File Systems
   j. Mass Storage Structure
   k. I/O Systems
   l. Protection and Security
Appendix A – Course Syllabi – EC436

1. Course number and name: EC436 Introduction to Computer Networks

2. Credits and contact hours: 4 Credits (3-2-4) and 5 Contact Hours

3. Course coordinator’s name: CDR T. Owens Walker III, USN, Ph.D.

4. Text books, title, author, and year:

5. Specific course information:
   a. This course provides a foundation in the fundamentals of data and computer communications. Students develop the ability to design, implement, and analyze modern data and computer networks. Emphasis is placed on both protocol and network design and performance analysis. Critical technical areas in data communications, wide area networking, and local area networking are explored. Network modeling simulation is introduced through the use of the OPNET® Modeler Suite.
   b. Prereq: EE354 or approval of department chair.
   c. Elective.

6. Specific goals for the course:
   a. Students shall be able to:
      i. Discuss and explain fundamental concepts for design, implementation and analysis of a modern data and telecommunications network.
      ii. Correlate modern protocols with the OSI and TCP/IP protocol layered models.
      iii. Explain and analyze random and scheduled access techniques associated with medium access control.
      iv. Analyze modern LAN and WAN topologies and transmission mediums for proper operation and performance metrics.
   b. Student Outcomes Addressed by the course:
      i. (a) an ability to apply knowledge of mathematics, science, and engineering
      ii. (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
      iii. (d) an ability to function on multidisciplinary teams
      iv. (e) an ability to identify, formulate, and solve engineering problems
      v. (f) an understanding of professional and ethical responsibility
      vi. (g) an ability to communicate effectively
      vii. (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
viii.  (i) a recognition of the need for, and an ability to engage in life-long learning
ix.  (j) a knowledge of contemporary issues

7. Brief list of topics to be covered:
   a. Intro to Computer Networks
   b. Network Models
   c. Review of Analog and Digital Signals
   d. Transmission Impairment
   e. Data Rate Limits
   f. Review of Analog and Digital Transmission
   g. Multiplexing
   h. Spread Spectrum
   i. Guided Media
   j. Unguided Media
   k. Switching
   l. Telephone and Cable Networks
   m. Basic Queuing Theory
   n. Error Detection and Correction
   o. Data Link Control
   p. Contention-based Medium Access
   q. Non-contention-based Medium Access
   r. Ethernet
   s. Logical Addressing
   t. Internet Protocol
   u. Address Mapping
   v. Forwarding and Routing
   w. User Datagram Protocol (UDP)
   x. Transmission Control Protocol (TCP)
   y. Congestion Control
   z. E-mail, File Transfer, and World Wide Web
Appendix A – Course Syllabi- EC 462

1. Course number and name: EC 462 Superscalar Processor Design

2. Credits and contact hours: 3 Credit Hours and 3 Contact Hours

3. Course coordinator’s name: CAPT Kevin Rudd

4. Text book, title, author, and year:
   b. Additional Internal Supplements

5. Specific course information
   a. Topics essential to modern superscalar processor design are covered: review of pipelined processor design and hierarchical memory design; advanced topics covering a range of processes, techniques and superscalar computer designs.
   b. Prereq: EC362
   c. Elective

6. Specific goals for the course
   a. Provide students an in-depth look at the design of superscalar processors beginning with a review of elementary computer architecture and quickly moving into an examination of modern methods of wringing high-speed performance from processors.
   b. Student Outcomes Addressed by the course:
      i. (a) an ability to apply knowledge of mathematics, science, and engineering
      ii. (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
      iii. (e) an ability to identify, formulate, and solve engineering problems
      iv. (g) an ability to communicate effectively
      v. (j) a knowledge of contemporary issues

7. Brief list of topics to be covered
   a. Instruction set design, measuring processor performance, instruction-level processing
   b. Limits of instruction-level parallelism
   c. Scalar pipelines
   d. Ideal pipelining, instruction pipelining
   e. Unifying instruction types
   f. Deeply pipelined processors
   g. Memory latency and bandwidth
   h. Temporal and spatial locality
   i. Hierarchical memory systems and cache memory systems
j. Virtual memory
k. I/O Systems
l. Limitations of scalar pipelines
m. Parallel, diversified, and dynamic pipelines
n. Superscalar pipelines
o. Program control flow, control dependencies, and the effect of branch misprediction
p. Branch prediction techniques
q. Branch misprediction recovery
r. Register reuse and false data dependence
s. Register renaming techniques
t. True data dependence, the data-flow limit
u. The Tomasulo algorithm for honoring true dependences
v. Dynamic instruction core, reservation stations, reorder buffers
w. Memory accessing instructions, ordering memory accesses
x. Load bypassing, load forwarding
y. PowerPC620 Case Study
z. Intel P6 Case Study
aa. Static Branch Prediction
bb. Dynamic branch prediction
cc. Hybrid branch prediction
dd. Other instruction flow techniques
ee. Value locality and redundant execution
ff. Memorization, instruction reuse, block and trace reuse
gg. Data flow region reuse, weak dependence model, speculative value prediction
hh. Introduction to multiprocessor systems
ii. Cohere memory and cache structures
Appendix A – Course Syllabi- EC 463

1. Course number and name: EC 463 Microcomputer Interfacing

2. Credits and contact hours: 4 Credit Hours and 6 Contact Hours

3. Instructor’s or course coordinator’s name: AstProf Hau T. Ngo

4. Text book, title, author, and year:
   a. No textbook.
   b. Additional Internal Supplements
      i. Quartus II introduction with VHDL
      ii. PS/2 Keyboard, Scan Codes, Controller
      iii. SOPC using VHDL tutorial
      iv. GPIO interface
      v. Using C with DE2 board
      vi. SRAM, SDRAM controller
      vii. SDRAM tutorial
      viii. Timer controller
      ix. UART controller
      x. LCD controller
      xi. Interrupt with Nios Processor
      xii. Audio controller
      xiii. Video controller

5. Specific course information
   a. This course provides a strong foundation in techniques for connecting computers to peripheral and communications devices and in the methodology for programming the computer to control external devices in real time. This course is supported by a project-oriented laboratory with an opportunity to use a wide variety of computer-controlled peripheral devices. The student will learn the architecture of a representative digital signal processor (DSP) and how to use assembly language to program it. A major emphasis of the course is the in-depth study of interrupt processing, polling, direct memory access, parallel input/output (I/O) protocols, inter-process communication, and modular techniques for designing hardware and software.
   b. Prereq: EC262 or EE313 or EE332.
   c. Elective

6. Specific goals for the course
   a. Specific outcomes of instruction.
      The students will be able to
      i. Explain hardware, software interfaces
      ii. Design a design and implement drivers for hardware peripherals.
      iii. Explain how a processor communicates with different memory modules.
      iv. Explain different processor-peripheral communication protocols.
v. Program in VHDL, hardware interfaces between a microprocessor and a device.
vi. Program in C, software that utilizes hardware interfaces.
vii. Use the lab station and DE2 boards effectively, including necessary time-consuming debugging.
viii. Be familiar with and understand the implications of the following issues relating to interfaces: software to hardware communication; memory map; interrupts; polling; bus communication; serial and parallel connections; memory access.
ix. Independently learn a new device extracting necessary information from data sheets to design a system interface both in software and hardware.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
ii. Outcomes a, b, c, e, g, j, k.

7. Brief list of topics to be covered
   a. Review of VHDL
   b. System on a programmable chip design (SOPC)
   c. General purpose input/output controller interface (GPIO)
   d. Memory controller and interface
   e. Timer controller and interface
   f. UART controller and interface
   g. LCD controller and interface
   h. Audio controller and interface
   i. Video controller and interface
Appendix A – Course Syllabi – EE-221

1. Course number and name: EE-221

2. Credits and contact hours: 4 Credits and 5 Contact Hours

3. Course coordinator’s name: Associate Professor Deborah Mechtel

4. Text books, title, author, and year:

5. Specific course information:
   a. This course addresses the analysis of linear electric circuits through the application of basic network laws and theorems. The student derives solutions for DC circuits, sinusoidal steady-state circuits, and first- and second-order circuits. Students are introduced to linear integrated circuits such as operational amplifiers and timers. Laboratory exercises where students build and design circuits and use test equipment reinforce course material. Introductory troubleshooting skills and lab notebook maintenance are emphasized. Computer simulation is used throughout the course to support both analysis and design objectives.
   b. Prereq: Calculus I (SM 121)
   c. Required

6. Specific goals for the course:
   a. Students shall develop the ability to analyze and understand basic electric circuit concepts, as well as to demonstrate an ability to design, construct, test and debug circuits in the laboratory
   b. Student Outcomes Addressed by the course:
      i. (a) An ability to apply fundamental principles of mathematics, science, and engineering
      ii. (b) An ability to design and conduct scientific and engineering experiments and conduct software simulations, as well as to analyze and interpret data
      iii. (c) An ability to design a system, component, or process to meet desired needs. This includes problem definition, specification, design, implementation, test and operation of systems, components, and/or processes within performance and resource constraints
      iv. (e) An ability to identify, formulate, and solve practical electrical engineering problems
      v. (f) An understanding of professional and ethical responsibility
      vi. (g) An ability to communicate effectively, both verbally and in writing
      vii. (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

7. Brief list of topics to be covered:
a. Introduction And Ohm's Law
b. Resistors, Power And Energy
c. DC Circuit Analysis
d. Operational Amplifiers
e. Capacitors, Inductors
f. First order circuits
g. Sinusoids, Phasors, Complex Numbers, Impedance
h. AC circuit analysis, AC power
i. Resonance and passive filters
j. Active filters
k. Laplace transform
l. Laplace transform circuit applications
m. Second order circuits
Appendix A – Course Syllabi- EE 241

1. Course number and name: EE 241 Electronics I

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: AscProf R. Brian Jenkins

4. Text book, title, author, and year:
   a. Electronics, Allen Hambley, 2000

5. Specific course information
   a. The physics of semiconductor devices (p-n junction diode, bipolar and field effect transistors) is introduced. Device characterization in terms of appropriate external variables then leads to construction of small-signal and large-signal models. Emphasis is on practical electronic circuits such as amplifiers, filters, rectifiers, regulators and switching circuits.
   b. Prereq: EE221 or EE331.
   c. Required.

6. Specific goals for the course
   a. Specific objectives of the course:
      i. Understand the basic structure and operation of diodes, bipolar junction transistors and field-effect transistors, operational amplifiers and comparators.
      ii. Solve for voltages and currents in simple semiconductor device circuits.
      iii. Design basic operational amplifier circuits using various configurations, accounting for non-ideal op-amp characteristics and behavior.
      iv. Apply and implement small-signal device models, and use them to analyze and understand single-stage amplifier circuits.
      v. Design single-stage amplifier circuits using transistors.
      vi. Apply and implement large-signal device models, and understand their use in switching and digital circuits.
      vii. Design basic logic gates using transistors
      viii. Apply programming skills to model circuits using circuit modeling tools.
      ix. Demonstrate the ability to design, build, prototype, test, debug and troubleshoot basic electronics circuits in a laboratory environment.
      x. Develop appropriate design equations for circuits as part of the design process.
      xi. Demonstrate the ability to properly record and report laboratory work
      xii. Demonstrate knowledge of current trends in electronics and impact on society.
      xiii. Develop a greater understanding of ethics within an engineering context.
   b. Outcomes 1, 2, 3, 5, 6, 7, 8, 9, 10, 11

7. Brief list of topics to be covered:
a. Amplifiers
b. Op-amps
c. Diodes and diode circuits
d. BJT and FETs
e. and various transistor circuits
Appendix A – Course Syllabi – EE-301

1. Course number and name: EE-301 Electrical Fundamentals and Applications

2. Credits and contact hours: 4 Credits and 5 Contact Hours

3. Course coordinator’s name: LCDR Robert Schultz

4. Text books, title, author, and year:
   b. Additional Internal Supplements

5. Specific course information
   a. Provides an introduction to AC and DC circuit theory appropriate to model shipboard systems. Circuits of resistors, capacitors, inductors and sources are analyzed to predict steady state and first-order transient voltage, current, and power. Impedance matching, filters, transformers, motors/generators, and three-phase power distribution systems are introduced in the context of shipboard application. Laboratory exercises use tools and equipment found in the fleet and allow for a comparison of theoretical and actual circuit performance.
   b. Prereq: Physics II (SP212 or SP222).
   c. Required

6. Specific goals for the course
   a. Students shall develop the ability to understand basic AC and DC circuits with resistors, capacitors, and inductors and construct and analyze these circuits using provided components. Students shall demonstrate an understanding of power, voltage, current, transformers, three-phase power distribution systems, AC generators and DC motors.
   b. Student Outcomes Addressed by the course:
      i. (a) an ability to apply knowledge of mathematics, science, and engineering
      ii. (e) an ability to identify, formulate, and solve engineering problems
      iii. (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

7. Brief list of topics to be covered
   a. Introduction And Ohm's Law
   b. Resistors, Power And Energy
   c. Series Circuits And Kirchhoff’s Voltage Law
   d. Voltage Divider And Reference Voltages
   e. Parallel Circuits And Kirchhoff’s Current Law
   f. Series-Parallel Circuits
   g. Current Sources, Source Conversion
   h. Nodal Analysis
   i. Thévenin’s Equivalent And Max Power Transfer
j. Capacitors
k. Inductors
l. Sinusoids, Phasors, Complex Numbers
m. Impedance
n. Ac Circuits
o. Ac Power, Power Triangle And Power Factor
p. Power Factor Correction
q. Ac Source Transformation And Thévenin’s Theorem
r. Magnetism And Transformers
s. Transformers And Reflected Impedance
t. Linear Motors
u. Dc Motors Part
v. Ac Generators
w. Three Phase Sources And Loads, Three Phase Power
x. Shipboard Power Systems
Appendix A – Course Syllabi- EE 302

1. Course number and name: EE 302 Electronic Communication Systems & Digital Communications

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: CDR Hewitt Hymas

4. Text book, title, author, and year:

5. Specific course information
   a. This course is a follow-on to EE301, Electrical Engineering Fundamentals. This course begins with the basic principles of analog communications to include the most common modulation techniques and a study of amplitude modulation and frequency modulation. Radio wave propagation and the fundamentals of antennas are also presented. The course then covers digital logic circuitry followed by analog-digital/digital-analog conversion, digital modulation techniques, error detection and correction techniques. The course ends with a study of the engineering fundamentals of networking including topology, connectivity, routing, bandwidth, subnetting, TCP/IP, and the Internet as an application of networking concepts.
   b. Prereq: EE301 or EE331.

6. Specific goals for the course
   Students shall be able to:
   a. Demonstrate the ability to analyze tuned circuits and filters through use of simulation and hardware.
   b. Demonstrate working knowledge of amplitude modulation (AM) and frequency modulation (FM) transmission and AM reception through use of hardware.
   c. Demonstrate working knowledge of antennas and their applications at various frequencies and under varying conditions.
   d. Demonstrate working knowledge of analog-digital (A-D) and digital-analog (D-A) conversions.
   e. Demonstrate working knowledge of digital communications, their modulation and multiplexing techniques, as well as error detection and correction.
   f. Demonstrate working knowledge of microwave systems and the fundamentals of satellite communications, including the Global Positioning System (GPS).
   g. Demonstrate a working knowledge of computers, computer networking, and the Internet.
h. Demonstrate working knowledge of Local Area Networks (LAN) and their use of hardware, fiber optics, protocols, and addressing.

7. Brief list of topics to be covered
   a. Gain
   b. Tuned Circuits
   c. Filters
   d. Amplitude Modulation
   e. Frequency Modulation
   f. Superheterodyne Receivers
   g. Antennas
   h. Analog-Digital/Digital-Analog Conversion
   i. Digital Transmission Techniques
   j. Satellite Communications
   k. Optical Communications
   l. Networking Fundamentals
Appendix A – Course Syllabi- EE 303

1. Course number and name: EE 303 Digital Communications (Taught in conjunction with EE 302)

2. Credits and contact hours: 3 Credit Hours and 4 Contact Hours

3. Course coordinator’s name: CDR Hewitt Hymas

4. Text book, title, author, and year:

5. Specific course information
   a. This course begins with the theory behind radio waves and how they travel as well as antenna fundamentals. Tuned circuits are also discussed along with their applications in communication circuits. The first major focus of the course is amplitude modulation as it applies to radio-frequency communications; frequency modulation is presented as a comparison. The second major focus is methods for converting between analog and digital data for communicating. Also covered are digital modulation, error detection and correction, and multiplexing techniques. During discussions of each topic, military application and relevance is covered.
   b. Prereq: (EE301 or EE331) and CS/IT major.

6. Specific goals for the course
   Students shall be able to:
   a. Demonstrate the ability to analyze tuned circuits and filters through use of simulation and hardware.
   b. Demonstrate working knowledge of amplitude modulation (AM) and frequency modulation (FM) transmission and AM reception through use of hardware.
   c. Demonstrate working knowledge of antennas and their applications at various frequencies and under varying conditions.
   d. Demonstrate working knowledge of analog-digital (A-D) and digital-analog (D-A) conversions.
   e. Demonstrate working knowledge of digital communications, their modulation and multiplexing techniques, as well as error detection and correction.
   f. Demonstrate working knowledge of microwave systems and the fundamentals of satellite communications, including the Global Positioning System (GPS).
   g. Demonstrate a working knowledge of computers, computer networking, and the Internet.
   h. Demonstrate working knowledge of Local Area Networks (LAN) and their use of hardware, fiber optics, protocols, and addressing.

7. Brief list of topics to be covered
a. Gain 
b. Tuned Circuits 
c. Filters 
d. Amplitude Modulation 
e. Frequency Modulation 
f. Superheterodyne Receivers 
g. Antennas 
h. Analog-Digital/Digital-Analog Conversion 
i. Digital Transmission Techniques 
j. Satellite Communications 
k. Optical Communications 
l. Networking Fundamentals
Appendix A – Course Syllabi- EE 313

1. Course number and name: EE 313 Logic Design and Microprocessors

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: LCDR Robert Schultz

4. Text book, title, author, and year:
   a. Digital Electronics with VHDL Quartus II Version, Willilam Kleitz, 2005
   b. Additional Internal Supplements

5. Specific course information
   a. This is an introductory level project course in digital electronics for non-electrical engineering majors. It begins with the design, analysis and minimization of both combinatorial and sequential circuits and their realization in both discrete components and programmable logic devices. The course then progresses into the uses of MSI devices and digital arithmetic. Finally, an introduction to assembly level programming and microprocessor/microcontroller based systems design is also provided.
   b. Prereq: EE302 or EE332 or approval of department chair.
   c. Required

6. Specific goals for the course
   a. Students shall develop the ability to understand and design combinational and sequential logic circuits and construct, test, and debug these circuits using small and medium scale integrated circuits. Students shall demonstrate an understanding of basic computer architecture and how a computer executes simple programs as it pertains to digital systems. This understanding extends to studying how to design state machines such as those at the heart of computer’s microprocessor. The course requires a final design project.
   b. Student Outcomes Addressed by the course:
      i. (a) an ability to apply knowledge of mathematics, science, and engineering
      ii. (b) an ability to design and conduct experiments, as well as to analyze and interpret data
      iii. (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
      iv. (e) an ability to identify, formulate, and solve engineering problems
      v. (g) an ability to communicate effectively
      vi. (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

7. Brief list of topics to be covered
a. Decimal, Binary, Binary-Coded-Decimal (BCD), Octal, and Hexadecimal number systems
b. Computations involving signed binary number systems.
c. Combinational logic circuit analysis and design.
d. Sequential logic circuits analysis and design using Asynchronous and Synchronous state-machine design techniques.
e. Use of adders, multiplexers, decoders, counters and state-machines in combinational and sequential circuit designs.
f. Computer Architecture and basic program execution.
**Appendix A – Course Syllabi – EE-320**

1. Course number and name: EE-320  Introduction to Electrical Engineering II

2. Credits and contact hours: 3 Credits and 4 Contact Hours

3. Course coordinator’s name: Dr. Thomas Salem

4. Text books, title, author, and year:
   a. Fundamentals of Electric Circuits, Alexander & Sadiku
   b. Additional supplements as posted on course website

5. Specific course information:
   a. This course provides an introduction to the analysis of power systems and rotating machinery. The student applies circuit analysis techniques to solve single-phase and three-phase power problems. Further, the analysis of ideal and non-ideal transformers and synchronous machines is included. An introduction to power electronic circuits is provided, including rectifier and dc/dc converter examples. Problem solving and laboratory exercises are emphasized.
   b. Prereq: Introduction to Electrical Engineering I (EE221).

6. Specific goals for the course:
   a. Students shall develop the ability to make AC power calculations given single-phase or three-phase circuit descriptions. The students should also be able to quantify the effects of incorporating transformer and synchronous machine equivalent circuits into a system using measures such as efficiency and voltage drop. A basic understanding of the theory of operation of a transformer and synchronous machine is expected. The students are then expected to make basic calculations regarding full-wave-bridge rectifier circuits with both resistor-capacitor and voltage regulator loads. Finally, students are expected to make calculations and understand the theory behind the basic elements of a dc-dc buck chopper: high-frequency inductor and filter capacitor, power switch and diode, gate driver, pulse-width-modulation (pwm) chip, and heat sinks.
   b. Student Outcomes Addressed by the course:
      ABET Student Outcomes; a, b, c, e, j, and k are addressed by the following course objectives:
      ii. Demonstrate an understanding of AC power in single-phase and three-phase circuits and an ability to make basic calculations
      iii. Demonstrate an understanding of transformers and synchronous machines and use circuit analysis and power calculations to make performance calculations
      iv. Demonstrate an understanding of full-wave-bridge rectifier circuits and make calculations relevant to capacitor sizing and designing a linear voltage regulator
v. Demonstrate an understanding of the dc-dc buck chopper circuit and make basic calculations regarding duty cycle, inductor ripple current, and output capacitance.

vi. Demonstrate an ability to make calculations to either design or evaluate the performance of the following buck chopper elements: inductor, capacitor, main switch, main diode, gate driver, pwm chip, and heat sinks.

vii. Demonstrate an ability to prototype circuits in the lab, use measurement equipment to collect data, and then use the data to make basic calculations regarding performance.

viii. Demonstrate the ability to use simulation to predict circuit operation.

7. Brief list of topics to be covered:
   a. AC Analysis Review
   b. Single-Phase Power - Real and Instantaneous
   c. Single-Phase Power - Reactive, Apparent, and Complex
   d. Single-Phase Power - Power Factor Correction
   e. Three-Phase Systems - Loads and Sources
   f. Three-Phase Systems - Circuit Analysis
   g. Three-Phase Systems - Power Calculations
   h. Magnetically Coupled Circuits and Ideal Transformers
   i. Magnetic Concepts and Real Transformers
   j. Three-Phase Transformers and Transformer Applications
   k. Synchronous Machines: Structure, Operation, and Voltages
   l. Synchronous Machines: Per-Phase Equivalent Circuit
   m. Synchronous Machines: Torque
   n. Rectifiers: Half-wave, Full-wave, and Three-Phase
   o. DC-DC Converters - Buck Chopper Ideal Operation
   p. Buck Chopper - Inductance and Capacitance
   q. Buck Chopper - Inductor Design
   r. Buck Chopper - MOSFET as switch
   s. Buck Chopper - MOSFET gate
   t. Buck Chopper - MOS and Diode
   u. Buck Chopper - Heat Sink and Design Example
Appendix A – Course Syllabi- EE 322

1. Course number and name: EE 322 Signals & Systems

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: LCDR Christoph Flaherty

4. Text book, title, author, and year:
   Introduction to MATLAB, 2nd ed., Delores Etter, 2011
   b. Additional Internal Supplements including handouts on basic continuous time &
      discrete time functions, Fourier transform pairs and properties, and Laplace
      transform tables and properties.

5. Specific course information
   a. The principles of circuit analysis are extended to the transmission of signals
      through linear systems. The approach is based on determination and interpretation
      of natural frequencies, pole-zero diagrams, and their relation to the governing
      system equations. Transform techniques are applied to the analysis of systems,
      including circuits. Both continuous-time and discrete-time systems are discussed.
      Computer software is used to model and analyze signals and systems.
   b. Prereq: EE241 or approval of department chair.
   c. Required for Electrical and Computer Engineering majors

6. Specific goals for the course
   a. Students shall develop the ability to understand the relationship between the time
      domain and the frequency domain for both signals and systems. Analyzing linear
      systems will include the ability to perform convolution in both the time and
      frequency domain to determine input/output relationships. Students will analyze
      signals and systems using both software tools and standard laboratory equipment.
   b. Student Outcomes addressed by the course:
      i. (a) an ability to apply knowledge of mathematics, science, and
         engineering
      ii. (b) an ability to design and conduct experiments, as well as to analyze
          and interpret data
      iii. (e) an ability to identify, formulate, and solve engineering problems
      iv. (f) an understanding of professional and ethical responsibility
      v. (g) an ability to communicate effectively
      vi. (h) the broad education necessary to understand the impact of
           engineering solutions in a global, economic, environmental, and
           societal context
      vii. (k) an ability to use the techniques, skills, and modern engineering
           tools necessary for engineering practice.

7. Brief list of topics to be covered
a. Introduction to MATLAB
b. Predefined MATLAB functions
c. Plotting in MATLAB
d. Programming in MATLAB
e. Continuous-time (CT) functions
f. Operations on CT functions
g. Characteristics of CT functions
h. Discrete-time (DT) functions
i. Operations on DT functions
j. Characteristics of DT functions
k. Properties of CT systems
l. Properties of DT systems
m. Convolution integral
n. Convolution sum
o. Complex numbers and functions
p. Continuous-time Fourier series
q. Continuous-time Fourier transform
r. Fourier analysis of signals and systems
s. Bode diagrams
t. Impulse sampling and the discrete Fourier transform
u. Laplace transform
Appendix A – Course Syllabi- EE 331

1. Course number and name: EE 331 Electrical Engineering I

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: LCDR Charles Nelson

4. Text book, title, author, and year:
   b. Introduction to Electric Machinery, USNA

5. Specific course information
   a. A study of DC and AC electrical elements and circuits, including Thevenin equivalence, natural and forced responses of first-order systems, AC power, and AC three-phase systems. Amplifiers, diodes and transistors are introduced and drive discussion of applications in power regulation and machine control. AC and DC machines are investigated and discussed in the context of a shipboard environment.
   b. Prereq: Physics II (SP212 or SP222).
   c. Required

6. Specific goals for the course
   a. Apply circuit analysis techniques to solve for voltage, current, and power in linear DC and AC circuits. Analyses including voltage or current dividers, nodal, Thevenin, source transformation, and basic application of Kirchhoff’s voltage and current laws.
   b. Design linear circuits to achieve an intended function.
   c. Understand the operation of, and make basic analysis computations for, circuits containing op amps, transformers, rectifiers, and zener diodes.
   d. Analyze three-phase circuits and be able to calculate voltages, currents, and power.
   e. Analyze DC (linear and permanent magnet) and AC (synchronous) electric machines and predict electrical and mechanical performance.
   f. Demonstrate the ability to properly perform/simulate, record, and report laboratory work.
   g. Understand military applications of course material.

7. Brief list of topics to be covered
   b. Operational Amplifier basics
   c. Linear Machines and DC Motors
   d. Capacitors, Inductors, and RL and RC transient analysis
e. AC Circuit Analysis – Sinusoids, Phasors and Impedance, KCL, KVL, Ohm’s Law, series and parallel, Nodal Analysis, Voltage and Current dividers, and Thevenin
f. Single phase AC Power, Complex Power, Power Factor, and Power Factor Correction
g. Transformer and power distribution basics
h. Three phase sources, circuit analysis and Synchronous Machine basics
i. Diodes, half and full wave rectifier basics, and basic power supply design
Appendix A – Course Syllabi – EE-332

1. Course number and name: EE-332 Electrical Engineering II

2. Credits and contact hours: Credit and 5 Contact Hours

3. Course coordinator’s name: CDR Hartley Postlethwaite

4. Text books, title, author, and year:

5. Specific course information:
   a. This course is a follow-on to EE331, Electrical Engineering I for Systems Engineering majors. In this course, modeling and analysis techniques are applied to electronics. Also introduced in this course are analog and digital modulation and demodulation as well as combinational and sequential digital logic circuits.
   b. Prereq: Electrical Engineering I (EE331).

6. Specific goals for the course:
   a. Students shall develop the ability to understand basic electronic principals. Students shall demonstrate an understanding of basic semiconductor physics, operation amplifiers, and field effect transistors. Students shall have the ability to apply truth tables, Karnaugh maps, and demonstrate understanding of logic design. Students demonstrate understanding of filters, AM, FM, and digital communication concepts.
   b. Student Outcomes Addressed by the course:
      i. (a) an ability to apply knowledge of mathematics, science, and engineering
      ii. (b) an ability to design and conduct experiments, as well as to analyze and interpret data
      iii. (c) an ability to identify, formulate, and solve engineering problems

7. Brief list of topics to be covered:
   a. Diodes
   b. Semiconductor Physics
   c. Bipolar Junction Transistor (BJT) operation, analysis, and models
   d. Operation Amplifiers
   e. Comparators / Schmitt Triggers
   f. Field Effect Transistors (FET)
   g. Logic Gates
   h. Analog vs. Digital
   i. Binary Arithmetic
   j. Boolean Algebra
   k. Karnaugh Maps
   l. Combinatorial Logic Design
   m. Sequential Logic
n. Counters
o. State Machine Design
p. Frequency Response
q. Filters (LPF/HPF/BPF)
r. Amplitude Modulation and Demodulation
s. Superheterodyne Receivers
t. Frequency Modulation
u. Digital Communications
Appendix A – Course Syllabi- EE 334

1. Course number and name: EE 334 Electrical Engineering and IT Systems

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: Major Christopher B. Mayer

4. Text book, title, author, and year:
   b. Additional Internal Supplements: The course uses three home-grown supplemental texts and/or note packets. Supplemental Text #1 covers AM, super heterodyne receivers, noise, digital communications, and networking. Supplemental text #2 is a guide to counters and state machines. Supplement #3 focuses on analog-to-digital and digital-to-analog conversion. The supplements can be downloaded from the course’s website at www.usna.edu/ee/ee334.

5. Specific course information
   a. This course is a follow-on to EE331, Electrical Engineering I. In this course, modeling and analysis techniques are applied to electronic communication systems including both analog and digital modulation/demodulation techniques. Also in the course, students design and analyze combinational and sequential digital logic circuits. An in-depth study of computer networking is included with specific emphasis on the OSI model and wireless systems.
   b. Prereq: EE331.
   c. Required for all Cat I students other than Electrical and Computer Engineering majors.

6. Specific goals for the course
   a. Students shall be able to…
      i. Be able to read and manipulate Boolean equations, construct a minimum SOP equation subject to design constraints, and create state machine for a specified design problem.
      ii. Convert from binary to decimal and back and perform binary addition and subtraction.
      iii. Design a passive filter using basic components, apply the filter to a time domain signal and derive the transfer function.
      iv. Demonstrate an understanding at a block diagram level of an AM Super heterodyne receiver and trace a signal through the receiver in the frequency domain.
      v. Construct and successfully troubleshoot a working AM radio using common test equipment.
      vi. Design an analog-to-digital and digital-to-analog converter.
      vii. Demonstrate how information is transferred from one computer to another, using networking protocols.
b. Eight of the eleven ABET Outcomes are addressed by the course. The missing Outcomes are #s 4, 6, and 9. The Outcomes addressed by the course are…
   i. a. an ability to apply knowledge of mathematics, science, and engineering
   ii. b. an ability to design and conduct experiments, as well as to analyze and interpret data
   iii. c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
   iv. e. an ability to identify, formulate, and solve engineering problems
   v. f. an ability to communicate effectively
   vi. h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
   vii. j. a knowledge of contemporary issues
   viii. k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

7. Brief list of topics to be covered
   a. Gain, Attenuation, and Decibels
   b. Noise
   c. Fourier, Frequencies, and Time
   d. Passive Filters (Low-pass, High-pass, Band-pass, and Notch-pass)
   e. Amplitude Modulation and Demodulation
   f. AM Power
   g. AM Frequency Division Multiplexing
   h. Superheterodyne Receivers
   i. Binary Numbers and Arithmetic
   j. MOSFET Transistors and Logic Circuits
   k. Boolean Logic
   l. Boolean Algebra
   m. Logic Design Using Karnaugh Maps
   n. Sequential Logic and Counters
   o. State Machine Design
   p. Digital-to-Analog Conversion and Analog-to-Digital Conversion
   q. Digital Signal Modulation
   r. Communication Channel Capacity
   s. Wideband Modulation
   t. Error Detection and Correction of Digital Signals (incl. Hamming Codes)
   u. Internet Hardware and Basics of Operations and Addressing
   v. Network Subnetting
   w. Network Security
   x. Internet Operations (DNR services, significance of ports, URL composition, etc.)
Appendix A – Course Syllabi- EE 342

1. Course number and name: EE 342 Electronics II

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: AssocProf Louiza Sellami

4. Text book, title, author, and year:
   b. Additional Internal Supplements
      i. None

5. Specific course information
   a. BJT and MOSFET amplifiers are studied. This includes the analysis of
differential amplifiers, current mirrors, multistage amplifiers, feedback amplifiers,
power amplifiers, and integrated circuit amplifiers. Feedback and frequency
analysis of amplifiers is emphasized. Applications include active filters and
oscillators.
b. Prereq: EE241 or approval of department chair.
c. Required or Elective
   Elective

6. Specific goals for the course
   a. Outcomes of instruction: Students shall be able to:
      i. Analyze BJT and MOSFET differential amplifiers as well as current
         mirror circuits.
      ii. Analyze cascode configuration and understand its advantages with respect
to CE/CB cascade.
      iii. Compute voltage and current gain, input and output resistances in
multistage amplifiers.
      iv. Sketch a bode plot for 1st, 2nd, 3rd and 4th order transfer functions.
      v. Perform a frequency response analysis of BJT and MOSFET single state
amplifiers.
      vi. Analyze BJT series-shunt, series-series, shunt-shunt, and shunt-series
amplifiers in the midband.
      vii. Perform circuit implementations and analysis of class A, class B, and
Class AB power amplifiers.
      viii. Perform DC and small signal and frequency response analysis of the three
stages of the 741-Op Amp.
      ix. Understand, analyze, and design 1st and 2nd order passive and active low
pass, high pass, bandpass, and bandreject filters.
      x. Understand, analyze, and design Wien bridge, phase shift, quadrature, LC
and crystal oscillators.
      xi. Understand and analyze comparators, Schmidt Trigger, astable,
monostable, and bistable multivibrators.
xii. Demonstrate the ability to design, build, prototype, test, debug and troubleshoot a variety of electronics circuits in a laboratory environment.

xiii. Develop appropriate design equations for circuits as part of the design process.

xiv. Demonstrate the ability to properly record and report laboratory work.

b. EE342 addresses student outcomes c, e, and k.

7. Brief list of topics to be covered
   
   a. Electronics Review
   b. BJT Differential Pair
   c. BJT Differential Amplifier Analysis
   d. BJT IC Biasing
   e. Differential Amplifier and Active Load
   f. Multistage Amplifiers
   g. MOS Differential Amplifier Analysis
   h. Frequency Response/Bode Plots
   i. Amplifier Transfer Function
   j. Low Frequency Response
   k. High Frequency Response
   l. Feedback Amplifiers
   m. 13. Class A, Class B, Class AB Amplifiers
   n. 741 OP-AMP Analysis
   o. Filter Functions
   p. 16. 1st & 2nd Order Passive Filters
   q. KHN and Tow-Thomas filters
   r. 2nd Order Biquad Filters
   s. Sinusoidal Oscillators
   t. LC and crystal Oscillators: Analysis and design
   u. Multivibrators
Appendix A – Course Syllabi – EE-344

1. Course number and name: EE-344 Solid-State Power Electronics

2. Credits and contact hours: 4 Credits and 5 Contact Hours

3. Course coordinator’s name: Dr. John G. Ciezki

4. Text books, title, author, and year:
   a. Power Electronics, Mohan, 3rd Ed.
   b. Additional supplements as posted on course website

5. Specific course information:
   a. The course covers aspects of the analysis, simulation, design, control, and prototyping of power electronic circuits, with an emphasis on industrial and Department of Defense applications. Topical coverage includes rectifiers, dc-dc converters, dc-ac inverters, motor drives, semiconductor device characteristics, and practical issues such as snubbers, drivers, and heat dissipation. Design through mathematical modeling and simulation, followed by implementation and testing, is emphasized.
   b. Prereq: Electronics I (EE241).

6. Specific goals for the course:
   a. Students shall develop the ability to analyze, simulate, design, control, prototype, implement, and test a variety of power electronic circuits including rectifiers, dc-dc converters, and inverters.
   b. Student Outcomes Addressed by the course:
      ABET Student Outcomes; a, b, c, e, i, j, and k are addressed by the following course objectives:
      i. Design power electronic circuits and evaluate their performance utilizing computer simulation tools.
      ii. Build and test prototype circuit boards that implement power electronic converters.
      iii. Demonstrate an understanding of device characteristics (as detailed on manufacturer’s datasheets) and the selection process for circuit application.
      iv. Derive and use governing equations that describe circuit operation and performance.
      v. Work in a team setting to accomplish engineering tasks.
      vi. Demonstrate an understanding of the future growth and opportunities for research and development in power electronics, with particular emphasis on military platforms.

7. Brief list of topics to be covered:
   a. Power Semiconductor Switches: Diodes and Thyristors; Heat Sinks
   b. Power Semiconductor Switches: BJT’s, MOSFET’s, GTO’s, IGBT’s
c. AC-to-DC Conversion: half-wave rectifier with RL-load; input current distortion
d. AC-to-DC Conversion: half-wave rectifier with RL-load and non-ideal diode model
e. AC-to-DC Conversion: half-wave rectifier with RL + Voltage Source load; Controlled halfwave rectifier, gating an SCR ON
f. AC-to-DC Conversion: full-wave bridge rectifier with RL + Voltage Source load (continuous current operation)
g. AC-to-DC Conversion: full-wave bridge rectifier with RL + Voltage Source load (discontinuous current)
h. AC-to-DC Conversion: full-wave bridge rectifier with LC filter and commutation delay
i. AC-to-DC Conversion: full-wave bridge rectifier LC filter design
j. AC-to-DC Conversion: three-phase rectifier
k. AC-to-DC Conversion: three-phase rectifier with phase control
l. AC-to-DC Conversion: three-phase rectifier LC output filtering; 12-pulse rectifiers
m. DC-to-DC Conversion: Buck chopper waveforms, Lcrit and Cmin determination
n. DC-to-DC Conversion: Buck chopper effects of non-ideal components
o. DC-to-DC Conversion: Buck chopper inductor design
p. DC-to-DC Conversion: Buck chopper capacitor selection and high-side driver selection
q. DC-to-DC Conversion: Buck chopper switch and diode selection
r. DC-to-DC Conversion: Buck chopper design example
s. DC-to-DC Conversion: Buck chopper state space averaging and closed-loop control
t. DC-to-DC Conversion: Buck chopper input filtering
u. Current-Mode Control
v. Power Converter Layout
w. DC-to-DC Conversion: Boost Converter waveforms, Lcrit and Cmin determination
x. DC-to-DC Conversion: Boost Converter nonideal components, low-side driver
y. Isolated DC-to-DC Conversion: Flyback converter operation
z. Isolated DC-to-DC Conversion: Flyback converter Lcrit and Cmin determination
aa. Flyback Converter Transformer Design and Implementation
bb. Isolated DC-to-DC Conversion: Full-Bridge converter waveforms and design relations
cc. High-Frequency transformer design
dd. Snubber Design
e. DC-to-AC Conversion: H-Bridge square-wave mode
ff. DC-to-AC Conversion: H-Bridge square-wave mode example, sine-triangle pulse-width modulation
gg. DC-to-AC Conversion: H-Bridge STPWM inverter losses
hh. DC-to-AC Conversion: three-phase inverter, sixstep mode
ii. DC-to-AC Conversion: three-phase inverter STPWM
jj. Three-phase induction motors
kk. Three-phase induction motor control
II. Electric Vehicle Example
Appendix A – Course Syllabi- EE 354

1. Course number and name: EE 354 Modern Communication Systems

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: AscProf Christopher Anderson

4. Text book, title, author, and year:

5. Specific course information
   a. An introduction to communication systems that focuses on the analysis and design of analog and digital communication systems. Topics include power and energy spectral density, quantization of analog signals, line coding, basic modulation techniques, and transmitter and receiver design concepts. Modulation techniques will be analyzed both on the basis of spectral characteristics and performance in AWGN. Application of these techniques to practical communication systems will be presented.
   b. Prereq: EE322 or approval of department chair.
   c. Required for all EE/CE majors

6. Specific goals for the course
   a. Compute the Fourier transform and the energy/power spectral density of communications signals.
   b. Analyze the components of baseband signaling in the time and frequency domain, using pulse code modulation (PCM) and time division multiplexing (TDM).
   c. Calculate the bandwidth and signal-to-noise ratio of a signal at the output of a linear time-invariant system given the signal and the power spectral density of the noise at the input of the system.
   d. Evaluate the operation of amplitude and angle modulation systems (both analog and digital) in both the time and frequency domains including plotting the magnitude spectra and computing the power and bandwidth requirements of each type of signal.
   e. Analyze the performance of a digital communication link in terms of the signal-to-noise ratio and bit error rate in the presence of additive white Gaussian noise.
   f. Demonstrate the ability to use MATLAB to design and simulate communication signals and systems.

7. Brief list of topics to be covered
   a. Bandwidth and Energy Spectral Density
   b. Sampling and Analog-to-Digital Conversion
   c. Double Sideband Amplitude Modulation
   d. Single Sideband Amplitude Modulation
   e. Software-Defined Radio AM Demodulation
f. Performance of AM in Noise  
g. Superheterodyne Receivers  
h. Angle Modulation: Frequency and Phase  
i. Wideband FM/PM  
j. Spectral Characteristics of Angle Modulation  
k. Performance of FM in Noise  
l. Baseband Signal Transmission and Line Codes  
m. Performance of Baseband Signals in Noise  
n. Simple Digital Bandpass Modulation: OOK/FSK/PSK  
o. Signal Space Representation of Digital Bandpass Modulation  
p. M-Ary Digital Bandpass Modulation  
q. Matched Filter Receiver Architecture  
r. Performance of Digital Modulation in Noise
Appendix A – Course Syllabi – EE-372

1. Course number and name: EE-372

2. Credits and contact hours: 4 Credits and 5 Contact Hours

3. Course coordinator’s name: Associate Professor Deborah Mechtel

4. Text books, title, author, and year:

5. Specific course information:
   a. Basic transmission line theory is introduced with high-frequency circuit design applications. Maxwell’s equations are formulated and applied to dynamic electromagnetic problems. Laboratory work includes microwave circuit design, simulation, fabrication and test, as well as investigations of optical systems and antenna operation.
   b. Prereq: SP212 –General Physics II or SP222 – Electricity and Magnetism
   c. Required EE majors, Elective CE majors

6. Specific goals for the course:
   a. Students will understand Maxwell’s equations to the point where waveguide, optical fibers and antennas could be addressed
   b. Student Outcomes Addressed by the course:
      i. (a) An ability to apply fundamental principles of mathematics, science, and engineering
      ii. (b) An ability to design and conduct scientific and engineering experiments and conduct software simulations, as well as to analyze and interpret data
      iii. (c) An ability to design a system, component, or process to meet desired needs. This includes problem definition, specification, design, implementation, test and operation of systems, components, and/or processes within performance and resource constraints
      iv. (e) An ability to identify, formulate, and solve practical electrical engineering problems
      v. (g) An ability to communicate effectively, both verbally and in writing
      vi. (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

7. Brief list of topics to be covered:
   a. Mathematics of wave motion
   b. Lumped element transmission line model
   c. Smith Chart
d. Multivariable calculus review
e. Electrostatics
f. Magnetostatics
g. Faraday’s law
h. Displacement current
i. Maxwell’s Equations
j. Free Space Propagation, Power
k. Reflection and Transmission
l. Antennas
Appendix A – Course Syllabi- EE 411

1. Course number and name: EE 411 Electrical and Computer Engineering Design I

2. Credits and contact hours: 3 Credit Hours and 4 Contact Hours

3. Course coordinator’s name: AscProf Samara Firebaugh

4. Text book, title, author, and year:

5. Specific course information
   a. A series of design problems are presented to take the student through the total design process from specification to verification of performance. In addition to technical design, factors such as safety, economics, and ethical and societal implications are considered. A small project is executed and evaluated. Each student chooses a capstone project and develops and submits a proposed design to be completed in EE414 (for electrical engineers) or EE415 (for computer engineers). The proposal is presented to the student's peers and project advisors in lieu of a final exam.
   b. Prereq: 1/C standing in EEE major or ECE major or approval of department chair.
   c. Required

6. Specific goals for the course
   a. To review and connect the concepts covered throughout the electrical and computer engineering curriculum.
   b. To provide the student with practice in the design, implementation, analysis, and verification of performance of electrical engineering projects in a realistic project development laboratory situation.
   c. To develop important professional skills including technical writing ability and presentation skills.
   d. To develop an understanding of engineering ethics and the ability to consider technical issues in their global context.
   e. To lay the foundation for the project that will be completed in EE414 or EE415.

7. Brief list of topics to be covered
   a. The design process.
   b. Formal methods for problem definition.
   c. Objective trees and metrics.
   d. Use of technical literature databases and other library resources.
   e. Functional decomposition.
   f. Engineering requirement formulation.
g. Generating and evaluating design alternatives.
h. Morphology and Pugh charts.
i. Technical writing.
j. Communicating with figures.
k. Project management.
l. Engineering ethics.
Appendix A – Course Syllabi- EE 414 and EC415

1. Course number and name: EE 414 Electrical Engineering Design II, EC415 Computer Engineering Design II

2. Credits and contact hours: 2 Credit Hours and 4 Contact Hours

3. Course coordinator’s name: AscProf Samara Firebaugh

4. Text book, title, author, and year:
   a. No textbook

5. Specific course information
   a. This course provides practice in engineering design, development, and prototype testing. Following approval of the project by the instructor, the student develops a prototype, troubleshoots, and gathers performance data, and completes construction and packaging of the final design. A formal briefing to peers and department faculty follows a written final project report on the completed project in lieu of a final exam.
   b. Prereq: EE411 and 1/C EEE (for EE414) or ECE (for EC415) major or approval of department chair.
   c. Required.

6. Specific goals for the course
   a. To review and connect the concepts covered throughout the electrical and computer engineering curriculum.
   b. To provide the student with practice in the design, implementation, analysis, and verification of performance of electrical engineering projects in a realistic project development laboratory situation.
   c. To develop teamwork skills by functioning as part of a technical team.
   d. To develop important professional skills including technical writing ability and presentation skills.
   e. To consider technical issues in their societal context.
   f. To complete the project begun in EE411.

7. Brief list of topics to be covered
   a. Specific topical coverage depends on the project.
   b. The end of term deliverables include:
      i. A project prototype.
      ii. A project video spot (an advertisement for the product)
      iii. A final presentation before the faculty and other majors.
      iv. A technical poster for the poster session which is held at lunchtime of our conference day.
      v. A final report.
Appendix A – Course Syllabi – EE-420

1. Course number and name: EE-420 Electric Machines and Drives
2. Credits and contact hours: 4 Credits and 5 Contact Hours
3. Course coordinator’s name: Dr. John G. Ciezki
4. Text books, title, author, and year:
   a. Electric Machinery, Fitzgerald, 6th Ed.
   b. Additional supplements as posted on course website
5. Specific course information:
   a. The course includes an introduction to magnetic circuits and electromechanical energy conversion principles. Building on these topics, the basic operation, analysis, modeling and design of transformers, dc machines, induction machines, and synchronous machines is then presented. The simulation and power electronic control of dc and ac machines are considered. The output waveforms of a synchronous machine/three-phase rectifier, as part of a dc distribution system, are investigated. The course utilizes both simulation exercises and extensive laboratory hardware exercises to reinforce theory and validate derived models.
   b. Prereq: Introduction to Electrical Engineering II (EE320).
6. Specific goals for the course:
   a. Students shall demonstrate the ability to model, analyze, test, simulate and control electromagnetic components such as transformers, relays, dc machines, induction machines and synchronous machines. Students shall design and execute hardware and software laboratory experiments to assemble, verify and exercise models.
   b. Student Outcomes Addressed by the course:
      ABET Student Outcomes; a, b, c, e, g, and k are addressed by the following course objectives:
      i. Explain the operating principles of transformers, relays, and dc/induction/synchronous machines.
      ii. Analyze and derive machinery models using magnetic equivalent circuit concepts.
      iii. Solve steady-state machinery problems using equivalent circuits, torque and power relationships.
      iv. Execute hardware laboratory experiments to characterize machinery performance and determine model parameters.
      v. Design and execute digital SIMULINK simulations of machinery, power converters, and control systems.
      vi. Explain the operation and control of dc and ac machine power converters.
      vii. Analyze, design and characterize the operation of dc and ac machine speed control systems.
viii. Use MATLAB to graphically document laboratory work and solve more complicated steady-state problems.

7. Brief list of topics to be covered:
   a. Magnetic Equivalent Circuit Concepts: flux, flux density, field intensity, Ampere’s law, mmf, permeability, reluctance
   b. Flux Linkage, Inductance, Faraday’s Law, and Energy
   c. Properties of Ferromagnetic Materials: Domain Wall Motion, Hysteresis, Eddy-Currents, Magnetization
   d. Permanent Magnet Materials: Stabilization, Demagnetization, Shear Line, and Sizing
   e. Transformers: Core and Shell Type, Magnetic Equivalent Circuit Analysis, Change of Variables
   f. Transformers: T-equivalent Circuit, Design Equation, Parameter Determination
   g. Transformers: Coupling to Secondary-side Circuits, per unit; transformer design
   h. Energy Conversion and Electromagnet Analysis
   i. Electromagnet Design MMF of Distributed Windings: pitch and distribution factors
   j. Rotating Machine Concepts and Overview
   k. MMF of Distributed windings: pitch and distribution factors
   l. Rotating MMF in AC Machines (single and three phase)
   m. P-Pole Machine MMFs and Generated Voltages
   n. Torque in Round Rotor AC Machines; Sizing Equation
   o. Synchronous Machine Per-Phase Equivalent Circuit, Torque Angle Characteristic
   p. Measuring Synchronous Generator Parameters
   q. Synchronous Machine Characterization
   r. Synchronous Machines Operating in Systems
   s. Synchronous Machine Torque and Terminal Characteristics
   u. Synchronous Machine Design
   v. Induction Machine Principles
   w. Induction Machine Equivalent Circuit
   x. Induction Machine Torque versus Speed Characteristic
   y. Impact of Rotor Design on Torque Versus Speed Characteristics
   z. Induction Machine Nameplate Information
   aa. Induction Machine Parameter Determination
   bb. Induction Machine Variable Frequency Control
   cc. Three-Phase Voltage Inverters: 6-step and STPWM
   dd. Induction Machine Speed Control
   ee. Synchronous Machine Variable Speed Control
   ff. DC Machine Equivalent Circuit and Winding Schemes
   gg. DC Machine Commutation
   hh. Shunt-Connected DC Machines
   ii. Series-Connected DC Machines and Permanent Magnet DC Machines
   jj. Self-Excited Shunt-Connected DC Generators
kk. PM DC Machine Chopper Control
Appendix A – Course Syllabi- EE 426

1. Course number and name: EE 426 Fundamentals of Electronic Instrumentation

2. Credits and contact hours: 3 Credit Hours and 4 Contact Hours

3. Course coordinator’s name: AscProf Samara Firebaugh

4. Text book, title, author, and year:

5. Specific course information
   a. A practical introduction to the design of electronic instrumentation. Common to all instruments is input from the physical world. Many instruments also entail control of external devices. Students examine a wide range of sensors and actuators. Labs support a broad study of the major components of electronic instrumentation systems: sensors, data acquisition, signal conditioning, computer control, and actuators.
   b. Prereq: EE302 or EE332.
   c. Elective.

6. Specific goals for the course
   a. Define the figures of merit for a measurement system.
   b. Describe sources of noise in measurement systems and methods for noise reduction.
   c. Describe microfabrication techniques, and how they are used to manufacture a variety of transducers.
   d. Describe common transducers for a variety of phenomena and physical properties, including temperature, translation, velocity, angular acceleration, flow rate, pressure, sound, force, illumination and chemical composition.
   e. Evaluate various sensor systems and make appropriate calculations to determine their performance.
   f. Develop design equations for a measurement system.
   g. Integrate a variety of transducers with a data acquisition system that utilizes LabVIEW.
   h. Design, test and evaluate an instrumentation system and make suggestions for improvement.
   i. Communicate his or her work using appropriate technical writing format and including proper citations to previous work.

7. Brief list of topics to be covered
   a. Static characteristics of measurement system elements.
   b. Accuracy of measurement system elements – measurement error and error reduction techniques.
   c. Dynamic characteristics of measurement systems.
d. Loading effects and general two-port networks, including circuit analogies for mechanical and acoustic systems.
e. Signals and noise in measurement systems.
f. Sensing elements – resistive, capacitive, inductive, electromagnetic, thermoelectric, elastic, piezoelectric, piezoresistive, electrochemical, hall-effect.
g. Signal conditioning circuitry.
h. A/D conversion and software.
i. Data presentation elements.
j. Flow measurement systems.
k. Optical measurement systems.
l. Ultrasonic measurement systems.
m. Microfabrication technology applied to instrumentation systems.
n. Biomedical instrumentation.
Appendix A – Course Syllabi – EE-432

1. Course number and name: EE-432, Digital Signal Processing

2. Credits and contact hours: 4 Credits and 5 Contact Hours

3. Course coordinator’s name: Dr. Robert Ives

4. Text books, title, author, and year:
   b. Digital Signal Processing using MATLAB by Etter & Ives (Draft Textbook)
   c. Introduction to MATLAB 7 by Etter et al.
   d. Additional Internal Supplements

5. Specific course information:
   a. Digital signal processing principles are studied and applied to modern radar,
      sonar, and communication systems. The DFT is introduced, its properties are
      explored and the FFT algorithm is developed. Discrete correlation, convolution,
      spectral analysis, matched filter detection problems, complex demodulation
      techniques, the Z transform, and stability of discrete systems are explored.
      Properties of FIR and IIR digital filters are studied. Digital filters are designed
      and applied to random and deterministic signals.
   b. Prereq: EE322 or EE332 or approval of department chair.
   c. Elective

6. Specific goals for the course:
   a. The students shall be able to: explain the relationship between sampling and
      aliasing, and give Shannon's limit for correct sampling of an analog signal;
      analyze a given digital signal and determine whether it is stationary or non-
      stationary in order to choose the correct techniques for analysis; use
      MATLAB to determine the frequency content of a digital signal and to
      compute common metrics of a signal such as mean, standard deviation,
      variance, and power; define, compute, and give uses for the autocorrelation
      function for a given digital signal; demonstrate the various ways to define a
      digital (FIR and IIR) filter - transfer function, impulse response, poles/zeros,
      block diagrams, filter coefficients, z-transform; use MATLAB to design and
      apply a digital filter to simulated data and to data collected in the lab; discuss
      ways in which digital filters are used in commercial and military systems..
   b. Student Outcomes Addressed by the course:
      i. (a) an ability to apply knowledge of mathematics, science, and engineering
      ii. (b) an ability to design and conduct experiments, as well as to analyze and
          interpret data
      iii. (c) an ability to design a system, component or process to meet desired
          needs. This includes problem definition, specification, design,
implementation, test and operation of systems, components, and/or processes within performance and resource constraints
iv. (e) an ability to identify, formulate, and solve practical electrical engineering problems
v. (g) an ability communicate effectively, both verbally and in writing
vi. (i) a recognition of the need to continually update their knowledge and skills, and an ability to engage in life-long learning
vii. (j) a knowledge of contemporary issues
viii. (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

7. Brief list of topics to be covered:
   a. Analog-to-digital and digital-to-analog conversion
   b. Difference equations and filtering
   c. Convolution and correlation
   d. Sampling
   e. Z-transforms
   f. Discrete-time Fourier transform/discrete Fourier transform
   g. Finite impulse response/infinite impulse response filters
   h. Filter design
Appendix A – Course Syllabi- EE 433

1. Course number and name: EE 433 Wireless and Cellular Communications Systems I

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: AsstProf Christopher Anderson

4. Text book, title, author, and year:

5. Specific course information
   a. An in-depth study of wireless and cellular systems. This study includes system design, mobile radio propagation (large-scale path loss, small-scale fading, and multipath), and modulation techniques for mobile radio. A working knowledge of the characteristics of the three major cellular/PCS systems in use in the U.S. today is also developed. Technical discussions of recent topics/publications related to the course material are also conducted. Laboratory experiments emphasize indoor and outdoor RF propagation measurements. A final project is required in lieu of a final examination.
   b. Prereq: EE354 or approval of department chair.
   c. Elective.

6. Specific goals for the course
   a. Understand the basic structure of a wireless or cellular communication system.
   b. Apply cellular traffic design principles and understand their impact on system traffic.
   c. Understand the various multiple-access schemes as they apply to wireless systems.
   d. Understand large-scale propagation characteristics of the wireless channel.
   e. Understand small-scale propagation and fading mitigation for wireless systems.
   f. Complete an individual or small team investigation of an open-ended problem.
   g. Present the results of an individual or small team investigation both orally and via written reports.

7. Brief list of topics to be covered
   a. Gain, dB, Noise, and Noise Figure
   b. Multiple Access Techniques: Time, Frequency, Code
   c. Cellular Planning and Frequency Reuse
   d. Major Cellular Standards
   e. Interference and System Capacity
   f. Trunking and Grade of Service: Voice and Data
   g. Coverage and Capacity in Cellular Systems
   h. Free-Space Radiowave Propagation
   i. Two-Ray Propagation Model
   j. Knife-Edge Diffraction
k. Scattering, Shadowing, and Log-Normal Propagation
l. Link Budgets
m. Indoor Propagation Models
n. Temporal Parameters of Multipath Channels
o. Spatial Parameters of Multipath Channels
p. Small-Signal Fading: Rayleigh and Ricean
Appendix A – Course Syllabi- EE 434

1. Course number and name: EE 434 Wireless and Cellular Communications Systems II

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: Prof. Sarkady

4. Text book, title, author, and year:
   a. Modern Wireless Communications, Haykin & Mohr, 2004
   b. Additional Internal Supplements

5. Specific course information
   a. A continuation of the in-depth study of wireless and cellular systems. This study includes modulation techniques for mobile radio, equalization, diversity, and channel coding. Small group research projects are conducted in lieu of a final examination.
   b. Prereq: EE433 or approval of department chair.
   c. Elective.

6. Specific goals for the course
   a. Student Goals
      i. Student shall develop ability to apply probabilistic concepts to compute error rates as a function of signal to noise ratio in wireless PCM systems and networks.
      ii. Student shall develop ability to apply Fourier transform concepts to compute bandwidth requirements for wireless communication systems and network using various types of modulation techniques.
      iii. Student shall develop ability to compute the information content of a message.
      iv. Student shall acquire a thorough understanding of modern analog, digital modulation techniques.
      v. Student shall acquire a thorough understanding of spreading codes and detection techniques.
      vi. Be able to design a Matched Filter to “capture” a PCM code sequence hidden in additive Gaussian noise.
      vii. Be able to assess and characterize the performance of a Direct Sequence and Frequency-Hopping type Spread Spectrum wireless communication systems.
      viii. Be able to understand the IEE802.11a (OFDM) and IEE802.15.1 (Bluetooth) wireless communication standards.
      ix. Be able to configure a full-duplex wireless communication link using the XECOM XE900SL10 Wireless Kit and successfully encode, transmit, receive and decode a discrete voice message in a noisy environment (mini lab project).
b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
   
   viii. (a) an ability to apply knowledge of mathematics, science, and engineering
   
   ix. (b) an ability to design and conduct experiments, as well as to analyze and interpret data
   
   x. (e) an ability to identify, formulate, and solve engineering problems
   
   xi. (f) an understanding of professional and ethical responsibility
   
   xii. (g) an ability to communicate effectively
   
   xiii. (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
   
   xiv. (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

7. Brief list of topics to be covered

a. Axioms of probability
b. Bay’s theorem
c. Bernoulli trials
d. Random Variable, pdf, CDF
e. Binomial, Gaussian random variables
f. Statistical moments, Entropy, Information content of a message
g. Channel Capacity, Hartley-Shannon theorem
h. Central Limit theorem, Statistical Correlation, Coherence Function
i. Introduction to a random process, Ergodic processes
j. Error rate computation in PCM communication Systems
k. Error rate computation in cascaded systems
l. Introduction to discrete and continuous time-series analysis
m. Autocorrelation and cross-correlation functions, Power Spectrum and Cross-Spectrum
n. DFT and IDFT, FFT and IFFT
o. Convolution and correlation computations with the FFT
p. Matched Filter design and the select-saving algorithm
q. Introduction to Linear and nonlinear Modulation processes
r. Amplitude Modulation DSB-LC, DSB-SC, SSB
s. Angle Modulation, PM, FM (narrow and wideband FM)
t. OOK, PSK, FSK Modulation/Demodulation
u. Hilbert Transform and the Complex Analytic Signal
v. Signal-Space Rep., QAM, Binary Frequency-Shift Keying, Phase Trellis
w. Orthogonal signals, Walsh-Hadamard sequences
x. Properties of maximum length sequences, PN codes and Gold Codes
y. Direct Sequence Spear Spectrum Modulation/Demodulation and CDMA
z. Fast and Slow Frequency-Hopping Spread Spectrum Modulation/Demodulation
aa. The 802.11a and 802.15.1 (Bluetooth) wireless standards.
Appendix A – Course Syllabi – EE-435

1. Course number and name: EE-435, Biometric Signal Processing

2. Credits and contact hours: 4 Credits and 5 Contact Hours

3. Course coordinator’s name: Dr. Robert Ives

4. Text books, title, author, and year:
   c. Additional Internal Supplements

5. Specific course information:
   a. Digital signal processing methods for multi-dimensional signals are studied and applied to biometric signals (primarily face, fingerprint and iris images or video) for use in determining an individual’s identity. Digital image processing in the spatial and frequency domains, in conjunction with pattern recognition techniques, are developed and tested. The students have the opportunity to work hands-on with state-of-the art commercial systems that perform biometric recognition, and become familiar with issues that surround the collection and use of biometric data (such as privacy).
   b. Prereq: EE432 or approval of department chair.
   c. Elective

6. Specific goals for the course:
   a. Students shall be able to: apply image processing techniques to digital imagery using MATLAB and C/C++; state the privacy, policy, and legal issues associated with the use of biometrics; describe techniques for fingerprint, iris and facial recognition; describe the processes of biometric enrollment, identification and verification; use commercial biometric systems for enrollment, identification and verification; using MATLAB, develop algorithms that will use fingerprint, iris and/or facial imagery for identification or verification; and present the results of their research both orally and written.
   b. Student Outcomes Addressed by the course:
      i. (a) an ability to apply knowledge of mathematics, science, and engineering
      ii. (b) an ability to design and conduct experiments, as well as to analyze and interpret data
      iii. (c) an ability to design a system, component or process to meet desired needs. This includes problem definition, specification, design, implementation, test and operation of systems, components, and/or processes within performance and resource constraints
iv. (e) an ability to identify, formulate, and solve practical electrical engineering problems
v. (g) an ability communicate effectively, both verbally and in writing
vi. (i) a recognition of the need to continually update their knowledge and skills, and an ability to engage in life-long learning
vii. (j) a knowledge of contemporary issues
viii. (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

7. Brief list of topics to be covered:
   a. Image processing techniques
   b. Introductory pattern recognition
   c. Face recognition
   d. Iris recognition
   e. Fingerprint recognition
   f. Other biometrics
   g. System performance
   h. Societal impact of biometrics: policy/privacy/current uses
Appendix A – Course Syllabi- EE 451

1. Course number and name: EE 451 Electronic Properties of Semiconductors

2. Credits and contact hours: 3 Credit Hours and 3 Contact Hours

3. Course coordinator’s name: AscProf Samara Firebaugh

4. Text book, title, author, and year:
   a. An Introduction to Semiconductor Devices, Donald Neamen, 2006

5. Specific course information
   a. This course develops an understanding of semiconductor properties and how they determine the performance of semiconductor devices. Hole and electron conduction and charge carrier distribution models are developed. Charge carrier generation and recombination and carrier dynamics leading to drift and diffusion are used to study semiconductor transport phenomena. The p-n junction, bipolar junction transistor, and field-effect transistor are studied in detail.
   b. Prereq: Physics II (SP212 or SP222) or EE241 or approval of department chair.
   c. Elective.

6. Specific goals for the course
   a. Demonstrate an understanding of basic principles of quantum mechanics and solid state physics, and relate these principles to semiconductor band structure and carrier concentration.
   b. Demonstrate an understanding of charge transport, and carrier generation and recombination processes in both equilibrium and non-equilibrium conditions.
   c. Describe the band structure, charge distribution and electric field and potential distribution for semiconductor devices in both equilibrium and non-equilibrium conditions, and relate these internal characteristics to externally measurable properties such as current or capacitance.
   d. Relate device parameters such as material choice, doping levels and dimensions to device performance, such as current-voltage relationship, including non-ideal effects.
   e. Design a semiconductor device such as a diode or transistor to meet a set of desired specifications.
   f. Identify critical issues for semiconductor devices and describe current trends in the semiconductor industry.

7. Brief list of topics to be covered
   a. Crystal structure of solids.
   b. Basic principles of solid state physics: energy quantization, wave functions, density of states, statistical mechanics, energy band theory.
   c. Semiconductors in equilibrium
d. Carrier transport and excess carrier phenomena.
e. The pn junction and metal-semiconductor interface
g. MOSFET scaling and non-ideal effects.
h. Nonequilibrium excess carriers in semiconductors.
i. The pn junction and schottky diode current-voltage characteristic.
j. Bipolar transistor operation.
k. Optical devices.
Appendix A – Course Syllabi- EE 452

1. Course number and name: EE 452 Semiconductor Electronics

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: AscProf Samara Firebaugh

4. Text book, title, author, and year:
   a. An Introduction to Semiconductor Devices, Donald Neamen, 2006
   c. Supplemental technical articles

5. Specific course information
   a. This course continues on the foundations developed in EE451 for discrete semiconductor devices. This course will focus computer-aided device design and simulation. Solar cells, light-emitting diodes, microfabrication techniques, and microelectromechanical systems (MEMS) are also introduced. The laboratory involves an individual student research project.
   b. Prereq: EE451 or approval of department chair.
   c. Elective.

6. Specific goals for the course
   a. Describe the field of microsystems and its largest contributions to military and civilian life.
   b. Describe standard microfabrication techniques.
   c. Describe common actuation and sensing methods in microsystems.
   d. Calculate expected electrical and mechanical parameters for microfabricated sensors and actuators given geometry and material property information.
   e. Analyze a given microsystem to explain its operation mechanism and how it is manufactured.
   f. Determine a process sequence using standard microfabrication techniques that will result in a desired device design.
   g. Design, layout and simulate a device using MEMSPro CAD software.
   h. Apply microfabrication techniques in the laboratory
   i. Test and evaluate a microsystem design and make suggestions for improvement
   j. Communicate his or her work using appropriate technical writing format and including proper citations to previous work.

7. Brief list of topics to be covered
   a. Microfabrication technology: the CMOS process, surface micromachining, bulk micromachining, polymer and glass processing.
   b. Review of electrical and mechanical physics concepts: conductivity in semiconductors, mechanics of solids, resonance
   c. Electrostatic sensing and actuation
d. Thermal sensing and actuation
e. Piezoresistive sensors
f. Piezoelectric sensing and actuation
g. Magnetic actuation
h. Microfluidic devices.
i. Optical devices
Appendix A – Course Syllabi- EE 472

1. Course number and name: EE 472  Fiber Optical Communications

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: AscProf R. Brian Jenkins

4. Text book, title, author, and year:
   a. Fiber Optic Communications, Joseph Palais, 2005
   b. Supplements: Projects in Fiber Optics, Newport Corp., Fiber Optic Test and Measurement, by Dennis Derickson

5. Specific course information
   a. An introduction to the nature of optical waveguides and fiber optical communications systems. Fiber propagation modes, dispersion and attenuation are studied. Lightwave transmitters and receivers, optical amplifiers, and components for wavelength division multiplexing are discussed, and a complete optical communication network is analyzed.
   b. Prereq: EE354 or approval of department chair.
   c. Elective.

6. Specific goals for the course
   a. Specific objectives for course:
      i. Demonstrate a conceptual and practical understanding of the fundamental components of a fiber optic link: light sources, receivers, and the optical fiber.
      ii. Develop a practical perspective on the use of emerging photonic technologies and systems that use optical fiber, such as wavelength-division multiplexing, optical modulators and optical amplifiers, various passive optical components, and all-optical networks.
      iii. Demonstrate the ability to use optical fiber and fiber optic cable in the lab and to use test equipment to analyze a fiber optic communication link.
      iv. Use the computer to numerically model, analyze and design photonic and fiber optic components and systems.
      v. Design a fiber optic communication system and verify its functionality using both theoretical and numerical analysis techniques, considering various design options, components, or budget constraints.
   b. Outcomes 1, 2, 3, 5, 7, 8, 9, 10, 11

7. Brief list of topics to be covered
   a. Optics fundamentals (dispersion, rays, slab waveguides)
   b. Optical fiber (modes, attenuation, dispersion)
   c. Transmitters (LEDs and laser diodes, modulation techniques)
d. Receivers (photodetection, noise, SNR, BER)
e. Network components (directional couplers, wavelength division multiplexing, optical amplifiers)
f. System design
Appendix A – Course Syllabi – EM316

1. Course number and name: Thermo-Fluid Sciences I

2. Credits and contact hours: 3 Credits and 3 Contact Hours

3. Course coordinator’s name: Associate Professor Andrew N. Smith

4. Text book, title, author, and year:

5. Specific course information
   a. A first course in thermal systems that covers incompressible fluid mechanics and heat transfer. Topics in fluid mechanics include properties of fluids, fluid statics, integral conservation equations, differential field analysis, dimensional analysis and similitude, incompressible boundary layers, viscous flow in conduits and flow about immersed bodies. Topics in heat transfer include one-dimensional steady conduction, convection and radiation exchange. Heat transfer emphasis is related to heat exchangers and electronics cooling applications.
   b. Prereq: SC112 Coreq: SM212
   c. Required, division core for engineering majors other than ME

6. Specific goals for the course
   a. Identify open and closed system; and apply conservation of mass and energy to those systems.
   b. Solve hydrostatic problems involving manometers, variation of pressure with depth and hydrostatic forces on planar surfaces.
   c. Apply buoyancy to the determination of hydrostatic forces, righting moments and terminal velocity.
   d. Perform a dimensional analysis using the Buckingham Pi Theorem and use that information to determine the similarity/scaling of experiment results.
   e. Apply Bernoulli’s equation to fluid dynamic problems, and demonstrate an understanding of the applicability Bernoulli’s equation.
   f. Calculate major and minor losses, and use that information in the steady flow energy equation to calculate pressure or pump head.
   g. Solve fluid dynamic problems involving external flow. Calculate drag forces on 2D and 3D bodies. Calculate lift and drag forces on foils.
   h. Solve heat transfer problems that include conduction, convection and radiation. Solve heat transfer problems using the resistor analogy with conduction and convection resistances in Cartesian and cylindrical coordinates.
   i. Calculate convection heat transfer coefficients for internal and external flow based on the flow conditions, geometry and fluid properties.
   j. Analyze heat sinks for electronic cooling applications.
7. Brief list of topics to be covered
   a. Thermal Systems
   b. Fundamental Properties
   c. Properties of Liquid, Solids & Ideal Gases
   d. Conduction, Convection and Radiation
   e. Resistor Analogy
   f. Hydrostatics/Buoyancy
   g. Open System, Conservation of Mass & Momentum
   h. Bernoulli’s Equation
   i. Dimensional Analysis
   j. Internal Flow, Major and Minor Losses
   k. Pump Head
   l. External Flow, Lift and Draft
   m. Convection Heat Transfer
   n. Heat Sinks and Extended Surface Heat Transfer
Appendix A – Course Syllabi – EM317

1. Course number and name: Thermo-Fluid Sciences II

2. Credits and contact hours: 3 Credit Hours and 4 Contact Hours

3. Course coordinator’s name: Associate Professor Andrew N. Smith

4. Text book, title, author, and year:

5. Specific course information
   a. A basic thermodynamics course in which the first and second laws of thermodynamics are studied primarily from the classical macroscopic viewpoint and applied to both closed and open systems. Working substances include perfect gases, real gases and vapors in addition to solids and liquids. Thermodynamic cycles are covered with specific reference to internal combustion engines, gas turbine engines, steam power plants and refrigeration systems. Methods for improving the performance of thermodynamic cycles are discussed including regeneration.
   b. Prereq: EM316 or EM324
   c. Required, engineering for Aerospace engineering majors

6. Specific goals for the course
   a. Apply conservation of mass and the 1st law of thermodynamics to the analysis of closed system including the determination of boundary work.
   b. Apply conservation of mass and the 1st law of thermodynamics to the analysis of open systems including nozzles, diffusers, pumps, turbines, compressors, throttling valve, mixing chambers and heat exchangers.
   c. Determine thermodynamic property information for ideal gases, water and R134a utilizing property tables, property diagrams, ideal gas law and the assumption of constant specific heats.
   d. Apply the effectiveness NTU method to the analysis of heat exchangers.
   e. Understand the 2nd law of thermodynamics and how it relates to the performance and design of heat engines.
   f. Incorporate isentropic efficiencies in the analysis of systems that utilize turbines, pumps, compressors and nozzles.
   g. Analyze heat pumps and refrigeration systems using the vapor-compression refrigeration cycle.
   h. Analyze steam power cycles using the Rankine cycle, including cycle modifications such as reheat and regeneration.
   i. Analyze gas turbine engines using the Brayton cycle, including split shaft gas turbine and aircraft engines.
   j. Analyze internal combustion engines using the Otto and Diesel Cycles.
7. Brief list of topics to be covered
   a. First Law Closed Systems
   b. Properties, Substances, Phases, Ideal Gases, Specific Heats
   c. First Law, Open Systems
   d. Second Law, Open and Closed Systems
   e. Convection Heat Transfer
   f. Heat Exchangers
   g. Internal Combustion Engines
   h. Gas Turbine Engines
   i. Steam Power Plants
   j. Refrigeration
   k. Pressurized Water Reactor
Appendix A – Course Syllabi – EM321

1. Course number and name: _Mechanics and Materials for Aerospace Engineers_

2. Credits and contact hours: 4 Credit Hours and 5 Contact Hours

3. Course coordinator’s name: CAPT Lloyd Brown

4. Text book, title, author, and year:

5. Specific course information
   a. A first course in materials and mechanics. Topics include: Aerospace material properties; treatments; manufacturing and fabrication processes including jointing; design and selection considerations, including durability, reparability, maintainability, corrosion and protective treatments; fatigue and creep phenomena; basic elasticity; simple structural element behavior for rods, beams, shafts and plates. Laboratory work and demonstrations are integrated to show the relevance of the topics and to give practical insight to the behavior of aerospace structural materials and structures.
   b. Prereq: EM211-Statics
   c. Required

6. Specific goals for the course
   a. The student will learn diffusion mechanisms of and be able to calculate associated diffusion parameters given pertinent data and properties.
   b. The student will become familiar with various methods of material property testing.
   c. The student will be able to describe mechanisms and causes of brittle and ductile failure, fast fracture, corrosion and creep.
   d. The student will be able to explain various points on a typical binary phase diagram and use the diagram to calculate phase compositions and mass fractions.
   e. The student will be able to describe microstructure for the microconstituents found in alloys and then relate this microstructure to material properties with a phase diagram and will be able to correlate interatomic bonding to material properties.
   f. The student will gain an understanding of composite materials properties, fabrication and use.
   g. The student will be able to apply the generalized form of Hooke's Law, given material properties and pertinent loading data.
   h. The student will learn how to transform stress and strain components to principal axes and to calculate principal stresses and strains.
i. The student will predict the deformation of axial members and torsional members resulting from standard loadings and stress components resulting from axial and torsional loading.

j. The student will be exposed to error analysis, design loads and factors of safety.

7. Brief list of topics to be covered
   a. Review of Statics
   b. Material Microstructure
   c. Diffusion
   d. Material Defects
   e. Materials testing and laboratory exercises
   f. Material Failure Theories
   g. Phase Diagrams
   h. Composites/polymers
   i. Stress/strain/Hooke’s law
   j. Axial loading and deformation
   k. Torsional loading and deformation
   l. Principle stresses/strains
   m. Pressure Vessels
   n. Failure Criteria
   o. Examinations/quizzes
Appendix A – Course Syllabi - SC111

1. Course number and name: SC111 Foundations of Chemistry

2. Credits and contact hours: Lecture 3; Laboratory 2; Credits 4

3. Coordinator: W. Pearson, Associate Professor

4. Textbook:
   a. Chemistry, Chang, 10th edition
   b. Supplemental Materials:
      ii. Student Study Guide (included with textbook)
      iii. McGraw-Hill Aris electronic homework

5. Specific course information:
   a. Catalogue Description: The first in a two-semester sequence presenting the fundamental laws and theories of chemistry.
   b. Prerequisite: None
   c. Category: Required

6. Specific goals for the course:
   a. The course serves as an introduction to the scientific method and critical thinking. Students are expected to be able to apply chemical principles to solve problems and gain an understanding of how chemistry affects every day life both inside and outside of the Navy.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcomes (a), (b): Students develop scientific knowledge that relates to chemistry, physics and mathematics. They experience the practical application of mathematics to deal with chemical problems. Students are introduced to the use of Excel as a powerful tool for data analysis. Students learn to appreciate the proper use of significant figures in scientific work.
      ii. Outcome (f): Although students may collect data together in lab, they are responsible for their own work in reporting the results and learn to only claim the work that is theirs.
      iii. Outcome (g): Students apply their writing skills to produce memorandum reports for the laboratory work.
      iv. Outcome (i) and (j): Current topics are introduced so that students appreciate that chemistry is a changing subject that requires a commitment to stay current in the discipline.

7. Brief list of topics covered:
   a. Chemical Stoichiometry
   b. Use of Dimensional Analysis to solve problems
c. Properties of Gases, Liquids and Solids

d. Kinetic Molecular Theory of Matter

e. Atomic Theory and Quantum Mechanics

f. Energy and its relationship to Chemical and Physical Change

g. Theory of Chemical Bonding

h. Phase Transformations

i. Explosives, Fuels and Lubricants
Appendix A – Course Syllabi - SC112

1. Course number and name: SC112 Foundations of Chemistry

2. Credits and contact hours: lecture 3; laboratory 2; credits 4

3. Coordinator: W. Pearson, Associate Professor

4. Textbook:
   a. Chemistry, Chang, 10th edition
   b. Supplemental Materials:
      i. Student Study Guide (included with textbook)
      ii. McGraw-Hill Aris electronic homework

5. Specific course information:
   a. Catalogue Description: The second in a two-semester sequence presenting the fundamental laws and theories of chemistry.
   b. Prerequisite: SC111
   c. Category: Required

6. Specific goals for the course:
   a. The course serves as an introduction to the scientific method and critical thinking. Students are expected to be able to apply chemical principles to solve problems and gain an understanding of how chemistry affects every day life both inside and outside of the Navy.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcomes (a), (b): Students develop scientific knowledge that relates to chemistry, physics and mathematics. They experience the practical application of mathematics to deal with chemical problems. Students are introduced to the use of Excel as a powerful tool for data analysis. Students learn to appreciate the proper use of significant figures in scientific work.
      ii. Outcome (f): Although students may collect data together in lab, they are responsible for their own work in reporting the results and learn to only claim the work that is theirs.
      iii. Outcome (g): Students apply their writing skills to produce memorandum reports for the laboratory work.
      iv. Outcome (i) and (j): Current topics are introduced so that students appreciate that chemistry is a changing subject that requires a commitment in order stay current in the discipline.

7. Brief list of topics covered:
   a. Solution Chemistry
   b. Chemical Kinetics
   c. Fundamentals of Acid/Base Chemistry
   d. Chemical Equilibrium
e. Chemical Thermodynamics
f. Electrochemistry
g. Nuclear Chemistry/Nuclear Power and Nuclear Weaponry
h. Organic and Polymer Chemistry
i. Submarine Atmosphere
Appendix A – Course Syllabi – SI204

1. Course number and name: SI204 Introduction To Computer Science

2. Credits and contact hours: Lecture 3; Laboratory 2; Credits 4

3. Coordinator: P. Ortiz, Captain, USMC

4. Textbook:
   b. Supplemental Materials:
      i. None

5. Specific course information:
   a. Catalogue Description: Introduction to algorithmic development, problem solving
      and software design. Principles and concepts to provide foundational knowledge
      and experience upon which later computer science courses will build.
   b. Prerequisite: None
   c. Category: Required for EEE and ECE majors

6. Specific goals for the course:
   a. Solve problems using the procedural programming paradigm. Design, develop,
      debug, and document computer programs using structured programming
      techniques. Select and implement the most appropriate data structure for a
      solution and justify your selection. Identify common uses of documents found on
      the Internet and explain why each is, or is not, a breach of copyright law.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcome (a): Implement well known mathematical problems in C++;
         Apply mathematical concepts to graphics programming
      ii. Outcome (f): Learn about use of digital media, copyright and plagiarism
      iii. Outcome (k): Introduced to basic programming skills that can be applied
          to any problem or programming language

7. Brief list of topics covered:
   a. Types and Expressions
   b. Flow Control with sequence and selection
   c. Repetition with loops
   d. Ethics, digital media
   e. File Input/Output
   f. Functions
   g. Pass-by-reference, pass-by-value
   h. Recursion
   i. Arrays and Linked Lists
   j. Sorting
   k. Structs
   l. Multi-file programs
Appendix A – Course Syllabi – SI221

1. Course number and name: SI221 Data Structures in C++

2. Credits and contact hours: Lecture 2; Laboratory 1; Credits 3

3. Coordinator: Sikora, Matthew, Capt, USAF

4. Textbook:
   a. Data Structures and Other Objects Using C++, Main and Savitch, 2011
   b. Supplemental Materials:
      i. None

5. Specific course information:
   b. Prerequisite: SI204
   c. Category: Required

6. Specific goals for the course:
   a. To gain experience programming and using different data structures while analyzing the running time analysis of using specific data structures
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcomes (a) and (b): Develop programs and understand what is happening while being able to calculate run time of the program
      ii. Outcomes (g): Write technical explanations of code for full understanding
      iii. Outcome (k): Use Windows and Linux operating systems to write C++ programs and to understand different compilers

7. Brief list of topics covered:
   a. C++ Classes, Abstract Data Types
   b. Static and Dynamic Arrays
   c. Strings
   d. Linked Lists
   e. Queues
   f. Stacks
   g. Trees
   h. Graphs
   i. Hash
   j. Heaps
   k. Polymorphism
Appendix A – Course Syllabi – SM121

1. Course number and name: SM121 Calculus I

2. Credits and contact hours: Lecture 4; Laboratory 0; Credits 4

3. Coordinator: M. Meyerson, Professor

4. Textbook:
   a. CALCULUS, Early Transcendental, ed 7E, James Stewart, 2012
   b. Supplemental Materials:
      i. Enhanced WebAssign online homework management system (included with textbook)
      ii. TI-Nspire CX CAS calculator

5. Specific course information:
   a. Catalogue Description: The first of a traditional two course sequence covering differential and integral calculus of one real variable and infinite series.
   b. Prerequisite: None.
   c. Category: Required.

6. Specific goals for the course:
   a. To review algebra and trigonometry through their use in calculus. To review and expand upon the concepts of functions and graphs. To introduce the concepts of limit and continuity. To study the concept of the derivative along with its graphical, numerical, and algebraic properties. To study methods for evaluating derivatives. To study methods for evaluating derivatives. To apply derivatives to a number of practical problems including optimization, related rates, graphing, etc. To use the calculator to reinforce the above concepts and objectives in an appropriate manner.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcome (a): Fundamental mathematical foundation for science and engineering
      ii. Outcome (f): Continuation of life time learning in mathematics

7. Brief list of topics covered:
   a. Precalculus review
   b. Functions and graphs
   c. Limits and continuity
   d. The concept of the derivative
   e. Rules and methods for evaluating derivatives
   f. Applications of the derivative
Appendix A – Course Syllabi – SM122

1. Course number and name: SM122 Calculus II

2. Credits and contact hours: Lecture 4; Laboratory 0; Credits 4

3. Coordinator: M. Meyerson, Professor

4. Textbook:
   a. CALCULUS, Early Transcendental, ed 7E, James Stewart, 2012
   b. Supplemental Materials:
      i. Enhanced WebAssign online homework management system (included with textbook)
      ii. TI-Nspire CX CAS calculator

5. Specific course information:
   a. Catalogue Description: Continuation of Calculus I.
   b. Prerequisite: Calculus I.
   c. Category: Required.

6. Specific goals for the course:
   a. To study the concept of integration and develop standard techniques of integration. To learn approximation techniques for integrals and how to evaluate improper integrals. To apply the concept of the integral to a variety of geometric and physical problems. To study the fundamentals of first order ordinary differential equations including modeling, direction fields, approximate solutions, and exact solutions for separable and linear equations. To study infinite series, particularly power series; to develop tests for their convergence and techniques for their manipulation; and to obtain power series representations for functions. To introduce vectors and vector algebra. To use the calculator and computer algebra system to reinforce the above concepts where appropriate.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcome (a): Fundamental mathematical foundation for science and engineering
      ii. Outcome (f): Continuation of life time learning in mathematics

7. Brief list of topics covered:
   a. Concept of the integral
   b. Methods of integration
   c. Applications of the integral
d. Differential equations

e. Numerical sequences and series

f. Power series, Taylor series, Maclaurin series

g. Vectors and vector algebra
Appendix A – Course Syllabi – SM212

1. Course number and name: SM212 Differential Equations with Matrices

2. Credits and contact hours: Lecture 4; Laboratory 0; Credits 4

3. Coordinator: W. D. Withers, Professor

4. Textbook:

5. Specific course information:
   a. Catalogue Description: Linear and simultaneous differential equations; solution by Laplace transform; partial differential equations and Fourier series.
   b. Prerequisite: Calculus III (SM221 or SM223)
   c. Category: Required

6. Specific goals for the course:
   a. To introduce students to various time and frequency domain techniques for modeling and solving differential equations with respect to physical systems they might encounter in their engineering syllabi.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcome (a): Modeling with differential equations and using a variety of mathematical methods to obtain and interpret solutions.

7. Brief list of topics covered:
   a. Classification of Differential Equations
   b. Existence and Uniqueness Theorems
   c. Separable first-order equations
   d. Linear first-order equations
   e. Linear equations with constant coefficients
   f. Solving nonhomogeneous linear equations with annihilators
   g. Spring-mass systems
   h. Series electric circuits
   i. Resonance
   j. Solving linear equations with Laplace transforms
   k. Basic matrix operations
   l. Eigenvalues and eigenvectors
   m. Solving linear systems with matrix methods
   n. Solving nonhomogeneous systems with variation of parameters
   o. Spring-mass systems
   p. Electrical networks
   q. Euler’s method for systems
   r. Solving PDE’s with separation of variables
   s. Fourier series
t. The heat equation
u. Solving the heated-bar problem
Appendix A – Course Syllabi – SM221

1. Course number and name: SM221 CALCULUS III WITH VECTOR FIELDS

2. Credits and contact hours:  Lecture 4; Laboratory 0; Credits 4

3. Coordinator:  C. G. Melles

4. Textbook:
   a. CALCULUS, Early Transcendentals, 7e by James Stewart, 2011
   b. Supplemental Materials:
      i. WebAssign

5. Specific course information:
   a. Catalogue Description: Differential and integral calculus of several real variables; vector analysis including integral theorems.
   b. Prerequisite:  Calculus II
   c. Category: Required

6. Specific goals for the course:
   a. Use vectors to explain the algebra and geometry of multidimensional space. Use vector-valued functions to describe curves, surfaces, and motion in space. Apply functions of several variables, their derivatives, and their integrals to a variety of geometric and physical problems. Explore vector fields, line integrals, surface integrals, and some of their applications.
   b. Relationship of course to student outcomes (a)-(k):
      i. (a) an ability to apply knowledge of mathematics, science, and engineering
      ii. (g) an ability to communicate effectively
      iii. (i) a recognition of the need for, and an ability to engage in life-long learning

7. Brief list of topics covered:
   a. Use vectors to explain the algebra and geometry of multidimensional space.
   b. Use vector-valued functions to describe curves, surfaces, and motion in space.
   c. Apply functions of several variables, their derivatives, and their integrals to a variety of geometric and physical problems.
   d. Explore vector fields, line integrals, surface integrals, and some of their applications.
   e. Green’s Theorem, Stokes’ Theorem, Divergence Theorem.
Appendix A – Course Syllabi – SM230

1. Course number and name: SM230 Probability with Naval Applications

2. Credits and contact hours: Lecture 3; Laboratory 0; credits 3

3. Coordinator: Maj J. Jabin, USMC

4. Textbook:
   b. Supplemental material:
      i. various online modules

5. Specific course information:
   a. Catalogue Description: An elementary treatment of the basic concepts of probability with an emphasis on naval applications. Sample spaces, discrete and continuous random variables and standard distributions. Selected topics of naval applications of probability theory such as random search, minefields and lateral range curves. Conditional probability and Bayes' theorem.
   b. Prerequisite: SM122
   c. Category: Required for EGE

6. Specific goals for the course:
   a. Practice analytic and critical thinking in the context of probability. Introduction to the use of probability modeling in naval applications.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcome (a): Choosing the proper probability model for a given situation; using the probability model to solve problems.
      ii. Outcome (b): Comparing a probability model to real-world data
      iii. Outcomes (e) and (k): Understanding the inherent variability that may be present in various engineering systems and how to account for that variability through probabilistic estimation.

7. Brief list of topics covered:
   a. Probability and set theory
   b. Conditional probability and Bayes Theorem
   c. Search theory
   d. Distribution functions
   e. Normal, binomial, exponential, Poisson distributions
   f. Central Limit Theorem
   g. Elementary statistics
   h. Naval applications
Appendix A – Course Syllabi – SM239

1. Course number and name: SM239 Probability and Statistics I

2. Credits and contact hours: Lecture 3; Laboratory 0; Credits 3

3. Coordinator: L. Jager, Assistant Professor

4. Textbook:
   b. Supplemental Materials:
      i. R/RStudio (Statistical software)

5. Specific course information:
   a. Catalogue Description: An applied study of a variety of discrete and continuous probability models. Probability models covered include binomial, Poisson, exponential, gamma, normal, Student-t, and chi-squared. Methods for calculating probabilities and estimating parameters are included. The Law of Large Numbers and the Central Limit Theorem are included.
   b. Prerequisite: Calculus III (SM221 or SM223), may be as a co-requisite
   c. Category: Required for EGE

6. Specific goals for the course:
   a. To learn a variety of probability distributions, to see how they relate to real-world situations, and to learn to use them to solve problems.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcome (a): Choosing the proper probability model for a given situation; using the probability model to solve problems.
      ii. Outcome (b): Comparing a probability model to real-world data
      iii. Outcome (c): Using statistical software (R/RStudio); using simulation to investigate the outcome of a scenario.
      iv. Outcomes (e) and (k): Understanding the inherent variability that may be present in engineering systems and how to account for that variability through probabilistic estimation.

7. Brief list of topics covered:
   a. Outcomes, sample spaces, events, probability laws
   b. Conditional probability and independence
   c. Discrete random variables
   d. Continuous random variables
   e. Simulation
   f. Expectation and variance
   g. Transformations of random variables
   h. Covariance and correlation
   i. Poisson process
j. Law of Large Numbers
k. Central Limit Theorem
l. Estimation
Appendix A – Course Syllabi – SM313

1. Course number and name: SM 313 Probability for Engineers

2. Credits and contact hours: Lecture 3; Laboratory 0; Credits 3

3. Coordinator: P. A. McCoy, Professor

4. Textbook:
   b. Supplemental Materials:
      i. None

5. Specific course information:
   a. Catalogue Description: Fundamental Topics from calculus based probability theory (discrete and continuous random variables in one and two dimensions). Basic notions such as expected value, standard deviation, variance, Bayes’ Theorem and The Total Probability Theorem. Basic statistical concepts are introduced such as the Law of Large Numbers, Central Limit Theorem and the Students T-Distribution in settings suitable for engineering applications.
   b. Prerequisite: SM212 Differential Equations or SM222 Differential Equations with Matrices
   c. Category: Required for ECE and EEE

6. Specific goals for the course:
   a. The student will be able to set up, analyze and solve discrete probability problems in various settings. The student will be able to perform similar analyses under the heading of continuous distributions. The student will be able to correctly state, derive and implement concepts such as Chebyshev’s Inequality, Law of Large Numbers, Bayes’ Theorem, The Total Probability Theorem and one and two sided confidence intervals for an (unknown) expected value when the variance is either known or unknown.
   b. Relationship of course to student outcomes (a)-(k):
      i. (a) an ability to apply knowledge of mathematics, science, and engineering
      ii. (e) an ability to identify, formulate, and solve engineering problems
      iii. (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

7. Brief list of topics covered:
   a. Permutations and Combinations
   b. Venn Diagrams
   c. Basic Properties of Probability Functions
   d. Discrete PDF’s such as Binomial, Pascal, Exponential, Poisson and Hypergeometric
   e. The Total Probability Theorem
f. Bayes’ Theorem

g. Conditional Probabilities

h. Continuous Distributions

i. Cumulative Distributions

j. Two Dimensional PDF’s

k. Expected Values

l. Variance

m. Standard Deviation

n. The Central Limit Theorem

o. Student’s T-Distribution

p. One and Two Sided Confidence Intervals

q. Important Statistics such as Sample Mean and Variance.
Appendix A – Course Syllabi – SM316

1. Course number and name: SM316 Engineering Mathematics with Probability and Statistics

2. Credits and contact hours: Lecture 3; Laboratory 0; Credits 3

3. Coordinator: A. Gaglione, Professor

4. Textbooks:
   a. Probability and Statistics for Engineers & Scientists 9th Ed, Walpole, Myers, Myers, and Ye, Prentice Hall 2011

5. Specific course information:
   a. Catalogue Description: Basic concepts in probability and statistics and matrix theory.
   b. Prerequisite: SM212 or SM222
   c. Category: Required for Systems Engineering majors; does not count as a math elective for mathematics majors

6. Specific goals for the course:
   a. To understand basic concept of a random variable - both discrete and continuous. Be able to set up and solve problems involving basic distributions from probability. Also to understand the concept of a sampling distribution from statistics. To know and be able to apply the Central Limit Theorem. Also to be able to set up and compute Confidence Intervals both when the population standard deviation is known or unknown. Also know how to compute Tolerance Intervals.
   b. Relationship of course to student outcomes (a)-(k):
      (a, b, e, and k): To understand basic concepts from matrix theory. These include being able to do basic matrix algebra. Know how to solve systems of linear equations by both Gaussian Elimination and Gauss-Jordan reduction. Know what the reduced row echelon form of a matrix is. Know how to find and use the LU decomposition of a square matrix. Understand concepts of linear independence and linear dependence of vectors. Also understand what the rank of a matrix is how to compute it. Also know determinants and Cramer’s Rule. Know how to find eigenvalues and eigenvectors and know when matrices are diagonalizable. If a matrix is diagonalizable, be able to find a modal matrix and the diagonal matrix it is similar to. Finally know that real symmetric matrices are diagonalizable.

7. Brief list of topics covered:
   a. Set Probability
   b. Random Variables and Probability Distributions
   c. Sampling Distributions
   d. Estimation (Confidence Intervals & Tolerance Intervals)
   e. Matrix Algebra
f. Systems of Linear Equations

h. Eigenvectors & eigenvalues

i. Similar matrices and diagonalization

j. Symmetric matrices
Appendix A – Course Syllabi – SM342

1. Course number and name: SM342 Discrete Structures

2. Credits and contact hours: Lecture 3; Laboratory 0; Credits 3

3. Coordinator: C. Bailey, Professor

4. Textbook:
   a. Applied Combinatorics 5E, Tucker, 2007
   b. Supplemental Materials: Calculator with computer algebra system

5. Specific course information:
   b. Prerequisite: Calculus II (SM122 or SM162)
   c. Category: Required

6. Specific goals for the course:
   a. To learn basic counting techniques. To learn graph theory basic definitions and theorems.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcomes (a): When to use which counting technique and how to apply theorems in graph theory.

7. Brief list of topics covered:
   a. Permutations and combinations
   b. Balls in boxes
   c. Inclusion-Exclusion
   d. Generating Functions
   e. Bipartite graphs
   f. Planar Graphs
   g. Eulerian Graphs
   h. Hamiltonian Graphs
Appendix A – Course Syllabi – SP211

1. Course number and name: SP211 Physics I Mechanics

2. Credits and contact hours: Lecture 3; Laboratory 2; Credits 4

3. Coordinator: D. Katz, Professor

4. Textbook:
   a. Fundamental of Physics, Halliday, Resnick and Walker, 2011
   b. Supplemental Materials:
      i. None

5. Specific course information:
   a. Catalogue Description: The first of a two course sequence emphasizing the fundamental principles of classical physics and a variety of applications. Topics include mechanics, electricity, magnetism, wave motion, fluids, sound, and light. Lectures, recitations, hands-on laboratories, and large-scale demonstration lectures are employed.
   b. Prerequisite: SC112 or SC151;
   Corequisite: SM221 or SM223 or SM251 or approval of department chair.
   c. Category: Required

6. Specific goals for the course:
   a. Develop a fundamental understanding of classical physics as it applies to engineering. Specifically, this is the first time the future engineering students are exposed to modeling of static and dynamic systems with respect to force and energy balance.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcomes (a) and (e): all topics of the course cover math and science that will be necessary to solve future engineering problems.
      ii. Outcomes (b), (d), (g), and (k): Students are exposed to experimental analysis through weekly labs and are expected to communicate and work effectively amongst their groups.

7. Brief list of topics covered:
   a. Kinematics
   b. Dynamics
   c. Conservation of energy
   d. Conservation of momentum
   e. Rotational motion
   f. Fluid statics and dynamics
   g. Oscillations
   h. Traveling waves
   i. Standing waves
Appendix A – Course Syllabi – SP212

1. Course number and name: SP212 Physics II Electricity and Magnetism

2. Credits and contact hours: Lecture 3; Laboratory 2; Credits 4

3. Coordinator: P. Mikulski, Associate Professor

4. Textbook:
   a. Fundamental of Physics, Halliday, Resnick and Walker, 2011
   b. Supplemental Materials:
      i. None

5. Specific course information:
   a. Catalogue Description: The second of a two course sequence emphasizing the fundamental principles of classical physics and a variety of applications. Topics include mechanics, electricity, magnetism, wave motion, fluids, sound, and light. Lectures, recitations, hands-on laboratories, and large-scale demonstration lectures are employed.
   b. Prerequisite: Physics I (SP211 or SP221) or approval of department chair;
   c. Category: Required

6. Specific goals for the course:
   a. Develop a fundamental understanding classical physics in the context of electricity and magnetism building off of the foundation established the previous semester in SP211. While all of the course material addresses foundational material needed in the context of nearly every investigation in the areas of science and in engineering, much of the course has a direct focus on elements that directly connect with the needs of engineers. Specifically, the abstract concepts and theory of fields (electric and magnetic) are addressed not only fundamentally but also in the context of circuit devices (capacitors, resistors, inductors) and a variety of circuits.
   b. Relationship of course to student outcomes (a)-(k):
      i. Outcomes (a) and (e): all topics of the course cover math and science that will be necessary to solve engineering problems.
      ii. Outcomes (b), (d), (g), and (k): Students are exposed to experimental analysis through weekly labs and are expected to communicate and work effectively amongst their groups.

7. Brief list of topics covered:
   a. Electric Charge, Electric Fields, Gauss' Law, Electric Potential
   b. Capacitance, Current and Resistance, Circuits
   c. Magnetic Fields, Magnetic Fields Due To Currents
   d. Induction and Inductance, Electromagnetic Oscillations
   e. Maxwell's Equations, Electromagnetic Waves
   f. Geometrical Optics, Interference, Diffraction
Appendix B – Faculty Vitae

Currently available if desired and will be included in final submission.
Appendix B – Faculty Vitae

1. **Name:**
   Capt. Agur S. Adams

2. **Degrees, with field institution and dates:**
   Electrical Engineer, Naval Postgraduate School, 2011
   M.S. Electrical Engineering, Naval Postgraduate School, 2011
   B.S. Electrical Engineering, U.S. Naval Academy, 2003
   B.S. Computer Science, U.S. Naval Academy, 2003

3. **Academic Experience**
   2012-Present U.S. Naval Academy, Instructor, full time.
   2009-2011 Student, Naval Postgraduate School.

4. **Non-Academic Experience**
   2003-2009 Ground Intelligence Officer, USMC, full time.

5. **Certifications or Professional Registrations**

6. **Current Membership in professional organizations**
   Member IEEE

7. **Honors and Awards**

8. **Service Activities**
   N/A

9. **Principle publications of the last five years**

10. **Professional development activities in the last five years.**
    Actively seeking PhD from Naval Postgraduate School.
Appendix B – Faculty Vitae

1. **Name:**
   Christopher R. Anderson

2. **Education:**
   Ph.D. in Electrical Engineering (Biomedical Engineering Option), September 2006
   Virginia Polytechnic Institute and State University, Blacksburg, Virginia
   M.S. in Electrical Engineering, May 2002
   Virginia Polytechnic Institute and State University, Blacksburg, Virginia
   B. S. in Honors in Electrical Engineering, December 1999
   Virginia Polytechnic Institute and State University, Blacksburg, Virginia

3. **Academic experience:**
   United States Naval Academy: Department of Electrical & Computer Engineering
   Assistant Professor, Full-Time, July 2007-Present

4. **Non-academic experience:**
   Virginia Polytechnic Institute and State University: Bradley Department of ECE
   Andrew Corporation: Wireless Innovations Group
   International Resistor Corporation/TT Woods
   Electrical Engineering Intern, Full-Time, Summer 1999
   Corning Cable Systems
   Associate Measurements Engineer August 1996 – May 1998

5. **Certifications or professional registrations:**
   Engineer In Training Status in Virginia as of 1999

6. **Professional Organizations:**
   Institute of Electrical and Electronic Engineers – Senior Member 2011.
   National Society of Professional Engineers – Associate Member 2007.
   Radio Club of America – Member 2007.

7. **Honors and awards:**
   Received the USNA Electrical and Computer Engineering Department nomination for the
   USNA Apgar Award For Excellence in Teaching, 2010.
   Received the USNA Electrical and Computer Engineering Department nomination for the
   USNA Class of 1951 Award For Excellence in Research, 2011.

8. **Service activities:**
   **Contributions to Refereed Publications**
   TPC Member for a variety of IEEE Technical Conferences.
   Reviewer for a variety of IEEE Journals.
Reviewer for a variety of IET Journals.

**Academic Service**
External Ph. D. Dissertation Reviewer for N. Sakar, University of Auckland, NZ.
External Masters Thesis Reviewer for L. R. Soriano, and F. Zanini, National University of Ireland, Maynooth.
National Science Foundation proposal review panelist.

**University**
Faculty Representative for the USNA IEEE Student Chapter.

9. **Publications and presentations:**

**Refereed Journal Articles**


**Most Recent Refereed Conference Papers**


**Tutorials**


**Invited Lectures, Seminars, and Talks**


10. **Professional development activities:** NA
Appendix B – Faculty Vitae

1. **Name:**
   LT Jesse M. Atwood

2. **Education:**
   B.S. Electrical Engineering, University of Texas at San Antonio, 2003
   Masters of Engineering Management, Old Dominion University, 2008

3. **Academic Experience:**
   2011-Present  USNA, Instructor

4. **Non-Academic Experience:**
   2008-2011  Senior Design Engineering, Comanche Peak Nuclear Power Plant, Luminant Power, Glenrose TX.
   2005-2008  Division Officer on Submarine USS Henry M. Jackson. Served as the Main Propulsion Assistant, Electrical Assistant, and Assistant Weapons Officer supervising 25 personnel.
   2003-2005  Nuclear Power Officer Pipeline and Submarine School.
   2001-2003  Engineering Student Internship, Southwest Research Institute, San Antonio, TX.

5. **Certifications or Professional Registrations:**
   Professional Engineer in the state of TX.

6. **Current Membership in professional organizations:**
   None

7. **Honors and Awards:**
   Navy Achievement Medal

8. **Service Activities:**
   None

9. **Principle publications of the last five years:**
   None

10. **Professional development:**
    Completed course required become the academy Radiation Safety Officer and authorize transportation of Radioactive Material.
Appendix B – Faculty Vitae

1. Stephen R. Bast

2. Education
   • Johns Hopkins University – M.S. (Education), 1977
   • Johns Hopkins University – M.S. (Electrical Engineering), 1970
   • Pratt Institute – B.E.E. (Electrical Engineering), 1966

3. Academic experience
   • USNA, 2011-2012 – Adjunct Faculty (part time)
   • USNA, 2007-2011 – Visiting Instructor (full time)
     Course coordinator, EE332 (Spring, 2011)
   • USNA, 2005-2007 – Adjunct Faculty (part time)
   • USNA, 1990-1991 – Visiting Instructor (part time, exchange program w/ NSA)
   • Anne Arundel Community College, 2004-2009 – Adjunct Faculty (part time), Math
   • Prince George’s Community College, 1998-2004 – Associate Professor (full time), Math/Engineering
   • Prince George’s Community College, 1973-1997 – Adjunct Faculty (part time), Math/Engineering
   • National Cryptologic School (NSA), 1993-1997 – Senior Instructor (full time)

4. Non-academic experience
   • National Security Agency, 1966-1993 – Senior Electronics Engineer (full time)
     – Responsibilities included the definition, design, development, testing, documentation, and deployment of a wide variety of specialized electronic communications and data processing equipment for use by the Dept. of Defense
   • Northrup-Grumman, 1996 – Consultant/Instructor (part time)
     – Taught basic and intermediate electronic theory to a group of N-G customers
Appendix B – Faculty Vitae

1. **Name:**
   Jay H. Benson

2. **Education:**
   BScs Virginia Tech 1975
   BSee NPS 1979
   MSee NPS 1981

3. **Academic experience:**
   Full Professor, Anne Arundel Community College, 1997-pres)
   Adjunct Professor, USNA, 2003-pres

4. **Non-academic experience:**

5. **Certifications or professional registrations:**
   Cisco CCNA, Cisco CCNP, Cisco CCAI

6. **Professional organizations:**
   IEEE, ACM, Navy League, American Radio Relay League

7. **Honors and awards:**
   Various military

8. **Service activities:**
   Acdu USN – Weapons System Acquisition Manager
   Acdu USN – Space Systems Operations
   Current – MHEC Technical Review for IT School Curricula

9. **Publications and presentations:**
   “MiniMUF on the TI-59 calculator”, NPS, 1981.
   “Empirical De-convolution of Gold Codes”, NSA, 1983 (classified)
   “Emerging Technology”, US Army, 2010
   “Cloud Computing”, AACC, 2011

10. **Professional development:**
    RET, Research Education for Teachers, NSF/UMD, 2011
Appendix B – Faculty Vitae

1. **Name:**
   Justin A. Blanco

2. **Education:**
   - Brown University, Providence, RI, ScB(Honors), 1999, Neuroscience
   - Stanford University, Stanford, CA, MS, 2003, Mechanical Engineering
   - University of Pennsylvania, Philadelphia, PA, PhD, 2010, Bioengineering

3. **Academic Positions:**
   - 1998-1999(PT) Research Assistant, Dr. J. Simmons, Brown U - sonar research; bat echolocation
   - 1999-2000(FT) Teaching Fellow, Deerfield Academy – science instruction, coaching, student advising
   - 2004-2006(PT) Research Assistant, Dr. D. Bogen, UPenn – medical device electronics; embedded systems
   - 2006-2010(PT) PhD Candidate, Dr. B. Litt/Dr. L. Finkel, UPenn – DSP of intracranial EEG
   - 2010-2011(FT) Postdoctoral Fellow, Dr. B. Litt, UPenn – machine learning/signal processing of brain signals
   - 2011-Pres (FT) Assistant Professor, Department of Electrical and Computer Engineering, USNA

4. **Non-academic Positions:**
   - 2001 (FT) Summer Associate in Drug Delivery, Medtronic Neurological, Inc. – spinal catheter design
   - 2001-2003(PT) Research Assistant, Dr. K. Shenoy, Stanford University – neural prosthetics systems
   - 2002 (FT) Summer Associate in Neuro Technology, Medtronic Neurological, Inc., – neural stimulation
   - 2003-2004(FT) Mechanical Design Engineer, Medtronic Neurological, Inc. – brain infusion hardware design

5. **Certifications or Professional Registrations:** (N/A)

6. **Current Membership in Professional Organizations:** (N/A)

7. **Honors and Awards:**
   
<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1995</td>
<td>Brown Club of Westchester Scholarship</td>
</tr>
<tr>
<td>1999</td>
<td>Sigma XI (associate member; international science and engineering honors society)</td>
</tr>
<tr>
<td>1999</td>
<td>Magna Cum Laude (highest distinction conferred at Brown)</td>
</tr>
<tr>
<td>2001</td>
<td>Stanford/Medtronic fellowship: full tuition/fees and stipend for MS program; 2 years</td>
</tr>
</tbody>
</table>
2003  James F. Lincoln Merit Award (shared; national student design competition)
2006-2010 Penn fellowship: partial tuition/fees and stipend for PhD program; 4 years
2006  Epilepsy Foundation fellowship: $20,000 for neurostimulation research; 1 year
2007  Woods Hole MBL scholarship: to attend program in Neuroinformatics; 1 summer

8. **Service Activities (current):**
   - ECE department plebe recruiting committee member
   - ECE department plebe recruiting host
   - Senior design project co-mentor: optical neural probe
   - Senior design project co-mentor: brain computer interface for written communication
   - PhD thesis committee member: Drausin Wulsin, UPenn
   - PhD thesis mentor: Ann Chamberlain, UPenn

9. **Selected Publications and Presentations:**


10. **Selected Recent Professional Development Activities:**
2011 Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA
2011 Conference on High Frequency Brain Oscillations, Montreal, Canada
2010 IEEE EMBS Conference, Buenos Aires, Argentina
2010 IEEE Forum on Grand Challenges in Neuroengineering, Bethesda, MD
2010 Reviewer for Epilepsy Research
Appendix B –Faculty Vitae

1. Name:
   LT Dane A. Brown

2. Degrees, with field institution and dates:
   M.S. Electrical Engineering, Naval Postgraduate School, 2006

3. Academic Experience
   2010-Present USNA, Senior Instructor

4. Non-Academic Experience
   2007-2010 Division Officer on submarine USS Boise. Served as Reactor Control Assistant, Assistant Combat Systems Officer, and Strike Officer supervising.
   2006-2007 Nuclear Power Officer Pipeline and Submarine School.

5. Certifications or Professional Registrations
   Professional Engineer

6. Current Membership in professional organizations
   National Society of Black Engineers

7. Honors and Awards
   Navy Marine Corps Achievement Medal, Modern-Day Technology Leader for 2011 Black Engineer of the Year Awards

8. Service Activities
   Radiation Safety Officer
   Midshipmen Black Studies Club Officer Representative

9. Principle publications of the last five years

10. Professional development activities in the last five years.
    Prospective Nuclear Engineer Officer certification
    Radiation Safety Officer Certification
    Actively seeking certifications in Linux (LPI) and Security (CISSP, CEH)
Appendix B – Faculty Vitae

1. **Name:**
   Harry K. Charles, Jr.

2. **Education:**
   BS, Electrical Engineering, Drexel University, 1967
   Ph. D., Electrical Engineering, The Johns Hopkins University, 1972

3. **Academic experience:**
   The Johns Hopkins University, Professor in Applied Physics and Electrical Engineering in the Hopkins Engineering for Professionals Program (1979 to present, part time). The Johns Hopkins University, Chair of the Applied Physics Program in the Hopkins Engineering for Professionals Program (2001 to present, part time). The United States Naval Academy, Distinguished Chair in Science and Technology, Electrical Engineering (2008 to present, part time).

4. **Non-academic experience:**
   The Johns Hopkins University Applied Physics Laboratory (JHU/APL), Laurel, MD
   Chief Engineer (2008-2011) - Principal Investigator on research tasks involving microelectronics, miniaturized packaging, and materials. Program trouble shooter, coach for staff professional development.

   Department Head (2003-2008) - Responsible for all aspects of management and operations of a large, multidisciplinary technical service organization (over 400 staff and >$60M annual budget). Executive oversight of $365M new building program.

   Assistant Department Head for Engineering (1996-2003) - Responsible for all aspects of technology and engineering in large, multi-disciplined organization (>30M annually). Directed internal technology development program (over $5M annually).

   Engineering, Design, and Fabrication Branch Supervisor (1989-1996) - Supervised and provided technical leadership in the design, development, fabrication, and testing of electronic and mechanical hardware components, assemblies, and systems. Managed annual budgets in excess of $20M and 300 technical staff.

   Microelectronics Group Supervisor (1984-1989) - Provided supervision and direction in the design, development, and fabrication of hybrid microcircuits, monolithic gate arrays, and custom integrated circuits. Directed special development projects involving thin and thick film techniques, semiconductor processing, solder reflow, and photolithography.

5. **Certifications or professional registrations:**
   NA

6. **Professional organizations:**
Life Fellow of the IEEE, Life Fellow of the International Microelectronics and Packaging Society, Member American Physical Society

7. **Honors and awards:**


8. **Service activities:** NA

9. **Publications/Presentations/Inventions:** (Selected from over 50 during last 5 years over 300 lifetime)

- U.S. Patent 6,977,381, “Gating Grid and Method of Making Same” (December 20, 2005).

10. Professional development activities: NA
Appendix B – Faculty Vitae

1. Name: 
   Visiting Professor Richard W. Kopka

2. Degrees: 
   M.S. Electrical Engineering, University of Pittsburgh, 1967
   Post Graduate Work, Engineering Management, George Washington University, 1985-89

3. Academic Experience: 
   2008-Present USNA, Visiting Professor (FT) 
   2008-Present Anne Arundel Community College, Distinguished Senior Lecturer (PT) 
   1992-2007 USNA, Adjunct Professor (PT) 
   1987-2007 Anne Arundel Community College, Associate Professor (FT) 
   1976-1979 USNA, Assistant Professor (FT) 
   1972-1976 USAFA, Assistant Professor (FT) 
   1986-1991 University of Maryland, Lecturer (PT) 
   1986-1991 George Washington University, Professorial Lecturer (PT) 
   1967-1971 Northeastern University, Adjunct Professor (PT) 
   1968-1969 University of Lowell, Adjunct Professor (PT) 
   1964-1967 University of Pittsburgh, Instructor (FT) 
   1962-1963 University of Pittsburgh, Graduate Teaching Assistant (PT)

4. Non-Academic Experience: 
   1989-1991 ARINC Research Corporation, Staff Principal Engineer, Advanced Systems Program. Responsibilities included assuring the technical work and documentation provided to corporate clients by Program Managers met the quality standards of ARINC. 
   1987-1989 ARINC Research Corporation, Senior Engineer, Tactical Aircraft. Served as the Project Leader for a C-130 Radar System Block Modification Program. 
   1986-1987 Air Force Office of Scientific Research, Program Manager. Mr. Kopka assisted Air Force laboratories in identifying research and engineering activities to enhance the defense research sciences baseline. He also served as the Program Manager for Special Research Programs of the Air Force Office of Scientific Research. 
   1983-1986 Department of Defense Electromagnetic Compatibility Analysis Center, Chief of Technical Resources. Responsible for development of databases, analytic capability, and computer systems used by defense services and federal agencies. 
   1979-1983 Air Force Office of Scientific Research, Assistant Chief of Technical Resources. Developed an automated information and documentation system and managed a number of Special Faculty Programs offered by the Air Force. 
   1967-1972 Air Force Cambridge Research Laboratories, Electrical Engineer. Responsible for the decommutation of data acquired from satellite, rocket,
balloon and ground based scientific experiments for analysis.

5. **Certifications or professional registrations:** N/A

6. **Current membership in professional organizations:**

   - Past Member IEEE
   - Past Member ASEE
   - Past Member IEEE Computer Society
   - Past Regional Director of Zone IV of the Computers in Education Division (ASEE)
   - Past Chairman of the Computers in Education Division of ASEE
   - Member of Eta Kappa Nu (Honorary Electrical Engineering Fraternity)
   - Member of Sigma Tau (Honorary Engineering Fraternity)

7. **Honors and awards:**

   - Armed Forces Communications and Electronics Award
   - Outstanding Electrical Engineering AFROTC Student Award
   - Air Force Commendation Medal
   - Air Force Commendation Medal – First Oak Leaf Cluster
   - Air Force Meritorious Service Medal
   - Air Force Meritorious Service Medal – First Oak Leaf Cluster

8. **Service activities (within and outside of the institution):**

   - Cyber Security Course Development Committee
   - EE Department Curriculum Committee
   - Core Course Assessment Team

   **Outside USNA**

   - Elder, Mariner’s Church
   - Vice President, St. Andrew’s Condominium Association

9. **Publications and presentations:** N/A

10. **Professional development activities:** N/A
Appendix B – Faculty Vitae

1. **Name:**
   Assoc. Prof. Samara Firebaugh

2. **Degrees, with field institution and dates:**
   Ph. D. Electrical Engineering, Massachusetts Institute of Technology, 2001
   M.S. Electrical Engineering, Massachusetts Institute of Technology, 1997
   B.S.E. Electrical Engineering, Princeton University, 1995

3. **Academic Experience**
   2006-Present  Associate Professor, Electrical Engineering Department, USNA
   2001-2006  Assistant Professor, Electrical Engineering Department, USNA
   1995-2001  Graduate Student, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology

4. **Non-Academic Experience**
   None

5. **Certifications or Professional Registrations**
   None

6. **Current Membership in professional organizations**
   Member, IEEE

7. **Honors and Awards**
   National Science Foundation Fellow (1996-1998)

8. **Service Activities**
   EE Department Senior Academic Advisor (2005 – present)
   Assessment Outcome Champion (2004 - present)
   Vice President, Faculty Senate (2011)
   Steering Committee Member, Mid-Atlantic Micro/Nano Alliance (2001- present)
   Reviewer, Department of Energy SBIR program (2004 – present)
   Panel Member, Naval Research Advisory Council (2007)

9. **Principal publications of the last five years**


10. **Professional development activities in the last five years.**
Active participation in seven different research-related conferences, including technical committee membership on three. Attendance at multiple short courses for training in the use of COMSOL multiphysics modeling software.
Appendix B – Faculty Vitae

1. **Name:**

   LCDR Christoph J. Flaherty

2. **Degrees, with field institution and dates:**

   M.S. Electrical Engineering, Tufts University, 1994
   B.S. Physics, U.S. Naval Academy, 1992

3. **Academic Experience**

   2006-Present  USNA, Master Instructor
   1999-2001    Trident Training Facility, Engineering and General Training Department
                 Instructor/Evaluator
   1992-1994    Tufts University, Electro-Optics Technology Center Teaching Assistant

4. **Non-Academic Experience**

   2006-Present  Consulting Electrical Engineer for accident, malfunction, and failure
                 analysis.
   2003-2005    Senior Electrical Engineer for CED Investigative Technologies, Inc.
                 Performed various accident, malfunction, and failure analysis.
   2001-2003    Optical Engineer and Laser Safety Officer for Lumera, Inc. Coordinated
                 the design, procurement, and assembly of production, research, and testing
                 systems for polymer material optical communication devices.
   1996-1999    Submarine Junior Officer aboard USS Florida (SSBN 728, Gold). Jobs
                 included Main Propulsion Assistant, Strategic Missile Officer, and Quality
                 Assurance Officer.

5. **Certifications or Professional Registrations**

   Professional Engineer in Electrical Engineering

6. **Current Membership in professional organizations**

7. **Honors and Awards**

   Navy Commendation Medal, Navy Achievement Medal.

8. **Service Activities**

   Assessment Outcome f Campion

9. **Principle publications of the last five years**

10. **Professional development activities in the last five years.**
Appendix B – Faculty Vitae

1. **Name:**
   
   CDR Charles W. Hewgley IV

2. **Education:**
   
   Ph. D. Electrical Engineering, Naval Postgraduate School, 2012
   M.S. Aeronautical Engineering, Naval Postgraduate School, 2001
   B.S. Electrical Engineering, Carnegie Mellon University, 1992

3. **Academic experience:**
   
   2011-Present  U.S. Naval Academy, Permanent Military Professor

4. **Non-academic experience:**
   
   2006-2008  Staff, Commander, U.S. SEVENTH Fleet, Yokosuka, Japan. Served as Requirements, Innovation and Experimentation Officer.
   2003-2005  Special Projects Patrol Squadron ONE, Brunswick, Maine. Served as Maintenance Officer, Administrative Officer, Training Officer. Qualified as Mission Commander, Sensor Coordinator aboard P-3 aircraft.
   2001-2003  Air Test and Evaluation Squadron TWENTY, Patuxent River, Maryland. Served as Project Officer, developing and supervising test plans for various airborne navigation and sensor systems aboard P-3 aircraft.
   1995-1996  Patrol Squadron ELEVEN, Brunswick, Maine. Served as Aircrew Training Officer. Qualified as Tactical Coordinator and Navigator/Communicator aboard P-3 aircraft.

5. **Certifications or professional registrations:**
   
   Private Pilot

6. **Professional organizations:**
   
   Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
   Senior Member, American Institute of Aeronautics and Astronautics (AIAA)
   Member, American Society of Naval Engineers (ANSE)

7. **Honors and awards:**
Meritorious Service Medal, Joint Service Achievement Medal, Navy Commendation Medal, Navy Achievement Medal
2004 U.S. Naval Test Wing Atlantic Test Naval Flight Officer of the Year

8. **Service activities:**

Class of 2015 Midshipman Sponsor

9. **Publications:**


10. **Professional development activities:**

Team Leader of the AIAA Point Lobos, California Section team for the 2010 AIAA Young Professionals Rocket Launch Competition, Mojave, California.
Appendix B – Faculty Vitae

1. **Name:**
   Hewitt M. Hymas, CDR, USN

2. **Education:**
   - B.S Physical Geography, University of Utah, 1986
   - M.S Logistics Management, National University, 1991
   - M.S. Physics, Naval Postgraduate School, 1994

3. **Academic experience:**
   - US Naval Academy, CDR, Course Coordinator EE 302, 2007-2011, Full Time
   - US Naval Academy, CDR, Associate Chair- Electrical and Computer Engineering Dept, 2009-2011, Full Time

4. **Non-academic experience:**
   - Space and Naval Warfare Command, Battle Group Electronic Configuration Manager, 2000-2006, Full Time

5. **Certifications or professional registrations:** NA

6. **Professional organizations:** NA

7. **Honors and awards:** NA

8. **Service activities:**
   - Scout Master, Boy Scouts of America
   - Adjunct Professor, Anne Arundel Community College

9. **Publications and presentations:** NA

10. **Professional development activities:** NA
Appendix B – Faculty Vitae

1. **Name:**

   Associate Professor Robert W. Ives

2. **Degrees, with field institution and dates:**

   Ph. D. Electrical Engineering, University of New Mexico, 1998  
   M.S. Electrical Engineering, Naval Postgraduate School, 1990  
   B.S, Mathematics, United States Naval Academy, 1982

3. **Academic Experience**

   2010-Present  USNA, Chairman, Department of Electrical and Computer Engineering  
   2006-Present  USNA, Associate Professor  
   2002-2006  USNA, Assistant Professor  
   1999-2002  Naval Postgraduate School, Assistant Professor

4. **Non-Academic Experience**

   1982-2002  US Naval Officer (Submarines)  
   1994-1999  Military Research Associate, Sandia National Laboratories, Albuquerque, NM  
   1990-1994  Weapons Officer (Department Head), USS Baton Rouge (SSN689)  
   1988-1990  Student, US Naval Postgraduate School  
   1984-1988  Division Officer, USS Baton Rouge (SSN667): Electrical Officer and Communications Officer  
   1982-1984  Nuclear Power Officer Pipeline and Submarine School.

5. **Certifications or Professional Registrations**

   None

6. **Current Membership in professional organizations**

   Senior Member IEEE

7. **Honors and Awards**

   Various military medals and ribbons

8. **Service Activities**

   Department Chairman  
   Bowman Scholar Committee  
   Cyber Configuration Control Board  
   EE Majors Academic Advisor/Plebe Academic Advisor

9. **Principle publications of the last five years**
Journal


Conference


10. Professional development activities in the last five years.
   Effective College Teaching workshop, by Felder & Brent, May 2011.
Appendix B – Faculty Vitae

1. **Name:**
   
   Assoc Prof R. Brian Jenkins

2. **Degrees, with field institution and dates:**
   
   Ph. D. Electrical Engineering, University of Colorado at Boulder, 1995
   M.S. Electrical Engineering, The Ohio State University, 1991
   B.S. Electrical Engineering, The Ohio State University, 1983

3. **Academic Experience**
   
   1996-Present USNA, Associate Professor (Assistant Professor, 1996-2001)
   2009-2010 USNA, Associate Chair, Electrical and Computer Engineering Department
   2006-2009 USNA, Chair, Electrical and Computer Engineering Department
   2005 Johns Hopkins University Applied Physics Laboratory, Visiting Professor (while on sabbatical)
   1998-2001 Naval Research Laboratory, Visiting Professor
   1995-1996 University of Colorado at Boulder, Postdoctoral Research Associate
   1991-1995 University of Colorado at Boulder, Graduate Research Assistant
   1992 University of Colorado at Boulder, Graduate Teaching Assistant
   1990-1991 The Ohio State University, Graduate Research Associate
   1989-1990 The Ohio State University, Graduate Teaching Associate

4. **Non-Academic Experience**
   
   2002-2007 Johns Hopkins University Applied Physics Laboratory, Consultant
   2001-2003 Optinel Systems, Inc, Consultant
   1983-1990 International Business Machines, Senior Associate Engineer
   1982-1983 Summer Pre-Professional
   1981 Wright-Patterson Air Force Base, Engineering Technician

5. **Certifications or Professional Registrations**
   
   None

6. **Current Membership in professional organizations**
   
   Institute of Electrical and Electronics Engineers (IEEE)
   IEEE Photonics Society

7. **Honors and Awards**
   
   Nominated by Electrical and Computer Engineering Department to receive the 2011 Superintendent’s Service Excellence Award
   
   Wertheim Fellow, 2009
Nominated by USNA Electrical Engineering Department to receive USNA Civilian Faculty Teaching Excellence Award, 2002-2003 and 2003-2004

Nominated by USNA Electrical Engineering Department to receive Raouf Ali Raouf Award for Excellence in Teaching Engineering, 2002-2003

Nominated for Best Conference Paper at 1999 ASEE Annual Conference for “Graphical Analysis and Animation in an Introductory Electrodynamics Course”

Nominated for Best Conference Paper at 1998 ASEE Annual Conference for “Simulation and Animation in Optical Fiber Communication”

NCR Award of Excellence in Teaching, presented by NCR Corporation, 1991

IBM First Level Invention Achievement Award, 1990

IBM First Patent Filed Award, 1987

8. Service Activities
   MIDN 1/C Kyle Milden, 2011-present
   MIDN 1/C Mark Daniel, 2006-2007
   MIDN 1/C Clifford Jessop, 2005-2006
   MIDN 1/C Adam Fisher, 2003-2004
Finance Committee, Faculty Senate, 2009-present
Outcome Champion, Outcome 3, ECE Department, 2009-present
Promotion and Tenure Committee, ECE Department, 2001-present (Chair, 2009-present)
Faculty Search and Hiring Committee, ECE Department, 2000-2006, 2009-present
Curriculum Committee, ECE Department, 2000-2006, 2009-present (Acting Chair, Fall Semester 2005)
Academic Advisor, ECE Department, 1996-present
Senior Design Project Mentor, ECE Department, 1996-present
Associate Chair, Electrical and Computer Engineering Department (ECE), 2009-2010
Chair, ECE Department, 2006-2009
Core Curriculum Oversight Committee, ECE Department, 2005-2007
Curriculum Committee, Faculty Senate, 2003-2006
Engineering Curriculum Subcommittee, Faculty Senate, 2003-2006 (Chair, 2003-2004)
Core Curriculum Subcommittee, Faculty Senate, 2003-2006 (Chair)
ABET Assessment Committee, ECE Department, 1999-2006
ECE Department Senator, Faculty Senate, 2003-2005
Trident Scholar Advisor, 2001-2007


Midshipman Tarek Elmasry, “Characterization of an Optical Self-Homodyne DPSK Receiver”, Trident Scholar Project Report; no. 294 (2002); Advisors: B. Jenkins and D. Mechtel

9. **Principle publications of the last five years**
   


10. **Professional development activities in the last five years.**
None (excluding new research endeavors that have been initiated)
Appendix B – Faculty Vitae

1. **Name:**
   John Spencer Lankford

2. **Education:**
   - BSEE Georgia Institute of Technology, 1994
   - MSEET Southern Polytechnic State University, 2008

3. **Academic experience:** N/A

4. **Non-academic experience:**
   - All experience Full Time
   - Radiance Technologies – Afghanistan
     November 2009 – July 2011
     Intelligence Surveillance and Reconnaissance Systems Architect in Afghanistan
   - General Dynamics – Regional Support Team, Tampa FL
     April 2009 – November 2009
     World Wide Deployable Systems Engineer
   - General Dynamics, Mons, Belgium
     July 2003 – April 2009
     Systems Engineer for Allied Command Counter Intelligence
   - SHAPE/Survey, Mons, Belgium
     March 2003 – June 2003
     Intelligence Specialist Second Class – OIF all source Analyst
   - EMS Wireless, Norcross, Georgia
     February 2002 – March 2003
     Senior Systems Engineer
   - Movaz Networks, Norcross, Georgia
     November 2000 – January 2002
     Optical Carrier Senior Engineer
   - Dish Networks, Atlanta, Georgia
     June 2000 – November 2000
     Radio Frequency Design Senior Engineer
   - Scientific Research Corporation, Atlanta, Georgia
     June 97 – June 00
     Radio Frequency Design Engineer II
   - Aeronautical Radio, Inc., Annapolis, Maryland
     June 96 - June 97
     Radio Frequency Design Senior Engineer
   - Scientific Research Corporation, Atlanta, Georgia
     July 92 - June 96
     Radio Frequency Design Engineer

5. **Certifications or professional registrations:**
N/A

6. **Professional organizations:**
   IEEE

7. **Honors and awards:**
   N/A

8. **Service activities:**
   N/A

9. **Publications and presentations:**
   N/A

10. **Professional development activities:**
    Master’s Degree
Appendix B – Faculty Vitae

1. **Name:**
   Francis P. Lanzer

2. **Education:**
   - BS Electrical Engineering, U.S. Naval Academy 1973
   - MS Business Administration, Boston University, 1983
   - MS Electrical Engineering, University of Maryland, 1984

3. **Academic experience:**
   - Senior Lecturer in EE at USNA, 1984-1987
   - Teacher and Business Department Chair, Chesapeake High School, Pasadena, Maryland
   - Lecturer III in Computer Technology, Anne Arundel Community College, 1994-1997
   - Associate Professor, Digital Media & Web Technology, University of Maryland University College, 1994-2001
   - Professor and Chair of Engineering, Anne Arundel Community College, 2002-present

4. **Non-academic experience:** company or entity, title, brief description of position, when
   - Independent computer systems consultant.
     - Major client: Amachea Corp (part-time)

5. **Certifications or professional registrations:**
   - Registered Professional Engineer licensed in Virginia since 1987

6. **Professional organizations:**
   - IEEE, IEEE Computer Society, ASEE
   - National Association of Professional Engineers

7. **Honors and awards:**
   - USNA Clements Award nominee, 1987

8. **Service activities:**
   - Assistant Scoutmaster, Boy Scot Troop 758
   - Worship Ministry Team Chair, Community United method Church

9. **Publications and presentations:**
ASEE Mid-Atlantic Section Meeting – American Society for Engineering Education. Tom’s River, NJ. November 2-4, 2006. Presented the paper entitled “Attracting Girls to Technology: Reach Them Before High School”.


North Carolina State University Undergraduate Assessment Symposium. April 25-27, 2008, Cary, NC. Presented one forum on the communication process relative to the college-wide core competency review, “The Three C’s of Culture of Assessment”


STEMtech 2011, Walt Disney World, FL. Presentation title: Reach ‘em... Keep ‘em! Crafting Camp Experiences that Encourage Minorities

10. **Professional development activities:**

   Participated in the Advanced Placement Computer Science reading for the 10th time.

   Designed, coordinated then instructed the NSA computer science summer camp, Summer 2010

   Taught Scratch and Alice programming to middle school students as part of Kids in College.

   Researched then implemented more advanced techniques of VHDL in the Digital Logic Design course.
Appendix B – Faculty Vitae

1. **Name:**
   LT. Robert Thomas Magnotta

2. **Education:**
   BSEE – Wilkes University, 1992
   MSEE – Wilkes University, 2001

3. **Academic experience:**
   This is my first academic experience.

4. **Non-academic experience:**

5. **Certifications or professional registrations:**
   PE in the state of PA.

6. **Professional organizations:**
   Infraguard.

7. **Honors and awards:**
   None

8. **Service activities:**
   Assistant Scout Master, Boy Scout Troop 155

9. **Publications and presentations:**
   None

10. **Professional development activities:**
    None
Appendix B – Faculty Vitae

1. **Name:**
   Tracy A. Martin, Captain, USMC

2. **Education:**
   - B.S., Systems Engineering, United States Naval Academy, 2004
   - M.S., Electrical Engineering, Naval Postgraduate School, 2010

3. **Academic experience:**
   United States Naval Academy, Instructor, 2010 - current

4. **Non-academic experience:**
   - Electrician’s Mate, United States Navy, Nuclear Reactor Operator, 1998-2000
   - Officer, United States Marine Corps, Signals Intelligence Officer, 2004 - current

5. **Certifications or professional registrations:**
   - EIT (MD)

6. **Professional organizations:**
   - IEEE, member

7. **Honors and awards:**
   - Various military personal and unit awards

8. **Service activities:**
   - 27th USMC Company Mentor
   - Volunteer Firefighter (Company 17)

9. **Important Publications and presentations:**
   - Thesis presentation – Analysis and Simulation of Disadvantaged Receivers for Multiple-Input Multiple-Output Communications Systems, September 2010

10. **Professional development activities:**
    - Multiple IEEE webinars in communications
Appendix B – Faculty Vitae

1. **Name:**
   Christopher B. Mayer, Major, USAF

2. **Education:**
   
   **Ph.D. Computer Science**, Arizona State University, 2005
   Dissertation: *Quality-based Replication of Freshness-Differentiated Web Applications and Their Backend Databases*

   Thesis: *A Reconfigurable Superscalar Architecture*

   **B.S. Electrical Engineering**, Texas A&M University, 1992

3. **Academic experience:**
   
   Air Force Institute of Technology, Department of Electrical and Computer Engineering, Lecturer, Jan 2004 – Dec 2005, Full Time

   Air Force Institute of Technology, Department of Electrical and Computer Engineering, Assistant Professor, Jan 2005 – Sep 2007, Full Time

   United States Naval Academy, Department of Electrical and Computer Engineering, Assistant Professor, Oct 2007 – Present; Full Time

4. **Non-academic experience:**
   
   United States Air Force – Rome Laboratory, NY; March 1993 – May 1996; contracting oversight, software development, technical writing; Full Time

   Air Force Operational Test and Evaluation Center (AFOTEC), Kirtland AFB, NM; Evaluated the source code and software development process in support of the CV-22, C-130J, and C-5 Avionics Upgrade test programs; wrote a computer-based notation and scoring tool for use by software analysts; Jan 1998 – July 2000; Full Time

   Operation New Dawn, Tikrit, Iraq; Advised faculty at the Iraqi Air Force College; performed assorted tasks as part of the Department of State’s Office of Security Cooperation – Tikrit stand-up effort; part-time executive officer for the OSC-I Tikrit senior military advisor; Aug 2011 – Oct 2011, Full Time

5. **Certifications or professional registrations:**
   None
6. **Professional organizations:**
   None

7. **Honors and awards:**
   None

8. **Service activities:**
   Session Chair, International Congress on Evolutionary Computation, 5-8 June 2011
   Senior Academic Advisor for Computer Engineering, ECE Department, USNA
   Plebe (Freshman) Academic Advisor, USNA
   ABET Outcome 8 Champion, ECE Department, USNA

9. **Significant Publications:**


10. **Professional development activities:**
    Reviewer for IEEE Computer
    Reviewer for 2007 IEEE Swarm Intelligence Symposium
    Reviewer for 2007 Information Resources Management Association International Conference
Appendix B – Faculty Vitae

1. **Name:**
   
   Deborah M. Mechtel

2. **Education:**
   
   BS Mechanical engineering, The University of Virginia, 1982  
   MS Electrical Engineering, The Johns Hopkins University, 1988  
   Ph.D. Electrical Engineering, The Johns Hopkins University, 1994

3. **Academic experience:**
   
   1999-Present  USNA, Associate Professor, Tenure 08/99, FT  
   1994-1999  USNA, Assistant Professor, FT

4. **Non-academic experience:**
   
   1982-1984  Engineer, Westinghouse Electric Corporation, Baltimore, MD

5. **Certifications or professional registrations:**
   
   NA

6. **Current membership in professional organizations:**
   
   ASEE, IEEE

7. **Honors and awards:**
   
   U.S. Patent No. 6,271,671 issued on August 7, 2001 for an invention entitled "Multi-Chip Module Testability Using Poled-Polymer Interlayer Dielectrics"


8. **Service activities:**
   
   Division I Curriculum Committee  
   Academic advisor  
   Assessment Group Chair  
   Course Coordinator for EE221 and EE372  
   Curriculum Committee Chair  
   Junior faculty mentor  
   Faculty Search Committee
P and T Committee
Student recruiting
Trident Mentor
Clean Room Support

9. **Principle publications and presentations of the last five years:**


Firebaugh, Samara L and Mechtel, Deborah M., “Making the Abstract Come Alive in an Introductory Electrodynamics Course” 2010 ASEE Annual Conference Proceedings

Deborah Mechtel,“ Building Engineering Literate Non-Engineers” Presentation ASEE Annual Conference, Pittsburgh, Pennsylvania, June 2008

Deborah Mechtel, Robert Voigt, Keith Kintzley, Andrew McCue “Building Engineering Literate Non-Engineers” 2008 ASEE Annual Conference Proceedings,

10. **Professional development activities:**
Sonnet Training Course, Feb 17 2009

Howard County Maryland STEM Business and Education Leadership Symposium, March 6, 2008
Appendix B – Faculty Vitae

1. **Name:**
   
   LT Juan Moreno

2. **Degrees, with field institution and dates:**
   
   Navy Officer, Escuela Naval Militar, 2001
   Major in Information and Communications Technology, Spanish Navy Specialization School, 2006

3. **Academic Experience**
   
   2011-Present USNA, Military Instructor
   2009-2011 Escuela Naval Militar Instructor/Evaluator

4. **Non-Academic Experience**
   
   2007-2009 Head of Operations Department, amphibious ship SPS Galicia, Rota (Spain). Served as Operations Officer, Navigator and Communications Officer.
   2001-2006 Division Officer on frigate SPS Almirante Juan de Borbon, Ferrol (Spain). Served as Damage and Control Officer managing a team of 80 personnel, Bridge and CIC Officer, as well as Communications Officer the last year.

5. **Certifications or Professional Registrations**
   
   2001 SP Navy Officer.
   2002 Aegis Combat System and Console Operator.
   2003 Damage and Control Officer.
   2008 NATO Operational Electronic Warfare and Flight Safety course.
   2009 Tactical Action Officer and Warfare Electronic Chart Display Information System course.
   2010 Pedagogical skills course.

6. **Current Membership in professional organizations**
   
   None.

7. **Honors and Awards**
   
   Two Honorific Mentions and NATO Article 5 Medal.

8. **Service Activities**
   
   EE301 Instructor.
9. Principle publications of the last five years

None.
Appendix B – Faculty Vitae

1. **Name:**
   Maj Corry P. Murphy

2. **Degrees, with field institution and dates:**
   B.S. Aeronautical Engineering, University of Maryland, College Park, MD, 1999
   M.S. Electrical Engineering, Naval Post Graduate School, 2006

3. **Academic Experience**
   2008-Present USNA, Master Instructor

4. **Non-Academic Experience**
   Jul 98 – Aug 98 Officer Candidate School, PLC Combined
   Nov 99 – Jun 00 The Basic School
   Jun 02 – Nov 03 HMT-302, Replacement Aircrew CH-53E
   Dec 03 – Jul 03 HMH-464, (Embark Officer)
   Aug 03 – May 05 HMH-461 (S-6, Operations and Safety)
   Jun 05 – May 06 2nd Blt, 2nd Marines, 2nd Marine Division (Forward Air Controller)
   Jun 06 – Jun 08 Naval Postgraduate School (Student)
   Aug 08–Present USNA EE Dept (Instructor)

5. **Certifications or Professional Registrations**

6. **Current Membership in professional organizations**
   None

7. **Honors and Awards**
   Air Medal, Navy Achievement Medal, Combat Action Ribbon, Space and Naval Warfare (SPAWAR) Systems Command Award for distinguished academic achievement in the advanced Electronics Systems Engineering Program, Best Student Thesis Award

8. **Service Activities**
   Executive Assistant

9. **Principle publications of the last five years**
   None

10. **Professional development activities in the last five years,**
    None
Appendix B – Faculty Vitae

1. **Name:**
   Charles Nelson

2. **Education:**
   - BS Physics USNA 1996
   - Master of Engineering Management (M.E.M) Old Dominion University, 2003
   - Master of Science Electrical and Computer Engineering (M.S.E.C.E) Johns Hopkins University, 2004

3. **Academic experience:**
   - USNA, LT, Instructor, 2002-2003, Naval Architecture and Ocean Engineering Department, full time
   - USNA, LCDR, Instructor, 2007 – present, Electrical and Computer Engineering Department, full time

4. **Non-academic experience:**
   - General Electric
     - Lean Six Sigma Master Black Belt (2006 – 2007), full time
     - Lean Six Sigma Black Belt (2005), full time
     - Application Engineer and Business Development Associate (2004-2005), full time

5. **Certifications or professional registrations:**
   - Qualified Nuclear Engineer, US Navy (2001)

6. **Professional organizations:**
   - ASEE

7. **Honors and awards:**
   - NA

8. **Service activities:**
   - Head of Robotics Club at Windsor Farm Elementary School

9. **Publications and presentations:**


Joseph E. Sluz; James Riggins II; Juan C. Juarez; Raymond M. Sova; David W. Young; Charles Nelson, “Characterization of data transmission through a maritime free-space optical channel with a custom bit error rate tester,” Proc. SPIE 7700, (2010)


10. Professional development activities:

NA
Appendix B – Faculty Vitae

1. **Name:**
   Hau Trung Ngo

2. **Education:**
   Doctor of Philosophy, Electrical and Computer Engineering, Old Dominion University, 2007.
   Master of Science, Computer Engineering, Old Dominion University, 2003.
   Bachelor of Science, Computer Engineering, Old Dominion University, 2001.

3. **Academic experience:**
   United States Naval Academy, Assistant Professor, 2008 – present, full time.
   Old Dominion University, Adjunct Assistant Professor, 2008.
   Old Dominion University, Instructor, 2003-2007.

4. **Non-academic experience:**
   NA

5. **Certifications or professional registrations:**
   NA

6. **Professional organizations:**
   IEEE member

7. **Honors and awards:**
   NA

8. **Service activities:**
   Outcome champion for outcome j (knowledge of contemporary issues) for ABET accreditation.
   Member of the Plebe recruiting committee.

9. **Publications and presentations:**

   **Journal papers:**


Conference papers:


10. **Professional development activities:**

   Attended “Effective Teaching” workshop in May 2011.
Appendix B – Faculty Vitae

1. **Name:**
   
   CDR Hartley Albert Postlethwaite, V

2. **Education:**
   
   BS Computer Science, United States Naval Academy 1995
   MS Electrical Engineering, Naval Post Graduate School, 2011

3. **Academic experience:**
   
   USNA, Military Faculty, 2011-present, full time

4. **Non-academic experience:**
   
   Naval Officer / Naval Aviator 1995-2011
   Held various leadership positions as public affairs, training, safety and standardization, C4I, and operations officer. Certified as a flight instructor and check pilot for multiple Navy airframes. Culminated as the Operations Officer of one of the most dynamic squadron in the Navy’s inventory. Full time

5. **Certifications or professional registrations:**
   
   FAA Certified Flight Instructor
   FAA Advanced and Instrument Ground Instructor

6. **Professional organizations:**
   
   AIAA

7. **Honors and awards:**
   
   1995 Aerospace Leader of Tomorrow, Laureate Award from Aviation Week and Space Technology.

8. **Service activities:**
   
   Event Director of “All Red Star.” The largest gathering of Eastern block aircraft
   Volunteer open ocean sailing instructor for Midshipmen
9. **Publications and presentations:**

   2011 – Author, Thesis for MSEE. “Alternate Alamouti Space Time Block Codes”

10. **Professional development activities:**

    Concentrating on developing the most efficient and relevant teaching techniques for Midshipmen.
Appendix B – Faculty Vitae

1. **Name:**
   Asc. Prof. Ryan N. Rakvic

2. **Degrees, with field institution and dates:**
   - Ph.D. Computer Engineering Carnegie Mellon University 2003
   - M.S. Computer Engineering Carnegie Mellon University 1999
   - B.S. Computer Engineering University of Michigan 1997

3. **Academic Experience:**
   - 2011-Present USNA Associate Professor
   - 2005-2011 USNA Assistant Professor
   - 1999 Carnegie Mellon University Teaching Assistant
   - 1996-1997 University of Michigan Grader

4. **Non-Academic Experience:**

   **Intel Corporation**
   Visiting Research Engineer May 2006-August 2006
   Intel Barcelona Research Center, Barcelona, Spain
   Collaborative research between Naval Academy and Intel Corporation which resulted in novel energy efficient solutions for multi-threaded multi-core microprocessors.

   Senior Research Engineer October 2000-August 2005
   Microarchitecture Research Lab, Santa Clara, CA
   Worked five years in computer architecture research lab responsible for driving Intel Corporation to leadership in the high-performance microprocessor domain. Technical patents and refereed conference publications were key measurable outputs.

   Graduate Technical Engineer Summer 1998
   Microprocessor Research Lab, Portland, OR
   Researched memory latency issues of a microprocessor which resulted in a patent filing.

   Intern Engineer Summer 1997
   Architecture Validation Team (Itanium Processor), Santa Clara, CA
   Performed architecture validation of memory instructions for Intel's first 64 bit microprocessor.

   Intern Engineer Summer 1996
   Design Automation Team (Itanium Processor), Santa Clara, CA
Contributed to a full chip design task force that developed a new microprocessor design tool suite.

5. **Certifications or Professional Registrations:**

NA

6. **Current Membership in professional organizations:**

Member IEEE  
Eta Kappa Nu  
Phi Kappa Phi  
Golden Key National Honor Society

7. **Honors and Awards:**

Nominated for Research Award (2011)

8. **Service Activities:**

Computer Engineering Major Program Development  
Led proposal to add one elective to computer engineering matrix. 2009-2010  
Matrix modification combines 2 old courses into one new course.  
Introduces new major computer elective.  
Course elective rules created.  
Results in a competitive computer engineering degree.

Member of Computer Engineering Committee  
2006-Present  
Assisted with computer engineering curricula development.  
Assisted with computer engineering newsletter.  
Directed budget allocation for computer engineering courses.

Member of Computer Engineering Recruiting Committee.  
2008-Present  
Led computer engineering recruiting events.  
Attended numerous open houses and recruiting events.

Department  
Member of Curriculum Committee  
2008-Present  
Academic Adviser for an average of 8 midshipmen per year  
2006-Present  
Member of Group Outcome Team for ABET outcomes 1,2, & 11  
2009-Present  
Co-implemented new proposal which includes course coordinator-based survey student-based blackboard survey, and path for feedback.

Outcome Champion for ABET outcome 11  
2009-Present  
Evaluated outcome through process with instructor responses.

Outcome Champion for ABET outcome 5  
2006-2009  
Member of Faculty Recruiting Committee  
2007-2009  
Assessed potential candidates with Department Chair.

Course Brief Presenter  
Delivered numerous course briefs for EE242, EE461 and EE462.

HRPP Admin. for USNA Center for Biometric Signal Processing  
2009-Present
Maintained the forms necessary for human subject research.

Yard
Member of the Cyber Warfare Adhoc Committee 2009
Attended meetings that discussed future of cyber warfare at the USNA.
Researched prominent Information Security graduate schools.
Reported on type of student ideal for future research in cyber warfare.
Member of Cyber Director Hiring Committee 2010
Plebe Adviser for 17 midshipmen 2008
STEM and Summer Seminar participant 2009
Prepared biometric lab with multiple demonstrations to inspire high-school and plebe students to consider engineering as a major.
ECE Department Library Liaison 2009-Present

9. **Principle publications of the last five years:**

**Journal Publications**


**Conference Publications**


10. **Professional development activities:**

   Promoted to Associate Professor with tenure in August 2011.
Appendix B – Faculty Vitae

1. **Name:**
   Kevin W. Rudd, Ph. D., CAPT, USN

2. **Degrees, with field institution and dates:**
   M.S. Electrical Engineering, Stanford University, 1992.
   B.S. Electrical Engineering, Stanford University, 1984.

3. **Academic Experience**
   2009–Present  USNA, Assistant Professor.
   2008  Technical University Delft, Visiting Assistant Professor.
   1998  Stanford University, Teaching Fellow.

4. **Non-Academic Experience**
   1983–Present  Officer, United States Navy and United States Naval Reserve.  Qualified Submarine Assistance Team Watch Officer, Submarine Force Pacific.  Qualified Debrief Officer, Brief Officer, Watch Officer, Patrol Wing Ten.  Qualified on Submarines, USS Puffer (SSN 652).
   1989–1999  Teaching Fellow, System Administrator, Graduate Research Assistant.

5. **Certifications or Professional Registrations**
   None Engineer

6. **Current Membership in professional organizations**
   Member IEEE, Member ACM, Member ASEE.

7. **Honors and Awards**
   Navy Commendation Medal, Navy Achievement Award.

8. **Service Activities**
   Director, General Engineering Program.  Senate Subcommittee on Information Technology.  Officer Representative, Mountaineering Club.

9. **Principle publications of the last five years**

10. **Professional development activities in the last five years.**
Computer Architecture technical advisor to Johns Hopkins University Applied Physics Laboratory, Asymmetric Operations Department.
Appendix B – Faculty Vitae

1. **Name:**

   Thomas E. Salem

2. **Education:**

   Ph.D. – Electrical Engineering, The University of Alabama, 1996  
   M.S.E.E. – Electrical Engineering, The University of Alabama, 1993  
   B.S.E. – Electrical Engineering, Grove City College, 1988

3. **Academic Experience:**

   U.S. Naval Academy, Associate Professor, 2008 – Present, full-time  
   U.S. Naval Academy, Assistant Professor, 2002 – 2008, full-time  
   Elizabethtown College, Assistant Professor, 1998 – 2002, full-time  
   Penn State University (Harrisburg), Adjunct Lecturer, 2000 – 2001, part-time  
   Penn State University (Mont Alto), Assistant Professor, 1996 – 1998, full-time

4. **Non-Academic Experience:**

   U.S. Army Research Laboratory, Senior Engineer, research engineer in power electronic components and systems, 2004 – Present, part-time  
   U.S. Naval Research Laboratory, Research Engineer, research engineer in power electronic components and systems, 2002 – 2003, part-time  
   ATC – Diversified Electronics, Senior Staff Engineer, product engineer and senior management advisor, 1999 – 2000, part-time  
   TB Wood’s Inc., Principal Electronics Engineer, research engineer in power electronic components and systems, 1997 – 1998, part-time  
   Fort James Inc., Consultant, taught fundamentals of electricity course, 1998, part-time  
   Westinghouse Savannah River Co., Project Engineer, process control instrumentation engineer, 1989 – 1995, full- and part- time  
   E.I. DuPont DeNemours & Co., Project Engineer, process control instrumentation engineer, 1988 – 1989, full-time

5. **Certifications or Professional Registrations:**

   Licensed Professional Engineer, State of Pennsylvania

6. **Professional organizations:**

   No current professional memberships, inactive IEEE Senior Member

7. **Honors and Awards:**
Member of Sigma Pi Sigma and Eta Kappa Nu
Recipient of Westinghouse Total Quality Achievement Award and the George
Westinghouse Signature Award of Excellence
Listed in Marquis Who’s Who in America 2007

8. **Service Activities:**

- ABET EE Program Lead
- Outcome Group Leader
- Academic Curriculum Committee Member
- Division Trident Committee Member

9. **Publications and presentations:**


10. **Professional development activities:**

   Attended the tutorial session “Microgrids – Designing Their Role in Smart Grid” at the IEEE Power Systems Conference and Exposition, March 2011
Appendix B – Faculty Vitae

1. **Name:**

Professor Antal A. Sarkady

2. **Degrees, with field institution and dates:**

Ph. D., University of New Hampshire, 1975
M.S. Electrical Engineering, University of New Hampshire, 1967
B.S, Electrical Engineering, University of New Hampshire, 1964

3. **Academic Experience**

1977-Present  USNA, Professor of Electrical and Computer Engineering
1974-1977 Virginia Polytechnic Institute and State University, Assistant Professor
1971-1974 University of New Hampshire, Instructor
1970-1971 Jamestown Community College, Assistant Professor

4. **Non-Academic Experience**

1976-Present  Consultant, Elmeco Engineering
1971-1974  Consultant, University of New Hampshire Space Science Center
1969-1969  Consultant, Gerrald-Ashe Company
1964-1968  Project Engineer, University of New Hampshire Space Science Center
1959-1961  Electronics Designer, Canal Industrial Corporation
1957-1959  Electronics Designer, National Instruments Laboratory

5. **Certifications or Professional Registrations**

Former member of IEEE, ASEE

6. **Current Membership in professional organizations**

Senior Member IEEE

7. **Honors and Awards**

Award and Citation from NASA for design of "A Low Cost-Low Power multi-channel Pulse Height Analyzer for University Balloon and Rocket Experiments," 1966.

8. **Service Activities**

NA

9. **Principle publications of the last five years**

10. **Professional development activities in the last five years.**

“Validating the integrated airborne hostile fire indicator and shooter location system based on the China Lake Helicopter Test Data”, Code 5663 NRL, 2011.

Based on these reports and recommendations NRL performed the following field experiments and studies:


Appendix B – Faculty Vitae

1. **Name:**
   
   LCDR Robert C. Schultz

2. **Degrees, with field institution and dates:**
   
   M.S. Electrical Engineering, Florida Atlantic University, 1999  
   *Thesis: Voice Activity Detection over Multi Resolution Subspaces*
   
   B.S. Electrical Engineering, Florida Atlantic University, 1998
   
   A.A. Palm Beach Community College, 1995

3. **Academic Experience**
   
   2011-Present  USNA, Junior Permanent Military Professor
   
   2009-2011  Naval Submarine School, Navigation and Submarine Department Head
   
   2004-2006  USNA, Master Instructor

4. **Non-Academic Experience**
   
   2006-2009  Department Head on submarine USS Providence. Served as Operations Officer.
   
   2001-2004  Division Officer on submarine USS West Virginia Blue. Served as Main Propulsion Assistant, Communications Officer, and Quality Assurance Officer supervising up to 21 personnel.
   
   2000-2001  Nuclear Power Officer Pipeline and Submarine School.
   
   1998-1999  Unix Systems Administrator for Florida Atlantic University, College of Engineering.
   
   1997  Co-Op Student at Siemens Business Communications. Responsible for testing of telephone switches and development of automatic test scripts.
   
   1996  Co-Op Student for United Space Alliance. Responsible for design and drafting of special tools for use in support of shuttle ground operations.
   
   1994-1996  PADI Dive Master for numerous charter boats located in Riviera Beach, FL.
   
   1990-1993  US Navy Machinist Mate on submarine USS Von Steuben Blue. Served in numerous billets within the Machinery division responsible for the maintenance and operation of the submarine nuclear power plant mechanical systems.
   

5. **Certifications or Professional Registrations**
   
   NA

6. **Current Membership in professional organizations**

166
Student Member IEEE

7. **Honors and Awards**
   Navy Commendation Medal – 4, Navy Achievement Medal - 3

8. **Service Activities**
   NA

9. **Principle publications of the last five years**
   NA

10. **Professional development activities in the last five years.**
    Actively seeking PhD from UMBC.
Appendix B – Faculty Vitae

1. **Name:**
   Louiza Sellami

2. **Education:**
   MS, Electrical Engineering, University of Maryland, College Park, May 1988.

3. **Academic experience:**
   August 2000-Present: Associate Professor
   January 1993 – August 2000: Assistant Professor

4. **Non-academic experience:**

5. **Certifications or professional registrations:**
   NA

6. **Professional organizations:**
   IEEE, ASEE, Sigma Xi

7. **Honors and awards:**
   Listed in Whose Who (Technology).

8. **Service activities:**
   Academic advisor and Plebe advisor.
   Faculty Senate NARC.
   E&W Division Trident Scholarship Committee.
   Plebe briefings, EE openhouse, Recruiting.
   Faculty Search Committee.
   Research Committee: Midshipmen Research Liaison.
   Assessment Committee.
   EE Graduate Program Advisor.
   Promotion and Tenure Committee.
   Department Trident Scholarship Committee.
   Curriculum Committee.
Internships Coordinator.
Senior Design Project Judging Committee.
Collaboration with Professors and Researchers from the Microsystems Lab at the University of Maryland, and the VLSI Lab at the George Washington University.

9. **Publications and presentations:**


10. **Professional development activities:**

ABET Faculty Workshop on Assessing Program Outcomes, Spring 2009.
Assessment Colloquium, Naval Academy, Fall 2001.
IT Conference, Naval Academy, Fall 2001.
Joint Spectrum Center brief, Fall 2001.
Three Workshops on Active Learning, presented by Jim Eison, Faculty Enhancement Center, US Naval Academy, June 99.
Effective Teaching Workshop, presented by Richard M. Felder and Rebecca Brent, Faculty Enhancement Center, US Naval Academy, July 99.
Appendix B – Faculty Vitae

1. **Name:**
   
   LT Jennifer L. Shafer

2. **Degrees, with field institution and dates:**
   
   B.S. Electrical Engineering, Virginia Tech, 2003  
   M.S. Electrical Engineering, Naval Postgraduate School, 2009

3. **Academic Experience:**
   
   2009-Present USNA, Instructor

4. **Non-Academic Experience:**
   
   2006-2008 Division Officer on USS COMSTOCK(LSD 45). Served as Navigator.  
   2004-2006 Division Officer on USS JOHN PAUL JONES(DDG 53). Served as Administrative Officer and Legal Officer.

5. **Certifications or Professional Registrations:**
   
   N/A

6. **Professional organizations:**
   
   Member IEEE

7. **Honors and Awards:**
   
   Navy Achievement Medal 2008, 2006

8. **Service Activities:**
   
   Navy Sailing Program XO  
   Women’s Crew Team Officer Representative

9. **Publications and presentations:**
   


10. **Professional development activities:**
    N/A
Appendix B – Faculty Vitae

1. **Name:**
   Maj Michael B. Slatt, USMC

2. **Education:**
   B.S Weapons and Systems Engineering, U.S. Naval Academy, 2000
   M.S Applied Physics, Naval Postgraduate School, 2011

3. **Academic experience:**
   2012-Present  USNA, Instructor

4. **Non-academic experience:**
   2009    MAG-13 Staff
   2007-2009  VMA-311 Quality Assurance Officer
   2006-2007  VMA-513 Safety Officer
   2004-2006  VMA-214 Scheduling Officer
   2003-2004  VMAT-203 Initial AV-8B training
   2001-2004  Flight training (NAS Whiting Field, FL/NAS Meridian, MS)
   2000-2001  The Basic School, Quantico, VA

5. **Certifications or professional registrations:**  None

6. **Professional organizations:**  None

7. **Honors and awards:**
   Air Medal
   Navy Marine Corps Commendation Medal

8. **Service activities:**  None

9. **Publications and presentations:**  None

10. **Professional development activities:**  None

Appendix B – Faculty Vitae

1. **Name:**
   CDR Patrick Vincent

172
2. **Degrees, with field institution and dates:**

Ph. D. Electrical Engineering, Naval Postgraduate School, 2007  
Electrical Engineer, University of California, Los Angeles, 2000  
M.S. Electrical Engineering, Naval Postgraduate School, 1992  
B.S. Electrical Engineering, Polytechnic Institute of New York, 1984

3. **Academic Experience:**

2006-Present USNA, Permanent Military Professor  
2002-2006 Doctoral student  
2000-2002 USNA, Instructor

4. **Non-Academic Experience:**

1996-1997 Executive Officer, COMSUBPACREP NORWEST, Bremerton, WA.  
1992-1996 Department Head on submarine USS ALASKA (SSBN 732) (GOLD). Served as Engineer Officer.  
1986-1989 Division Officer on submarine USS ALABAMA (SSBN 731) (GOLD). Served as Main Propulsion Assistant, Communications Officer, Damage Control Assistant.

5. **Certifications or Professional Registrations:**

None

6. **Professional organizations:**

None

7. **Honors and Awards:**

Meritorious Service Medal, Navy Commendation Medal, Navy Achievement Medal

8. **Service Activities:**

None presently.

In the past, served as Computer Science Department Associate Chair (twice), served as Computer Science Department Assessment Committee Chair during successful ABET reaccreditation for Computer Science and first-ever accreditation for Information Technology major, served as Senior Academic Advisor for the Computer Science major, chaired committee that developed new USNA core course in cyber security.
9. **Publications and presentations:**


10. **Professional development activities:**

None
Appendix B – Faculty Vitae

1. Name:
   CDR T. Owens Walker III, USN, Ph.D.

2. Degrees, with field institution and dates:
   Ph. D. Electrical Engineering, Naval Postgraduate School, 2009
   Electrical Engineer, Naval Postgraduate School, 1995
   M.S. Electrical Engineering, Naval Postgraduate School, 1995

3. Academic Experience
   2009-Present  Assistant Professor, United States Naval Academy, Annapolis, MD
   2004-2006  Lecturer, Computer Science, Naval Postgraduate School, Monterey, CA

4. Non-Academic Experience
   2004-2006  Program Officer and Military Faculty: Computer Science Department, Naval Postgraduate School, Monterey, CA.
   1998-2000  Aviation Department Head Tour: Operations Officer, Assistant Maintenance Officer, Administrative Officer – Patrol Squadron Four (VP-4), MCBH Kaneohe Bay, HI.
   1995-1998  Disassociated Sea Tour: Catapult & Arresting Gear Officer - USS JOHN C. STENNIS (CVN-70), Norfolk, VA.
   1989-1992  Aviation Junior Officer Tour: Assistant Administrative Department Head, AV/ARM Division Officer – Patrol Squadron ELEVEN (VP-11); Line Division Officer, Public Affairs Officer - Patrol Squadron FORTY-FOUR (VP-44), NAS Brunswick, ME.
   1987-1989  Student: Flight Training Pipeline – Aviation Preflight Indoctrination, Pensacola, FL; VT-3, NAS Milton, FL; VT-31, NAS Corpus Christi, TX, Patrol Squadron THIRTY (VP-30), NAS Jacksonville, FL.

5. Certifications or Professional Registrations
   Member, Eta Kappa Nu

6. Current Membership in professional organizations
   Member, IEEE

7. Honors and Awards
   Military Awards: Meritorious Service Medal (2 awards), Navy Commendation Medal (2 awards), Navy Achievement Medal (2 awards)
   Civilian Honors and Awards: Nominated for Best Paper at Hawaii International Conference on Systems and Sciences (January 2010); First Command Military Leadership Award (2 awards – September 2005, June 2006); Navy League Award for Outstanding Academic Achievement (June 1995)
8. **Service Activities**
   ECE Department Assessment Chair
   Member, ECE Department Curriculum Committee
   USNA Plebe Academic Advisor
   USNA Honor Remediation Senior Mentor

9. **Principle publications of the last five years**

10. **Professional development activities in the last five years.**
    Attended numerous research-related Conferences and Symposia.
    Attended ABET Conference and Workshop, October, 2011.
    Attended ABET Symposium and Workshop, April 2011.
    Earned Ph.D., 2009.
Appendix B – Faculty Vitae

1. **Name:**
   Capt Ryan D Whitty

2. **Education:**

3. **Academic experience:**
   USNA, Instructor, Jan 2011-Present, full time

4. **Non-academic experience:**
   Signals Officer USMC, 2003-2008, full time

5. **Certifications or professional registrations:**

6. **Professional organizations:**
   NA

7. **Honors and awards:**
   NA

8. **Service activities:**
   Officer Rep for various Midshipman ECA’s

9. **Publications and presentations:**


   Whitty, R.D.; McEachen, J; Tummala, M; , “Three-Dimensional Geolocation of Mobile WiMax Subscribers,” MilCom, 2011 IEEE Military Communications Conference, 7-10 Nov. 2011

10. **Professional development:**
   Attendance and presentation at MilCom 2011.
Appendix B – Faculty Vitae

1. **Name:**
   Jonathan R. Williams

2. **Education:**
   BSEE, USNA 1992; MSECE, Georgia Tech, 2004

3. **Academic experience:**
   2009 to present, USNA, Senior Instructor

4. **Non-academic experience:**
   Extensive US Navy operational, acquisition, and aviation test experience from 1992 to present.

5. **Certifications or professional registrations:**
   N/A

6. **Professional organizations:**
   IEEE

7. **Honors and awards:**
   N/A

8. **Service activities:**
   Youth sports coaching, Boy Scouts of America leader

9. **Publications and presentations:**
   N/A

10. **Professional development activities:**
    N/A
Appendix B – Faculty Vitae

1. **Name:**
   LT Stephen Winchell

2. **Degrees, with field institution and dates:**
   M.S. Applied Physics, Naval Postgraduate School, 2006
   B.S. Physics, United States Naval Academy, 2005

3. **Academic Experience:**
   2010-Present USNA, Military Professor
   2009-2010 Submarine Nuclear Engineering Education Coordinator/Evaluator

4. **Non-Academic Experience:**
   2007-2010 Division Officer on submarine USS Charlotte. Duties included Assistant Engineer, Chemical and Radiological Assistant, Electrical Officer, Damage Control Assistant and Reactor Controls Assistant.
   2006-2007 Nuclear Power Officer Pipeline and Submarine School.
   1999-2000 Laboratory Technician working in High Pressure Liquid Chromatography (HPLC).

5. **Certifications or Professional Registrations:**
   Nuclear Engineer Officer (Department of Energy).

6. **Professional organizations:**
   None.

7. **Honors and Awards:**
   Navy Commendation Medal.

8. **Service Activities:**
   None.

9. **Publications:**
Ives, R.W., Ngo, H. and Winchell, S.D., "Evaluating the Information Content of Near-Infrared Iris Imagery" (in submission)

10. **Professional development activities:**

Auditing classes in Computer Science and Computer Engineering with a view towards pursuing Doctorate studies in the future.
Appendix B – Faculty Vitae

1. **Name:**
   LCDR Jennie H. G. Wood

2. **Degrees, with field institution and dates:**
   M.S. Electrical Engineering, Naval Postgraduate School, 2007
   B.S. Naval Architecture, U.S. Naval Academy, 2001

3. **Academic Experience**
   2011-Present USNA, Junior Permanent Military Professor

4. **Non-Academic Experience**
   2007-2011 Department Head and Project Officer at Navy Cyber Warfare Development Group (Suitland, MD). Supervised 30 civilian, enlisted, and contractor personnel and managed project budgets totaling over $20M.
   2002-2005 Watch Officer and Branch Head in National Security Agency’s Information Warfare Support Center, supporting time-sensitive requests for information and intelligence activities.
   2001-2001 Naval Cryptologic Officer’s Basic Course pipeline.

5. **Certifications or Professional Registrations**
   Joint Professional Military Education – Phase I

6. **Current Membership in professional organizations:**
   NA

7. **Honors and Awards:**
   Joint Service Commendation Medal, Navy Commendation Medal, Joint Service Achievement Medal.

8. **Service Activities:**
   Engineering & Weapons Senior Watch Officer
   Midshipman Intern Sponsor for Navy Cyber Warfare Development Group
   Officer Representative for Winter Musical

9. **Principal publications:**
10. **Professional development activities:**
Credit towards Certificate in Financial Accounting.
## Appendix C – Equipment

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Appendix D – Institutional Summary

Programs are requested to provide the following information.

1. The Institution
   a. Name and address of the institution

      The United States Naval Academy
      Annapolis, MD 21402-5000

   b. Name and title of the chief executive officer of the institution

      Vice Admiral Michael H. Miller, USN
      Superintendent

   c. Name and title of the person submitting the self-study report.

      Dr. Andrew T. Phillips
      Academic Dean and Provost

   d. Name the organizations by which the institution is now accredited and the dates of the initial and most recent accreditation evaluations.

      Middle States Association of Colleges and Schools
      Commission on Higher Education – (MSA/CHE)
      Initial Accredication – 1947
      Recent Accreditation - 2006

2. Type of Control

   Federal Government

3. Educational Unit Organization

   There are five academic departments in the Division of Engineering and Weapons. They are Aerospace Engineering (EA), Electrical Engineering and Computer Engineering (ECE), Mechanical Engineering (EME), Weapons and Systems Engineering (ESE), and Naval Architecture and Ocean Engineering (NAOE). The chair of each of these departments reports to the Division Director through the Division Senior Professor. The Division of Engineering and Weapons is one of five academic divisions within the Naval Academy. The Division Director reports to the Superintendent via the Academic Dean and Provost. Also reporting to the Division Director of Engineering and Weapons are the Directors of the Naval Academy Hydromechanics Laboratory (NAHL), the Technical Support Department (TSD), and the Satellite Ground Station.
(SGS). The Senior Professor reports to the Academic Dean through the Division Director. Organizational charts are provided as Figures D.1. The names and titles for the department chairs, the Division Director, and the Senior Professor are

CAPT Jay Bitting, USN
Division Director (effective approx Aug 15, 2012)

Dr. Patrick J. Moran, Professor
Division Senior Professor

CAPT Kenneth Ham, USN
Chair, Aerospace Engineering Department

Dr. Robert W. Ives, Professor
Chair, Electrical and Computer Engineering Department

Dr. Oscar Barton, Jr. Professor
Chair, Mechanical Engineering Department

Dr. David Kreibel, Professor
Chair, Naval Architecture and Ocean Engineering Department

Dr. Kiriakos Kiriakidis, Professor
Chair, Weapons and Systems Engineering Department

Figure D-1 U.S. Naval Academy Organization
4. Academic Support Units

The names and titles of the individuals responsible for each unit that teaches courses required by the Electrical Engineering program are

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Danial W. O’Sullivan</td>
<td>Professor and Chairman</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Dr. Geoffrey L Price</td>
<td>Professor and Chairman</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Dr. Charles A. Edmondson</td>
<td>Professor and Chairman</td>
<td>Physics</td>
</tr>
<tr>
<td>Dr. Timothy D. O’Brien</td>
<td>Professor and Chairman</td>
<td>English</td>
</tr>
<tr>
<td>Dr. Richard P. Abels</td>
<td>Professor and Chairman</td>
<td>History</td>
</tr>
</tbody>
</table>

5. Non-academic Support Units

The names and titles of the individuals responsible for each unit that provide non-academic support required by the Electrical Engineering program are

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. James Rettig</td>
<td>Director</td>
<td>Library</td>
</tr>
<tr>
<td>Mr. Lou Gianotti</td>
<td>Director</td>
<td>ITSD</td>
</tr>
<tr>
<td>Dr. Bruce Burkowski</td>
<td>Director</td>
<td>Academic Center</td>
</tr>
<tr>
<td>Mrs. Wendy Shekdar</td>
<td>Director</td>
<td>Learning Skills Program</td>
</tr>
<tr>
<td>LCDR Kathleen O’Leary</td>
<td>Coordinator</td>
<td>Tutorial Programs</td>
</tr>
<tr>
<td>Mrs. Sandra Erb</td>
<td>Acting Director</td>
<td>Computer Support Branch</td>
</tr>
<tr>
<td>Mr. Gerald Ballman</td>
<td>Director</td>
<td>Technical Support Branch</td>
</tr>
</tbody>
</table>

6. Credit Unit

The Naval Academy operates on a semester schedule, graduating midshipmen in May, August, and December. Class and laboratory sessions are offered between the hours of 7:55 am and 3:30 pm, Monday through Friday. There are six class periods per day. Classes are usually scheduled for one period in a given day; however, some classes have been scheduled using 1½ periods per day. Lab sessions typically occupy two class periods.

The format for all course descriptions includes the number of lecture hours, lab hours, and credit hours and is designated in the following form:

    Course Number (lecture hours – lab hours – credit hours)

A three credit lecture course meets three times each week and is designated as (3-0-3). For lecture based classes one hour of lecture is equivalent to one credit hour. Lab-based courses are
given formats of either (2-2-3) or (3-2-4). For most courses with a laboratory component, two hours of lab instruction is equivalent to one credit hour. Therefore, most laboratory based courses award three or four credits for the course overall.

The academic year begins in mid-August and ends early May, a total of 32 weeks of instruction, not including the final examination period. The Naval Academy uses the definition that one-half year of study is equivalent to 16 semester credit hours for all of its engineering programs.

7. **Tables**
   
   Complete the following tables for the program undergoing evaluation.
Table D-1. Program Enrollment and Degree Data

Computer Engineering

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Enrollment Year</th>
<th>Total Undergrad</th>
<th>Total Grad</th>
<th>Degrees Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>Current 2012</td>
<td>FT</td>
<td>18</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>PT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 2011 FT</td>
<td>16</td>
<td>11</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>PT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 2010 FT</td>
<td>15</td>
<td>11</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>PT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 2009 FT</td>
<td>13</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>PT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 2008 FT</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>PT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Give official fall term enrollment figures (head count) for the current and preceding four academic years and undergraduate and graduate degrees conferred during each of those years. The “current” year means the academic year preceding the fall visit. Note: 1<sup>st</sup> year enrollment typically only involves selecting the major: program courses begin in the 2<sup>nd</sup> year.

FT—full time
PT—part time
Table D-2. Personnel

Electrical and Computer Engineering Department

Year¹: Academic Year 2011-12

<table>
<thead>
<tr>
<th></th>
<th>HEAD COUNT</th>
<th>FTE²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT</td>
<td>PT</td>
</tr>
<tr>
<td>Administrative³</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Faculty (tenure-track)</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Other Faculty (excluding student Assistants)</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td>Student Teaching Assistants</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Student Research Assistants</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Technicians/Specialists</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Office/Clerical Employees</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Others⁴</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Report data for the program being evaluated.

¹ Data on this table should be for the fall term immediately preceding the visit. Updated tables for the fall term when the ABET team is visiting are to be prepared and presented to the team when they arrive.

² For student teaching assistants, 1 FTE equals 20 hours per week of work (or service). For undergraduate and graduate students, 1 FTE equals 15 semester credit-hours (or 24 quarter credit-hours) per term of institutional course work, meaning all courses — science, humanities and social sciences, etc. For faculty members, 1 FTE equals what your institution defines as a full-time load.

³ Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category.

⁴ Specify any other category considered appropriate, or leave blank.
Appendix E – Supplemental Documentation

This appendix contains supplemental data to support the main text of this self-study report. Specifically, the following items are provided in this appendix:

1. Course Assessment Tool (CAT) Template – each course coordinator is asked to complete a survey document as part of the CAT. This survey is assembled and updated as needed by the outcome champions that make use of it.

2. Capstone Mentor Tool Rubric – each senior design mentor is asked to complete this rubric on his/her student design students. This provides outcome champions with a direct measure of student attainment of many of their performance indicators in the student’s final semester.

3. Deficiency Survey (Example) – designed to quantify the deficiencies regarding outcomes (a), (b), and (k). All majors courses course coordinators are asked to respond to this survey once a year. Formally titled the “We Are Deficient on Outcomes (a), (b), and (k) … Or Are We?” survey.

4. Laboratory Survey – provides a student perspective on outcomes (a), (b) and (k). Students are asked for a self-evaluation, mainly in quantitative form, of their laboratory skills. Currently only seniors are asked to respond to this survey upon graduation.

5. Student Outcome Summaries: Full write-ups – These full write-ups support the brief summaries in Criterion 4 and provide additional detail (including the full process table of Figure 4-3 for each outcome), supporting documentation as appropriate, and illustrate the continuous improvement process across multiple assessment cycles

6. Course Coordinators Checklist – outlines tasks associated with the role of Course Coordinator.

7. Plebe Advisor’s Handbook – provides guidance for faculty members serving as Plebe Academic Advisors.


9. ECE Advising Guide – provides guidance for faculty members serving as academic advisors in the Electrical and Computer Engineering Department.
1. Course Assessment Tool (CAT) Template

Course Assessment Tool (CAT)

EEXXX Title of Course

Date

Name and Title of Course Coordinator

USNA Course Catalog Data

EEXXX Title of Course (#-#-#): Description of Course.

Course Pre-requisites by Topic

EEXXX Title of Prerequisite Courses

Additional Topical Requirements

Prerequisites other than courses. If there aren’t any write in “none”

Courses this course serves as a Pre-requisite

EEXXX Title of course served

List the courses that require this course as a pre-requisite. If there aren’t any write in “none

Course Goals

A short description of the major student learning goal for the course.

Course Objectives

Students shall be able to:

A numbered list of the course objectives (COs). (usually less than eight course objectives are listed. (An example follows)
ix. Demonstrate an understanding of AC power in circuits (including multi-phase circuits), electromechanical AC and DC energy conversion devices, magnetic coupling of energy in coils, and the frequency response of circuits and filters.

x. Develop an ability to use advanced circuit analysis techniques, such as Laplace transforms and Fourier analysis, to determine the system response of circuits (including second-order circuits) to various signals.

xi. Design, analyze, build and debug circuits and systems.

xii. Use computer tools to numerically analyze and describe circuit behavior, and use test equipment (multimeters, function generators, oscilloscopes) to experimentally analyze circuits.

xiii. Demonstrate the ability to properly record and report laboratory work in a laboratory notebook.

If your course is a Majors Course, then mark an X in the block if the course objective (CO) applies to the Student Outcome (SO). There should be a clear relationship between the course objectives that support a particular Student Outcome (SO). For example, if you have indicated course objectives that aid Student Outcome g, those course objectives should mention oral or written work. See the example below. The PCOs are listed at the end of this document. **Delete the CO to CCO matrix.**

<table>
<thead>
<tr>
<th>Course Objectives (COs) Relationship to Student Outcomes (SOs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOs</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>EEXXX - 1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

If your course is a Core Course, then mark an X in the block if the course objective (CO) applies to the Core Curricular Outcome (CCO). There should be a clear relationship between the course objectives that support a particular Core Curricular Outcome (CCO). For example, if you have indicated course objectives that aid Core Curricular Outcome a, those course objectives should cover AC and DC circuit theory. See the example below. The CCOs are listed at the end of this document. **Delete the CO to SO matrix.**

<table>
<thead>
<tr>
<th>Course Objectives (COs) Relationship to Core Curricular Outcomes (CCOs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCOs</td>
</tr>
<tr>
<td>------</td>
</tr>
</tbody>
</table>
Assessment and Evaluation

Assessment Methods that Support Measurement of Course Objectives

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Obj 1</th>
<th>Obj 2</th>
<th>Obj 3</th>
<th>Obj 4</th>
<th>Obj 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exams</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory Exercises</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Design Project</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Final Exam</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Any other assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>method used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assessment Matrix Evaluation Rating System:
The following rating system was used for evaluation:
- 1, 80% or more of the students met the course objective,
- 2, 60% - 80% of the students met the course objective.
- 3, 40% - 60% of the students met the course objective.
- 4, less than 40% of the students met the course objective.

List the assessment methods you used in the matrix and rate student performance using the numbered 1 to 4 rating system. (An example matrix is shown above).

Evaluation Results

Include details on all 2, 3 and 4 ratings in the evaluation matrix.

Overall Course Assessment
Assign a subjective score using the following A to E scale to assess the delivery and accomplishments of the course.

**Overall Course Rating System:**
The following rating system was used for evaluation:

**Scale Definitions:**
- A, no adjustments are necessary
- B, a few minor changes are needed in one or two areas
- C, minor changes in many areas
- D, a major change in some area
- E, more than one major change is needed to improve the course.

(a) Course flow (order of topics, time spent on each topic, scope of exams, etc): *(assign a letter from A to E)*

*Required: Commentary that supports the letter rating.*

(b) Student feedback via formal critiques and informal comments: *(assign a letter from A to E)*

*Required: Commentary that supports the letter rating.*

(c) Student mastery of Course Objectives (COs): *(assign a letter from A to E)*

*Required: Commentary that supports the letter rating.*

(d) Utility of assessment methods used to determine student mastery of Course Objectives (COs) (homework, quizzes, exams, labs, projects): *(assign a letter from A to E)*

*Required: Commentary that supports the letter rating.*

(e) Adjustments in course from prior recommendations: *(assign a letter from A to E)*

*Review previous CATs and Outcome Champion Group Reports and discuss any changes that were implemented in this year’s course offering. Also assess how any recent changes have impacted the course.*

*Required: Commentary that supports the letter rating.*

**Student Outcomes (SOs)**

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. an ability to function on multidisciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i. a recognition of the need for, and an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Core Curricular Outcomes (CCOs)

a. Understand principles of direct and alternating current electrical circuit theory and analysis.
b. Understand principles of electrical power and energy conversion, including three-phase systems.
c. Understand principles of basic electrical elements, including electrical motors and generators.
d. Understand principles of analog and digital communication systems.
e. Understand principles of computer network operations and system components.
Course Coordinator Survey  
**Outcomes 6, 8, 9, and 10**

**OC 6**

1. Did your course include any lessons, discussions, or assignments that aided in developing an understanding of professional or ethical responsibility?

   YES   NO

2. If so, indicate how it was incorporated into the class:

   a) Case studies involving issues of professional or ethical responsibility were presented and discussed.

   b) Questions regarding responsibility were incorporated into assignment(s).

   c) Instructors discussed work experiences concerning issues of responsibility.

   d) Responsibility related to design, manufacture, maintenance, or operation was discussed.

   e) Guest lecturer discussed aspects of their work that involve professional responsibility.

   f) Students completed a project or assignment during which they analyzed and reconciled disparate requirements.

   g) Projects or assignments incorporated design challenges regarding public or operator safety.

   h) Other (elaborate):
Course Coordinator Survey  
Outcome H  
Course Number: EEXYZ

Complete the table below with regards to the Outcome 8 concepts listed in the left column. For the “Hours” columns, please estimate the number of in-class and out-of-class hours students spent on each concept. In the Presentation Methods columns, mark all methods used to present or educate the concepts. Notes can be left in the “Other” column. A blank row indicates that you did not pursue the respective concept in the course.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Hours</th>
<th>Presentation Methods</th>
<th>Other (please explain)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>In-class</td>
<td>Out-of-class</td>
</tr>
<tr>
<td>Environmental Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health or Safety Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment &amp; Economic Tradeoffs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health/safety &amp; Economic Tradeoffs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Societal Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Are course instructors encouraged to incorporate any of the above topics into their classes beyond what is already designed into the course? If YES, please elaborate.

YES  NO

Are students evaluated on their understanding of the subjects listed below? If YES, please elaborate.

<table>
<thead>
<tr>
<th>Concept</th>
<th>YES</th>
<th>NO</th>
<th>Brief Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health or Safety Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment &amp; Economic Tradeoffs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health/safety &amp; Economic Tradeoffs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Societal Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. In your course, do you discuss the need for continuing education and lifelong learning?

   YES   NO

2. If YES, circle the statement(s) that apply to your course:

   • Current issues and need for lifelong learning introduced through anecdotal comments during lecture.

   • Students complete at least one assignment that requires them to investigate current issues or use popular science media sources.

   • Students attend a research conference

   • Students are exposed to one or more outside speakers working in an electrical-engineering related field.

   • Students complete one or more projects that require them to work independently, identify and locate resources and teach themselves about a new topic.

   • The course emphasizes emerging technologies, and therefore inherently demonstrates how technology evolves and the need for lifelong learning.

   • Other (please describe):

3. If you circled any statements above, how did your students perform on those activities?
1. In your course, do you discuss the importance of keeping up with contemporary issues (current developments)?

   YES   NO

2. If YES, circle the statement(s) that apply to your course:

   • Current issues and need for lifelong learning introduced through anecdotal comments during lecture.

   • Students complete at least one assignment that requires them to investigate current issues or use popular science media sources.

   • Students attend a research conference

   • Students are exposed to one or more outside speakers working in an electrical-engineering related field.

   • Students complete one or more projects that require them to work independently, identify and locate resources and teach themselves about a new topic.

   • The course emphasizes emerging technologies, and therefore inherently demonstrates how technology evolves and the need for lifelong learning.

   • Other (please describe):
## 2. Capstone Mentor Tool Rubric

Mentor Instructions: Enter data on worksheet labeled with student name-- only enter data into pink squares! For each row-- choose a score between 0 and 4 according to the gauge on the right.

<table>
<thead>
<tr>
<th>#</th>
<th>Item</th>
<th>Scoring Details (leave blank if N/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Student’s intellectual curiosity (i)</td>
<td>0: Student has no intellectual curiosity; 2: Student sometimes asks questions beyond “testable material”; 4: Student is constantly exploring ideas and never uses the “I Believe” button</td>
</tr>
<tr>
<td>2</td>
<td>Student’s ability to independently acquire knowledge (i,j)</td>
<td>0: Student demonstrates no ability; 2: Student can identify and discuss major technical issues and locate info sources, but needs guidance to digest them; 4: Student needs little or no external guidance to acquire new skills and knowledge</td>
</tr>
<tr>
<td>3</td>
<td>Student’s awareness of major issues currently facing the country or the world (h, j)</td>
<td>0: Student demonstrates no awareness; 2: Student can describe engineering implications of one or more contemporary issues with design work; 4: Project work includes excellent discussion of engineering implications of one or more contemporary issues. Student takes initiative to address such issues in design</td>
</tr>
<tr>
<td>4</td>
<td>Student’s ability to relate engineering solutions to environmental issues (h)</td>
<td>0: Student demonstrates no awareness; 2: Can identify major issues but considers the relationships from only one perspective; 4: Has a nuanced and comprehensive understanding of relationship</td>
</tr>
<tr>
<td>5</td>
<td>Student’s ability to relate engineering solutions to economic issues (h)</td>
<td>0: Student demonstrates no awareness; 2: Can identify major issues but considers the relationships from only one perspective; 4: Has a nuanced and comprehensive understanding of relationship</td>
</tr>
<tr>
<td>6</td>
<td>Student’s ability to relate engineering solutions to health and safety issues (h)</td>
<td>0: Student demonstrates no awareness; 2: Can identify major issues but considers the relationships from only one perspective; 4: Has a nuanced and comprehensive understanding of relationship</td>
</tr>
<tr>
<td>7</td>
<td>Student’s ability to relate engineering solutions to societal issues (culture, behavior, sensitivities, etc) (h)</td>
<td>0: Student demonstrates no awareness; 2: Can identify major issues but considers the relationships from only one perspective; 4: Has a nuanced and comprehensive understanding of relationship</td>
</tr>
<tr>
<td>8</td>
<td>Student’s ability to define goals in a multi-disciplinary environment (d)</td>
<td>0: Demonstrated no ability; 2: Demonstrated suitable skills and abilities; 4: Demonstrated abilities that were commendable and should be used as an example for others</td>
</tr>
<tr>
<td>9</td>
<td>Student’s ability to communicate with a team (d)</td>
<td>0: Demonstrated no ability; 2: Demonstrated suitable skills and abilities; 4: Demonstrated abilities that were commendable and should be used as an example for others</td>
</tr>
<tr>
<td>10</td>
<td>Student’s ability to participate and contribute to the accomplishment of a team’s goals (d)</td>
<td>0: Demonstrated no ability; 2: Demonstrated suitable skills and abilities; 4: Demonstrated abilities that were commendable and should be used as an example for others</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Evaluation</td>
</tr>
<tr>
<td>---</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>11</td>
<td>Student’s engagement in multidisciplinary projects (d)</td>
<td>Student has never strayed outside of EE/CE</td>
</tr>
<tr>
<td>12</td>
<td>Student’s ability to produce engineering estimates and approximate solutions by applying understanding of algebraic relationships, calculus concepts, and scientific principles.</td>
<td>Relies heavily on calculator. Has difficulty understanding order of magnitude, time-scale, proportional and power-law relationships, error, etc.</td>
</tr>
<tr>
<td>13</td>
<td>Student’s ability to apply fundamental math and science principles in modeling or simulating electrical or computer engineering systems.</td>
<td>Uses a nearly 100% trial-and-error approach to design.</td>
</tr>
<tr>
<td>14</td>
<td>Student’s ability to apply fundamental engineering and logical skills in troubleshooting and debugging tasks. (b) (c)</td>
<td>Takes a haphazard, “Hail Mary” approach to troubleshooting and debugging.</td>
</tr>
<tr>
<td>15</td>
<td>Student’s use of modern prototyping and debugging skills of electrical or computer engineering problems. (b) (c)</td>
<td>Changes something and hopes it works</td>
</tr>
<tr>
<td>16</td>
<td>Student’s use of modern equipment for design in electrical or computer engineering tasks.</td>
<td>Poor use of crude techniques for design such as punch cards and vacuum tubes</td>
</tr>
<tr>
<td>17</td>
<td>Student’s use of modern techniques for measuring and simulating electrical or computer engineering problems.</td>
<td>Ineffective use of antiquated technology such as abacus for measuring</td>
</tr>
<tr>
<td>18</td>
<td>Student’s use of simulation to develop models of engineering processes or circuits (b)</td>
<td>No simulations were used when they could have been (i.e. no MATLAB/Simulink modeling, or SPICE circuit simulation)</td>
</tr>
<tr>
<td>19</td>
<td>Student’s use of modern documentation and presentation methods for electrical or computer engineering problems.</td>
<td>Ineffectual use of feather quills and smoke signals for documentation and presentation purposes</td>
</tr>
<tr>
<td>20</td>
<td>Student’s ability to develop a hardware test plan to verify a hypothesis or validate a design (b)</td>
<td>Either no testing performed, or haphazard testing conducted with no plan</td>
</tr>
<tr>
<td>21</td>
<td>Student’s use of test equipment to locate and correct hardware errors and collect experimental data (b)</td>
<td>Incorrect instrument or article of test equipment used, or equipment used incorrectly</td>
</tr>
<tr>
<td>22</td>
<td>Student’s ability to interpret or verify data using engineering analysis and theory (b)</td>
<td>Incorrect, or only partially correct theory used for analysis; sources of experimental error not explored</td>
</tr>
<tr>
<td>23</td>
<td>Student’s ability to define a technical problem (e)</td>
<td>Does not understand how to begin. Does not display understanding of how to utilize theory or mathematics to achieve a solution</td>
</tr>
<tr>
<td>24</td>
<td>Student’s ability to formulate a well-defined end-state and developing a methodology and strategy for reaching that end-state (e)</td>
<td>Haphazard and inconsistent strategies for problem solving; does not realize when major components of the solution are missing.</td>
</tr>
<tr>
<td>25</td>
<td>Student’s ability to carry out the logical progression necessary to reach an engineering problem end-state and provide meaningful documentation of the solution. (e)</td>
<td>Entire solution is unfocused, little to no evidence of logical progression, solution contains multiple errors or one severe error, student required continuous coaching.</td>
</tr>
<tr>
<td>26</td>
<td>Student’s ability to write effectively, completely, and accurately.</td>
<td>Demonstrated no ability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>27</td>
<td>Student's ability to present work effectively, completely, and accurately.</td>
<td>Demonstrated no ability</td>
</tr>
<tr>
<td>28</td>
<td>Student can identify/define an engineering design problem and develop a solution, considering realistic constraints (economic, health/safety, environmental, political, social, ethical, manufacturability or sustainability) (c)</td>
<td>Needs much assistance at identifying problems to begin with or to establish success criteria.</td>
</tr>
<tr>
<td>29</td>
<td>Student can conceptualize and analyze a design solution (c)</td>
<td>No brainstorming ability to approach a problem or even to analyze a problem at the component level</td>
</tr>
<tr>
<td>30</td>
<td>Student can perform system integration and verification for a design (c)</td>
<td>Is clueless about how to put the pieces together</td>
</tr>
<tr>
<td>31</td>
<td>Student is aware of the IEEE code of ethics (f)</td>
<td>No idea</td>
</tr>
<tr>
<td>32</td>
<td>Does the student consider the IEEE code of ethics when making technical decisions (f)</td>
<td>Nope</td>
</tr>
<tr>
<td>33</td>
<td>Student is aware of engineering standards that might apply to their problem (f)</td>
<td>No idea</td>
</tr>
<tr>
<td>34</td>
<td>Does the student consider standards when making technical decisions (f)</td>
<td>Nope</td>
</tr>
</tbody>
</table>
WE ARE DEFICIENT

Purpose: The purpose of this part is to collect opinions from course coordinators regarding specific student weaknesses. The goal is to focus future data collection for Outcomes (a), (b), and (k). Course coordinators should gather feedback from all professors who taught the course.

Directions: For each of the following categories, please identify examples where students struggle toward proficiency in your course. Also include examples of pre-requisite knowledge or skills that are lacking. **Please add a new row to the table once per course offering.**

1. **Measurement/Simulation Skills** (examples here might include “place ammeter in parallel instead of series” or “struggle to simulate their digital circuit”)

<table>
<thead>
<tr>
<th>Year</th>
<th>Instructor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPR2010</td>
<td>Dr. Mechtel</td>
<td>Most students are able to use the SONNET software tutorial to learn how to use SONNET. Many students (over half) have difficulty translating theoretical concepts to circuit layout parameters.</td>
</tr>
<tr>
<td>SPR2011</td>
<td>Dr. Mechtel</td>
<td>Most students are able to use the SONNET software tutorial to learn how to use SONNET. With the help of instructor scaffolding all students were able to translated theoretical concepts to circuit layout parameters.</td>
</tr>
</tbody>
</table>

2. **Documentation** (examples here might be “lab notebooks are incomplete” or “inability to formulate and document test procedures” or “inability to verify design specifications”)

<table>
<thead>
<tr>
<th>Year</th>
<th>Instructor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPR2010</td>
<td>Dr. Mechtel</td>
<td>Over half of the students used the first person for their formal lab report. Most students were able to adequately document their design and simulation results.</td>
</tr>
<tr>
<td>SPR2011</td>
<td>Dr Mechtel</td>
<td>Student formal reports were clearly better this year. Few students used the first person. Reports were more clearly and thoroughly documented with adequate supporting data.</td>
</tr>
</tbody>
</table>
3. Prototyping/Debugging Skills (examples here might include “circuit layout is disorganized” or “weak troubleshooting” or “unable/unwilling to sequentially test a design”)

<table>
<thead>
<tr>
<th>SPR2010</th>
<th>Dr. Mechtel</th>
<th>Most students were able to trouble shoot their designs</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPR2011</td>
<td>Dr. Mechtel</td>
<td>Most students were able to trouble shoot their designs</td>
</tr>
</tbody>
</table>

4. Equipment Modernization (examples here might include “using older UP2 digital boards instead of modern DE2 boards”)

<table>
<thead>
<tr>
<th>SPR2010</th>
<th>Dr. Mechtel</th>
<th>We just don’t have enough network analyzers to do a thorough job explaining microstrip circuit operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPR2011</td>
<td>Dr. Mechtel</td>
<td>A purchase request for additional modern network analyzers was submitted</td>
</tr>
</tbody>
</table>

5. Applying Fundamental Principles (of mathematics, science, and engineering--examples here might include “trouble computing phase angle without calculator” or “trouble computing simple definite integrals” or “does not understand voltage/current relationships in an AC circuit”)

<table>
<thead>
<tr>
<th>SPR2010</th>
<th>Dr. Mechtel</th>
<th>Calculus skills are weak</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPR2011</td>
<td>Dr. Mechtel</td>
<td>Weak calculus skills</td>
</tr>
</tbody>
</table>
4. **Laboratory survey**

**OR ARE WE**

**Purpose:** The goal of this section is to focus on strengths, not weaknesses. It is just an assessment of the current status of your course with regards to Outcomes 1,2, and 11.

**Directions:** For each of the following questions, please update the answer once per course offering. For example, for question 1, if the percent in 2009 was 80% and now in 2010 it is 90%, then please put 90% and completely remove 80%.

*Date Last Updated: SPRING2010 Dr. Mechtel*

1. What percent of the final course grade is lab based? 10%

2. How many separate laboratory exercises are in this course? 7
   a. How many are purely hardware? 3 purely software? 3
   b. How many are a combination of hardware and software? 1

3. How many lab exercises are documented via:
   a. Lab notebook: 0 c. Lab handout sheet: 4
   b. Formal lab report: 1 d. Other (clean room procedure): 2

4. What percentage of lab exercises requires student demonstration of circuit operation? 50%

5. What percentage of labs requires use of data sheets? 10%

6. What percentage of labs requires simulation to confirm design calculations? 50%

7. What percentage of labs requires building circuits on proto-boards or PC-boards? 30 % to build on microwave laminates

8. How many labs require partnering
   a. by design: 2 b. due to equipment limitations: 3
c. due to lab technician limitations: 3

9. How many lab exercises require:
   a. Following provided procedures: 2
   b. Students creating and documenting procedures to test a design: 1

10. How many design projects require selecting multiple components to satisfy several criteria? N/A
11. What percentage of lab projects contains design exercises? 40%

12. Are troubleshooting techniques typically discussed with the entire class, individually or not at all? Please comment.
   
   Entire class and individually

13. Describe how frequently the following equipment is used in your course. Please write {ALL, MOST, A FEW, NONE} for each one below.

   Power Supply: none
   Function Gen.: none
   Oscilloscope: none
   Spectrum Anal.: none
   Proto-Board: none
   Logic Anal.: none
   IC Chips: none
   Semiconductors: none

14. Describe how frequently the following software is used in your course. Please write {Never, 1-2 Times, 3-4 Times, More than 4 Times} for each one below.

   Multisim: Never
   Matlab: Never
   Simulink: Never
   Modelsim: Never
   Quartus: Never
   OPNET: Never
   VPI Photonics: Never
   MP Lab: Never

15. List other pieces of equipment that are used in this course
   Microwave laminates: A FEW
   Network Analyzer: A FEW

16. List any other simulation packages that you may use in your course.
   SONNET™: MOST
# Student (Laboratory) Survey

**Student Year (Circle One):**  
1st Class  
2nd Class  
Youngster

1. My ability to build a circuit from a schematic or block diagram is:  
   - excellent  
   - good  
   - fair  
   - poor

2. My ability to collect data using measurement equipment is:  
   - excellent  
   - good  
   - fair  
   - poor

3. My perception is that the EE lab equipment is:  
   - excellent  
   - good  
   - fair  
   - poor

4. The EE lab technician support is:  
   - excellent  
   - good  
   - fair  
   - poor

5. The quality of my assigned lab experiments this year has been:  
   - excellent  
   - good  
   - fair  
   - poor

6. My ability to document my lab work in a notebook is:  
   - excellent  
   - good  
   - fair  
   - poor

7. My ability to document my lab work in a formal report is:  
   - excellent  
   - good  
   - fair  
   - poor

8. My ability to use software simulation (like Multisim) is:  
   - excellent  
   - good  
   - fair  
   - poor

9. My understanding of the limitations of software simulation is:  
   - excellent  
   - good  
   - fair  
   - poor

10. My troubleshooting skills are:  
    - excellent  
    - good  
    - fair  
    - poor

11. My ability to create and document a testing procedure is:  
    - excellent  
    - good  
    - fair  
    - poor

12. As a result of my courses this academic year, my lab skills have:  
    - improved significantly  
    - improved  
    - stayed the same  
    - deteriorated
13. My **comfort level** with the following equipment is:
   a. Proto-Board  high  medium  low
   b. Power Supply  high  medium  low
   c. DMM  high  medium  low
   d. Function Generator  high  medium  low
   e. Oscilloscope  high  medium  low
   f. Spectrum Analyzer  high  medium  low
   g. Logic Analyzer  high  medium  low

14. My **comfort level** with the following simulation packages is:
   a. Multisim  high  medium  low
   b. Matlab  high  medium  low
   c. Modelsim  high  medium  low
   d. Quartus  high  medium  low

15. The design projects this year have been:
   a. too hard  about the right difficulty  too easy
   b. too many  about the right number  too few

16. My comfort level with data sheets and engineering standards is:
   high  medium  low  untested

17. My ability to make technical presentations is:
   excellent  good  fair  poor

18. My ability to create design alternatives is:
   excellent  good  fair  poor

19. Please make any comments or suggestions that you think would help us to improve your EE laboratory experience.
5. Student Outcome Summaries: Full write-ups

Student Outcome (a): An ability to apply knowledge of mathematics, science, and engineering.
- Outcome Champion: Assistant Professor Justin Blanco

- The following strategy was in place prior to the 2011-2012 cycle.

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can produce engineering estimates and approximate solutions by applying understanding of algebraic relationships, calculus concepts, and scientific principles.</td>
<td>All courses</td>
<td>Faculty Survey</td>
<td>All Courses</td>
<td>Every Year</td>
<td>2006-2011</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Student Survey</td>
<td>All Seniors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CATs</td>
<td>All Courses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Can apply fundamental engineering and logical skills in troubleshooting and debugging tasks.</td>
<td>All courses</td>
<td>Faculty Survey</td>
<td>All Courses</td>
<td>Every Year</td>
<td>2006-2011</td>
<td>90%</td>
</tr>
<tr>
<td></td>
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<td>Student Survey</td>
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<tr>
<td></td>
<td></td>
<td>CATs</td>
<td>All Courses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Can apply fundamental math and science principles in modeling or simulating electrical or computer engineering systems.</td>
<td>All courses</td>
<td>Faculty Survey</td>
<td>All Courses</td>
<td>Every Year</td>
<td>2006-2011</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Student Survey</td>
<td>All Seniors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CATs</td>
<td>All Courses</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assessment Results (direct measures) 2006-08: A review of Course Assessment Tools (CATs) was conducted. Assessment data included course coordinator evaluation of the degree to which various assessment tools (quizzes, exams, labs, homework, etc.) supported Outcome A for their courses, and a subjective estimate of the proportion of students in the course who met each course objective. Across the nine courses for which data were available (EE221, EE241, EE242, EE322, EE354, EE361, EE372, EE411, and EE414), which include sophomore through senior offerings, instructors reported on average that at least 81% (1-4 scale average = 1.461 ± 0.226) of students met course objectives related to Outcome A. A general conclusion was that our students are having difficulty performing basic mathematical steps in applying their engineering knowledge. In EE 241, circuit analysis challenges students, particularly when it requires the use of algebra, such as in small-signal modeling. In EE 322, students find Fourier analysis difficult for all but the most basic problems. Also, some cannot seem to tie together the fact that processes happen both in the time and frequency domains concurrently. In EE 354, the concept of Fourier series, time/frequency duality, and frequency spectra eluded students throughout the semester.

Evaluation and Actions 2006-08: It was recommended that a requirement be added to all entry level network analysis courses to perform certain tasks without the aid of a calculator or an equation sheet. These tasks should start at a very basic level but progress. To avoid diluting other evaluation such as exams, these tasks should be made pass/fail with the course grade hinging on their success. They will be very easy for many students, but those who struggle should be assigned EI sessions. The EI program may require augmentation to help students who fail these “miniature” exercises. The following skeleton plan was proposed: Tier one - Application of parallel resistance calculations in limiting and basic cases. (e.g. Without the aid of a calculator, perform 10||1000, 2k||2k, and perhaps 8||2); Tier two - Application of the VDR without an equation sheet; Tier three - Application of nodal analysis; Tier four: Use basic calculus to verify solutions to DC capacitive transients; Tier five: Derive the capacitive impedance formula.
Assessment Results (direct measures) 2008-10: A review of Course Assessment Tools (CATs) and the Deficiencies survey was conducted. Assessment data included course coordinator evaluation of the degree to which various assessment tools (quizzes, exams, labs, homework, etc.) supported Outcome A for their courses, and a subjective estimate of the proportion of students in the course who met each course objective. One section of the Deficiencies survey asked course coordinators to assess their students’ ability to apply fundamental principles of math, science and engineering. Across the ten courses for which data were available (EE221, EE241, EE242, EE320, EE322, EE354, EE361, EE372, EE411, and EE414), which include sophomore through senior offerings, instructors reported on average that at least 79% (1-4 scale average = 1.545 ± 0.366) of students met course objectives related to Outcome A. The most salient finding related to weakness in this outcome was students’ continuing reliance on high-powered calculators to solve problems the ECE faculty would like to see them work by hand (e.g., integrals, derivatives).

Evaluation and Actions 2008-10: Several ideas for curricular change based on the main assessment finding of over-reliance on calculators were presented to the department during our end-of-semester meeting. We proposed: 1) to disallow calculators on selected quizzes and exams; 2) to focus on giving problems that have only variables in them so that no numerical computation is required; and 3) to give students exercises in which data/results are presented and they are required to provide interpretation. It was suggested that these ideas be piloted during the next offerings of EE322 and EE354.

Second-Cycle Results 2010-11: A review of Course Assessment Tools (CATs) and the Deficiencies survey was conducted. Across the ten courses for which data were available (EE221, EE241, EE242, EE320, EE322, EE354, EE361, EE372, EE411, and EE414), which include sophomore through senior offerings, instructors reported on average that at least 79% (1-4 scale average = 1.550 ± 0.341) of students met course objectives related to Outcome A. In EE344 algebra skills were found to be improved, even with lower QPR students. At the same time, it was noted in EE 221 that students still rely too heavily on their calculators for basic mathematical computations. Weak calculus skills were observed in EE 372. In EE 241, students struggled less with small signal analysis for BJTs, but still with op-amp design circuits and non-ideal behavior in op-amps. In EE 361 it was found that some students learn the equations to describe the behavior of the hardware by rote, and that this sometimes leads to their inappropriate application. EE 362 students had trouble working in multiple arithmetic bases. They were required to shift frequently from binary to hexadecimal to decimal. Most ultimately found ways to manage, however. In EE 420, revisiting phasor fundamentals was painful for students as were 3-phase power formulas. In EE 426, students favored trial and error over design equations and calculations. The most widespread observation related to Outcome A, however, was a lack of fundamental troubleshooting skills among students.

Evaluation and Actions 2010-11: It was again recommended that instructors consider offering exams that prohibit the use of calculators. We also suggested several means to address poor troubleshooting skills: 1) As part of laboratory exercises, present students with circuits or pieces of code that do not function according to specification and have them investigate why; 2) Add a troubleshooting lesson into the 1st semester of the senior design course (EE411); and 3) For design projects that require building large systems, create deliverables involving smaller subsystems that require well-defined troubleshooting and validation steps for each phase. We concluded that the only way to truly measure how well fundamental skills like troubleshooting are grasped is with a pre-test/post-test approach. EE322 uses the “Signals and Systems Concept Inventory” to determine how much improvement students have made in grasping fundamental concepts during the course. A generic troubleshooting pre-test/post-test given each year in the major would help us better track student progress in this area.
We have also decided as a group to make the following assessment changes to make our assessment process more streamlined. This approach was initiated during the 2011-12 cycle.

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can produce engineering estimates and approximate solutions by applying basic understanding of algebraic relationships, calculus concepts, and scientific principles.</td>
<td>(I) EE221 EE244 (R)EE241 EE322 EE354 EC361 EE411 EE414 EC415</td>
<td>Faculty Survey</td>
<td>EE411,EE414, EC415</td>
<td>3 Years</td>
<td>2014, 2017</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Student Survey</td>
<td>All seniors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CATs</td>
<td>EE411,EE414, EC415</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Can apply fundamental engineering and logical skills in troubleshooting and debugging tasks.</td>
<td>(I) EE221 EE244 (R)EE241 EE322 EE354 EC361 EE411 EE414 EC415</td>
<td>Faculty Survey</td>
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</tr>
<tr>
<td>3. Can apply fundamental math and science principles in modeling or simulating electrical or computer engineering systems.</td>
<td>(I) EE221 EE244 (R)EE241 EE322 EE354 EC361 EE411 EE414 EC415</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Preliminary Data (2012):** 2011 was the first year in which the CE major was awarded and data are now being collected that permit the quantitative distinguishing of EE and CE student performance. Pre-assessment cycle results from a newly created faculty survey (the “EOYMentorTool”), broken out by performance indicator and major, are shown in the table below. The mean outcome A score (average of the individual performance indicator scores) was 2.53/4.00 for EE majors and 3.08/4.00 for CE majors, suggesting a potential gap in performance between students in the two major tracks, with CE students outperforming EE students on all indicators for the outcome. Linearly mapping these preliminary averages to percentages gives an outcome A achievement score of 60.6% for EE students and 71.6% for CE students, below the 90% target for performance. Whether these early trends, including the gap in performance between EE and CE students are statistically significant will be clear by the next assessment cycle, at which point a more detailed evaluation of results will be carried out and corresponding recommendations for action made.
<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Electrical Engineering Student Average (0-4 scale, n=22)</th>
<th>Computer Engineering Student Average (0-4 scale, n=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student’s ability to produce engineering estimates and approximate solutions by applying understanding of algebraic relationships, calculus concepts, and scientific principles.</td>
<td>2.71</td>
<td>2.97</td>
</tr>
<tr>
<td>Student’s ability to fundamental engineering and logical skills in troubleshooting and debugging tasks.</td>
<td>2.55</td>
<td>3.13</td>
</tr>
<tr>
<td>Student’s ability to apply fundamental math and science principles in modeling or simulating electrical or computer engineering systems.</td>
<td>2.32</td>
<td>3.13</td>
</tr>
</tbody>
</table>
Student Outcome (b): An ability to design and conduct experiments, as well as to analyze and interpret data.

- Outcome Champion: CDR Chas Hewgley, USN

- Listed below are the performance indicators, educational strategies, and assessment methods that were in use until recently. A revised matrix of performance indicators, educational strategies, and assessment methods is presented in the second part of this section.

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. conduct hardware and software experiments</td>
<td>EE221, EE228, EE242, EE323, EE341, EE342, EE354</td>
<td>Course Assessment Tool</td>
<td>course coordinators of listed courses</td>
<td>1 year</td>
<td>2009, 2010, 2011</td>
<td>subjective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deficiency survey</td>
<td>course coordinators of listed courses</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>student surveys</td>
<td>Blackboard online system</td>
<td></td>
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</tr>
<tr>
<td>2. participate in Trident, Bowman, and directed studies</td>
<td>EE49X</td>
<td>EE49X project gradesheets</td>
<td>EE49X</td>
<td>1 year</td>
<td>2009, 2010, 2011</td>
<td>subjective</td>
</tr>
<tr>
<td>3. complete lab practical examinations</td>
<td>EE221, EE228, EE242, EE323, EE341, EE342, EE354</td>
<td>Course Assessment Tool</td>
<td>course coordinators of listed courses</td>
<td>1 year</td>
<td>2009, 2010, 2011</td>
<td>subjective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deficiency survey</td>
<td>course coordinators of listed courses</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>student surveys</td>
<td>Blackboard online system</td>
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</tbody>
</table>

Assessment Results 2009-2010: Until recently, the educational strategy and assessment method in use for this student outcome followed the “all classes, all the time” approach. Assessment data were gathered at the conclusion of each majors course in Electrical Engineering and Computer Engineering using several methods. The Course Assessment Tool is a form completed by the Course Coordinator, and contains broad questions spanning all student outcomes. The Deficiency survey is also completed by the course coordinator, but is specific to student outcomes (a), (b), and (k). Also, student surveys were distributed that contained questions for the students concerning their perceived level of proficiency in a laboratory setting.

Evaluation and Actions 2009-2010: The data collected during these years were analyzed rather qualitatively; however, several process improvements were implemented based on the findings during these years. The chief issue identified through the assessment process was a weakness on the part of the students to diagnose and correct errors in hardware or equipment setup – internal discussions of this issue label this the “debugging” or “troubleshooting” issue. The assessment method that most clearly highlights this issue is the student survey. Statements such as “if my circuit doesn't work the first time, then I'm pretty much lost” have spurred the outcome group to consider ways of incorporating formal instruction in troubleshooting methods into the curriculum. The course and form for this additional topic is still being considered; however, the concrete steps that have been taken...
to improve these lab skills include: increasing the percentage of the final course grade that depends on laboratory work, including laboratory practical examination in courses, and including laboratory quizzes.
- Listed below are the performance indicators, educational strategies, and assessment methods that are being implemented currently.

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. develop a hardware test plan to verify a hypothesis or validate a design</td>
<td>introduce: EE221. EE241, EC262 reinforce: EE322, EE354, EC361 assess: EE414, EC415</td>
<td>Deficiency survey</td>
<td>EE414, EC415</td>
<td>3</td>
<td>2013, 2016</td>
<td>quantitative criteria in development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EE414, EC415 project gradesheet</td>
<td>EE414, EC415</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>student survey</td>
<td>Blackboard online system</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2. use simulation to develop models of engineering processes or circuits</td>
<td>introduce: EE221. EE241, EC262 reinforce: EE322, EE354, EC361 assess: EE414, EC415</td>
<td>Deficiency survey</td>
<td>EE414, EC415</td>
<td>3</td>
<td>2013, 2016</td>
<td>quantitative criteria in development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EE414, EC415 project gradesheet</td>
<td>EE414, EC415</td>
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<td></td>
<td></td>
<td>student survey</td>
<td>Blackboard online system</td>
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</tr>
<tr>
<td>3. use test equipment to locate and correct hardware errors and collect experimental data</td>
<td>introduce: EE221. EE241, EC262 reinforce: EE322, EE354, EC361 assess: EE414, EC415</td>
<td>Deficiency survey</td>
<td>EE414, EC415</td>
<td>3</td>
<td>2013, 2016</td>
<td>quantitative criteria in development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EE414, EC415 project gradesheet</td>
<td>EE414, EC415</td>
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<td>student survey</td>
<td>Blackboard online system</td>
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</tr>
<tr>
<td>4. interpret or verify the hardware or software data using engineering analysis and theory</td>
<td>introduce: EE221. EE241, EC262 reinforce: EE322, EE354, EC361 assess: EE414, EC415</td>
<td>Deficiency survey</td>
<td>EE414, EC415</td>
<td>3</td>
<td>2013, 2016</td>
<td>quantitative criteria in development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EE414, EC415 project gradesheet</td>
<td>EE414, EC415</td>
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<td></td>
<td></td>
<td>student survey</td>
<td>Blackboard online system</td>
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</tbody>
</table>

**Second-Cycle Results 2011-2012:** In November, 2011, it was decided to make changes in the performance indicators, educational strategies, and methods of assessment. One of the main reasons for this change was that under the “all courses, all the time” assessment system, much more data was being collected that could be effectively analyzed. Several cycles of student and instructor surveys were collected, but we found it difficult to manage the volume of data. The assessment process was quickly becoming increasingly time-intensive and unsustainable. Accordingly, it was decided to try more specific means. It was decided that lab practices and techniques should be introduced in the majors courses that are common to both electrical engineering and computer engineering majors in their third-class (sophomore) year. These courses are EE221 (basic circuits), EE241 (electronics), and EC262 (digital logic). These laboratory techniques and procedures will be reinforced in the courses that are common to both electrical engineering and computer engineering majors in their second-class (junior) year. These courses are EE322 (advanced circuits), EE354 (communications systems), and EC361 (microprocessor-based design). The assessment for laboratory techniques and procedures will occur during the first-class (senior) year, when the students are required to put their laboratory skills to use as part of the capstone design class. The student surveys will still be collected online, and will span the scope the students' laboratory experience; however, the Deficiency survey (for faculty), and the project gradesheets that will be collected as part of the assessment process will be specific to the capstone design class, EE414, and EC415. Currently, quantitative criteria are being developed with which to analyze survey and gradesheet results. These criteria will take the form of “rubrics”.

**Evaluation and Actions 2011-2012:** The faculty and student surveys that were collected in 2011 will be considered along with the full scope of the assessment materials that will be collected during the next full assessment cycle in 2013.
**Preliminary Assessment 2012:** Even though the planned assessment for this student outcome is not scheduled to occur until 2013, due to the introduction of the new Senior Mentor Tool with the capability to separate data by Electrical Engineering and Computer Engineering majors, an opportunity presented itself to take a very preliminary look at some of the data. Performance measures from the Senior Mentor Tool rubric are listed in the left column, followed by columns of average scores across all students in a given major.

The actual numerical standards have not yet been determined for each performance measure that are the minimum for this student outcome to be considered attained by the student body. Nevertheless, one can take a qualitative look at this data and conclude that, in general, this outcome is being attained by the Computer Engineering majors, and also by the Electrical Engineering majors, although that cohort is marginal for some performance measures. It is interesting to note that the scores of the Computer Engineering majors were uniformly higher than those of the Electrical Engineering majors.

| Student's ability to apply fundamental engineering and logical skills in troubleshooting and debugging tasks. | Electrical Engineering Students (avg. with scale 0-4) | 2.43 | Computer Engineering Students (avg. with scale 0-4) | 3.13 |
|---|---|---|---|
| Student's use of modern prototyping and debugging skills of electrical or computer engineering problems. | 2.38 | 3.13 |
| Student's use of simulation to develop models of engineering processes or circuits. | 2.44 | 2.97 |
| Student's ability to develop a hardware test plan to verify a hypothesis or validate a design. | 2.41 | 2.73 |
| Student's use of test equipment to locate and correct hardware errors and collect experimental data. | 2.68 | 2.75 |
| Student's ability to verify data using engineering analysis and theory. | 2.49 | 3.08 |
Student Outcome (c): An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

- Outcome Champion: Associate Professor Brian Jenkins

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Assessment Methods</th>
<th>Where data are collected</th>
<th>Assessment cycle length (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Define problem, identify constraints, develop specifications</td>
<td>EC361,EE411, EE414,EC415</td>
<td>Mentor Evaluation</td>
<td>EE414,EC415</td>
<td>2</td>
<td>2012</td>
<td>&gt;90% of all students meet each indicator</td>
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<td></td>
<td></td>
<td>Oral Appraisal</td>
<td></td>
<td></td>
<td>2009,2011</td>
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<tr>
<td></td>
<td></td>
<td>Faculty Evaluation (CAT)</td>
<td>EC361,EE411</td>
<td></td>
<td>2009,2011</td>
<td></td>
</tr>
<tr>
<td>ii) Conceptualize and analyze solutions</td>
<td>EE221,EE241, EE262,EC361, EE411/4,EC415</td>
<td>Mentor Evaluation</td>
<td>EE414,EC415</td>
<td>2</td>
<td>2012</td>
<td>All evaluation averages &lt; 2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral Appraisal</td>
<td></td>
<td></td>
<td>2012</td>
<td>Scale: 1 = met</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faculty Evaluation (CAT)</td>
<td>EE221/241/411,EC262/361</td>
<td></td>
<td>2009,2011</td>
<td>2 = partly met</td>
</tr>
<tr>
<td>iii) Project management, prototype implementation, test, and debug</td>
<td>EE221, EE241, EE262,EC361, EE411/4,EC415</td>
<td>Mentor Evaluation</td>
<td>EE414,EC415</td>
<td>2</td>
<td>2012</td>
<td>3 = not met</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral Appraisal</td>
<td></td>
<td></td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faculty Evaluation (CAT)</td>
<td>EE221/241/411,EC262/361</td>
<td></td>
<td>2009,2011</td>
<td></td>
</tr>
<tr>
<td>iv) System integration and verification</td>
<td>EC361,EE411, EE414,EC415</td>
<td>Mentor Evaluation</td>
<td>EE414,EC415</td>
<td>2</td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral Appraisal</td>
<td></td>
<td></td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faculty Evaluation (CAT)</td>
<td>EC361,EE411</td>
<td></td>
<td>2009,2011</td>
<td></td>
</tr>
</tbody>
</table>

Note on Assessment Methods:
Mentor Evaluation – During spring 1/C year by capstone mentors
Oral Appraisal – Upon completion of 1/C capstone course by the outcome champion during the ECE Capstone Design Conference
CAT – During general course assessment (i.e., from 3/C through 1/C years) by various faculty

Prior Cycle Assessment Results (AY2007-2009): Several course coordinators integrated design (including resource constraints) more effectively in their courses. CATs for various courses demonstrate broader coverage of design throughout the curriculum (e.g., in EE242, EE228, EE241 as well as in the capstone design sequence, EE411/414). In direct response to a program concern expressed in the prior ABET visit, resource constraints are applied within the design process in the robot project in EE221 and in the prototyping project in EE241, as well as in the capstone sequence. In the robot project (recommended as part of the curriculum review process in 2008), students were given numerous design alternatives and asked to consider design tradeoffs and constraints related to performance and cost. In the prototyping project in EE241 (introduced in 2008), students consider realistic constraints related to manufacturability and economic concerns. Specifically, the student designs are restricted to a printed circuit board (PCB) of a size that must fit into an Altoids™ tin with a battery (requiring students to meet both packaging and cost requirements for a simple PCB). The prototyping project was well received by the students and they performed well on the assignment. (See the assignments and the EE241 CAT from May 2008 provided in Appendix E for further details about both of these projects.)

Prior Cycle Evaluation and Actions (AY2007-2009): A design model and teaching matrix was created for use in a series of courses identified as appropriate for assessment of this outcome. The outcome champion notes that too few faculty members were responsive in implementing the recommendations. The concern was expressed that although design is being incorporated more in the curriculum, it needed to be better documented and a better feedback process developed. To improve the overall feedback process for all outcomes, this outcome was combined with outcomes 4, 5, and 7, as part of a revised department assessment process that uses outcome groups to more effectively gather and share data. The outcome group also agreed there were problems in “closing the feedback loop” for this outcome, and recognized the need for greater accountability and a more tangible method to implement recommendations on this outcome. Specific recommendations were made to explore the use of a database as a more effective means of gathering assessment data.
Current Cycle Assessment Results (AY2010-2012): As described in the Prior Cycle Evaluation and Actions, the previous method for assessing this outcome was deemed to need improvement by the new (in fall 2009) outcome champion. The previous method did not clearly assess and document whether the design skills (i.e., performance indicators) needed for success as an electrical or computer engineer were being taught adequately throughout the curriculum. Hence, the assessment efforts for this outcome during the first few semesters of this assessment cycle were focused on defining a new method by which to assess this outcome. Note that the new assessment methods for this outcome also more effectively document the application of realistic constraints within an engineering design process (a concern that was noted at the last ABET visit).

As a result of this effort, faculty have evaluated this outcome for the previous academic year using a new Design Matrix in the CAT. Data was gathered for courses taught during the spring semester (EE241, EE411/4 and EE415), as well as for one course taught during the fall semester (EC262). In the future, data will be gathered in the CAT for the courses shown above every other year. Some of the Design Matrices from spring 2011 and fall 2011 are attached at the end. Note that the design skills identified in the Design Matrix map directly to the Performance Indicators shown above. Note also, as of fall 2011, student outcome 3 is now referred to as student outcome (c).

As a result of this effort, faculty have evaluated this outcome for the previous academic year using a new Design Matrix in the CAT. Data was gathered for courses taught during the spring semester (EE241, EE411/4 and EE415), as well as for one course taught during the fall semester (EC262). In the future, data will be gathered in the CAT for the courses shown above every other year. Some of the Design Matrices from spring 2011 and fall 2011 are attached at the end. Note that the design skills identified in the Design Matrix map directly to the Performance Indicators shown above. Note also, as of fall 2011, student outcome 3 is now referred to as student outcome (c).

In addition, data was gathered at the end of the 1/C capstone courses in spring 2012 in two manners. The outcome champion performed an appraisal of the oral presentations given by all the 1/C students during the ECE Capstone Design Conference. In addition, the mentors evaluated each Performance Indicator and provided their feedback using the Mentor Assessment Tool (i.e., with spreadsheet entries provided by each capstone mentor for each student). The results for the oral appraisal and the mentor evaluation are included in the Outcome (c) notebook.

A tabular summary of the data from each assessment method follows. First, it is clear that the vast majority of the student do consider realistic constraints in their capstone design project. More than 90% of the graduates for both the EE and CE majors met each indicator to some degree, as desired. Also, the evaluation averages for each indicator were < 2.0, as desired, for all performance indicators except for indicator iv) when assessed with the CAT, for which a score of 2.25 was measured (see data below). This implies that this indicator was only marginally met, and that student ability to perform system integration and verification may be insufficient. Note that this assessment occurred before the capstone project selection process was changed to occur earlier in the program (during spring 2/C year). Assessment of this indicator during the mentor evaluation and the oral appraisal demonstrate that student ability has improved for the most recent graduating class. Further assessment cycles will be needed to verify if this trend continues.

Current Cycle Evaluation and Actions (AY2010-2012): The new assessment process used for this outcome has been effective in identifying strengths and weaknesses in the design process. It is evident that the Outcome (c) is being attained based on the results. The Performance Indicators (skill set) listed above are being emphasized to some degree throughout the program, so that all students gain some exposure to all of the skills, and > 90% of the students in both majors meet each indicator to some degree. It does appear that a significant number of EE majors are struggling to meet indicator iii). This should be monitored in future assessment cycles, as it is difficult to draw conclusions based on the data collected from only one year. As data from future semesters is obtained, it should become evident how to interpret the data. Based on this evaluation, recommendations and other suggested changes to the assessment process are as follows:

- May need greater mentor involvement earlier in fall semester 1/C year to improve EE and CE student performance on indicator i)
- Must validate expected improvement in indicator iv) due to recent changes in capstone project selection process
- Continue monitoring indicator iii) in future cycles to verify if performance by EE majors is actually that much lower than CE
- Further development is needed to streamline the assessment process for this outcome (greater use of data processing tools, across multiple cycles)

Lastly, changes were made to the wording of this outcome during the summer 2011. The wording now conforms more precisely to the wording of ABET outcome (c). The Oral Appraisal assessment method was changed to account for this rewording and provided the necessary assessment data.
Assessment data (as of spring 2012) using each assessment method (potential areas of concern highlighted in yellow):

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>i)</th>
<th>ii)</th>
<th>iii)</th>
<th>iv)</th>
</tr>
</thead>
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<tr>
<td>Scale</td>
<td>EE</td>
<td>CE</td>
<td>EE</td>
<td>CE</td>
</tr>
<tr>
<td>1.0-1.5 Students fully meeting indicator</td>
<td>9</td>
<td>7</td>
<td>12</td>
<td>9</td>
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<tr>
<td>1.51-2.0 Students partly meeting indicator</td>
<td>11</td>
<td>8</td>
<td>8</td>
<td>6</td>
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<tr>
<td>2.01-2.5 Students marginally meeting indicator</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2.51-3.0 Students not meeting indicator</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number of students: evaluated/total</td>
<td>22/26</td>
<td>15/15</td>
<td>22/26</td>
<td>15/15</td>
</tr>
<tr>
<td>Mentor Evaluation Avg (1/C)</td>
<td>1.69</td>
<td>1.63</td>
<td>1.55</td>
<td>1.53</td>
</tr>
<tr>
<td>Oral Appraisal Avg (19 EE,10 CE @ EOY)</td>
<td>1.22</td>
<td>1.3</td>
<td>1.26</td>
<td>1.3</td>
</tr>
<tr>
<td>CAT Avg (1/C – 3/C)</td>
<td>1.5 (1/C)</td>
<td>2.0 (all)</td>
<td>1.5 (all)</td>
<td>2.25 (1/C)</td>
</tr>
<tr>
<td>Economic</td>
<td>16</td>
<td>6</td>
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<tr>
<td>Environmental</td>
<td>16</td>
<td>7</td>
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<tr>
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<td>Safety</td>
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<tr>
<td>Manufacturability</td>
<td>15</td>
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</tr>
<tr>
<td>Sustainability</td>
<td>17</td>
<td>8</td>
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</tbody>
</table>
(3-2-4) The physics of semiconductor devices (p-n junction diode, bipolar and field effect transistors) is introduced. Device characterization in terms of appropriate external variables then leads to construction of small-signal and large-signal models. Emphasis is on practical electronic circuits such as amplifiers, filters, rectifiers, regulators and switching circuits.

Course Pre-requisites by Topic
EE221 – Introduction to Electrical Engineering I
or EE301 – Electrical Fundamentals and Applications
or EE331 – Electrical Engineering I

Additional Topical Requirements
None

Course Goals
Students shall develop the ability to understand and model basic semiconductor devices (p-n diodes, bipolar junction transistors and field-effect transistors), and apply these models to design single-stage analog and digital circuits.

Course Objectives
Students shall be able to:

i. Understand the basic structure and operation of diodes, bipolar junction transistors and field-effect transistors.

ii. Solve for voltages and currents in simple semiconductor device circuits.

iii. Design basic operational amplifier circuits including comparators and inverting and non-inverting amplifiers.

iv. Apply and implement small-signal models to understand single-stage amplifier circuits.

v. Design single-stage amplifier circuits using transistors.

vi. Apply and implement large-signal models to understand switching and digital circuits.

vii. Design basic logic gates using transistors

viii. Apply programming skills to model circuits using circuit modeling tools.

ix. Demonstrate the ability to design, construct, test, and debug basic electronics circuits in a laboratory environment

x. Demonstrate the ability to properly record and report laboratory work

xi. Demonstrate knowledge of current developments in electronics and their impact on society.

xii. Develop appropriate design equations for circuits as part of design process.

xiii. Develop prototyping and troubleshooting skills
## Course Objectives (COs) Relationship to Program Curricular Outcomes (PCOs)

<table>
<thead>
<tr>
<th>COs</th>
<th>PCOs</th>
<th>1</th>
<th>2</th>
<th>3</th>
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## Assessment Methods that Support Measurement of Course Objectives

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<tr>
<th>Assessment Method</th>
<th>Obj 1</th>
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### Assessment Method Details

**Assessment Matrix Evaluation Rating System:**

The following rating system was used for evaluation:

- 1, 80% or more of the students met the course objective,
- 2, 60% - 80% of the students met the course objective.
- 3, 40% - 60% of the students met the course objective.
- 4, less than 40% of the students met the course objective.
**Mid-Term Exams:**
There were two mid-term examinations. The first focused on op-amps and diode circuits, including rectifiers and regulators. The second exam focused on BJT circuits, including single-stage amplifiers and small-signal modeling.

**Practical Exams:**
There were two practical examinations. In both examinations the students were given a circuit diagram and the necessary components. The students then were asked to individually build the circuit and complete a list of measurements. In both exams there was a point at which the instructor checked off that the circuit was functional. The grade was based on the demonstration of functionality and on the correctness of the measurements. When students had difficulty in circuit assembly, they were offered the professor’s assistance with trouble shooting in exchange for points (the quantity of points depended on the severity of the apparent error).

**Lab Notebooks:**
The students were asked to keep a laboratory notebook for all of their work in the class. Pre-labs were always checked in the notebook. There were also period spot checks of the notebooks about every 2-3 weeks, and a final assessment at the end of the semester.

**Lab Reports:**
The students turned in two formal laboratory reports over the course of the semester. They were also given extensive guidance (see the course report) as to report format and were given the grading rubric in advance.

**Prototyping Lab:**
This laboratory exercise was new for this year. The students were given an open-ended design task: to create a circuit of their choosing that contained at least one sensor or dial, at least one actuator, at least one electronics component, and that would run off of 9V batteries. The list of suggested circuits included a burglar alarm, a metronome, and a light organ. The intent of the lab was to go through the entire design process in miniature. After choosing their project, the students prepared a block diagram of their system. They then built the circuit on a bread board. Then they completed a tutorial on PCB layout using ExpressPCB and laid out their circuits on a PCB. The designs were shipped off for production. The students then assembled their PCBs and demonstrated them in the last week of classes. On the day of the demonstration, the students also prepared quad charts for their designs which they presented along with their circuits. The assignment description and samples of the quad charts are included in the course report.

**Electronics News Presentation:**
Over the course of the semester, each student gave a 3 minute oral presentation of a news item on a technological advance related to electronics. The topic was of their own choosing, although they were given a list of web sites and journals to help in their search. At the time of the presentation, they also turned in a memo summarizing the news item and citing the source.

**Final Exam:**
The final exam contained problems designed to test the student’s knowledge and ability for all of the topics covered in Objectives 1-7. Some of the problems were open-ended design questions. One design question specifically asked the student to produce the required design equations for gain, input impedance and output impedance of a single-stage transistor amplifier, and then use the equations to solve for component values to match specifications.

**Evaluation Results**
In my last evaluation of Electronics—EE341 from the fall of ’06-07-- I noted that circuit analysis skills were weak and noted that moving the course up immediately following EE221 might improve the situation. However, circuit analysis continues to challenge these students, particularly when the circuit analysis requires the use of algebra,
such as in the small-signal modeling, where student exam performance was particularly poor despite repeated quizzes, homework and laboratory assignments. I worry that this is a larger trend due to increased dependence on calculators. On the other hand, I’ve observed a marked increase in design skills. Perhaps analytical skills can be improved with more drilling, or improved by demanding more analysis on laboratory reports.

Also in my last evaluation of Electronics, I noted that a multi-part lab was needed to teach soldering skills and better motivate the students. This was implemented this year with the prototyping laboratory described above. The performance of the students on this laboratory exceeded my expectations. They clearly enjoyed themselves, while learning a lot about electronics and the design process. I strongly recommend that this laboratory exercise continue. Improvements to consider would be shortening the PCB tutorial to an hour, increasing the amount of total time for the exercise by one lab period, and restricting the students to a board size that could fit into an Altoids box with a battery (then you’d have a ready source of packaging and could economically use the board service with the screen-printed layer by combining several student designs on one board).

The first several laboratory exercises prepared the students for the prototyping laboratory by introducing sensors and simple sensor-based applications (for example, a burglar alarm using a comparator). The other laboratory exercises in the course were either multipart labs--- a function generator and a multistage amplifier lab--- or single-session labs. The multipart labs were too close to exercises in Hambley, tempting the students to just follow along in the book instead of truly attempting design, so these labs should be adjusted in the future to avoid this problem.

The lab notebooks and lab reports were disappointing. In particular, the laboratory notebooks were very poor despite repeated warnings and grade penalties. The students did not seem to understand how to use the notebooks. Lab reports were initially very poor but improved after the first reports were returned with more guidance as to format. In both lab reports and notebooks, students consistently shortchanged analysis and prediction, and were very bad about recording procedures. In the next offering of the course, I plan to make the lab assignments less specified, forcing the students to explain what they did in their write-up and not just regurgitate the instructions. It will also help to provide detailed lab notebook instructions and the grading rubric for the notebook at the beginning of the semester. Furthermore, having points during the laboratory where the instructor will check off milestones in the laboratory notebook might help the students to see the notebook as a tool to be used during the laboratory itself. As a department, we may want to agree upon a format for lab notebooks and reports that we consistently push throughout the curriculum.

Reports might also be dramatically improved by requiring students to complete revisions. I would suggest that in the next offering of the course that lab reports be required for the sensors lab, function generator lab, and multistage amplifier lab, and that for at least one of these reports there be an initial grade, an expectation of a revision, and a revision grade.

**Overall Course Assessment**

**Overall Course Rating System:**
The following rating system was used for evaluation:

**Scale Definitions:**
- A, no adjustments are necessary
- B, a few minor changes are needed in one or two areas
- C, minor changes in many areas
- D, a major change in some area
- E, more than one major change is needed to improve the course.

(a) Course flow (order of topics, time spent on each topic, scope of exams, etc): A
Overall, I thought the course flow was excellent.

(b) Student feedback via formal critiques and informal comments: A

Students felt that the course was good but fast-paced. They particularly liked the prototyping laboratory exercise.

(c) Student mastery of Course Objectives (COs): B

The students did very well with design but not as well with analysis.

(d) Utility of assessment methods used to determine student mastery of Course Objectives (COs) (homework, quizzes, exams, labs, projects): A

Overall the assessment methods are sufficient.

PCOs

1. an ability to apply fundamental principles of mathematics, science, and engineering
2. an ability to design and conduct scientific and engineering experiments and conduct software simulations, as well as to analyze and interpret data
3. an ability to design a system, component, or process to meet desired needs. This includes problem definition, specification, design, implementation, test and operation of systems, components, and/or processes within performance and resource constraints
4. an ability to function on multi-disciplinary teams and in one-on-one situations
5. an ability to identify, formulate, and solve practical electrical engineering problems
6. an understanding of professional and ethical responsibility
7. an ability to communicate effectively, both verbally and in writing
8. the broad education necessary to understand the impact of engineering solutions in a global and societal context
9. a recognition of the need to continually update their knowledge and skills, and an ability to engage in life-long learning
10. a knowledge of contemporary issues
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
The goal of this lab is to design and create a battery-powered electronic circuit of your own devising that can operate outside of the lab. In addition to honing our design skills, we will also learn the electronics prototyping process. This process consists of the following stages:

1. Develop system specifications (i.e. what you want the circuit to do)
2. Consider different solution approaches.
3. Design the system block diagram
4. Design internal circuits for each block
5. Breadboard the circuits and test the system
6. Make adjustments to the design to improve performance
7. Layout the circuit on a printed circuit board (PCB)
8. Assemble the circuit
9. Test the final system

Your circuit must involve one 9V batteries, an on/off switch, at least one sensor (photoresistor, thermistor, microphone, etc.), at least one electronic device (diode, op-amp, BJT, etc.) and at least one actuator (LED, buzzer, motor, etc.). The department will provide your components and circuit boards but you will need to buy your batteries (although there will be some batteries available in the lab for device testing). You must be able to lay your circuit out within the confines of a 1.9” by 2.5” circuit board, which will fit with a 9V battery inside a standard Altoids-type tin. We will design and fabricate our PCBs through Express PCB, and the PCB layout software is available as a free download from www.expresspcb.com.

The “pre-lab” for this activity is that you should come to lab on Mar. 24 having consulted with your partner and having already determined what sort of project you’d like to attempt. Four lab periods and three lecture period will be dedicated to this activity. Since we are sending out the boards for fabrication, the deadlines are critical in this project.

You should document your design as you proceed in your lab notebook. In lieu of a formal lab report, a poster for each lab group that explains your design and reflects all of the stages of the prototyping process is due during the last week of classes, when we will show off our projects and compete for a yet-to-be-named prize.
The purpose of this laboratory exercise is to tie together many of the skills that you have developed though this class in one project. Your group will be implementing the block diagram shown in Figure 1. In this class you will be designing, building and testing the battery, sensors, and motor controller. In ee242 you will be learning how to program the FPGA to control the robot. You will have several selection choices to make to meet your groups design goals. The basic setup of the chassis can be found in the Assembly Instructions.

Battery
Batteries need to be selected for your group’s robot. The FPGA Robot Protection Board requires a minimum of 4.4V to operate.

Sensors
Your group will be designing, building and testing the circuit to detect a black line on a white surface using a Fairchild semiconductor QRB1134 Phototransistor Reflective Object Sensor. The biasing for the line following sensor will be described by your instructor. The sensors need to output ≥2.4V when a black line is sensed and <0.9V when the white background is sensed.

Motor Controllers
Your group will be building a transistor motor drive circuit (as done in a previous lab, however a comparator is unnecessary for this application) that allows the FPGA to drive the motors. The FPGA outputs a digital level of 0V to stop the motor and 3.3V to turn the motor. The FPGA can provide a maximum of 1.5 mA.
Battery selection for robot project

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<tr>
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<td>Capacity</td>
<td>850mAh based on 170mA discharge to 1V</td>
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Motor selection for robot project

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<td>&lt;=12V</td>
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<td>Speed*</td>
<td>66.6 RPM</td>
<td>62.5 RPM</td>
<td>66 RPM</td>
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<td>Current*</td>
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<td>Cost</td>
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*=(No load at Max Rated Voltage)
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<th>Rating (Metric)</th>
<th>Comments (assessment methods/tools, explanation or basis for ratings, suggestions for improvement)</th>
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<tr>
<td><strong>1. Problem Definition</strong></td>
<td>1.5 (1/C)</td>
<td>These skills are assessed through the final project reports, final project presentations, and feedback from the mentors, who meet regularly with the students over the course of the year.</td>
</tr>
<tr>
<td>• Identify and establish the need</td>
<td></td>
<td>1. 2. Problem definition and solution conceptualization are the focus for EE411. Students are given many opportunities to revise their problem statements with the help of their mentors, so by the second semester these are generally in good shape. However, there are some issues with the project selection and the consideration of alternatives. Many projects are over constrained or are more research than design in nature, limiting the opportunity for the students to make substantive design decisions. The burden for improvement here lies on the design coordinator and on the mentors. The capstone mentor needs to take an active role in shaping the project ideas set forward by the faculty to be phrased as problems to be solved. She also needs to guide the faculty in keeping the design space open for the students. Also, there will be more time spent in EE411 on the consideration of design alternatives.</td>
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<td>• Research previous approaches</td>
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<td>4. 7. The students are not doing enough quantitative analysis or assessment in their capstone work. Their methodology is too much trial and error. The challenge here is that there is such wide variety in the projects, that it’s hard to force the same type of quantitative analysis on every project. What quantitative analysis, for example, is appropriate for a cyber security project which is largely a programming problem? Still there were many projects where some calculations would have been completely appropriate, but were not done. I think this area could be improved by adding a variety of analysis examples to EE411.</td>
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<tr>
<td>• Develop a problem statement</td>
<td></td>
<td>5. Their project management was better this year than in the past. Starting the projects before Christmas really helps—the students recover much more quickly from the break and parts were in earlier even with the budget issues. Students still struggle with procrastination, of course, and some students did not break down their project into sufficiently small tasks.</td>
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<tr>
<td><strong>2. Develop Specifications</strong></td>
<td>1.5 (1/C)</td>
<td>6. Every group was able to get something to work. While it was not always the promised final product they all managed to get to something that could be properly labeled a prototype.</td>
</tr>
<tr>
<td>• Establish success criteria</td>
<td></td>
<td>8.9. Only about half the groups truly got through the system integration. This is largely a question of time— with projects already selected there should be more time available next year. Also, only a handful of groups closed the loop by comparing their final system performance against the requirements list. Those that did sometimes fudged the quantitative part of this comparison. The students need to be guided in establishing appropriate metrics and designing test procedures in EE411. Appropriate sections need to be added to the proposal assignments (and example).</td>
</tr>
</tbody>
</table>
| • Specify performance requirements       |                 | 9. System Verification<br>• Does solution produce desired results within constraints?  
• Adjust requirements as necessary       | 2.5 (1/C)       | 2. Analyze Solutions<br>• Component level designs  
• Solution comparisons  
• Solution selection |
| **3. Conceptualize Solutions**           | 2 (1/C)         | 4. 7. The students are not doing enough quantitative analysis or assessment in their capstone work. Their methodology is too much trial and error. The challenge here is that there is such wide variety in the projects, that it’s hard to force the same type of quantitative analysis on every project. What quantitative analysis, for example, is appropriate for a cyber security project which is largely a programming problem? Still there were many projects where some calculations would have been completely appropriate, but were not done. I think this area could be improved by adding a variety of analysis examples to EE411. |
| • Brainstorm approaches to the problem   |                 | 5. Their project management was better this year than in the past. Starting the projects before Christmas really helps—the students recover much more quickly from the break and parts were in earlier even with the budget issues. Students still struggle with procrastination, of course, and some students did not break down their project into sufficiently small tasks. |
| • Apply performance requirements and resource constraints | | |
| • System level design (block diagram, flow chart) | | |
| **4. Analyze Solutions**                 | 2.5 (1/C)       | 6. Every group was able to get something to work. While it was not always the promised final product they all managed to get to something that could be properly labeled a prototype. |
| • Component level designs                |                 | 8.9. Only about half the groups truly got through the system integration. This is largely a question of time— with projects already selected there should be more time available next year. Also, only a handful of groups closed the loop by comparing their final system performance against the requirements list. Those that did sometimes fudged the quantitative part of this comparison. The students need to be guided in establishing appropriate metrics and designing test procedures in EE411. Appropriate sections need to be added to the proposal assignments (and example). |
| • Solution comparisons                   |                 | 9. System Verification<br>• Does solution produce desired results within constraints?  
• Adjust requirements as necessary       |
| • Solution selection                     |                 | 2. Analyze Solutions<br>• Component level designs  
• Solution comparisons  
• Solution selection |
| **5. Project Management**                | 1.5 (1/C)       | 6. Every group was able to get something to work. While it was not always the promised final product they all managed to get to something that could be properly labeled a prototype. |
| • Project schedule                       |                 | 8.9. Only about half the groups truly got through the system integration. This is largely a question of time— with projects already selected there should be more time available next year. Also, only a handful of groups closed the loop by comparing their final system performance against the requirements list. Those that did sometimes fudged the quantitative part of this comparison. The students need to be guided in establishing appropriate metrics and designing test procedures in EE411. Appropriate sections need to be added to the proposal assignments (and example). |
| • Test plan                              |                 | 2. Analyze Solutions<br>• Component level designs  
• Solution comparisons  
• Solution selection |
| • Reports                                |                 | 9. System Verification<br>• Does solution produce desired results within constraints?  
• Adjust requirements as necessary       |
| **6. Prototype Implementation**          | 1 (1/C)         | 2. Analyze Solutions<br>• Component level designs  
• Solution comparisons  
• Solution selection |
| • Individual component construction      |                 | 6. Every group was able to get something to work. While it was not always the promised final product they all managed to get to something that could be properly labeled a prototype. |
| • System construction (e.g. power, sensor, feedback) | | |
| **7. Test/Debug**                        | 2 (1/C)         | 8.9. Only about half the groups truly got through the system integration. This is largely a question of time— with projects already selected there should be more time available next year. Also, only a handful of groups closed the loop by comparing their final system performance against the requirements list. Those that did sometimes fudged the quantitative part of this comparison. The students need to be guided in establishing appropriate metrics and designing test procedures in EE411. Appropriate sections need to be added to the proposal assignments (and example). |
| • Component and system level (compare to performance requirements/resource constraints) | | |
| • Analyze results, improve design and continue to test | | |
| **8. System Integration**                | 2 (1/C)         | 8.9. Only about half the groups truly got through the system integration. This is largely a question of time— with projects already selected there should be more time available next year. Also, only a handful of groups closed the loop by comparing their final system performance against the requirements list. Those that did sometimes fudged the quantitative part of this comparison. The students need to be guided in establishing appropriate metrics and designing test procedures in EE411. Appropriate sections need to be added to the proposal assignments (and example). |
| • Integrate systems into complete solution | | |
| • Continue improvement cycle (compare to performance requirements/resource constraints) | | |
| **9. System Verification**               | 2.5 (1/C)       | 2. Analyze Solutions<br>• Component level designs  
• Solution comparisons  
• Solution selection |
| • Does solution produce desired results within constraints?  
• Adjust requirements as necessary       | | |

**Student Performance Rating Key (comparison metric for each rating indicated by year group, in parentheses):**

1 – Met  
2 – Needs improvement  
3 – Not met  
N/A – Not applicable (or not expected)
<table>
<thead>
<tr>
<th>Design Skill</th>
<th>Rating (Metric)</th>
<th>Comments (assessment methods/tools, explanation or basis for ratings, suggestions for improvement)</th>
</tr>
</thead>
</table>
| 1. Problem Definition  | 2.5 (1/C) | Final Exam (design problems related to skills 3 and 4):  
3. Average percent score on design conceptualization (probs 7ab,8,12a) – 69.1%  
4. Average percent score on design analysis (probs 6b,7c, 12b) – 70.9% |
| 2. Develop Specifications  | 2.5 (2/C) | Lab Practicals (problems related to skills 4 and 7):  
4. Average percent score on design analysis (Lab Exam 2) – 86%  
7. Average percent score on test/debug (Lab Exam 1) – 88%. Score seems high based on instructor observations of actual student test/debug skills; exam re-write may be needed.  
Printed Circuit Board (PCB) design project – implement PCB using various electronic components; must fit in Altoids tin. Five class periods, three lab periods.  
1. Some designs defined by students themselves; others based on previous design projects.  
2. Some defined success criteria and performance requirements, identifying minor resource constraints. Students poor at estimating “scope” of design problems (project dependent).  
3. Brainstorming of possible solutions required on new projects. All applied resource constraints (size, 9V power). Most students did not consider system level design (block diagram).  
4. All had to analyze solutions at component level and consider various alternatives.  
5. Students did not create formal test plans/project schedules; goals and deadlines were given. Required poster presentation/demo.  
6. All students generated PCB schematic, layout, and populated board (soldering).  
7. Required test/debug on breadboard (before PCB layout) at component and/or system level, depending on project. Many projects required revision in circuit design based on test/debug results. Required significant help from instructor.  
8. Few projects required system integration; many needed improvements/re-work to succeed.  
9. Most projects worked to specification. Some required total re-work (revision of project).  
Suggested improvements to project:  
• Encourage use of larger surface mount components.  
• Allow use of 2-9V batteries (instead of 1-9V battery).  
• Integrate design labs from EE221 and EE242 with ideas in this course.  
Project/concept integration suggestions:  
• Yahtzee/blackjack – integrated with EE242, based on EE241 dice project  
• Filters – use Laplace discussion in EE221 to emphasize filter concepts (instead of 2nd order circuits); many students wanted to do related projects in EE241 but struggled |
| 3. Conceptualize Solutions  | 2 (3/C) |  
| 4. Analyze Solutions  | 1.5 (3/C) |  
| 5. Project Management  | 2 (3/C) |  
| 6. Prototype Implementation  | 1 (3/C) |  
| 7. Test/Debug  | 2 (3/C) |  
| 8. System Integration  | 2.5 (2/C) |  
| 9. System Verification  | 2 (1/C) |  

Student Performance Rating Key (comparison metric for each rating indicated by year group, in parentheses):  
1 – Met  
2 – Needs improvement  
3 – Not met  
N/A – Not applicable (or not expected)
<table>
<thead>
<tr>
<th>Rating (Metric)</th>
<th></th>
<th></th>
<th>Comments (assessment methods/tools, explanation/basis for ratings, suggestions for improvement)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Problem Definition</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Identify and establish the need</td>
<td>N/A</td>
<td></td>
<td></td>
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<tr>
<td>• Research previous approaches</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Develop a problem statement</td>
<td></td>
<td></td>
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<tr>
<td><strong>2. Develop Specifications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Establish success criteria</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Specify performance requirements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Identify resource constraints</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Conceptualize Solutions</strong></td>
<td>2 (3/C)</td>
<td></td>
<td>Final Design Project: Design and implement a sequential system using VHDL and DE2 boards. Two 1-week labs. Ratings based on instructor observations</td>
</tr>
<tr>
<td>• Brainstorm approaches to the problem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Apply performance requirements and resource constraints</td>
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<td></td>
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<tr>
<td>• System level designs (i.e., block diagram, flow chart)</td>
<td></td>
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<tr>
<td><strong>4. Analyze Solutions</strong></td>
<td>2 (3/C)</td>
<td></td>
<td></td>
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<tr>
<td>• Component level designs</td>
<td></td>
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<td></td>
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<tr>
<td>• Solution comparisons</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Solution selection</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>5. Project Management</strong></td>
<td>1 (3/C)</td>
<td></td>
<td></td>
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<tr>
<td>• Project schedule</td>
<td></td>
<td></td>
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<tr>
<td>• Test plan</td>
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<td></td>
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<tr>
<td>• Reports</td>
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<tr>
<td><strong>6. Prototype Implementation</strong></td>
<td>1 (3/C)</td>
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<td></td>
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<tr>
<td>• Individual component construction</td>
<td></td>
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<tr>
<td>• System construction (e.g. power, sensor, feedback)</td>
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<tr>
<td><strong>7. Test/Debug</strong></td>
<td>2 (3/C)</td>
<td></td>
<td></td>
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<tr>
<td>• Component and system level (compare to performance requirements/resource constraints)</td>
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<td></td>
<td></td>
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<tr>
<td>• Analyze results, improve design and continue to test</td>
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<tr>
<td><strong>8. System Integration</strong></td>
<td>N/A</td>
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<tr>
<td>• Integrate systems into complete solution</td>
<td></td>
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<tr>
<td>• Continue improvement cycle (compare to performance requirements/resource constraints)</td>
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<tr>
<td><strong>9. System Verification</strong></td>
<td>N/A</td>
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<tr>
<td>• Does solution produce desired results within constraints?</td>
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<tr>
<td>• Adjust requirements as necessary</td>
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</tbody>
</table>

Student Performance Rating Key (comparison metric for each rating indicated by year group, in parentheses):

- 1 – Met
- 2 – Needs improvement
- 3 – Not met
- N/A – Not applicable (or not expected)
Student Outcome (d): An ability to function on multidisciplinary teams.

- Outcome Champion: CDR Hewitt Hymas, USN

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Percent of Midshipmen Participating on Multi-Disciplinary Projects</td>
<td>EE 411/414</td>
<td>Professor Evaluation</td>
<td>EE 411/EE414/EC415</td>
<td>1 year</td>
<td>Yearly</td>
<td>30-40%</td>
</tr>
<tr>
<td>2. Ability to Define Team’s Goals in a Multi-Disciplinary Environment</td>
<td>EE 411/414 EM316/317 ES300/410 SI204</td>
<td>Peer Evaluation of Team Performance on Senior Project</td>
<td>EE 411/414/EC415</td>
<td>1 year</td>
<td>Spring 2012</td>
<td>80%</td>
</tr>
<tr>
<td>3. Ability to Communicate with Team Members from Other Disciplines</td>
<td>EE 411/414 EM316/317 ES300/410 SI204</td>
<td>Peer Evaluation of Team Performance on Senior Project</td>
<td>EE 411/414/EC415</td>
<td>1 year</td>
<td>Spring 2012</td>
<td>80%</td>
</tr>
<tr>
<td>4. Ability to Participate and Contribute to Accomplishment of Team’s Goals in a Multi-Disciplinary Environment</td>
<td>EE 411/414 EM316/317 ES300/410 SI204</td>
<td>Peer Evaluation of Team Performance on Senior Project</td>
<td>EE 411/414/EC415</td>
<td>1 year</td>
<td>Spring 2012</td>
<td>80%</td>
</tr>
</tbody>
</table>

Assessment Results 2009: Based on the assessment of Academic Year 2009-2010 data, participation in multi-disciplinary projects dropped from above 30% to 18%.

Evaluation and Actions 2009: After some investigation it was discovered that students in other engineering departments were selecting their projects the spring semester prior to the senior year and this was preventing many of our majors from participating on other engineering department projects. To correct this, the ECE Department changed the project selection process in AY 2010-2011 to align with the other engineering departments.

Second-Cycle Results 2010-2011: Data from the 2010-2011 Academic Year was assessed and actions taken above appear to have corrected the problem. Participation has increased as shown in Figure 1 below. This multi-year study quantifies the number of students participating in multi-disciplinary projects and addresses comments made by a visiting team in 2009.
Results 2011-2012

Figure 1 illustrates that over 30% of the Midshipmen participated in multi-Disciplinary projects, which is in-line with past participation.

New this year was a survey sent to graduates of the Naval Academy. The results of this survey are shown in Figures 2 and 3. When these results are compared to the same survey question included in the senior survey shown in Figure 4, we find the results are comparable with above 70% of the respondents stating they were prepared to function on a multi-disciplinary team. Academic year 2010 is the first year the “agree” response was split into “strongly agree” and “agree.”
Also new this year was a modification to the Senior Survey. In an effort to further assess the ability to function on a multi-disciplinary team four new questions were added, three of which assessed the Midshipmen’s opinion of their senior project team performance. The following four figures contain the results. 96% felt they possessed the ability to function on multi-disciplinary teams. In assessing their team’s performance with the remaining three questions, above 70% felt their team could function in a multi-disciplinary environment.
Finally, the senior project team mentors were asked to assess their team’s performance using the same questions. The results are shown below in a slightly different format. The following scale was used in this assessment.

0 – Demonstrated no ability
2 – Demonstrated suitable skills and abilities
4 – Demonstrated abilities that were commendable and should be used as an example for others

The results show that the class averages were slightly above 2, with ECE majors performing slightly better than EEE majors.
**Student Outcome (e): An ability to identify, formulate, and solve engineering problems.**

- **Outcome Champion:** Assistant Professor Chris Anderson

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Rubric Mapping</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recognize information given, existing parameters and definitions within the problem statement.</td>
<td>Problem Identification, Engineering Formulation, Figures and Graphs</td>
<td>EE221, EE241, EE322, EE354, EC262, Senior Electives</td>
<td>Homework</td>
<td>EE221/241/EC244</td>
<td>2 Years</td>
<td>2010, 2011</td>
<td>Tier 1</td>
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<td></td>
<td></td>
<td></td>
<td>Labs (Notebook and Report)</td>
<td>EE354/EC361</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Exams</td>
<td>EE262/SR Elective</td>
<td></td>
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</tr>
<tr>
<td>2. Define end state, solution method and identify relevant equations.</td>
<td>Engineering Formulation, Mathematical Calculations, Logical Progression</td>
<td>EE221, EE241, EE322, EE354, EC262, Senior Electives</td>
<td>Homework</td>
<td>EE221/241/EC244</td>
<td>2 Years</td>
<td>2010, 2011</td>
<td>Tier 1</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Labs (Notebook and Report)</td>
<td>EE354/EC361</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Exams</td>
<td>EC262/SR Elective</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Communicate solution in a neat and organized logical process or method.</td>
<td>Logical Progression, Engineering Formulation, Figures and Graphs</td>
<td>EE221, EE241, EE322, EE354, EC262, Senior Electives</td>
<td>Homework</td>
<td>EE221/241/EC244</td>
<td>2 Years</td>
<td>2010, 2011</td>
<td>Tier 1</td>
</tr>
<tr>
<td></td>
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<td>Labs (Notebook and Report)</td>
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<td>Exams</td>
<td>EC262/SR Elective</td>
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</tbody>
</table>

**Summary of Historical Results (2006-2009):** In 2006 and 2007, assessment of this outcome was performed by Dr. Rakvic, but focused on laboratory activities and practical design problems and was accomplished via a survey of the CATs. The emphasis was on determining whether students could demonstrate a high level of retention of practical knowledge when applying the concepts taught in class to the problems encountered in labs. It was noted that students were weak at troubleshooting the practical problems encountered in labs; further, there was an emphasis placed on bringing more practical design-type problems into the curriculum, such as the PCB project in EE241. Overall, students demonstrated weak to adequate performance in this outcome (as defined by Dr. Rakvic), and several curricular changes were recommended to emphasize practical lab skills and practical design problems. In 2008 and 2009, the first assessment of this outcome was performed by Dr. Anderson, and was assessed via a survey of the CATs. In the 2008 and 2009 years, it was noted that this outcome was primarily taught to students via design type problems, such as course projects or design labs. It was noted that students generally resisted retaining information for which they did not see a future need, resulting in anemic student improvement in this outcome over the course of their undergraduate career. Further, students were noted to have a tendency to stop working on projects and design problems after they had spent a certain amount of time working on the project, rather than when they had achieved a reasonable solution. Thus, the decision was made (starting with the 2009-2010 academic year) to shift from assessing students’ performance in laboratory and design-type problems (both of which are covered by other outcomes) and focus on assessing their mastery of the engineering problem solving process. Supporting material can be found in the historical “Outcome 5 Outcome Champion Notebook” which will be available during the site visit.

**Assessment Results 2010:** A detailed, rigorous, and thorough evaluation and analysis of all ECE course CATs and Course Reports was performed to gather data to assess student’s performance on this outcome. The results of the data gathering were highly qualitative, but can be found in the document “SPRING09 Outcome5_report.doc” which will be available during the site visit. This document basically two major pieces of information. For each course it provides an overall summary of the CAT narrative, a summary of the reported student performance in our outcome, and a summary of the reported assessment techniques used in the course. Additionally, it summarizes our assessment of whether students were achieving our outcome in this course, examples of specific student tasks or assignments that demonstrated or reinforced our outcome, and specific recommendations.
we had for improvement of the course. As a result of this effort, the decision was made to focus assessment on only those courses that most directly introduced, emphasized, and measured student’s problem solving skills. The qualitative data we gathered indicated that ECE students were weak in basic, logical, problem-solving skills, as reflected in their approach to homework problem solving and disorganized lab notebooks and reports. The result of our evaluation can be found in the document “Academic Year 2010 Outcome 5 Wrapup.doc” which will be available during the site visit, and indicated that students were performing at the Tier 3 level. Tier definitions are included in the supporting material for Outcome (e) in Appendix E.

Evaluation and Actions 2010: In response to the lack of quantitative assessment results, we began development on a set of criteria that we could use to more rigorously assess students problem-solving skill set. Additionally, we decided to begin focusing our assessment efforts on a select few courses we identified as needing to rigorously introduce, reinforce, and assess engineering problem solving. We also generated several program-level recommendations that were presented to our Outcome Group; detailed descriptions, as well as rationale for our recommendations, can be found in the document “PCO 5 General Recommendations.doc” which will be available during the site visit. Several of these recommendations for homework, labs, projects, and exams were implemented in EE354 to evaluate their efficacy.

Second-Cycle Results 2011: A more focused evaluation and analysis of ECE course CATs and Course Reports was performed, but still mainly resulted in qualitative data. The results of the data gathering can be found in the document “Academic Year 2011 Outcome 5 Wrapup.doc” which will be available during the site visit. Our assessment again generally indicated students were performing at the Tier 3 level, although we noted Tier 2 performance in Indicator 3. The techniques implemented in EE354 turned out to be too much for a single course, so the decision was made to have EE354 focus on reinforcing this outcome via labs only and emphasize the other aspects in separate courses.

Evaluation and Actions 2011: Even with our set of assessment criteria, we discovered that the results we collected were again qualitative in nature. As a result, we developed a quantitative rubric that we will be distributing in 2012 to course instructors so that they can assess student performance on one or more assignments during the course of the semester (discussed further below). We also presented program-level recommendations to our Outcome Group and initiated discussion within the group on how best to teach rigorous problem-solving skills within the department. As a result, we will be providing examples of Tier 1 Homework and Labs to instructors that teach and reinforce this outcome, and will formulate a plan with each instructor on how best to emphasize this outcome in their course.

Our Engineering Problem-Solving Assessment Rubric was developed and will be used by us to assess students’ mastery of the engineering problem solving process, which is different from the design process, laboratory troubleshooting process, or problem-solving product. Essentially, we break the problem-solving process down into five major categories: Problem Identification, Engineering Formulation, Mathematical Calculations, Logical Progression, and proper use of supporting Figures and Graphs. Subsets of each of these are used to determine student performance on each of our specific performance indicators; taken as a whole, they indicate overall student mastery of our outcome. Course coordinators where our outcome is assessed are instructed to select one type of problem (whether homework, lab, or exam), and assess each individual student’s performance under each category of our rubric. The results are then averaged together for each specific problem-solving category, subset of categories, and rubric as a whole. These results are then used to determine what Tier Level students are performing at according to our “ABET Outcome (e) Performance Targets” summary document. The Student Outcome (e) Assessment Rubric, the Student Outcome (e) Assignment Assessment, the Student Outcome (e) Targets, and Student Outcome (e) Performance Measurement Assignments can all be found in the Outcome (e) supporting material following this write-up.

Third-Cycle Results 2012: For 2012, three quantitative assessment tools were used to evaluate student attainment of Outcome (e): the Engineering Problem-Solving Assessment Rubric was used to evaluate 2/C student performance on an EE354 Exam 2 question (where the question was designed in part to evaluate their attainment of Outcome (e)), the Senior Design Mentor Tool (accessed on 16 June 2012), used to assess 1/C student performance on aspects of Outcome (e) over the duration of their Senior Design experience, and the EEE and ECE Graduating Senior Survey. The summary results are as follows, and raw data can be found in the J:\ drive assessment folder (an archive of the EE354 assessment can be found under J:\Assessment\Outcome Group - c, d, e, g (3, 4, 5, 7)\Outcome e (5)\AY2012 Raw Data which will be available during the site visit). Note that the table provides average performance for each program (EEE and ECE) in addition to which Outcome (e) Performance Tier (Tier 1, Tier 2, and Tier 3) categorized the student performance. In this table, the higher the score, the better the student performance. Conversely, the lower the Tier, the better the performance.

<table>
<thead>
<tr>
<th>Outcome (e) AY2012 Summary Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome (e)</td>
</tr>
</tbody>
</table>

251
Problem-Solving Category | Rubric Scale 1-4 | Rubric Scale 0-4
--- | --- | ---
**Program** | **EEE** | **ECE** | **EEE** | **ECE**
Problem Identification | 2.71 (T2) | 2.50 (T2) | 2.32 (T3) | 2.77 (T2)
Engineering Formulation | 2.57 (T2) | 2.25 (T3) | 2.48 (T3) | 2.67 (T2)
Calculations | 2.25 (T2) | 2.40 (T3) | -- | --
Logical Progression | 2.63 (T2) | 2.57 (T2) | 2.45 (T3) | 2.87 (T2)
Figures and Graphs | 2.25 (T3)* | 2.33 (T3)* | -- | --

* Figures were not required to solve the problem, but a proper figure greatly assisted with the Engineering Formulation.

On the Graduating Senior Survey, the following questions related to Outcome (e) were asked:

1. "I possess an ability to identify, formulate, and solve engineering problems."
   - 52% Strongly Agree, 40% Agree
2. "I possess an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice."
   - 52% Strongly Agree, 32% Agree
3. "My education has prepared me for solving real world engineering problems."
   - 40% Strongly Agree, 48% Agree

While the indirect measurement indicates EEE and ECE students perceive themselves as having good engineering problem-solving skills, the two direct measurements in 2012 indicate that EEE and ECE students are performing at the Tier 2/Tier 3 level. These results are consistent with our Qualitative results from AY 2009, 2010, and 2011, however, caution should be exercised in interpreting the data in that we only have two quantitative data points for our outcome.

**Evaluation and Actions 2012:** Our results indicate that engineering problem-solving is something that needs to be reinforced in both the EEE and ECE curriculum. We presented these findings at the ECE Department Meeting on 21 May 2012, and recommended meeting with instructors of core EEE and ECE courses (EE221, EE242, and EE322) in order to discuss methods and ideas for teaching, improving, and evaluating student’s engineering problem-solving skills. We intend to meet with these instructors at the beginning of Fall Semester to formulate a plan with each instructor on how best to emphasize this outcome in their course.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem Identification</strong></td>
<td>Identifies desired output and given information. Makes necessary simplifying assumptions. Identifies and lists all required theoretical concepts and equations.</td>
<td>Identifies most of the desired output and given information. Makes necessary simplifying assumptions. Identifies and lists most required theoretical concepts or equations.</td>
<td>Identifies desired output. Identifies given information. May not make all necessary simplifying assumptions. Lists one or two key theoretical concepts or equations.</td>
<td>Does not understand how to begin the problem. Does not display understanding of how to utilize theory or mathematics to achieve a correct final solution. No attempt at checking an obviously incorrect solution--no commentary.</td>
</tr>
<tr>
<td><strong>Engineering Formulation</strong></td>
<td>Can relate theoretical concepts to practical problem solving. Uses appropriate resources to locate information needed to solve problems. Takes new information and effectively integrates it with previous knowledge.</td>
<td>Demonstrates solution with integration of diverse concepts or derivation of useful relationships involving ideas covered in course concepts. Connects theoretical concepts to practical problem-solving when prompted. Uses limited resources to solve problems.</td>
<td>Has significant trouble relating theoretical concepts to practical problem solving. Must be assisted in integrating previous knowledge and new information. Is missing some of the pieces of the whole problem. Has some strategies for problem-solving, but does not apply them consistently.</td>
<td>The student response only repeats information in the problem task. An incorrect solution/response is given and no other information is shown. The solution/response and supportive information is totally irrelevant to the problem task. Does not realize when major components of the problem are missing. Have no coherent strategies for problem solving.</td>
</tr>
<tr>
<td><strong>Calculations</strong></td>
<td>Mathematical procedures are appropriate and complete. No calculation errors. Labels inputs and outputs with correct significant figures and units.</td>
<td>Parts of the mathematical procedure are missing. Makes one or two errors. Labels inputs and outputs with correct significant figures and units.</td>
<td>Makes more than two errors. May not include units with answer. Inputs and outputs may have improper number of significant digits. Units may be missing.</td>
<td>The entire solution contains severe mathematical errors. Does not have any calculations or has many errors.</td>
</tr>
<tr>
<td><strong>Logical Progression</strong></td>
<td>The entire problem solution is clear, focused, and logically connected. Demonstrates understanding of how various pieces of the problem relate to each other and the whole.</td>
<td>Parts of the solution are unclear, unfocused, and/or inconsistent.</td>
<td>A significant portion of the solution is unclear, unfocused, out-of-order, and/or has major inconsistencies.</td>
<td>There is little or no evidence of logical progression and the entire solution is unfocused.</td>
</tr>
<tr>
<td><strong>Figures and Graphs</strong></td>
<td>Includes all required diagrams with properties and units labeled correctly</td>
<td>Includes all required diagrams with axes and units labeled correctly. No more than one error.</td>
<td>Includes drawings but makes two or more errors.</td>
<td>Does not include necessary diagrams or required drawings.</td>
</tr>
</tbody>
</table>
# Student Outcome (e) Assignment Assessment

<table>
<thead>
<tr>
<th>Student</th>
<th>Problem Identification</th>
<th>Engineering Formulation</th>
<th>Calculations</th>
<th>Logical Progression</th>
<th>Figures &amp; Graphs</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Net Total Averages:
**Student Outcome (e) Targets**

**Tier 1 (Net Total Average of 3.6+ out of 4.0)**

Student work is characterized by all of the following:

- The student selects and implements relevant concepts and necessary procedures/strategies.
- The student considers all constraints of the problem situation.
- The solution and all relevant work are correct; or, there is a mistake due to some minor computational or copying error.
- Solutions are checked in other ways when possible; interpretations of results are appropriate and make sense.
- Student demonstrates creative synthesis of solution by combining knowledge and information.

**Tier 2 (Net Total Average of 3.2 – 3.6 out of 4.0)**

Student problem solving approach or problem solution is generally correct but has one major deficiency or several minor deficiencies, including:

- The student has a misconception or has failed to consider a relevant concept needed to solve the problem.
- The student is missing or has ignored several pieces of the whole problem.
- The student has used irrelevant information or has failed to use relevant information.
- The student must be assisted in integrating previous knowledge and new information in order to formulate a problem solution.
- The solution is generally correct, however, from the information provided it is not completely clear how the solution was generated.
- Problem-solving strategies are applied inconsistently or incorrectly.
- The solution is generally correct, but not checked in other ways.

**Tier 3 (Net Total Average of 2.8 – 3.2 out of 4.0)**

An incomplete and/or incorrect response/solution is provided, but with evidence to support a meaningful attempt to solve the problem; a correct response is provided but with two or more major deficiencies:

- Solution demonstrates only implementing simple applications of one theory/concept/formula in a manner analogous to class/lecture/example problems.
- Student does not see the connection between theory and problem solution.
- Student is unable to relate previous knowledge and current information to formulate a solution.
- The student did not carry the procedures/strategies/techniques far enough to reach a solution.
- The problem or solution is missing several major components.
- Answers are incorrect and not checked for reasonableness.
- Solution fails to consider several relevant constraints to the problem.
- Student selected a totally inappropriate strategy for formulating a solution.
- Solution fails to demonstrate a logical & coherent thought process.

**Student Outcome (e) Performance Measurement Assignments**

<table>
<thead>
<tr>
<th>Course</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE221/241/EC244</td>
<td>Two homework sets (one at &lt; 6 weeks, one at 12-15 weeks)</td>
</tr>
<tr>
<td>EE354/EC361</td>
<td>One formal lab report or lab notebook</td>
</tr>
<tr>
<td>EC262</td>
<td>One final exam problem or section</td>
</tr>
<tr>
<td>EE4XX (rotating)</td>
<td>One homework/exam problem/project report as selected by the course coordinator</td>
</tr>
</tbody>
</table>
Student Outcome (f): An understanding of professional and ethical responsibility.
- Outcome Champion: LCDR C. J. Flaherty, USN

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Seniors demonstrate an understanding of professional and ethical responsibility.</td>
<td>EE411</td>
<td>ESIT</td>
<td>EE411</td>
<td>Annually</td>
<td>Fall of senior year.</td>
<td>Average ESIT N2 score of 3.5 or higher</td>
</tr>
<tr>
<td></td>
<td>NE203, NL400</td>
<td>Graduating Class grades in NE203- Ethics and Moral Reasoning for the Naval Leader and NL400- Law for the Junior Officer.</td>
<td>Course grades as documented in MIDS</td>
<td>Annually</td>
<td>Fall of sophomore year and fall of senior year</td>
<td>Students achieve an average grade of B or better.</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>Graduating Senior Survey: seniors believe that their education has provided them with an understanding of professional and ethical responsibility.</td>
<td>EE414/EC415</td>
<td>Annually</td>
<td>Annually</td>
<td>80% or more graduating Seniors respond “Agree” or “Strongly Agree” to those questions related to an understanding of professional and ethical responsibility</td>
</tr>
<tr>
<td></td>
<td>Senior Design Project</td>
<td>Capstone Mentor Survey</td>
<td>EE414, EC415</td>
<td>Annually starting in 2012</td>
<td>Spring of senior year</td>
<td>Average rating of at least 3.0 on Outcome F entries</td>
</tr>
<tr>
<td>2. Students provide thoughtful and well-reasoned responses to case studies intended to spur critical thinking on ethics and professional responsibility.</td>
<td>EE221, EE241, EE322, EE354, EE411</td>
<td>Self-study: “59-Story Crisis” and IEEE Code of Ethics</td>
<td>EE221</td>
<td>Annually</td>
<td>Fall and spring of sophomore year, fall of junior year, and fall of senior year</td>
<td>75% of students provide responses evaluated as “good” by faculty</td>
</tr>
<tr>
<td></td>
<td>EE221, EE241, EE322, EE354, EE411</td>
<td>Self-study: “Goodrich Aircraft Brake Scandal”</td>
<td>EE241</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self-study: “Zappo”</td>
<td>EE322</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Self-study: “Incident at Morales” video and group discussion.</td>
<td>EE411</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Assessment, Evaluation and Actions 2006 - 2007: During 2006 and 2007 this outcome was assessed by monitoring Course Coordinator reporting in their CATs. Course Coordinators reported specific course objectives that related to professional and ethical responsibility and the extent to which their students met these objectives. The course objectives deemed by their coordinators to be relevant included:

- Demonstrate the ability to properly record and report laboratory work in a laboratory notebook.
- Demonstrate knowledge of current developments in electronics and their impact on society.
- Function effectively in the professional engineering environment.
- Keep a laboratory notebook in the context of an engineering design process.
- Verify and assess the operation of a capstone design project.
- State the privacy, policy, and legal issues with the use of biometrics.
- Identify critical issues for semiconductor devices including the environmental and safety issues related to semiconductor manufacturing.

Review of this outcome at the end of 2007 resulted in the generation of the following Program Assessment and Evaluation Matrix:
Outcome: an understanding of professional and ethical responsibility.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Implementation Strategy</th>
<th>Assessment</th>
<th>Evaluation</th>
<th>Logistics</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students in each track complete junior and senior elective courses that discuss ethical issues from current technology.</td>
<td>The ECE Department will offer a wide variety of senior level elective courses. Faculty will attempt to integrate contemporary ethical issues and problems into ECE core courses. USNA will require all students to complete courses in a wide variety of humanities and social science courses including a course in ethics. USNA Ethics department will conduct ethics seminars. USNA will implement a Midshipmen Honor Board to assess honor violations. USNA will require summer cruise.</td>
<td>(1,5) Student course checklist to verify courses taken. (1,2) All related course objectives and assessment tools. (3) USNA technical core curriculum. (4) Grading of final reports of senior design projects. (6) ECE faculty members will ensure students are adhering to honor code. (7) Professional development department will schedule all summer cruise activities.</td>
<td>Outcome champion will determine from assessment data which performance criteria have been met.</td>
<td>(1,3) Outcome champion will monitor USNA and ECE Department curricular requirements to insure breadth in the required and elective course offerings. (1,2) Course coordinators will do the course assessment tool.</td>
<td>Chairman of the professional and ethical responsibility subcommittee will make recommendations for improvements to the ABET and Curriculum Committees.</td>
</tr>
<tr>
<td>2. Students are exposed to ethical issues from current technology in required sophomore and junior ECE courses.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. Students have a broad exposure to courses in the humanities and social sciences.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4. Ethical issues from senior design projects will be considered and included in a final report.</td>
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<tr>
<td>5. All students take a course in ethics and participate in the MDS/CDS program.</td>
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<tr>
<td>6. All students at the Naval Academy are required to adhere to the Honor Code.</td>
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<tr>
<td>7. Students will be exposed to operational experience during summer cruise, which will enhance ethical and professional responsibility.</td>
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</tr>
</tbody>
</table>

The outcome champion at the time also noted that it was “cumbersome for individual course coordinators to come up with reasonable ways to address [this outcome]. I think having some case studies in place in a couple key courses would be sufficient … This way a set of materials could be issued for CC’s.” and he expressed a concern that this outcome was “not being addressed in such a way that there are quantifiable assessment methods in place that would allow for measuring an impact.” These observations resulted in a complete rethink{}ng and redesign of our approach to introducing, reinforcing and assessing students understanding of their professional and ethical responsibilities.

**Evaluation and Actions 2008:** During 2008 research and study was undertaken to determine the most effective way to introduce and discuss professional and ethical issues in an engineering context and how to more quantitatively assess an understanding of professional and ethical responsibility. Following extensive research, meetings, and discussions the following approach was developed: new Electrical and Computer Engineering majors would take the Engineering and Sciences Issues Test (ESIT) in their first majors course; they would then do a series of case studies spread out through their curriculum and culminating in “ethics week” during the first senior design course; finally, they would take the ESIT again. The case studies and the senior design “ethics week” would constitute the primary engineering-specific ethics education and the ESIT would be the primary measure of the efficacy of that curriculum.
The Engineering and Sciences Issues Test (ESIT) was developed by researchers at the Georgia Institute of Technology. Its development and use is extensively discussed in The Engineering and Science Issues Test (ESIT): A Discipline-Specific Approach to Assessing Moral Judgment by Jason Borenstein, Matthew J. Drake, Robert Kirkman, and Julie L. Swann. In brief, the ESIT measures whether a student’s reasoning about moral and ethical issues is characterized by narrow personal interest (deemed a low stage response), by an appeal to duty and to maintenance of the existing social order, or by the search for moral ideals on which a social order really ought to be based (deemed a high stage response). Two scores are calculated based on the students’ responses. These are the P-score, which measures the percentage of highest stage reasoning weighted by the importance given in the ranking scores compared to the maximum score possible; and the N2-score, which makes use of both the student’s relative ranking of the high stage issues as well as the student’s ability to rate the issues corresponding to lower stages appropriately. Since the N2-score is somewhat more comprehensive, we currently use it as the primary metric to assess moral and ethical reasoning over the course of instruction.

**Assessment Results 2009-2012:** In order to ensure that students achieve an understanding of professional and ethical responsibility during the course of their studies a specific curriculum was developed and has been implemented in the last 3 years. The Class of 2010 took the ESIT without any specifically dedicated technical ethics instruction. The Class of 2011 viewed and discussed the “Incident at Morales” case study in class prior to taking the ESIT as part of their senior design course. The Class of 2012 is the first class to have taken the ESIT in their 3/C year, then gone through the full regimen of case studies culminating with “The Incident at Morales” in their 1/C year followed by a second taking of the ESIT. The table below shows the regimen of case studies and ESITs given thus far to each Class.

<table>
<thead>
<tr>
<th>Class of</th>
<th>3/C Year</th>
<th>2/C Year</th>
<th>1/C Year</th>
<th>ESIT (EE411)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ESIT (EE221)</td>
<td>EE221 Case Study “59-Story Crisis”</td>
<td>EE241 Case Study “Brake Scandal”</td>
<td>EE322 Case Study “Zappo”</td>
</tr>
<tr>
<td>2010</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>2011</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>2012</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>2013</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>2014</td>
<td></td>
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</tr>
</tbody>
</table>

The case studies are a mix of fiction/non-fiction and positive/negative stories. In courses except for EE411, the case studies are packaged as a homework assignment. Students read the case study and provide short answers (a few sentences) to several questions. In EE411, students watch the “Incident at Morales” video and engage in an instructor-led Q&A and discussion session. The case studies are listed below.

- EE221: “The Fifty-Nine-Story Crisis” and IEEE Code of Ethics
- EE241: “Goodrich Aircraft Brake Scandal”
- EE322: “Zappo”
- EE354: “Geoslavery”
- EE411: “Incident at Morales” video and instructional material

Except for the “Incident at Morales”, the case studies can be found on the ECE Department’s shared drive at: “J:\Assessment\Outcomes 6 & 8 Material\Homework Assignments”. The discussion guide for the “Incident at Morales” can be found at “J:\Assessment\Outcomes 6 & 8 Material\Case 3/C Year”
The “Incident at Morales” DVD resides with either the Outcome H Champion or the EE411 instructor. These materials will be available during the site visit.

The analyzed ESIT scores indicate an increasing trend from class to class, as the use of case studies was introduced, as well as in the single class that has completed the entire current curriculum. Those scores are summarized in the table below.

<table>
<thead>
<tr>
<th>Class of</th>
<th>3/C Year</th>
<th>1/C Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P N2</td>
<td>P N2</td>
</tr>
<tr>
<td>2010</td>
<td>0.45</td>
<td>2.54</td>
</tr>
<tr>
<td>2011</td>
<td>0.50</td>
<td>3.12</td>
</tr>
<tr>
<td>2012</td>
<td>0.47</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Of interest is that the N2 score of the ECE majors of the Class of 2010, who took the ESIT without any of the engineering-specific ethics curriculum in place, is approximately the same as the pre-curriculum score for the ECE majors of the Class of 2012. Also of note is that the N2 score increased for each class in which more engineering-specific ethics curriculum was introduced. The Class of 2010 had none, the Class of 2011 did only the “Incident at Morales” study during their senior design course, and the Class of 2012 did all of the case studies. In each case, the score increased as additional studies were added to the curriculum. All Naval Academy students must take two core non-engineering courses relevant to Outcome F. The first course, NE203 Ethics and Moral Reasoning for the Naval Leader is “structured around classical and contemporary writing in moral philosophy.” NL400 Law for the Junior Officer “provides a broad survey of military law applicable to the junior officer.” Taken together, the two courses form a foundation for thinking about moral, ethical, and societal issues. Our assessment of these courses is to simply report the grade point averages of the Electrical Engineering and Computer Engineering graduates as seen in the graph below. Students average above a 3.0 in NE203 and NL400 year-after-year. Years 2010 and earlier report on EE majors only. Year 2011 includes both EE and CE majors combined. Starting in 2012, EE and CE majors were tracked separately as seen in the following figures.
Each graduating class is given a survey covering their time and experiences in the Electrical Engineering and Computer Engineering programs. Four statements on that survey pertain to Outcome F. The four statements were added to the survey starting with the Class of 2009. The two tables below summarize the results for each Class on each survey statement. The performance goal is for 80% or more of the responses to each statement be “Agree” or higher. With the exception of the Class of 2009, which received no extra instruction on Outcome F, this goal has been met for the past three Classes.

Statement: “My education has given me an understanding of professional and ethical responsibility.”

<table>
<thead>
<tr>
<th>Class of</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A or Unanswered</th>
<th>% Agree or Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009*</td>
<td>n/a</td>
<td>11</td>
<td>4</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
<td>73.3</td>
</tr>
<tr>
<td>2010</td>
<td>5</td>
<td>11</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
<td>88.9</td>
</tr>
<tr>
<td>2011</td>
<td>12</td>
<td>12</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td></td>
<td>85.7</td>
</tr>
<tr>
<td>2012†</td>
<td>64%</td>
<td>32%</td>
<td>4%</td>
<td>0</td>
<td>0</td>
<td></td>
<td>96</td>
</tr>
</tbody>
</table>

* The survey for the Class of 2009 had just three possible responses: Agree, Indifferent, and Disagree.

Statement: “My education gave me a thorough understanding of professional and ethical responsibility.”

<table>
<thead>
<tr>
<th>Class of</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A or Unanswered</th>
<th>% Agree or Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td></td>
<td>73.3</td>
</tr>
<tr>
<td>2010</td>
<td>4</td>
<td>11</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td>83.3</td>
</tr>
<tr>
<td>2011</td>
<td>11</td>
<td>13</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td></td>
<td>82.8</td>
</tr>
<tr>
<td>2012†</td>
<td>40%</td>
<td>60%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Statement: “In engineering work, it is important to carefully consider professional and ethical considerations relating to design, manufacture, maintenance, and operation of engineering systems.”

<table>
<thead>
<tr>
<th>Class of</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A or Unanswered</th>
<th>% Agree or Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td>86.7</td>
</tr>
<tr>
<td>2010</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
<td>81.3</td>
</tr>
<tr>
<td>2011</td>
<td>16</td>
<td>10</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td>96.3</td>
</tr>
<tr>
<td>2012†</td>
<td>64%</td>
<td>32%</td>
<td>4%</td>
<td>0</td>
<td>0</td>
<td></td>
<td>96</td>
</tr>
</tbody>
</table>

Statement: “Faculty effectively communicated issues related to professional and ethical responsibility in the design, manufacture, maintenance, and operation of engineering systems.”

<table>
<thead>
<tr>
<th>Class of</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A or Unanswered</th>
<th>% Agree or Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td></td>
<td>73.3</td>
</tr>
<tr>
<td>2010</td>
<td>4</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
<td>82.4</td>
</tr>
<tr>
<td>2011</td>
<td>15</td>
<td>12</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td>96.4</td>
</tr>
<tr>
<td>2012†</td>
<td>52%</td>
<td>44%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>96</td>
</tr>
</tbody>
</table>

† Survey results were reported as a percentage of respondents instead of as raw numbers.
Capstone Mentor Tool
The Capstone Mentor Tool (CMT) is a rubric-based survey completed by faculty mentors of senior design projects, including Bowman projects, done under the supervision of the Electrical and Computer Engineering Department. When possible, results from mentors of students working on projects outside of the Department (for example on “Cockpit of the Future” or dual major CE/CS students working in the Computer Science Department) were collected. The matrix for Outcome F items in the rubric is shown below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student is aware of the IEEE code of ethics (f)</td>
<td></td>
</tr>
<tr>
<td>No idea</td>
<td>Aware it exists but doesn't know all the details</td>
</tr>
<tr>
<td>Does the student consider the IEEE code of ethics when making technical decisions (f)</td>
<td>Student considers the code but does not always act accordingly</td>
</tr>
<tr>
<td>No idea</td>
<td>Aware they exist but don't know the details</td>
</tr>
<tr>
<td>Student is aware of engineering standards that might apply to their problem (f)</td>
<td>Student considers standards but does not always follow them</td>
</tr>
<tr>
<td>Does the student consider standards when making technical decisions (f)</td>
<td></td>
</tr>
</tbody>
</table>

Capstone Mentor Tool rubric for Outcome H.

The threshold value for this performance target has been set at 3.0 to indicate a better-than-passing level of understanding.

Results for the Class of 2012 (the first year the CMT was used) are shown in the table below. Results are separated by Electrical and Computer Engineering majors (EE and CE, respectively). The number in parenthesis in the table show the number of students for which results were collected. There were 26 EE students and 15 CE students subject to the survey for 2012. Students dual majoring in both EE and CE are included in both the EE and CE columns.
<table>
<thead>
<tr>
<th>Item</th>
<th>EE Average</th>
<th>CE Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student is aware of the IEEE code of ethics (f)</td>
<td>1.6 (15)</td>
<td>2 (5)</td>
</tr>
<tr>
<td>Does the student consider the IEEE code of ethics when making technical decisions (f)</td>
<td>1.53 (15)</td>
<td>2 (5)</td>
</tr>
<tr>
<td>Student is aware of engineering standards that might apply to their problem (f)</td>
<td>1.95 (19)</td>
<td>2.44 (9)</td>
</tr>
<tr>
<td>Does the student consider standards when making technical decisions (f)</td>
<td>1.84 (19)</td>
<td>2 (10)</td>
</tr>
</tbody>
</table>

*Capstone Mentor Tool results for the EE and CE graduates of 2012.*

These results clearly show that the 3.0 threshold for performance was not met. The rather low scores may be in large part due to a deficiency in our design courses, namely a lack of emphasis on the role and use of standards.

**Evaluation and Actions 2009-2012:** The target performance of achieving an average N2 score of 3.5 or higher on the ESIT is based on the current scoring data analyzed, the maximum theoretical score possible, and scoring results reported in the ESIT paper. The maximum theoretical N2 score is 6.9. In the published testing data, students with no ethics instruction experience had an average N2 score of 2.63 and students with ethics experience had an average N2 score of 3.33. The score of 3.5 was deemed a reasonable and achievable goal for students at the Naval Academy, who are generally more exposed to dealing with issues of responsibility than other college students. Although the increasing N2 score trend is encouraging, we do not yet meet the target performance score of 3.5. We are currently discussing a shift in focus for the case studies to make them more effective learning experiences and to stop attempting to use them as methods of assessment. The current target performance will be re-evaluated annually as additional data is gathered.

The case studies were originally intended to serve as both educational tool and assessment method. To support the assessment function, we had intended to develop an evaluation rubric for the assignment-based case studies (all those except for “Incident at Morales”). However, it was deemed that, with ESITs, surveys, and ethics course grade collection already in place, the addition of case studies as assessment method was overkill and unduly labor-intensive. As such the evaluation of the case studies as performance indicator was never completed and will be removed for the coming years. The current focus in regards to case studies is to enhance their educational effect by providing more feedback to the students.

The removal of case studies as performance indicator would leave this outcome with only one performance indicator. For next year, separating an understanding of professional responsibility from an understanding of ethical responsibility each into their own performance indicators will be considered. Methods of assessment more specifically applicable to professional responsibility (as opposed to professional and ethical responsibility) would then also be developed. The target for performance in NE203 and NL400 course grades has consistently been met by ECE majors, their grades averaging 3.2 or better in these courses.

The target for performance as measured by the Senior Survey has been met for the ECE majors of the Classes of 2010 through 2012. The EE majors of the Class of 2009 did not meet the target of performance for 3 of the 4 relevant questions. This may be attributed to the increased focus in ethics instruction in the later classes.

The results of the Capstone Mentor Tool with respect to students awareness of standards and their applicability has recently (within the last few months) highlighted an important area for future adjustments to our curriculum and assessment process. Currently, engineering standards are only officially covered in the curriculum during the senior design course. The two assessment questions on the Capstone Mentor Tool relating to standards represent our first attempt to measure whether or not the students have developed an understanding of their existence and potential applicability. Our results so far indicate that they have not.
A review of other student outcomes indicates that understanding of use and applicability of standards is not assessed elsewhere, although it could potentially fall under broader interpretations of Outcomes (c) and (k) as well as Outcome (f). Separating the performance indicators for Outcome (f) into those supporting an understanding of professional responsibility and those supporting an understanding of ethical responsibility would create a logical home for assessing an understanding of the use and applicability of standards in general (namely under professional responsibility). Given the low scores on our assessment in this area, it may be necessary to address standards more thoroughly throughout the Electrical and Computer Engineering curriculum by incorporating them into several other courses.
**Student Outcome (g): An ability to communicate effectively.**
- **Outcome Champion:** CAPT Kevin Rudd, USN, Ph.D.

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Able to write effectively</td>
<td>EE411, EE414/EC415</td>
<td>Course Coordinator analysis of graded writing assignments and project proposal</td>
<td>EE411 CAT</td>
<td>3 Years</td>
<td>2010–2011, 2012 (one-time out of sequence for assessment calibration)</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outcome Champion analysis of student evaluations</td>
<td>EE411 Student Feedback forms.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Able to document work completely and accurately</td>
<td>EE411, EE414/EC415</td>
<td>Course Coordinator analysis of lab books</td>
<td>EE411 CAT, EE414/EC415 CAT</td>
<td>3 Years</td>
<td>2010–2011, 2012 (one-time out of sequence for assessment calibration)</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Course Coordinator analysis of graded project proposal</td>
<td>EE411 CAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Able to present work to an informed audience</td>
<td>EE411, EE414/EC415</td>
<td>Project advisor review of project report and presentation</td>
<td>EE414/EC415 CAT, EE414/EC415 course records.</td>
<td>3 Years</td>
<td>2010–2011, 2012 (one-time out of sequence for assessment calibration)</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Course Coordinator analysis of faculty and student presentation surveys</td>
<td>EE414/EC415 CAT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Assessment, Evaluation and Actions 2006 - 2010:** During a review of CATs for 2006 there were a number of changes recommended; most of the recommended changes were accepted with one rejection. These changes were primarily documentation-based and did not include any substantive course-change recommendations. One comment in subsequent review in 2009 highlights a deficiency in collecting student work samples; this deficiency has since been corrected. A later review in 2011 showed that there were inconsistencies in how different courses were evaluating their contribution to Student Outcome (g). Based on these evaluations we have revised the assessment and evaluation plan to focus on the senior-design capstone courses, EE411 and EE414/EC415. This change was made to allow evaluation of student culminating accomplishments in this outcome area rather than evaluating a range of assignments from earlier courses which cover different aspects of communications but do not have the uniform requirements or standards.

**Assessment Results 2011:** This cycle begins assessment and evaluation using the new assessment and evaluation plan that examines students in their senior-design capstone courses. Student writing met the performance target in final work products (EE411 Course Objective 6) but slipped when students focused on project work (EE414/EC415 Course Objective 6); students did not meet the performance target for the writing assignments during the course. For those who wrote anything on the topic in their student-feedback surveys (these are archived for each faculty member), writing assignments were fairly-universally panned in...
student evaluations; it appeared that the general consensus was that writing was not important for a design project and should be reduced/eliminated—this position is consistent with other feedback that the only part of the course that should be kept was the design project itself, not project management or other non-project activities. Overall, documentation started off well and met the performance target (EE411 Course Objective 3) but also slipped when students focused on project work (EE414/EC415 Course Objective 1). Student presentations met the performance target (EE411 Course Objective 5 and EE414/EC415 Course Objective 7). #EEE# The Senior Mentor Tool results indicate that students barely met the target of performance for documentation and presentation methods (question 21: 3.06 average) and presentation ability (question 29: 3.02 average). #ECE# The Senior Mentor Tool results indicate that students barely missed meeting the target of performance for documentation and presentation methods (question 21: 3.06 average) and presentation ability (question 29: 3.02 average); these values were slightly below their Electrical Engineering counterparts (3.06 and 3.02 averages, respectively).

**Evaluation and Actions 2011:** Sample assignments in the EE411 CAT shows that student reports are complete and with reasonable quality indicating that students achieved appropriate writing skills; sample papers can be found in the EE411 CAT. What appears missing from the students is an understanding of the importance of the writing assignments and the specific skills that each assignment was intended to develop; going forward, all courses with writing requirements, but especially in EE411, should emphasize the relationship of writing to success in both engineering in general and the Navy or Marine Corps in particular; this change would enable the students to understand the reason behind these writing assignments. To this end, during 2012 we will revisit the question of setting formal standards for laboratory and engineering notebooks and reports which will be flexible enough to apply to all levels of courses as well as the individual preferences of course coordinators and individual instructors. Whether these standards mandate specific format requirements or are more general guidelines will depend on faculty consensus; however, the standards will include basic rubrics to standardize application of the standard to student work at all levels. Another issue is that there are currently no copies of the faculty and student presentation surveys provided in the 2011 EE414/EC415 CAT. Going forward, at a minimum, copies of these surveys for representative project presentations should be included in the CAT to document performance. To ensure that these recommendations provide sufficient information without undue complication for the Course Coordinators, there should be an out-of-cycle assessment and evaluation in 2012 so that any necessary corrections to the assessment and evaluation plan for this outcome can be made before the next scheduled assessment and evaluation in 2014.
Student Outcome (h): The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

- Outcome Champion: Major Chris Mayer, USAF

Overview: A new slate of educational strategies and assessment criteria and tools were introduced in the fall of 2009. Only one full cycle of the new strategy has been completed so far (the Class of 2012). Three out of five performance targets are being met at this time. The limited amount of data is not enough to establish a trend, however there are some encouraging signs. We have made some changes to educational strategies and introduced one new assessment method while holding to the current course. Separation of EE and CE results commenced with the Class of 2012.

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data collected</th>
<th>Assessment cycle length (yrs)</th>
<th>Target for Performance</th>
<th>Target Met?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sensitivity and alertness to factors affecting engineering designs.</td>
<td>Case studies in EE221, EE241, EE322, EE354, EE411, and the courses NE203, and NL400.</td>
<td>ESIT</td>
<td>EE411</td>
<td>Annual</td>
<td>Fall 1/C Year</td>
<td>Class avg N2-Score ≥ 3.5</td>
</tr>
<tr>
<td></td>
<td>Ibid</td>
<td>ESIT</td>
<td>EE411</td>
<td>Annual</td>
<td>Fall 1/C Year</td>
<td>Class avg P-Score ≥ 0.5</td>
</tr>
<tr>
<td></td>
<td>Ibid plus Senior Design Project</td>
<td>Capstone Mentor Survey</td>
<td>EE414 &amp; EC415</td>
<td>Annual</td>
<td>Spring 1/C Year</td>
<td>Average rating ≥ 3.0 on Outcome H entries</td>
</tr>
<tr>
<td>2. Engendered awareness of the role engineers play in the world and vice-versa.</td>
<td>NE203 and NL400</td>
<td>Grades in NE203 &amp; NL400</td>
<td>Course grades from MIDS</td>
<td>Annual</td>
<td>End of Spring semester each year.</td>
<td>Class average QPR of ≥ 3.0 in both NE203 and NL400</td>
</tr>
<tr>
<td></td>
<td>Case studies in EE221, EE241, EE322, EE354, EE411</td>
<td>Senior Survey</td>
<td>End of program feedback session</td>
<td>Annual</td>
<td>End of Spring semester 1/C year</td>
<td>≥ 80% respond “Agree” or better to statements about Outcome H</td>
</tr>
</tbody>
</table>

Assessment, Evaluation and Actions 2006 - 2011
Assessment and evaluation of Outcome H was minimal from 2006 through the summer of 2009. No Performance Indicators (PIs) were in place. The only data being collected on a regular basis were responses to the Outcome H questions in the graduating student survey (aka the 1/C Survey) and graduating class grade averages in NE203 and NL400.
In the fall of 2008 work began on improving the Electrical and Computer Engineering Department’s (the “Department”) efforts with regards to Outcome H. Without resident experts on Outcome H, the Outcome H Champion, Major Mayer, in conjunction with the Outcome F Champion, Dr. Deborah Mechtel, began a process of investigation that led to the Outcomes F and H education and assessment process that is in place now. Outcome F says that graduating students should have “an understanding of professional and ethical responsibility”. The investigation involved looking at peer institutions to see what they do in regards to the Outcomes, an examination of things already done at the Naval Academy that reflect on or impact Outcomes (both inside and outside the Department), and consideration of what could be done within the Department in regards to the Outcomes. The findings led us to propose and (mostly) implement an assessment plan with seven lines of attack that are described in detail shortly. We decided to introduce some instructional material (case studies) and assessment tools (ESIT) into the Department’s two degree programs. We deferred the details of how to make the best use of the case studies, gather more data, and interpret that data and ESIT results. As we learned more about ABET’s desires and encountered problems with our original plan, we have adapted. Currently six of the seven lines of attack from the original plan are in some state of implementation. Even those that were not grafted to PIs were implemented and results collected, collated and tracked, in case they might be useful at some later time.

Below, we discuss the seven lines of attack from the 2009 plan. The current status of each line of attack can be found some pages hence in the Assessment Results and Evaluation 2009-2012 section. Results and analysis of the plan items that do not support PIs are also discussed. A discussion of action items for the 2009 plan can be found subsequently under the heading “Evaluation and Actions 2012”.

1. **Case Study Assignments.**  We introduced minimally disruptive case study assignments to several courses that all EE and CE students must take. These additions take form of homework assignments in which students read a case study or watch a video and then answer several short-answer questions. The case studies are a mix of fiction/non-fiction and positive/negative scenarios. One assignment is given in each of the following courses. This amounts to exposure to Outcomes F and H each semester for five semesters starting in the Fall of the 3/C year:

   - EE221: “The Fifty-Nine-Story Crisis” and IEEE Code of Ethics
   - EE241: “Goodrich Aircraft Brake Scandal”
   - EE322: “Zappo”
   - EE354: “Geoslavery”
   - EE411: “Incident at Morales”

   The first four assignments consist of a cover sheet that motivates the student to complete the assignment and provides instructions, the case study proper, and a set of short-answer format questions. The “Incident at Morales” case study is a video with an instructor facilitated discussion. Except for “Morales” the assignments are given to instructors at the beginning of each semester with a recommendation that the assignments be made a gradable portion of the class (perhaps by making them equal to a homework assignment). The Outcome Champion prepares the assignments and stores completed assignments. Course instructors simply have to deliver the assignments to the student, collect them, and turn them over to the Outcome Champion. Students should take about two hours to complete each assignment. Assignments can be found on the Department’s shared J: drive under the Assessment folder, in the Outcome H binder in the ECE front office, or by request from the Outcome Champion. The “Morales” video resides with the Outcome H Champion when not in use. These materials will be available during the site visit.

2. **ESIT.**  The ESIT presents students with six scenarios, each of which puts a fictitious person in an ethically tough situation. After reading a scenario, students are asked to make a decision about what the person in the scenario should do. The student then rates twelve issues related to the scenario based on how important they are to the student’s decision. Each issue is rated on 5-point scale: 1 (great importance) to 5 (no importance). Then the
students are asked to rank the importance of the four issues they rated as being of highest importance.

Instead of focusing on the decision, the ESIT attempts to uncover the type of thinking involved in reaching the decision. To do this, the twelve issues accompanying each scenario are divided roughly equally into three types of thinking: preconventional, conventional, and postconventional. Preconventional issues are those that have an intense personal interest. They represent narrow, low-level, self-centered thinking. Conventional issues feature such ideas as a sense of duty and maintenance of the existing social order. Conventional issues are more advanced than preconventional issues. The highest level of moral thinking is postconventional, wherein an ideal social order results from moral actions. Further, postconventional issues “can include any moral outlook that offers a critical perspective on the status quo.”

The ESIT reports two scores for each respondent. The N2-Score “accounts for the postconventional thinking that is present and the preconventional thinking that is absent.” The P-Score “measures the percentage of postconventional reasoning weighted by the importance given in the ranking scores compared to the maximum score possible.” Higher numbers for each score are better. Taken together the scores give an indication of how deeply a student is thinking about the issues in the case study. Consequently, the scores reflect upon the student’s background and education desired for Outcomes F and H. Students are not told what the test is actually measuring; to them it’s just questions about ethical dilemmas.

The ESIT is given at two times in a student’s career. The first time is in the fall of the 3/C year in EE221 prior to completing any case study assignments and prior to their having had NE203 or NL400. The second administration comes in the fall of the 1/C year during EE411 after all the case studies have been delivered, including “Morales”, and the students have had NE203 and NL400. In addition to the raw N2-Scores and P-Scores, the hope is that scores will improve between 3/C and 1/C years thus indicating that the education in the intervening years was beneficial.

The ESIT and supporting material (rules for computing scores, academic papers, etc.) are located in the Assessment folder on the J: drive and will be available during the site visit.

3. **Senior Survey.** At the end of their normal course of study, graduating students are encouraged to take a survey concerning their experience and impressions of the Electrical and Computer Engineering degree programs. This is the so-called Senior Survey. Two statements related to Outcome H have been added to the survey. Students are asked to respond on a 5-point scale from “strongly agree” to “strongly disagree”. The statements are:
   - My education has helped me to understand how engineers and the products of their labor have shaped society and changed the world.
   - My education has helped me to understand the role that society and the world at large have on engineering.

4. **Performance in NE203 and NL400.** Per the course description, NE203, Ethics and Moral Reasoning for the Naval Leader, is “structured around classical and contemporary writing in moral philosophy.” NL400, Law for the Junior Officer, “provides a broad survey of military law applicable to the junior officer.” Taken together, the two courses form a foundation for thinking about moral, ethical, and societal issues. We cull grades for each course for all of our graduates and report average grades per graduating class.

5. **Course Coordinator Surveys.** Questions pertaining to Outcome H have been inserted into the course coordinator survey that is part of the Department’s Course Assessment Tool (CAT). Non-blank survey responses are copied from the CATs and cataloged for future reference.
6. **Information Gleaned from Course Assessment Tools.** Following each offering of a course, the course coordinator prepares a Course Assessment Tool (CAT) report that, among other things, links subject material to the ABET Outcomes and summarizes aggregate student performance in the course. CATs are reviewed annually by the Outcome H Champion. The Champion compiles a list of which courses contain material related to Outcome H material as a normal part of the course (not including the case studies listed in item #1 above). In addition, for course objectives linked to Outcome H, we compile the ratings reported for each objective. For example, if a course has the learning objective “students can fabricate a design based on a set of criteria” that is linked to Outcome H (perhaps the design asks them to consider safety or environmental issues) and the course coordinator reports that 80% of students met that objective, then we record that rating with respect to Outcome H.

7. **Capstone Project Reports.** In their senior design project reports students must include a discussion (have a section in the report) that addresses Outcomes F and H. The intent here is to collect and/or evaluate the quality of that discussion for each project report using a rubric.

**Status as of 2012**
The revamped Outcome H assessment plan was launched in the fall semester of 2009 as has been administred mostly as planned since then.

The table below shows the regimen of case studies and ESITs given thus far to each Class. For each Class, chronological order runs from left to right.

<table>
<thead>
<tr>
<th>Class of xxxx</th>
<th>3/C Year</th>
<th>2/C Year</th>
<th>1/C Year</th>
<th>ESIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ESIT</td>
<td>EE221 Case Study “59-Story Crisis”</td>
<td>EE241 Case Study “Brake Scandal”</td>
<td>EE322 Case Study “Zappo”</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td>√</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td>√</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>2012</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>2013</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>2014</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

In addition to the case studies and the ESIT, data collection continued or was renewed on the other assessment plan items with the exception of Capstone Project Reports. The current state of each of the seven 2009 assessment plan lines of attack are summarized below.

1. **Case Study Assignments.** All case studies have been built and administered at least twice each. Case studies are not being used directly for assessment nor are they driving any Performance Indicators. Instead, they are being used solely for education. Completed assignments (not including “Morales”) are being collected and saved in case they may be useful in the future.

2. **ESIT.** The ESIT is being administered as described previously and scores are computed and preserved. The two scores coming out of the ESIT are being used as assessment methods for PI #1.

The first assessment method measures the degree to which students separate preconventional thinking from postconventional thinking, as captured by N2-Scores. The performance threshold is a class average N2-Score of 3.5 or higher on the ESIT administered in the 1/C year. The 3.5 number was selected based on a control set of faculty members who took the ESIT and the maximum possible N2-Score of 6.9. Faculty N-Score averages were above 4.46. Discounting for a Midshipman’s hectic schedule, the possibility that they may not take the ESIT seriously, and their lack of life
experiences (they are only 22 to 23 years old), a point was taken off the faculty N-Score average, rounded up to the next tenth of a point, and set as the threshold. This is satisfying as the 3.5 threshold also corresponds to just over half of the maximum possible N2-Score.

The second assessment method based on the ESIT measures relies on P-Scores. P-Scores indicate how well the students can identify postconventional reasoning. We set the performance target for each Class at an average P-Score of 0.5 or higher. This means that the average student identifies postconventional items at least half the time.

We are also tracking secondary information based on N2-Scores and P-Scores. Specifically we are looking for improvements in N2-Scores and P-Scores between the 3/C and 1/C administrations of the ESIT. To do this we use a two-tailed Student t-test of means. We are hoping for a confidence level of 90% or greater.

3. Senior Survey. The questions are part of the annual 1/C survey. Responses are being tracked. PI #2 has an assessment method based on the Senior Survey.

4. Performance in NE203 and NL400. Data is being collected on each graduating class as planned. PI #2 uses this data to measure performance.

5. Course Coordinator Surveys. Data is being collected and preserved for possible future use and reference. No Performance Indicators rely on this item. Results are included in the annual Outcome H report, available upon request.

6. Information Gleaned from Course Assessment Tools. Data is being collected and preserved for possible future use and reference. No Performance Indicators are fed by data from this item. A summary of results are included in the annual Outcome H report, available upon request.

7. Capstone Project Reports. A spot inspection of project reports from the classes of 2010 and 2011 showed that minimal (sometimes no) effort is being put into this by the students. Given the problems and workload associated with the other six assessment lines, assessment efforts on capstone project have been postponed. No Performance Indicators rely on this item. The new Capstone Mentor Survey (discussed two paragraphs hence) satisfies the intent we originally had for monitoring project reports.

The 2012 cycle saw two new assessment tools become available. The first was the Alumni Survey of 2012. Covering far more than Outcome H, the survey was administered to Naval Academy graduates from the Classes of 2006 through 2010. The Alumni Survey happens infrequently (roughly every five years). An opportunity missed, the survey did not cover Outcome H. We recommend that this be corrected in future surveys.

The second new assessment tool is the Capstone Mentor Tool. The Mentor Tool is a rubric for use by senior design project mentors. Statements pertaining to Outcome H are included in the rubric. The Mentor Survey was added to the list of assessment methods for Performance Indicator #1.

Analysis and Results 2009-2012
We now present and analyze the two Performance Indicators.

PI #1 (Sensitivity and alertness to factors affecting engineering designs)

ESIT Results
The table below shows ESIT results collected to date by Class and the program year (3/C and 1/C). The number, #, columns show the number of ESITs collected for each administration and the number of exams rejected, (rej). Exams are rejected according to the criteria suggested by the ESIT developers. The two main reasons tests are rejected are that (1) too many rankings or ratings are omitted and (2) too many nonsense answers are selected. Although we are tempted to reject exams for other reasons (e.g., negative N2-Scores), we stick strictly to the ESIT’s criteria for rejection. We report the standard deviations, minimum scores, and maximum scores for both N2-Scores and P-Scores. This gives more insight into the range of responses. The columns corresponding to the relevant PI are shaded. Note that the Classes of 2010 and 2011 did not take the ESIT in their 3/C year.

<table>
<thead>
<tr>
<th>Class of</th>
<th>N2-Score</th>
<th>P-Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg PI #1</td>
<td>StDev</td>
</tr>
<tr>
<td>2010</td>
<td>2.57</td>
<td>0.81</td>
</tr>
<tr>
<td>2011</td>
<td>3.10</td>
<td>1.63</td>
</tr>
<tr>
<td>2012</td>
<td>3.23</td>
<td>1.22</td>
</tr>
</tbody>
</table>

Data at this time is minimal, so it’s too early to draw any firm conclusions. However, there are a few promising signs.
1. First, while no Class met the N2-Score threshold of 3.5 for PI #1, the trend is in the positive direction. This is especially encouraging since the Class of 2010 were not exposed to any of the five case studies and the Class of 2011 only had the “Morales” case study and discussion.
2. P-Score averages are close to or above the 0.5 threshold set for PI #1 for all Classes. The performance target for P-Scores is considered “met” at this time.
3. Although not tied to a PI, the Class of 2012 showed verifiable improvement in average N2-Scores and P-Scores between their 3/C and 1/C years (3/C data is not shown in order to save space). As seen in the two rightmost columns of the table, there is a 93% confidence level on a two-tailed Student’s t-test that average N2-Scores improved and an 80% confidence level that P-Scores improved.

The alert reader will notice that the minimum N2-Scores for the Classes of 2011 and 2012 were negative. Going back to the source numbers reveals that this occurs because P-Scores, which are used in computing N2-Scores, were already low (poor identification and weighting of postconventional reasoning). When factored in with numbers indicating separation of preconventional and postconventional thought to compute the N2-Score, the N2-Score becomes very low, even negative. A low N2-Score indicates that the student, for whatever reason, not only didn’t distinguish preconventional from postconventional thinking, but also rated preconventional (self-centered) reasoning as most important. While unsettling, we adhere strictly to the ESIT creators’ rules for discarding ESIT results, which these do not meet, and keep these poor results in our data set.

**Capstone Mentor Tool**
The Capstone Mentor Tool (CMT) is a rubric-based survey completed by faculty mentors of senior design projects, including Bowman projects, done under the supervision of the Electrical and Computer Engineering Department. When possible, results from mentors of students working on projects outside of the Department (for example on “Cockpit of the Future” or dual major CE/CS students working in the Computer Science Department) were collected. The matrix for Outcome H items in the rubric is shown below.
### Capstone Mentor Tool rubric for Outcome H.

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student’s awareness of major issues currently facing the country or the world (h, j)</td>
<td>0: Student demonstrates no awareness</td>
</tr>
<tr>
<td>Student’s ability to relate engineering solutions to environmental issues (h)</td>
<td>0: Student demonstrates no awareness</td>
</tr>
<tr>
<td>Student’s ability to relate engineering solutions to economic issues (h)</td>
<td>0: Student demonstrates no awareness</td>
</tr>
<tr>
<td>Student’s ability to relate engineering solutions to health and safety issues (h)</td>
<td>0: Student demonstrates no awareness</td>
</tr>
<tr>
<td>Student’s ability to relate engineering solutions to societal issues (culture, behavior, sensitivities, etc) (h)</td>
<td>0: Student demonstrates no awareness</td>
</tr>
</tbody>
</table>

Numerically speaking, the average response for each item is a 2.0. Work corresponding to a 2.0 rating is clearly indicated in the rubric. This Outcome champion would like our students to perform above the 2.0 level, ideally at the 4.0 level. However, this is unrealistic. Therefore the threshold value for this performance target has been set at 3.0 (or 75%).

Results for the Class of 2012 (the first year the CMT was used) are shown in the table below. Results are separated by Electrical and Computer Engineering majors (EE and CE, respectively). The number in parenthesis in the table show the number of students for which results were collected. There were 26 EE students and 15 CE students subject to the survey for 2012. Students dual majoring in both EE and CE are included in both the EE and CE columns.
### Capstone Mentor Tool results for the EE and CE graduates of 2012.

<table>
<thead>
<tr>
<th>Item</th>
<th>EE Average</th>
<th>CE Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student’s awareness of major issues currently facing the country or the world (h, j)</td>
<td>2.58 (20)</td>
<td>2.71 (12)</td>
</tr>
<tr>
<td>Student’s ability to relate engineering solutions to environmental issues (h)</td>
<td>2.75 (20)</td>
<td>2.73 (11)</td>
</tr>
<tr>
<td>Student’s ability to relate engineering solutions to economic issues (h)</td>
<td>2.88 (20)</td>
<td>2.64 (11)</td>
</tr>
<tr>
<td>Student’s ability to relate engineering solutions to health and safety issues (h)</td>
<td>2.92 (19)</td>
<td>3.00 (8)</td>
</tr>
<tr>
<td>Student’s ability to relate engineering solutions to societal issues (culture, behavior, sensitivities, etc) (h)</td>
<td>1.75 (20)</td>
<td>2.38 (12)</td>
</tr>
</tbody>
</table>

The results clearly show that the 3.0 threshold for performance for Performance Indicator #1 was only met by CE students with regard to health and safety issues. This was the strongest area for EE students as well, but they did not meet the threshold. The poorest showing for both majors was the societal issues item (the last row). Technically, the performance target was not met. Since 2012 was the first year for the CMT, the results cannot be considered terribly meaningful.

**PI #2 (Engendered awareness of the role engineers play in the world and vice-versa.)**

Grades in NE203 and NL400

As seen in the following three charts, students average above a 3.0 in NE203 and NL400 year-after-year. Years 2010 and earlier report on EE majors only (the Class of 2011 was the first ECE graduating class). Year 2011 includes both EE and CE majors. Starting with the Class of 2012, grades have been broken out by major (see the second and third charts).
1/C Survey
For the Classes of 2006 to 2008 the 1/C survey consisted of just one Outcome H question: “I have the broad education necessary to understand the impact of engineering solutions in a global and societal context.” Unfortunately, responses for the Class of 2008 are missing. Responses for the Class of 2006 were reported as percentages instead of raw numbers. The table below shows the results for the Classes of 2006 to 2008.

**Statement: “I have the broad education necessary to understand the impact of engineering solutions in a global and societal context.”**

<table>
<thead>
<tr>
<th>Class of xxxx</th>
<th>Agree</th>
<th>Indifferent</th>
<th>Disagree</th>
<th>N/A or Unanswered</th>
<th>% Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>61.3%</td>
<td>25.8%</td>
<td>6.5%</td>
<td>6.5%</td>
<td>61.3</td>
</tr>
<tr>
<td>2007</td>
<td>16</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>86.2</td>
</tr>
<tr>
<td>2008</td>
<td>Data missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Starting with the Class of 2009 the Outcome H statement in the graduate survey was replaced with two statements. The two tables below summarize the results for each Class on each survey statement.

**Statement: “My education has helped me to understand how engineers and the products of their labor have shaped society and changed the world.”**

<table>
<thead>
<tr>
<th>Class of xxxx</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A or Unanswered</th>
<th>% Agree or Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009*</td>
<td>-</td>
<td>13</td>
<td>2</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>86.7</td>
</tr>
<tr>
<td>2010</td>
<td>9</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>84.2</td>
</tr>
<tr>
<td>2011</td>
<td>13</td>
<td>12</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>86.2</td>
</tr>
<tr>
<td>2012†</td>
<td>40%</td>
<td>44%</td>
<td>4%</td>
<td>0%</td>
<td>4%</td>
<td>4%</td>
<td>88.0</td>
</tr>
</tbody>
</table>

**Statement: “My education has helped me to understand the role that society and the world at large have on engineering.”**

<table>
<thead>
<tr>
<th>Class of xxxx</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A or Unanswered</th>
<th>% Agree or Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009*</td>
<td>-</td>
<td>13</td>
<td>2</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>86.7</td>
</tr>
<tr>
<td>2010</td>
<td>5</td>
<td>9</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>73.7</td>
</tr>
<tr>
<td>2011</td>
<td>11</td>
<td>14</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>86.2</td>
</tr>
<tr>
<td>2012†</td>
<td>40%</td>
<td>48%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
<td>88.0</td>
</tr>
</tbody>
</table>

* The survey for the Class of 2009 had just three possible responses: Agree, Indifferent, and Disagree.
† Survey results were reported as a percentage of respondents instead of as raw numbers.

Quite clearly the percentage of students responding with at least “Agree” is usually above the 80% threshold. Why the scores were low for Classes 2006 and 2010 is unknown. One cannot rule out simple sample variation (e.g., some Classes think they got little in the way of Outcome H while others thought they did). We note that the Classes of 2006 and 2010 didn’t receive extra instruction on Outcome H.

**Actions 2012**
The current assessment plan with its seven PIs and six active lines of attack is a marked departure from what was in place prior to 2009. The current plan is young in the sense that only one Class, the Class of 2012, has undergone the full regimen of case studies and ESITs. Despite the plan’s youth, we already see some room for improvement and areas where changes need to be made.
Performance Indicators (PIs)
The PIs included in this report are, admittedly, not ideal as they were developed to fit the educational strategies and assessment tools available to us, especially those that resulting from the 2009 Outcome H plan. Now wiser, we see the potential benefits of reshaping the PIs to more specifically address Outcome H. For example, adding PIs like “The student is able to identify economic issues with an engineering solution.” and “The student can articulate the impact of changes in a design with regards to the environment.” would allow us a finer degree of resolution. Methods for assessing these new types of PIs and setting targets of performance will have to be carefully considered in terms of load on the faculty and students, impact to courses (already filled to the brim), and technique. Currently, the case studies seem the best vehicle for deploying new PIs of this type; the questions they ask could be adapted to specifically address the new PIs. This would require us to cross-link case study questions against the PIs and develop both new questions and a method to evaluate responses. More on case studies next.

Case Studies
The case studies were originally intended to expose the students to new ideas and encourage them to think in hopes that ESIT scores would improve between 3/C and 1/C applications. Assessing the case studies was expected to be imprecise and tedious, but it turned out to be worse than expected. We meant to develop an evaluation rubric for the assignment-based case studies (all those except for “Incident at Morales” which has a facilitated discussion). However, the skimpy nature of many of the student responses leads us to believe that a detailed rubric would be overkill. Stepping back from that, we considered (and experimented with) evaluating the level of thought and analysis shown in the students’ responses using a simple three point scale (low, medium, high). Details on this can be found in the Outcome 8 Executive Summary for 2010-2011. However, even this level of evaluation was not satisfying.

Another problem with the short answer format is that the wide range of answers makes it difficult to evaluate responses. One idea that would fix that and remove the need for a rubric is to change the case study questions to a multiple choice format in which the choices are generated by “experts. Ultimately, it was decided to continue to give the case studies in their current format for the next couple of years at least. If the ESIT scores don’t improve as hoped, or if more data is needed, the case studies can be rethought and revamped.

There are also doubts about the usefulness of evaluating the case studies without any feedback to the students (with “Morales” being the exception). The already tight course schedules and busy daily schedules of our students makes scheduling a feedback session exceedingly difficult and adds yet another thing to busy midshipmen schedules. While one hopes that exposure to the case studies has some benefit in and of itself, a feedback session would certainly have greater impact.

Additionally, case study results need to be separated by degree program (EE and CE) in the future.

ESIT (supports PI #1)
With over 100 ESITs given thus far, we believe that the ESIT is a useful tool for Outcome H. However, we are seeing a high number of ESITs in which it appears that the student did not understand how to complete the rating and rankings. Sometimes this results in rejected ESITs (using criteria suggested by the ESIT authors). Other times it simply results in poor P-Scores and N2-Scores. Given the low numbers of students in the Department’s degree programs, this is troubling. To address this we will begin to systematically lead students through the example problem included in the ESIT’s instructions. This will ensure that they understand at least the mechanics of the exam. The added instruction must not give away, or hint at, the true nature of what the ESIT is measuring. Additionally, ESIT results need to be separated by degree program (EE and CE) in the future.
Capstone Mentor Tool (support PI #1)
The target of performance has been initially set to ≥ 3.0. The Class of 2012 was the first and only class so far to be subjected to the tool. Of the five Outcome H items measured by the tool, only CE students met the performance target for just one item. Due to the lack of data (only one year’s worth of students) and the somewhat arbitrary 3.0 performance threshold, this metric needs to be tracked for some years before any decisions are made.

Performance in NE203 and NL400 (supports PI #2)
We see no need to change anything about this item at this time.

1/C Survey (supports PI #2)
Performance targets being met. Results need to be separated by degree program (EE and CE) in the future.

Course Coordinator Surveys and Information Gleaned from Course Assessment Tools.
The Course Coordinator Surveys and information culled from the Course Assessment Tools (CATs) are, at present, our best method for determining which courses address, however minimally, Outcome H material. Survey results are being filed away for future reference, but are otherwise not being used. Looking forward, the Coordinator Surveys and CATs could form the basis for identifying opportunities to insert more Outcome H material into our courses. Perhaps a Performance Indicator and a Target for Performance could be created that challenges the Department to reach some level of Outcome H coverage in our courses (e.g., a Target of Performance might be 70% of courses spend at least an hour a semester on Outcome H topics). For the present time, we plan to keep collecting data from the Course Coordinator Surveys and the CATs. The effort is minimal and provides some data about the status of Outcome H with respect to course content. Results need to be separated by degree program (EE and CE) in the future.

Capstone Project Reports.
The recommendation is to not assess capstone project reports for Outcome H at this time. The newly introduced Capstone Mentor Tool captures much of what this assessment method would have done and is much less labor intensive on the faculty and the Outcome H champion.

Alumni Survey
In 2012 a survey was administered to Naval Academy graduates from the Classes of 2006 through 2010. Roughly issued about every five years, the survey asks former students to rate, on a 5-point scale, how their education prepared them to “identify, formulate, and solve engineering problems” and “stay current in technologies related to my major” and other ABET Outcomes. Unfortunately, no item covered Outcome H. It is strongly recommended that future Alumni Surveys include an Outcome H item and that the survey be made a method of assessment for Outcome H.
**Student Outcome (i): A recognition of the need for, and an ability to engage in life-long learning.**
- **Outcome Champion:** Associate Professor Samara Firebaugh

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Graduate Survey</td>
<td>Survey administered by Division</td>
<td>3 years</td>
<td>2012 (planned)</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CATs</td>
<td>Filled out by course coordinators at end of each semester</td>
<td>1 year</td>
<td>2006 - present</td>
<td>80% on relevant course objectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Independent Study Notebook</td>
<td>Filled out by project mentors for EE49X</td>
<td>1 year</td>
<td>2006 - present</td>
<td>10% of class involved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Capstone Mentor Survey</td>
<td>Survey of capstone/independent study mentors in Spring</td>
<td>1 year</td>
<td>2012 (planned)</td>
<td>80%</td>
</tr>
<tr>
<td>2. Demonstration of the ability to independently learn a technical subject through self-study.</td>
<td>Open-ended assignments in EE241, EC242, EC361, EE411, EE414, EE415, EE49X</td>
<td>CATs</td>
<td>Filled out by course coordinators at end of each semester</td>
<td>1 year</td>
<td>2006 - present</td>
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<td></td>
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<td></td>
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<td>Capstone Mentor Survey</td>
<td>Survey of capstone/independent study mentors in Spring</td>
<td>1 year</td>
<td>2012 (planned)</td>
<td>80%</td>
</tr>
<tr>
<td>3. Awareness of cutting edge technology and research.</td>
<td>EE-related ECAs, EE News Assignment, Major Electives, EE414/EE415, EE49X</td>
<td>CATs</td>
<td>Filled out by course coordinators at end of each semester</td>
<td>1 year</td>
<td>2006 - present</td>
<td>80% on relevant course objectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Independent Study Notebook</td>
<td>Filled out by project mentors</td>
<td>1 year</td>
<td>2006 - present</td>
<td>10% of class involved</td>
</tr>
<tr>
<td>4. Demonstration of intellectual curiosity.</td>
<td>EE414/EE415, EE49X, EE News Assignment</td>
<td>Capstone Mentor Survey</td>
<td>Collected from capstone/independent study mentors in Spring</td>
<td>1 year</td>
<td>2012 (planned)</td>
<td>80%</td>
</tr>
</tbody>
</table>
Assessment Results 2007:
Senior Survey Results:
- 3/23 (13%) were planning to go immediately to graduate school
- 19/23 (83%) plan to eventually go to graduate school
- 18/23 (78%) agree with “My education has increased my ability to independently learn a new subject from self-study”
- 16/23 (70%) agree with “My education has increased my intellectual curiosity.”
There were 37 students in the class of 2007, so the survey was not as widely disseminated as would be optimal, but the results were representative of the class. The CATs before 2010 did not separate out related objectives clearly but where they were specified the faculty felt that students did well with these objectives. There were 4 students pursuing independent study projects in 2007, all of them as Trident Scholars. (There were 14 Trident scholars yard-wide in that year)

Evaluation and Actions 2007-2010:
The rate at which our students went on to graduate school was considered satisfactory—there are restrictions for the number of graduates from USNA who are eligible to go immediately to graduate school due to service requirements, and our majors are disproportionately well-represented among the students who are permitted to attend. Furthermore, the high self-reported rate of intent to eventually continue formalized schooling is excellent. In contrast, the intellectual curiosity and independent study skills survey results were below our targets, so we focused our efforts on improving these areas.

Our main strategy was to increase the extent of project-based-learning in our curriculum. Open-ended projects were added to and expanded in courses throughout the curriculum—the robot project in EE221 and EC262, the design project in EC262, the Altoid-tin electronics project in EE241, the PIC design project in EC361, projects in major electives like EE426. Capstone was renovated to push project selection up into the 2/C Spring—allowing more time for project development. Project options were updated by reaching out to the technological community for ideas.

We also made smaller changes, such as requiring the EE News assignment as part of the introductory courses, which requires students to survey popular science literature and report on an advance related to electrical engineering that interests them. Also, all capstone students were required to locate technical articles via a reference database such as INSPEC or IEEE Explore so that they would learn these tools. We also continued to support midshipmen seeking to pursue independent study projects, but made no new initiatives to increase independent study participation.

Assessment Results 2011:
Senior Survey Results:
- 5/29 (17%) were planning to go immediately to graduate school
- 28/29 (97%) plan to eventually go to graduate school
- 27/29 (93%) agree with “My education has increased my ability to independently learn a new subject from self-study”
- 25/29 (86%) agree with “My education has increased my intellectual curiosity.”
There were 25 EEE majors and 12 ECE majors in the Class of 2011—their survey results were not differentiated. The 78% survey completion rate was better than in prior years.

Graduate Survey Results (2012):
- 21/21 (100%) said that they recognize the importance of lifelong learning.
- 14/21 (67%) said that they were “quite well” or “very well” prepared by their education for independently learning a subject through self-study. An additional 5/21 (23%) said that they were “adequately” prepared.
- 6/21 (28.5%) had continued their education beyond USNA, 17/21 (81%) intended to continue it further.
CAT results:

- 7/17 (41%) course coordinators report that “current issues and need for lifelong learning introduced through anecdotal comments during lecture.”
- 5/17 (29%) course coordinators report that “students complete at least one assignment that requires them to investigate current issues or use popular media sources.”
- 1/17 (6%) course coordinators took their class to a research conference.
- 3/17 (18%) course coordinators brought in outside speakers.
- 8/17 (47%) course coordinators report that “students complete one or more projects that require them to work independently, identify and locate resources and teach themselves a new topic.”
- 7/17 (41%) course coordinators assert that “the course emphasizes emerging technologies and therefore inherently demonstrates how technology evolves and the need for lifelong learning.”

Project Notebook results: The number of independent study students per year remained fairly constant at 2–4 students per year. We had three students pursuing independent study in the class of 2011—one Trident scholar and two Bowman scholars.

Evaluation and Actions 2011:

There is clear improvement in the students self-expression of intellectual curiosity and self-identification of the ability to learn independently. However, self-assessment of the latter measure is suspect. This year we will implement an additional assessment tool that will ask faculty to assess the intellectual curiosity and independent learning skills of our graduating 1/C. We feel this will yield better data on these criteria. Our rates for students going on to graduate school continue to be satisfactory, particularly given the limitations placed by the institution on students pursuing immediate graduate work.
**Student Outcome (j):** Upon graduation students will have a knowledge of contemporary issues.
- **Outcome Champion:** Assistant Professor Hau Ngo

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demonstrates the awareness of major issues facing the country and the world.</td>
<td>Invited lectures, “ECE in the news”</td>
<td>Extracurricular activity notebook and Forrestal lecture series</td>
<td>Filled out by speaker or field trip sponsor</td>
<td>1 year</td>
<td>2009 - present</td>
<td>25% of class involved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/C survey</td>
<td>Filled out by 1/C midshipmen in Spring</td>
<td>1 year</td>
<td>2006 – 2007 2009 – present</td>
<td>80%</td>
</tr>
<tr>
<td>2. Demonstrates ability to discuss new and novel issues related to field of study.</td>
<td>Lectures, “ECE in the news,” assignments and labs in major electives, EE411/EE415/EC415</td>
<td>CATs</td>
<td>Filled out by course coordinators</td>
<td>1 year</td>
<td>2006 - present</td>
<td>70% of relevant course objectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/C survey</td>
<td>Filled out by 1/C midshipmen in Spring</td>
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<td>2006 – 2007 2009 – present</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Graduate survey</td>
<td>Administered by division</td>
<td>3 years</td>
<td>2012 (planned)</td>
<td>80%</td>
</tr>
<tr>
<td>3. Demonstrates the ability to formulate an engineering solution through self learning of current developments related to field of study.</td>
<td>Open-ended projects in EC361 and EE415/EC415</td>
<td>1/C survey</td>
<td>Filled out by 1/C midshipmen in Spring</td>
<td>1 year</td>
<td>2006 – 2007 2009 – present</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Final reports in EC361</td>
<td>EC361</td>
<td>1 year</td>
<td>2012 (planned)</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project proposals in EE411</td>
<td>EE411</td>
<td>1 year</td>
<td>2012 (planned)</td>
<td>70%</td>
</tr>
</tbody>
</table>

**Assessment Results 2009:**
1/C Survey Results:
- 15/15 (100%) of responses indicated that their education has given them a good knowledge of contemporary technical issues. This number represents 45% of the class of 2008.
CATs Results:

- 10/17 CATs indicated that outcome J was linked to at least one course objective. 34/45 (75.5%) of the linked objectives showed that the students met the course objectives.

There were 5 guest speakers who gave technical talks to ECE students in four different courses. There were 14 students participating in a field trip to NSA and Scitor Corp.

**Evaluation and Actions 2009-2011:**

Prior to 2009, the outcome champion determined from assessment data which performance indicators have been met. This task was achieved by reviewing the CATs and maintaining a list of topics and invited speakers related to electrical and computer engineering fields. Overall, our assessment is that contemporary issues are emphasized in many ECE courses throughout the curriculum and other extracurricular activities. CAT results of courses that introduced and reinforced current technological trend indicated that our students successfully demonstrated knowledge of contemporary issues.

One key observation obtained from the assessment process was that the CATs did not clearly show how Outcome (j) was linked to the course objectives. In addition, many courses included labs or assignments or design projects that add breadth to the student’s knowledge of contemporary issues, but were not linked to Outcome (j) in CATs. For example, many courses such as EE242, EE361 and EE414 included open-ended projects that required students to perform background research and innovative ideas to solve a problem.

We made changes to the CAT template to include a course coordinator survey that clearly indicated how Outcome (j) was linked to the course objectives. In order to add breadth to the student’s knowledge of contemporary issues, we also requested changes to the curriculum to include ECE in the news assignment in EE221. In addition, students were required to include a background information section addressing contemporary issues in their EC361 final reports and EE411 capstone proposals.

**Assessment Results 2011:**

1/C Survey Results:

- 26/29 (90%) of responses agreed or strongly agreed that their education has given them a good knowledge of contemporary technical issues. This number represents 70% of the class of 2011.

CATs Results:

- 12/17 (70%) course coordinators indicated that contemporary issues were discussed in their classes. Specifically,
  - 5 of these courses introduced contemporary issues during lectures
  - 2 of these courses introduced contemporary issues through assignments
  - 1 course introduced contemporary issues by exposing students to guest speakers
  - 4 of these courses introduced contemporary issues through independent projects
  - 5 of these courses emphasized emerging technologies.

All students attended 4 Forrestal lectures during AY 2011. In addition, the number of guest speakers and field trips introduced in ECE classes was around 1-3 per year.

**Evaluation and Action 2011-2012:**
Once again, the overwhelming majority of our student responses indicated that their education gave them a good knowledge of contemporary issues. Our program continued to demonstrate an emphasis on contemporary issues as evidenced by the results of the course coordinator survey. Our students also gained knowledge of contemporary issues in numerous lectures and field trips. Based on course coordinators’ evaluations of course objectives that are linked to knowledge of contemporary issues, our students demonstrated satisfactory attainment of this outcome. Additionally, a new mentor evaluation tool was developed and implemented in Spring 2012 to evaluate students’ attainment for Computer Engineering (CE) students and Electrical Engineering (EE) students separately. The results of this evaluation tool indicated that EE and CE students’ attainment was good. This tool provides direct measures for indicators 1 and 3. The evaluation results for both indicators showed satisfactory student attainment of this outcome (CE: 91.6%, EE: 90% for indicator 1; CE: 100%, EE: 86.3% for indicator 3).

The curriculum changes to EE221, EC361 and EE411 that we requested were approved and implemented in AY2012. This year, we included the final reports in EC361, EE411, and EE414/EC415 as our assessment tools. We developed and implemented a set of criteria and rubrics that were used to obtain more direct and quantitative assessment results from the final reports in EC361, EE411, and EE414/EC415.

Supporting Materials

1/C Survey Results

Statement: • “My education has given me a good knowledge of contemporary technical issues.”

<table>
<thead>
<tr>
<th>Class of xxxx</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A or Unanswered</th>
<th>% Agree or Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>13</td>
<td>13</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>89.6</td>
</tr>
<tr>
<td>2010</td>
<td>7</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>84.2</td>
</tr>
<tr>
<td>2009*</td>
<td>n/a</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>2007</td>
<td>n/a</td>
<td>21</td>
<td>2</td>
<td>0</td>
<td>n/a</td>
<td>1</td>
<td>87.5</td>
</tr>
<tr>
<td>2006</td>
<td>n/a</td>
<td>26</td>
<td>1</td>
<td>2</td>
<td>n/a</td>
<td>2</td>
<td>83.9</td>
</tr>
</tbody>
</table>

* The survey included 3 possible answers: Agree, Indifferent, and Disagree.

Lectures/field trips:

AY2010-2011
- General Keith Alexander’s lecture on cyber security (Forrestal lecture, Sep 2010)
- CAPT Jim Lovell’s lecture on Apollo 8 mission (Forrestal lecture, Nov 2010)
- GM CEO Dan Akerson’s lecture on the challenges GM faces in the near future (Forrestal lecture, Feb 2011)
- Facebook COO Sheryl Sandberg’s lecture on technology and leadership (Forrestal lecture, April 2011)
- Field trip to NSA and Scitor Corp (EE 435).

AY2009-2010
- CAPT Ivan Castro’s lecture on leadership and commitment to serving the country (Forrestal lecture, Sept 2009)
- Dr. Leslie H. Gelb’s lecture on foreign relations (Forrestal lecture, Nov 2009)
- Tom Brokaw’s lecture on leadership (Forrestal lecture, Jan 2010)
• Secretary of Defense’s lecture on integrity and moral courage (Forrestal lecture, April 2010)
• Brief on efforts to combat IEDs (EE414)
• Mr. Bill Gravell’s lecture on biometrics (EE 435)
• Field trip to NSA and Scitor Corp (EE 435).
**Student Outcome (k):** An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- **Outcome Champion:** Associate Professor Ryan Rakvic

- The following process was in place prior to the 2011-12 cycle:

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Educational Strategies</th>
<th>Method(s) of Assessment</th>
<th>Where data are collected</th>
<th>Length of assessment cycle (yrs)</th>
<th>Year(s)/semester of data collection</th>
<th>Target for Performance</th>
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<tr>
<td>1. Demonstrates the proper use of modern equipment for design in electrical or computer engineering tasks.</td>
<td>All courses</td>
<td>Deficiency Survey</td>
<td>All Courses</td>
<td>Every Year</td>
<td>2009, 2010, 2011</td>
<td>text</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laboratory Survey</td>
<td>All Seniors</td>
<td></td>
<td></td>
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<td></td>
<td>CATs</td>
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<td></td>
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<td>2. Demonstrates modern techniques for measuring and simulating electrical or computer engineering problems.</td>
<td>All courses</td>
<td>Deficiency Survey</td>
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<td>3. Demonstrates modern prototyping and debugging skills of electrical or computer engineering problems.</td>
<td>All courses</td>
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<td>Every Year</td>
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<td></td>
</tr>
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<td>4. Utilizes modern documentation and presentation methods for electrical or computer engineering problems.</td>
<td>All courses</td>
<td>Deficiency Survey</td>
<td>All Courses</td>
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Assessment Results (direct measures) 2009-10: The Deficiency Survey, which is included as part of the supplementary material in Appendix E, was rehashed this year so that a running history from each semester would be included. For each majors course, a separate document was created and course coordinators from this academic year have been asked to include their comments in the semester they coordinated their course. As each semester ends, following course coordinators will add their comments. Before each semester, new course coordinators will be able to read past comments and make adjustments to their course to help combat any deficiencies found. The Laboratory Survey, which is included as part of the supplementary material in Appendix E, is filled out in hard copy, but takes a fair amount of effort to assimilate results. This semester, we have initiated putting the survey onto Blackboard so that analyzing the results will be more straightforward and require less effort. We did not administer it in time to collect results from all courses this semester. CATs were also collected for all courses. To summarize the assessment of these three direct/indirect forms of input, our outcome group had an end of year meeting. The attainment of this outcome was discussed, and our focus turned to the major weakness of this outcome: laboratory/troubleshooting skills.

Evaluation and Actions 2009-10: Improvements have been implemented in several courses to improve lab skills and to place more weight on laboratory skills. For example, in EE322 (Signals and Systems), every exam had 2 parts...a written part and a lab part (MATLAB). Also, in EE354 (Modern Comms), there was a lab practical in mid-semester, and the final exam was entirely lab-based. By adding weight to the lab portion of the class forces the midshipmen are motivated to improve their skills. We still encourage placing more weight in the course on lab-based activities. More lab practicals in various courses would help. In courses where a lab notebook is used, they should be a part of the course grade, and perhaps allow the Midshipmen to use the lab notebooks for lab practicals or exams; this would force them to write in them.

Assessment Results 2010-11: Again, all three sources were discussed at our annual assessment meeting. The Deficiency survey results confirmed that the primary problem that students have is with Performance Indicator number 3: troubleshooting/debugging. Specifically, students struggle with decomposing problems/circuits into incremental problems/circuits and validating those subsystems. Further, students often do not know how to establish a hypothesis as to what could be wrong. Finally instructors noted in places that students were not able to competently use test equipment to confirm operation or, at times, be able to correctly interpret the measured data. On this point, students did complain via the Laboratory Survey that they felt they needed a better introduction to some of the equipment (via being thrown into using it). Other deficiencies noted included a weakness in formal reports, though several comments lead us to believe that progress is being made with regard to this complaint. Rubrics are being employed in various courses but it’s not a common rubric across the major. Initial impressions are that the data shows that the curriculum is offering a diverse lab experience with courses building on skills/tools/software previously developed. The elements that may be missing are formal instruction on troubleshooting/debugging and having a common formal report rubric through the ECE curriculum. The Group Leader has not identified any obvious gaps in the curriculum as formal reports are being assigned, lab practicals are being administered, software packages are being used, students have opportunities to build systems and take measurements, lab notebooks are being emphasized in several courses, and a significant part of the course grade is being impacted by these activities.

The Laboratory Survey results conveyed that the students do in fact recognize weaknesses in their troubleshooting skills but believe that their work during the academic year has led to improvement. The most significant self-identified weakness follows the EE354 junior-year experience. The greatest gain seems to follow the sophomore-year course sequence. Seniors are the most positive about their perceived skill set. The students probably over-rate their skills and improvement. Their chief complaints are that there are too many labs, the labs can be too long or difficult, and that sometimes not enough instruction is provided with regards to using equipment/software. The students are in general happy with the quality of the modern equipment and support; however, on occasion they appear frustrated with having parts not conveniently available. CATs showed that there has been improvement in lab notebook performance and that more attention is being paid to lab exams/practicals, formal reports, and weighting the lab portion of the course. Formal reports though remain a weakness as does troubleshooting and debugging.
Evaluation and Actions 2010-11: We feel that our improvements have led us to a level of attainment for this outcome. Improvements have been implemented in several courses to improve lab skills and to place more weight on laboratory skills. For example, lab practicals are now being administered in EE221, EE241, EE320, and EE354. Pre and post-exams are being used in EE322. Formal reports are being emphasized in EE241, EC361, EE354, and in EE414/EC415. Lab notebooks are being emphasized in EE221, EE241, and EE414/EC415. The students are being exposed to many simulation programs and programming languages to support the lab activities, and they are given opportunities to build systems and take measurements. There is some concern as to whether there are enough creative open-ended projects for the students to engage prior to their senior design projects. EC361 provides such an experience but the students find this course very difficult as of late. Trouble-shooting/debugging is probably the area that remains the biggest concern. The process for addressing it has been incremental but probably requires more curriculum-wide comprehensive attention. That is, some focused attention must be placed here. The Group Leader suggests that a small task group should be formed consisting of the course coordinators from EE221, EE241, EE242, and EE361 to establish an integrated approach to providing some formal instruction on debugging and providing additional opportunities to practice. It is also recommended that more courses use pre and post lab quizzes to concretely document lab skill proficiency. It is also believed that the idea of providing a separate lab grade should be revisited by the curriculum committee. This would raise expectations on the students that the lab performance is valued. Having more technical support and planning inventory to allow for more lab exercises to be done individually would also help. With regards to assessment, the group leader feels that the group needs to meet a bit more often, need to establish a better way to track performance on formal lab reports, need to establish a way to interpret lab practical results, and need to figure out a way to track relevant data emerging from the Course Surveys. The Group Leader wants course coordinators to continue to administer lab practicals, insist upon formal reports (providing the students with opportunities to edit and correct poor work), provide opportunities for students to use their lab notebooks for quizzes or future work, and use FE-approved calculators to complete homeworks, lab assignments, and exams.

2011-2012: We have also decided as a group to make the following assessment changes to make our assessment process more streamlined. Amongst the changes are the length of this assessment cycle and where the data will be collected. This approach was initiated in 2011-12 cycle.

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<td>EE411, EE414, EC415</td>
<td>3 Years</td>
<td>2012, 2015</td>
<td>70%</td>
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<td>EE411, EE414, EC415</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Assessment Results (direct measures) 2011-12: This assessment is not yet completed at this time, and will be updated before classes in the fall of 2012. The Deficiency survey, the Laboratory Survey and the Course Assessment Tools (CAT) are all being used. The Deficiency Survey is now also be complemented by the end of year capstone mentor assessment tool. This tool is now being collected for the EE414/EC415 courses and directly corresponds to the new performance indicators of this outcome. It allows us to collect data for Electrical and Computer Engineers separately. The Laboratory Survey, which is included as part of the supplementary material of outcome A, is completed by graduating seniors. CATs were also collected for all courses. After all data is collected, our outcome group will have an end of year meeting.

Evaluation and Actions 2011-12: As stated above, our group meeting to discuss our actions and complete our evaluation will take place in the fall of 2012. Here we will discuss the data that has already been collected. The capstone mentor tool allows us to directly measure the performance indicators for electrical engineers and computer engineers separately. The following table presents the results thus far for electrical and computer engineering students for the four performance indicators. The scale is 0-4 with 4 being the best and the average is presented. As can be seen, the data indicates that both electrical and computer engineering students are well above a 2.0 average for all performance indicators for this outcome. The laboratory survey confirms our evaluations from previous years. 80% of the students feel excellent with their design work, but less than 30% of them feel excellent about debug and documentation of their work. However more than 75% of those queried feel that they are at least good at debugging and documentation.

<table>
<thead>
<tr>
<th>CATs</th>
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<td>EE411,EE414, EC415</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Demonstrates the proper use of modern equipment for design in electrical or computer engineering tasks. | Electrical Engineering Students (avg.with scale 0-4) | 3 | 3.4 |
| Demonstrates modern techniques for measuring and simulating electrical or computer engineering problems. | 3.214 | 3.25 |
| Demonstrates modern prototyping and debugging skills of electrical or computer engineering problems. | 2.273 | 2.967 |
| Utilizes modern documentation and presentation methods for electrical or computer engineering problems | 3.061 | 2.767 |
6. Course Coordinators Checklist

Course Coordinator Checklist
Updated: 11 Sep 11

Before Semester:

Review prior year’s assessment and recommendations:

- Review previous year’s course report and Course Assessment Tool (CAT)
  - The CAT is included as part of your course report
- Review recommendations from previous course coordinators (included in CAT)
- Review and initial guidance and instructions from ECE Dept. Curriculum Committee
  - This resides in the following folder on the J-drive:
    J:\Assessment\Curriculum Committee Instructions for Course Coordinators
- Review reports from applicable Outcome Champions and Group Coordinators
  - These reside in binders in the ECE Conference Room and in subfolders in the following directory on the J-drive: J:\Assessment
  - Review all outcomes and their group executive summaries that apply to your specific course

Implement changes in response to above recommendations:

- Identify specific changes in course objectives, curriculum, etc.
- Identify specific metrics to measure effectiveness of these changes

Document your plans for the semester:

- Begin work on current year’s course report and CAT
  - Should include documentation and justification for changes and metrics identified above

During Semester:

- Collect representative sample of student work
  - This should include a “Excellent”, “Good” and “Poor” examples in each case
  - Should include all exams, quizzes, labs, assignments, etc.
- Update course report and CAT as applicable throughout the semester
After Semester:

- Complete course report and accompanying CAT
  - Document measured and observed impact of any changes implemented during the semester
  - As appropriate, document specific recommendations for subsequent course offerings

- Meet with specific Outcome Champions and Curriculum Committee to discuss any pertinent items
1. **Obligations of an Advisor:**
   a. Meet w/ advisee **before each preregistration period**
   b. Check that students are properly registered and progressing towards graduation.
   c. Promptly respond to requests for schedule and course changes.
   d. Council students for the best academic experience:
      i. Get to know your advisees. Ask about their goals for their education. Know if they are in a varsity sport or time-intensive ECA, or if they aim to get highly involved in striper positions back in the Hall.
      ii. Ensure that advanced students are aware of programs like language minors, exchanges, independent study, double majors, research opportunities, internships, and graduate education programs.
      iii. Guide struggling students to appropriate resources: the academic center for help with study and test-taking skills and writing, summer school for reducing course loading, etc.

2. **The Basics**
   a. Start an advising meeting by pulling up the student’s matrix in MIDS. Check that all the courses in past semesters are filled in, and that their grades are reasonable (more below for when there are problems). Then work out the pre-reg plan for the upcoming semester. I recommend that you photocopy the notated matrix sheet, keep the copy in a binder or folder for advisees and send the mid off to pre-register. Later, before registration starts, you should check in MIDS that the student followed the pre-reg plan.
   b. A student must register for 15-23 credits per semester. Light loading (<15) or heavy loading (24+) requires permission from the ADAA. In practice, it is nearly impossible to come up with a schedule for 24+ hours, so heavy loading is seldom worth pursuing unless it involves a lot of “by arrangement” courses.
   c. Classes that show up “below the line” don’t count towards graduation. Sometimes they really do, but require a notation like “EM471 counts towards EE411”—those notations are sent by the chair or senior ac advisor to the registrar. If your student needs one then please let the senior ac advisor know.
d. Students pursuing double majors or language minors will have a lot of classes below the line. You need to check these students' courses more carefully against the requirements for whatever special program they are following.

e. Students may add a course up until the “Add date” which is typically 2 weeks into the semester.

f. Students may drop a course as late as the “Drop date” which is typically around the 12-week point in the semester—but however they can only drop a course if they will remain above 15 credit hours with the deletion.

g. The senior academic advisor has created a Majors tracking spreadsheet which is kept on the J drive in the “Advising Dox” folder. The spreadsheet lists our majors, the assigned advisors, and whether students are attempting double majors or language minors. It is updated annually. Please check the spreadsheet periodically and alert the senior academic advisor if there are changes.

h. If a student changes his/her mind about their course slate after the pre-reg window closes, they need you to submit an electronic “MIDRECC” to make the change. **THE STUDENT CAN NOT CHANGE HIS/HER COURSE SLATE THEMSELVES DURING REGISTRATION.** To change courses or schedules, you send an e-mail to the scheduler at acsched@usna.edu. The subject line should read “MIDRECC LastName FirstName AlphaNo” Then in the body of the e-mail use the following codes:
   i. ADD XXXXX to add a course (also specify section if registration has started)
   ii. DROP XXXXX to drop a course
   iii. CHANGE SECTION for XXXXX from Sect. YYYYY to Sect. ZZZZZ to change the section.

i. When making schedule changes after registration has begun, you need to specify section numbers—you should confirm first that there is room in all the sections needed. If a section is full, the student needs to get permission to add it from the scheduler for the applicable department. Query Potential Mid Schedules in MIDS can be useful for seeing what’s available. It’s a pretty clunky interface—I suggest you get a lesson in navigating it the first time you use it.

j. The final word on most advising questions can be found among the ACDEAN instructions, which are on the Dean’s office web site. In particular, you should read Instruction 1531.59B—Majors, Course Enrollments, and Changes.

3. **Taking courses at different times then in the matrix.** This is common for students who are ahead or who have special goals, but keep in mind the following:

   a. To avoid being flagged and potentially heading to an ac board, **a mid should have one course ahead in the matrix for every course he/she is behind in the matrix.** Falling a net 2 courses behind could automatically trigger academic probation.
b. **Most pro-dev courses (NSXXX, NNXXX, NEXXX, NLXXX) must be taken in the class year in which they are assigned.** Sometimes they can be moved to either semester—depending on the loading in the Professional Development (pro-dev) divisions. The exceptions are NL400 and NS42X: NL400 can be taken ahead of the 1/C year, and NS42X (practicum) must be taken in the spring of 1/C year.

c. **Some courses move more easily than others:**
   
   i. HH215, HH216, and ES300 are offered every semester and in summer school. The same is true for Hum/SS electives (although the options during the summer are limited).
   
   ii. SM212, ES410, EM316, EM317 (and the other pro-dev courses, with caution note above) are also offered both fall and spring.
   
   iii. NN200, NL310 and NS300 are also offered in summer school—you can never count on getting summer school but there’s the chance of taking these ahead. (Not behind).
   
   iv. Major electives are offered both fall and spring, although you have to keep an eye on the pre-reqs.
   
   v. The rest of the courses in the matrix ore only offered in the semester they’re shown. Don’t plan to move them around unless the student can move them by an entire year and still meet the correct pre-reqs to complete the program.

d. **All credits are not created equal.** In general, the 2/C year is the hardest year. A strong student can overload in the 3/C year—to add language courses, for example—but it takes a really strong student to survive an overload in the 2/C or 1/C year without a hit to the QPR.

e. **Don’t count on summer school.** Even if a student is willing to give up leave for voluntary summer school, there is no guarantee that he/she will get in. Ac Board cases and some varsity sport teams get priority, and it also has to work with the student’s training schedule. A student can even be on the list for a class and then get bumped at the last minute for a student from the ac board. Thus-- a student should always pre-register as if he/she will not get summer school, and then adjust for the change only after they take the class. Advisors don’t have much of a role in the summer school process-- registration starts around spring break and all changes to summer school plans go directly between the student and the ADAA.

4. **Common student registration errors**
   
   a. Not taking the right levels of Hum/SS electives---**one must be at the 300/400 level**, and the other must be at the 200/300/400 level. The only exception to this is the 101/102 courses for “critical languages”: Chinese, Japanese, Russian, and Arabic.
b. Taking the wrong flavor of Probability – although this may soon change, currently our majors must take SM313. It is only offered in the fall. Students sometimes incorrectly try to take one of the other probability variants in the spring. This will not count toward our matrix.

c. **Ignoring courses that are missing in the plebe year.** Some students are put in a remedial writing class in their first semester, this will put them behind in the plebe writing sequence. Others opt to start on a critical language and are therefore allowed to put off HH104 and/or FP130 (in this case the FL101 and FL102 courses at least cover their Hum/SS requirements). They must make up these courses in order to graduate, and they should make them up as soon as possible. For the case of the student who was in remedial writing, they may want to try to pick up a summer school class to avoid overloading.

d. **Thinking they can change their course slate themselves during registration.** During registration, MIDS can give the student the impression that he/she can drop a course himself/herself just by leaving it off of the schedule. Unfortunately all this does is generate a registration error—the student needs you to submit a MIDRECC to drop or add a course.

5. **Changing Majors**
   a. If an advisee is seeking to change out of EEE or ECE, the procedure is as follows:
      i. Be advised that, currently, changes from STEM majors to non-STEM majors are strongly discouraged. If the student wishes to change to a non-STEM major he/she will need to consult with the ADAA.
      ii. The student should consult the senior advisor for the gaining major to ensure that he/she can make the change without falling behind in the new major’s matrix. The gaining major should also assist with the paperwork for changing majors.
   b. If a student seeks to change into EEE or ECE he/she should consult the senior academic advisor.

6. **Language Minors (see http://intranet.usna.edu/LanguagesAndCultures/)**
   a. **The requirement for a language minor is as follows:**
      i. French, German, Spanish: 12 credits (=4 courses) at the 300-400 level.
      ii. Arabic, Chinese, Japanese, Russian: 12 credits at the 200 level and above.
      iii. An average grade of 3.0 or better must be earned in all courses in the language of specialization for the minor.
      iv. Midshipmen who meet these requirements receive the minor automatically; there is no application procedure or designated adviser.
   b. **The HH216 Waiver**
i. To facilitate the acquisition of a language minor, the normal requirement to complete HH216, The West in the Modern World, may be waived to accommodate STEM majors desiring to achieve a language minor. **This waiver must be requested by a midshipman prior to the second semester of second class year**, through a special application form that is available on the Languages and Cultures website.

ii. The completed waiver request must be submitted to the Languages and Cultures Department. It is reviewed by the Chairs of the Languages and Cultures Department and the History Department, the Director of the Division of Humanities and Social Sciences and the Associate Dean for Academic Affairs.

iii. To qualify, a midshipman must have an average grade of at least a 3.0 in four courses: HE111, HE112, FP130, and one of the following three: HH104, HH215, or NE203. The midshipman must have validated just enough courses in the language, but not more, so that the waiver will permit achieving the minor without an overload or summer school.

7. **Double Majors**
   a. The general rule is that a double major must have taken or validated every course in the matrices for both majors—including the division requirements if the two majors are in different divisions. MIDS will only show the primary major, although the advisor can request a below-the-line notation of “Pursuing a double major in XXX”.
   
   b. **The EEE/ECE double major**
      i. This is the most common double major; it requires the fewest number of additional courses. The EEE and ECE senior academic advisors have worked out matrices for each class year that can be followed by the mid and advisor. These should be available on the ECE web site and on the J drive. MIDS does not have matrices for double majors.
      
      ii. Be sure to use the matrix for the correct year—there are significant differences between the ECE requirements for 2013 and 2014, and matrix changes will continue until the cyber adjustments settle out.
      
      iii. The advisor should alert the senior advisor that the student is pursuing a double major and confirm that the student is marked as such on the majors tracking spreadsheet.
   
   c. Less common double majors require careful planning and attention from the senior academic advisors from both majors. Please consult with the senior academic advisor in these cases.

8. **Trident and Bowman Scholars, and Independent Study**
   a. The **Trident Scholar Program** provides an opportunity for a student to pursue an in-depth research project in the 1/C year.
i. To qualify, the student will need to have a very high QPR, be at least 3 courses ahead in the 1/C year, and have a soundly formulated project plan. If an advisee seems to be a good candidate for the program, you should encourage the student to consult with faculty for project ideas early in the fall of the 2/C year.

ii. The proposal is due early in the spring semester of the 2/C year. Any interested candidate should look for and attend the briefs that are offered on the topic by the research office.

iii. The program allows the student to register for up to 12 credits per semester to be dedicated to their Trident project in the 1/C year.

iv. The department typically waives EE411 and EE414/EC415 for Trident Scholars as long as the proposed project contains a design component.

b. The Bowman Scholar Program provides an opportunity for a less intensive research project. It requires that the mid commit to either submarine or surface nuclear service selection, and also participate in a summer internship.

i. A Bowman Scholar should take a EE49X course in one or both semesters of the 1/C year to work on the proposed project.

ii. This project can be tied in with the capstone project as long as the mid and advisor specify separate deliverables for the capstone and the independent study so that the grades can be separated should the student fail to perform well.

c. A student who wishes a research experience outside of the Bowman or Trident programs can also take an independent study course—this is governed by a department instruction available on the department website.

9. Graduate Education Opportunities

a. There are a number of paths that allow for the advanced student to pursue graduate work. Interested students should look for briefings on the topic and consult with the department’s graduate education coordinator.

b. Students who are interested in going to medical school need to take the pre-med requirements on top of their major courses in consultation with the pre-med program coordinator. A student interested in this program needs to begin it in the 3/C year.

10. Service Academy Exchanges (see http://www.usna.edu/AcDean/saep/saep.html)

a. The Service Academy Exchange Program (SAEP) allows for students to go to one of the other service academies for a semester during the 2/C year.
b. When planning for a student’s exchange, you should consult the SAEP guide available on the intranet. In particular, you should look at the Table of Course Equivalents to determine what courses the mid can take at the exchange institution that can count towards the matrix.

c. Check that the service academy equivalents are offered in the same semester as at the Academy—the course catalogs for the other institutions are also found on the SAEP web site.

11. Foreign University Exchanges

   a. These are newer and not as carefully scripted as the SAEP. There are a few institutions, such as the Texas A&M Extension school in Qatar that offer technical courses. In general, however, I won’t let a student go on a foreign exchange unless he/she is far enough ahead in the matrix so that all they require for credit for the semester is language credit (they will usually get one language course credited by the exchange).

   b. There is a department instruction for course validation on the department web site that should be followed in the case that a mid seeks validation credit for an ECE course taken abroad.

   c. Foreign exchanges require careful attention. Please consult the senior academic advisor in such cases.

12. When Students Struggle

   a. Make sure that the students know the basics of sound study skills—

      i. They should be doing all reading and homework assignments on time.

      ii. They should be making good use of their weekend times as well as the weekdays.

      iii. They should minimize distractions such as Facebook, music, and chatter when they are studying.

      iv. They should stay awake and take notes in class. Sitting in the front row can help them to stay alert.

      v. They should seek EI with instructors in their challenging classes.

   b. The academic center has a number of resources that can be useful to struggling students, including counseling on study skills and test-taking strategies, and the writing center.

   c. Don’t be shy about contacting your advisee’s company officer to discuss a strategy for assisting a student. The e-mail address for the company CC officer is coCCofcr@usna.edu, and the phone number is x3-7BCC, where B is the battalion number (1 for Co. 1-5, 2 for Co. 6-10, etc.) and CC is the company number. If the student is a varsity athlete, you should also consider talking to the coach.

   d. If a student is ahead in the matrix and struggling, look to see if you can lighten his or her load by pushing a class to a later semester (although you can’t go below 15 credits). Or you can encourage him or her to take a voluntary summer school course and lighten the course load for the future.
Appendix F – Departmental Notices

1. ECEDEPTNOTE 100 ECE Departmental Policy on Calculators
2. ECEDEPTNOTE 1531 Course Validation
3. ECEDEPTNOTE 1531.20 Teaching Evaluations
4. ECEDEPTNOTE 1531.79 Midshipman Research Project Courses (EE/EC 495/496)
5. ECEDEPTNOTE 1650 Graduating Midshipmen End-of-Year Awards
6. ECEDEPTNOTE 1754 Rotational Military Faculty Mentoring Program
7. ECEDEPTNOTE 5700.2 Course Validation for Semester Study Abroad Programs
8. ECEDEPTNOTE 12550 Merit Pay System
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT NOTICE 100

From: Chairman, Electrical and Computer Engineering Department, United States Naval Academy

Subject: ECE DEPARTMENTAL POLICY ON CALCULATORS

Ref: (a) USNA Electrical Engineering Self-Study, 2012
(b) USNA Computer Engineering Self-Study, 2012

1. Purpose. This notice is intended to provide Electrical and Computer Engineering (ECE) Department faculty and students guidance regarding the student use of calculators in ECE courses taken by all engineering students.

2. Background. Based on the evaluation of assessment data collected by ABET Outcome Champions for Outcome (a), and addressed in Refs. (a) and (b), a weakness has been seen in our students’ ability to apply fundamental mathematical concepts to engineering problems. The general consensus among the faculty was that our students relied too heavily on their calculators and did not have a solid grasp of fundamental math principles. The calculators issued to midshipmen have powerful functionality, and can easily perform complex operations (such as calculus and algebra) such that the midshipmen do not have to think about the underlying methods. All of the other engineering department chairmen have found the same weakness in their students.

Calculators provide a very useful tool in many engineering applications, and as such, must be a part of the electrical and computer engineering curriculums. However, the currently issued calculators have proven to be too much of a crutch for the midshipmen. A compromise between on one extreme disallowing all calculators in our classes, and on the other extreme allowing the midshipmen to use the issued calculator, is to allow the students to use a less-capable calculator. Starting in the fall of 2012, in all ECE classes taken by any engineering major, students are only allowed to use a Fundamentals of Engineering Exam (FE) approved calculator when calculator work is warranted. This move should force the students to review and employ these fundamental mathematical concepts in a continual manner throughout their undergraduate coursework.

3. Responsibilities.

   a. Department Chair: The Department Chair is responsible for ensuring a rigorous program for electrical engineering majors, computer engineering majors, and other majors for which the department teaches core courses. The new policy dictated in this notice addresses the calculator issue, and the chair will review and evaluate this policy annually.

   b. Course Coordinators: Course coordinators are responsible for upholding this policy, and placing a statement such as the following into their course policy statements:
Calculators: For calculator use in Electrical and Computer Engineering (ECE) courses taught to engineers, it is the policy of the ECE Department to only allow calculators that have been approved for the Fundamentals of Engineering Exam (FE). Acceptable calculators are listed at: http://www.ncees.org/Exams/Exam-day_policies/Calculator_policy.php. These run in price as low as $15, and are required for all ECE Department courses.

Waivers to this policy for specific courses or portions of courses will be considered on a case-by-case basis, and must be approved by the department chair.

R.W. Ives
R.W. IVES
From: Midshipman
To: ECE Department Chair
Subj: VALIDATION REQUEST

Validation is requested for:  (Example: EE 301)
Justification for validation:  (Example: Took a similar course, ECE2003 at Civilian U)
Description of supporting documentation:  (Example: The ECE2003 course description, syllabus and transcripts documenting my grade are attached)

Signature

1. This request must be completed and submitted to the ECE Department Chair and your ECE academic advisor (if applicable) for course validation. The completed memo must be submitted electronically and in paper form to the ECE department chair for the validation request to be considered.

2. The midshipman must provide college transcripts and any other documentation necessary to verify that key course concepts or skills were (or in the case of exchange programs, will be) mastered. (For example, if “electronic equipment proficiency” is a specified skill, but a laboratory does not appear in any of the requested course documentation, then the student should include documentation supporting laboratory skill mastery).

3. The Department Chair will forward the validation request and supporting documentation to the responsible course coordinator for their assessment. If insufficient documentation is provided, the Department Chair will either deny or may permit resubmission of the validation request.

4. The responsible course coordinator will make their assessment and communicate their decision to the ECE Department Chair. The course coordinator may request the midshipman provide additional documentation via the department chair. The course coordinator will recommend that the midshipman be administered a validation exam where appropriate. Only one attempt to pass a validation exam is allowed for a given course.

5. The Department Chair will make the final validation decision.
Enclosure (1)
From: Chairman, Electrical and Computer Engineering Department, United States Naval Academy

Subject: PERFORMANCE EVALUATION PROCESS FOR MERIT PAY SYSTEM

Ref: (a) USNAINST 12550.4B (Civilian Faculty Pay System)
(b) ACDEANINST 5314.1C (Faculty Reporting Of Teaching and Professional Activities)

1. Purpose. This notice is intended to provide civilian tenured and tenure-track faculty information regarding the process for evaluating faculty annual performance and recommendations of faculty for merit pay awards.

2. Background. In accordance with reference (a), the department chairman is responsible for performing an annual assessment of each tenured and tenure-track faculty member’s performance and providing the Academic Dean with a rank-ordered list of faculty recommended for merit pay increases. The annual performance review considers the faculty members achievements in the areas of teaching, research/scholarship and service.

3. Responsibilities.

   a. Department Chair: Annually, the department chairman will perform an evaluation of the teaching, scholarship and service performance of each faculty member. The department chairman will determine the rankings of faculty recommended for merit pay awards with explanations for the recommendations that are sent forward to the Academic Dean. This ranking is based on the chair’s assessment of faculty teaching, research/scholarship and service. The department chairman has sole authority to decide upon the ranking of the civilian faculty and to make recommendations to the Academic Dean for merit pay awards.

   b. Faculty Member: Faculty members should review reference (a). They are responsible for accurately documenting their teaching, scholarship and service activity in the Faculty Activity Record (FAR), reference (b), annually. The FAR will be due to the ECE Department secretary one week before they are due to the Academic Dean (normally May 31). The FAR plays a key role in evaluating their performance. The following contains excerpts from the Academic Dean’s guidance regarding the three components for which each member of the faculty is evaluated: teaching, research/scholarship, and service.

(i) Teaching is the most important performance criteria; no amount of research, scholarly, or extracurricular accomplishment can outweigh mediocre performance in the classroom. Some examples (not an exhaustive list) of broad measures of effective teaching include the establishment of an environment that fosters student learning, demonstrated student learning and motivation to learn, contributions of individual faculty members to
assessments of student learning, application of assessment results to improve student learning, tangible course and laboratory development, regular peer and student evaluation of the course and instruction received, mentoring midshipmen in directed study and research courses, and serving as a Trident Scholar or Bowman advisor (which also represents research and scholarly activity in most cases).

(ii) Research/scholarship appropriate to the discipline, like excellence in classroom teaching, is a continuing expectation for all faculty members throughout a career at the Naval Academy. Tangible evidence of research/scholarly excellence, especially evidence that is peer-validated, provides the strongest single indicator of a person’s currency in his or her academic discipline, as well as exemplifying that person’s ability to foster a thirst for life-long learning among the midshipmen. Some examples or indicators of research/scholarship performance (again, not an exhaustive list) are peer-evaluated publications and presentations, patents and patent applications, authorship of books or book chapters, invitations to participate in or lead conference panels and workshops, and the acquisition of external research grant support.

(iii) Service is a faculty responsibility at the Naval Academy, and it provides important evidence of the candidate’s comprehensive understanding of and commitment to the Naval Academy mission. In fact, demonstrated contributions in service to the Naval Academy are a primary means for determining a person’s ability to work effectively with others in advancing the Academy mission beyond the contributions normally associated with classroom teaching. Some examples of service contributions (again, not an exhaustive list) include participating in significant curriculum development activities, serving on the Faculty Senate, contributing to department, division, or institutional assessment activities, participating as a faculty representative for a major extracurricular activity or club or varsity sport, and substantive committee service at every level of the Naval Academy. It may also include professional service such as conference planning, work on behalf of professional organizations, or reviewing books and journal articles.

(iv) The level of scholarship and service will be evaluated with consideration of the academic rank of the faculty member. The service element of a tenure-track faculty member is not expected to be as significant as that of a tenured faculty member in order to receive an excellent ranking. Similarly, senior faculty are expected to demonstrate leadership in their service endeavors or other significant contributions to the institution in order to receive an excellent ranking.

4. Action

   a. This guidance will be reviewed with each faculty member annually during the PARs review.

   R.W. Ives
   R.W. IVES
From: Chairman, Electrical and Computer Engineering Department, United States Naval Academy

Subject: ECE DEPARTMENTAL POLICY ON PEER TEACHING EVALUATION

1. Purpose. This notice is intended to provide Electrical and Computer Engineering (ECE) Department faculty with guidance on the developing departmental Peer Teaching Evaluation System.

2. Background. Every teacher can learn something from every other teacher. But without regular evaluation and feedback, there is a chance that we can lose our teaching edge. All ECE faculty will take part in peer review. The goal of this program will be to improve our teaching, both to our majors and to the core students. The program is not formalized yet, but while the program develops into a more formal one, we will begin with informal peer evaluations. I will designate pairs of teachers each semester, and each member of the pair will visit, observe and evaluate the teaching of the other. You should write down your feedback and share it with your partner, but no documentation need be turned in to the department.

3. Responsibilities.

   a. Department Chair: The Department Chair is responsible for designating pairs of teachers who will perform the informal evaluations, and for keeping a record of completion of these informal evaluations. The pairings for the fall semester are included on the next page.

   b. Teachers: At least once a semester, each member of the pair will perform an observation and evaluation of the other member of the pair. You should attend a lecture period, and observe what works or doesn’t work in the classroom, then provide that feedback to the teacher. You can use the attached sheet to guide you in your evaluation, although for now, no documentation must be kept. These informal evaluations should be complete before 18 November 2011, which is the week before Thanksgiving. Each teacher will inform the chair when their evaluation is complete so I can update my records.

R.W. IVES

R.W. IVES
### Teacher Pairings for Fall 2011

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CLASSROOM PERFORMANCE EVALUATION FORM

Name of Instructor: ______________________________________

Name of Course: ______________________________________

Date of Observation: ____________________________________

Assess the instructor’s classroom performance in regards to each of the following by circling either “S” (Satisfactory) or “N” (Needs Improvement).

1) Clearly presented the goals for the day’s instruction.   S  N
2) Demonstrated knowledge of the subject matter.         S  N
3) Presented material in a clear and understandable manner. S  N
4) Presented material in an interesting manner.           S  N
5) Presented material at a level appropriate for the course. S  N
6) Engaged audience in the learning process               S  N
7) Spoke clearly so that the entire class could hear.    S  N
8) Wrote legibly on the board and/or used appropriate AV materials. S  N
9) Maintained sufficient eye contact with audience.      S  N
10) Used class time effectively.                         S  N
11) Students in the classroom seemed orderly and were attentive to the lecture. S  N
12) Class instruction began and ended on time.           S  N
13) Content material was adequate.                       S  N
14) Presentation of the class was adequate.              S  N
15) Climate of the class was appropriate.                S  N
16) Teaching strategy was appropriate.                   S  N

Generally describe your impression of the effectiveness of the instructor in a classroom setting.

What specific changes would you recommend to strengthen the instructor’s classroom effectiveness?

Reviewer’s Signature: ______________________________________
Instructor’s Signature ______________________________________
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT NOTICE 1531.79

From: Chairman, Electrical and Computer Engineering Department, United States Naval Academy

Subject: ECE DEPARTMENTAL POLICY ON MIDSHIPMAN RESEARCH PROJECT COURSES (EE/EC 495/496)

Ref: (a) ACDEANINST 1531.79 (Midshipman Research Project Courses)

Encl: (1) Project Proposal Format from Reference (a)

1. **Purpose.** This notice is intended to provide Electrical and Computer Engineering (ECE) Department faculty and students information regarding midshipman research project courses (EE495/496 and EC495/496). This policy applies to the conduct of Bowman Scholar projects as well, although the application process is different. Notice cancels the 1531.79 notice dated 25 MAY 2011.

2. **Background.** Reference (a) establishes procedures for midshipman research project courses including specific instructions for midshipman and faculty mentors who engage in these courses. Midshipmen and faculty mentors interested in participating in these courses shall study reference (a) and must comply with the requirements therein stated as well as those stated in this ECE Department notice.

1/C and 2/C midshipmen majoring in electrical engineering or computer engineering are eligible to request approval to conduct a midshipman research project course in the ECE department. A minimum CQPR of 3.0 is also required. Exceptions to this last requirement will be considered on a case by case basis. A Midshipman Research Project Course shall not normally count towards fulfilling a major elective credit. This is evaluated on a case-by-case basis and requires Department Chair approval in writing for this to occur.

3. **Responsibilities.**

   a. **Department Chair:** The Department Chair is responsible for reviewing and approving all requests to conduct a Midshipman Research Project Courses.

   b. **Midshipmen:** Midshipman interested in pursuing research project courses must gain the concurrence of a faculty mentor or mentors prior to preparing a proposal and prior to preregistering for any research project course. Midshipman should approach prospective faculty mentors early in the semester prior to the one in which they wish to conduct the research course. A completed proposal must be submitted to the department chairman via the faculty mentor. This shall
normally be done prior to the end of the registration period of the semester that precedes the one in which the research project course is to be conducted. Proposals submitted later than the end of the first full week of classes for the semester in which the research course is to be conducted will not be considered. The required proposal format is given as enclosure (1) of reference (a) and is generally available for downloading from the Academic Dean and Provost’s website. The format is shown here in enclosure (1). Each proposal must include a written endorsement from the faculty mentor(s). Note: the Bowman Scholar application package meets the department application requirements. All midshipmen in EE49x or EC49x courses (including Bowman Scholars) are responsible for the following deliverables.

The minimum in terms of required deliverables during the course are:

1. **6-Week Midterm Deliverable:** An oral (PowerPoint) presentation to interested faculty.

2. **12-Week Midterm Deliverable:** A written progress report. It is intended that this progress report would become the foundation for the final report after revision/expansion.

3. **End-of-Semester Deliverables:** A complete and comprehensive final report must be submitted for each project prior to the first day of the final examination period following the procedures detailed in reference (a). As stated in reference (a), two hard copies of the report signed by the midshipman and the mentor(s), and endorsed by the Department Chair, plus one electronic copy in MS Word format on a CD must be submitted by the due date noted above. In addition:

   Each midshipman researcher is required to make an oral presentation (PowerPoint) at the end of the semester on his/her research project. Coordinating with the midshipman, the midshipman and faculty mentor will schedule this presentation to take place during the final examination period.

   Each midshipman researcher is required to make a poster at the end of the semester on his/her research project. This poster should be completed by the time of the end-of-semester presentation and available during the presentation.

   **c. Faculty Mentor:** Prior to endorsing a proposal, faculty mentors should conduct a thorough review to assure that the project can be accomplished and to assure that any resources and funding required are available. Mentor(s) shall attest that such review has taken place and include statements to that effect in their own endorsement of the proposal.

   Faculty mentor(s) must be aware of all pertinent safety issues and regulations involved in conducting the proposed research, including the use of lithium batteries, and must advise their midshipmen of these issues. Mentors must coordinate with the TSD supervisors to assure awareness of and compliance with applicable safety regulations.

   The reports from midshipman research project course will be evaluated by the faculty mentor(s) who supervised the project and will be utilized in the determination of the mid-term and final grades for the course.

   Coordinating with the midshipman, the faculty mentor will schedule the 6-week and final presentations, inviting all members of the faculty. The presentations from midshipman research project courses will be evaluated by all of the ECE Department faculty members that attend the presentations. Evaluations will be submitted directly to the mentor(s) immediately following each presentation and will be considered in determining the final grade for the course. Faculty members
serving as research mentors are required to attend all of the research project presentations of the department for the semester in which they serve as mentors.

Finally, the faculty mentor will include information on the project in the department’s Project Assessment Notebook.

R.W. Ives
R.W. IVES
Midshipman Research Project Course: PROJECT PROPOSAL

Midshipman Name: ________________________ Alpha #: __________
Major: ________________________ Company: __________
Academic Year and Semester for Project: ________________

1. Title of the Proposed Project:

2. Faculty Mentor(s):
Name and Academic Rank - Department (Primary Mentor)
Name and Academic Rank – Department (Other Mentor)
Name, Position and Affiliation (Mentor outside USNA)

3. Summary of the Proposed Research:
   a. Problem to be Addressed:
   b. Background Information:
   c. Describe any preparatory work undertaken by the midshipman research student:
   d. Abstract and Details of the Research Proposal:

4. Research Facilities:
   a. Primary facilities and equipment (type and location) to be used:
   b. Available at USNA? ______ If so, where? _______________
   c. Available nearby? ______ If so, where? _______________
   d. Can be borrowed? ______ If so, where? _______________

5. Published Materials:
   a. Identify the principal published paper documents you expect to use and indicate their availability. If not available through Nimitz Library, how will they be obtained?

   b. Identify the principal electronic publications you expect to use and indicate their availability. If any are not freely accessible over the Internet, explain how you expect to acquire access.

6. Requirement for Access to Classified Material:
Required: ____________ Not required: ____________

7. **Access to Special USNA facilities:** If access to special USNA facilities (e.g., the Hydromechanics Laboratory, the Technical Support Division (TSD), CADIG, etc.) is required, a letter from the operational manager of the facility **must** be included with this Project Proposal. This memo should indicate that the involved parties have discussed the use of the facility and that the use and support requirements of the project can be met without causing unnecessary hardship on the facility operators or equipment.

8. **Estimate of Costs:** Provide this information by Fiscal Year, which starts 1 October and ends 30 September. Any required startup funds needed prior to 30 September must be requested in the budget of the earlier fiscal year. When completing this section of the project proposal, be sure to review the “NOTES” section provided below.

**FY-Fall semester FY-Spring semester**

a. Midshipman travel: ________________
b. Midshipman per diem: ________________
c. Consumable Supplies: ________________
d. Equipment (over $200): ________________
e. Equipment (under $200): ________________
f. Other contractual services: ________________

**TOTALS:** ________________

**GRAND TOTAL:** ________________

**NOTES:**

- **Travel:** Possible destination: ____________________________
  Probable dates: ____________________________
  Purpose: ____________________________

- **Equipment over $200:** Describe the equipment and provide a letter of justification from the project mentor for any request for equipment over $200.00.
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT NOTICE 1531

From: Chairman, Electrical and Computer Engineering Department, United States Naval Academy

Subject: ECE DEPARTMENTAL POLICY ON COURSE VALIDATIONS

Ref: (a) ACDEANINST 1531.59B (Majors, Course Enrollments and Changes)
(b) ACDEANINST 1531.11 (Plebe Academic Handbook)

Encl: (1) Midshipman Request for Validation Form

1. Purpose. This notice is intended to provide Electrical and Computer Engineering (ECE) Department faculty and students information regarding the process for validating department courses.

2. Background. In accordance with reference (a) the process by which credit is awarded for previous work equivalent to that covered in courses in the Naval Academy curriculum is known as validation. Any academic course in the ECE curriculum can be validated. Validation exams may take place at any time mutually convenient to the department and the midshipman. Arrangements for validation are to be made by the midshipman with the ECE Department Chair. Where validation warrants the administration of a validation exam, only one opportunity for validation is allowed. Validation must be approved by the Department Chair and by the Associate Dean for Academic Affairs.

Validation of a course may be revoked either at the request of the midshipman or the ECE department if the midshipman's progress in a sequential course indicates the need to revert to a lower-level course. This action requires approval of the midshipman's academic adviser and the ECE Department Chair.

In accordance with reference (b), validation is generally only granted for equivalent college level experience elsewhere. Special consideration may be given in cases where midshipmen have documented prior experience in the Electrical and/or Computer Engineering fields and have successfully passed validation exams for both course and laboratory work. Self study, tutorial assistance, or completion of correspondence courses is not grounds for validation unless approved in advance by both the ECE Department Chair and the Associate Dean for Academic Affairs.

3. Responsibilities.

   a. Department Chair: The Department Chair is responsible for approving all department validations and forwarding those requests to the Associate Dean for Academic Affairs for final approval. The Department Chair must approve removal of validation if student progress in a sequential course is not adequate.

   b. Course Coordinators: Course coordinators are responsible for making validation recommendations to the Department Chair based on the validation
request and any validation exam results. Course coordinators may not give validation exams unless requested by the Department Chair.

c. Academic Advisors: Academic advisors are responsible for making recommendations to the Department Chair for removal of validation if student progress in a sequential course is not adequate.

d. Midshipmen: Midshipmen are responsible for notifying their academic advisor of their intention to apply for course validation and completing and submitting the validation request (Enclosure 1) to the ECE Department Chair.

R.W. IVES
R.W. IVES
From: Midshipman          Date
To:   ECE Department Chair

Subj: VALIDATION REQUEST

Validation is requested for:  (Example: EE 301)
Justification for validation:  (Example: Took a similar course, ECE2003 at Civilian U)
Description of supporting documentation:  (Example: The ECE2003 course description, syllabus and transcripts documenting my grade are attached)

Signature

1. This request must be completed and submitted to the ECE Department Chair and your ECE academic advisor (if applicable) for course validation. The completed memo must be submitted electronically and in paper form to the ECE department chair for the validation request to be considered.

2. The midshipman must provide college transcripts and any other documentation necessary to verify that key course concepts or skills were (or in the case of exchange programs, will be) mastered. (For example, if “electronic equipment proficiency” is a specified skill, but a laboratory does not appear in any of the requested course documentation, then the student should include documentation supporting laboratory skill mastery).

3. The Department Chair will forward the validation request and supporting documentation to the responsible course coordinator for their assessment. If insufficient documentation is provided, the Department Chair will either deny or may permit resubmission of the validation request.

4. The responsible course coordinator will make their assessment and communicate their decision to the ECE Department Chair. The course coordinator may request the midshipman provide additional documentation via the department chair. The course coordinator will recommend that the midshipman be administered a validation exam where appropriate. Only one attempt to pass a validation exam is allowed for a given course.

5. The Department Chair will make the final validation decision.

Enclosure (1)
DEPARTMENT OF THE NAVY
UNITED STATES NAVAL ACADEMY
121 BLAKE ROAD
ANNAPOLIS, MARYLAND 21402-1300

ECEDeptNote 1650
RWI
15 MAY 2012

ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT NOTICE 1650

From: Chairman, Electrical and Computer Engineering Department, United States Naval Academy

Subject: GRADUATING MIDSHIPMEN END-OF-YEAR AWARDS

Ref: (a) USNA NOTICE 1650 (Yard-Wide Prizes and Awards Ceremony)

1. Purpose. This notice is intended to provide guidance to the department faculty on the handling of awards given to midshipmen graduating from the Electrical and Computer Engineering Department.

2. Background. Each year, our department presents awards or recognition to the top performing graduates in our majors. This includes three awards given for senior capstone projects (the Steinmetz Prize, the Hamming Prize and the Hagee Prize), and a yard-wide award (the Captain Boyd R. Alexander Prize). In addition, our department provides the name for the winner of a yard-wide award for a midshipman who is not a part of our department (the Admiral Joseph R. Redman Prize). These are described below.

   a. Steinmetz Prize: The Steinmetz Prize is named in honor of Charles Proteus Steinmetz, inventor of the alternating current motor and a pioneer in electrical engineering. Steinmetz famously said, “No man becomes a fool until he stops asking questions.” The Steinmetz Prize is awarded to the Electrical Engineering major whose contribution to their capstone design project best applies engineering principles and modern technology to the solution of a real-world problem.

   b. Hamming Prize: The Hamming Prize is named in honor of Richard Wesley Hamming, a pioneer in computing and computer engineering. The Hamming Prize is awarded to the Computer Engineering major whose contribution to their capstone design project best applies engineering principles and modern technology to the solution of a real-world problem.

   b. Hagee Prize: The Hagee Prize is named in honor of General Michael Hagee, a USNA graduate, class of 1968, former instructor in the Naval Academy’s Electrical Engineering Department, and former Commandant of the Marine Corps. It is awarded to the midshipman or the midshipman team whose capstone design project best addresses a significant threat to deployed Marines. The award is typically an electrical multi-meter and a certificate. In addition their names will be added to a large plaque in Rickover Hall.

   c. Captain Boyd R. Alexander Prize: The Captain Boyd R. Alexander Prize is awarded by the Armed Forces Communications and Electronics Association to the midshipman in the Electrical Engineering major who will graduate with the highest grade point average in the major.
d. Admiral Joseph R. Redman Prize: The Admiral Joseph R. Redman Prize is awarded to the midshipman engineering major (non-EEE/ECE) in the graduating class who has demonstrated the greatest achievement in the professional courses in Electrical Engineering Fundamentals and Applications.

3. Responsibilities.

a. Department Chair: Annually, the department chairman will determine the winner of the Captain Boyd R. Alexander Prize, and the top 25% of the class in both the electrical engineering and computer engineering majors. He/she will also approve the award nominees determined by the Awards Committee, and provide the names of the yard-wide award winners to the yard-wide committee. At an E&W Division or Departmental Awards Ceremony, the chair will present the awards for the Steinmetz, Hamming and Hagee Prizes, announce the winners of the Captain Boyd R. Alexander and Admiral Joseph R. Redman Prizes, and announce the top 25% of the graduates in each major. Finally, the chair will arrange for the winners of the capstone prizes’ names to be added to the associated plaque in Rickover Hall.

b. Student Awards Committee: The Student Awards Committee will attend the presentations of all capstone projects, and review their final reports, and posters. They will review all available faculty feedback on the presentations, and determine possible candidates for the Steinmetz and Hagee award. They will then confer with the candidates’ capstone advisors and determine their nominees for the awards, and submit the names to the department chair for final approval.

The Steinmetz Prize and the Hamming Prize will be awarded to individual midshipmen, even if the underlying capstone project entailed a team of participants. In rare instances, when the Capstone Advisor believes the project work was equally shared among a team, the Capstone Advisor may petition the Department Chair for the prize to be awarded to all participants on the winning capstone project. Among the Hagee, Steinmetz and Hamming Prize, no midshipman is eligible to be awarded more than one of these prizes.

In the case of double-majors:

- The consideration for the Alexander Prize and the new yard-wide prize to CE majors will be based on the midshipman’s primary major.

- Double-majors (EE/CE and CE/EE) will be eligible for either the Steinmetz Prize or the Hamming Prize, but the prizes will be awarded to different midshipmen.

In addition, the Awards Committee will determine the name of the winner of the Admiral Joseph R. Redman Prize, using feedback from the applicable course coordinators (see (c) below). Note: the graduating midshipmen typically take EE331 and EE332 or EE334 in their 2/c year, so the required information is contained in the previous year’s course reports.

c. Core Course Coordinators EE331/EE332/EE334: The Admiral Joseph R. Redman Prize is given to the midshipman who has the highest GPA over the two-course electrical engineering sequence (either EE331/EE332 or EE331/EE334). At the end of each semester, the course coordinators for EE331, EE332 and EE334 will gather overall grade information from each section of their course and include this in the course report.

4. Action
a. This guidance will be reviewed each academic year for changes to the awards given (e.g., added awards, changes in the items presented to the midshipmen, etc.).

R.W. Ives
R.W. IVES
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT NOTICE 1754

From: Chairman, Electrical and Computer Engineering Department, United States Naval Academy

Subject: ROTATIONAL MILITARY FACULTY MENTORING PROGRAM

1. Purpose. To establish policy and publish guidance for the assignment of a mentor to each new rotational military instructor in the Electrical and Computer Engineering Department (ECE).

2. Policy. This mentoring program is intended to assist new faculty members in adjusting to the unique Naval Academy teaching environment. The program’s success will depend on the new faculty member, their mentor and the Department Mentor Coordinator (DMC) all taking an active role in the acclimation process.

3. Responsibilities.

   a. Department Mentor Coordinator (DMC): Prior to the arrival of a new instructor, the DMC will assign a mentor. The mentor will report directly to the DMC for the duration of his/her assignment, usually one year. Relief will occur at the DMC’s discretion. The mentor will meet periodically with the DMC to discuss progress and ideas for improvement.

   b. Mentor: The mentor will contact the new faculty member in advance of his/her arrival at the Academy and then meet with the new faculty member on a regular basis during the first 3 months of teaching. The mentor will provide informal advice to the new faculty member on aspects of teaching, military requirements, administrative actions, etc. The mentor shall treat all interactions and discussions in confidence. There is no evaluation or assessment of the new faculty member on the part of the mentor, only supportive guidance and constructive feedback. The most important function of a good mentor is to help the new faculty member acclimate to the Academy and succeed as an instructor. Although the role of mentor is an informal one, it poses a challenge and requires dedication and time. A good relationship with a supportive, active mentor has been shown to contribute significantly to a new instructor’s career development and satisfaction.

      i. General guidance for mentors:

         • Make sure the new faculty member completes the Academy check-in process with the Military Administration Office.

         • Introduce the new faculty member to the rest of the faculty and offer each faculty member the opportunity to discuss their field of expertise and ongoing research projects.
• Show the new faculty member where Department, Division, Academic Dean and Commandant policies can be found and instruct him/her to read appropriate policies carefully. Of specific interest are policies on grading criteria, student cheating and the honor system, course policies and course objectives, extra instruction (EI), regulations on keeping exams and recording grades, recording absences, student course evaluations, Midshipmen Academic Performance Reports (MAPRs), etc.

• Address the various social events that occur in the department.

• Assist the new instructor in developing a personal teaching style.

• Review the course website. Explain the course policy and grading criteria. Review the syllabus and explain the format of the course, etc.

• Help the new instructor compile a course folder with all requisite materials that may aid with instruction. Help the instructor develop his/her supplemental course policy statement.

• Help the instructor prepare for the first day of class. Rehearse the lecture and give constructive feedback.

• Have the instructor visit your classroom on the first day to see a lecture in progress. Discuss the class after the visit.

• Visit the new instructor’s classroom on the first day of class and provide feedback after the lecture.

• Review “MIDS” requirements including how to enter grades, MAPRs, attendance, etc.

• Explain the honor system and our responsibility to report all violations including cheating, lying, etc. Introduce the department’s honor representative. We are not adjudicators in this process, we simply enter the violation, then support the honor system as it investigates the charge.

• Address how one obtains feedback concerning teaching and what resources are available for teaching enhancement.

c. New faculty member. The new faculty member should keep his/her mentor informed of any problems or concerns that arise. As much as possible, courtesy should be shown to the mentor by meeting during times of mutual convenience.

d. Changing Mentors: In cases of changing commitments, either the new instructor or mentor should seek advice from the DMC.

4. Action

a. This policy will be implemented for all new faculty arriving after 1 Jan 2011.
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT NOTICE 5700.2

From: Chairman, Electrical and Computer Engineering Department, United States Naval Academy

Subject: ECE DEPARTMENTAL POLICY ON MIDSHIPMAN COURSE VALIDATION FOR SEMESTER STUDY ABROAD PROGRAMS

Ref: (a) ACDEANINST 5700.2 (Semester Study Abroad Program Guidelines)

Encl: (1) ECE Exchange Course Equivalency Worksheet

1. Purpose. This notice establishes ECE departmental procedures for determining validation credit for courses completed during ECE midshipmen SEMESTER STUDY ABROAD PROGRAM (SSAP) experiences.

2. Background. Reference (a) establishes procedures for midshipman SSAP experiences. To assure the academic feasibility of the SSAP for ECE majors applying for SSAP participation, SSAP candidates must complete the ECE Exchange Course Equivalency Worksheet (Encl (1)). Students must have an overall CQPR of 2.7 or better to be eligible.

3. Responsibilities.

   a. Department Chair: The Department Chair is responsible for reviewing and approving all requests for course equivalency prior to the SSAP. After midshipman completion of the SSAP, the Department Chair will make the final decision regarding course equivalency and enter the results in MIDS within two weeks of the start of the semester following the SSAP.

   b. Midshipmen: In preparing for the exchange, the midshipman will complete the ECE Exchange Course Equivalent Worksheet with the assistance of the CE or EE senior academic advisor and submit it, along with a copy of his or her matrix and a course plan detailing what courses the midshipman plans to take from the present semester through commissioning, to the department chair prior to department approval being granted for the exchange. Over the course of the exchange the midshipman will collect the specified documentation and any other documentation necessary to verify that key course concepts or skills were taught. Within two days of the start of the following semester after the SSAP, the midshipman will bring the ECE Exchange Course Equivalency Worksheet along with the required course materials to the ECE senior academic advisor. The department course equivalency worksheet is only necessary if the midshipmen intend to take a course while on exchange that would count towards an EE or CE major course.
c. **Senior Academic Advisor:** Prior to the SSAP, the CE or EE senior academic advisor will help the midshipman complete the ECE Exchange Course Equivalent Worksheet. After SSAP completion the senior academic advisor will distribute the materials submitted by the midshipman to the responsible faculty members for their assessment.

d. **Faculty:** Prior to the SSAP, responsible faculty members will review and initial the ECE Exchange Course Equivalent Worksheet. After SSAP completion the responsible faculty member will assess the materials provided by the midshipman via the senior academic advisor. The responsible faculty members will make their assessment within a week of the start of classes and communicate their decision to the ECE department chair.

R.W. Ives
R.W. IVES
ECE EXCHANGE COURSE EQUIVALENCY WORKSHEET

Midshipman Name & Alpha:________________________________________________
Exchange Location: _____________________________________________________________________ Semester:__________

1. In preparing for the exchange, the midshipman will complete this worksheet with the help of the ECE senior academic advisor, creating a table entry like the example below for each course in question. The completed worksheet must be initialed by each responsible faculty member, and submitted electronically and in paper form to the department chair prior to department approval being granted for the exchange.

2. The purpose of the table is to determine the following before the exchange takes place:
   a. The faculty member responsible for certifying course equivalency.
   b. The topics and skills that must be covered for course equivalency.
   c. The course materials that the responsible faculty member requires in order to assess topical coverage, the level of rigor, and midshipman performance in the exchange course.

3. Over the course of the exchange the midshipman will collect the specified documentation and any other documentation necessary to verify that key course concepts or skills were taught. (For example, if “MATLAB proficiency” is a specified skill, but MATLAB use does not appear in any of the requested course documentation, then the student should include his lab reports and code if he/she does in fact use MATLAB).

4. Within two days of the start of the following semester, the midshipman will bring this worksheet along with the specified course materials, sorted by course, to the appropriate senior academic advisor or department chair. If any requested materials are not included, the midshipman should note the reason. The senior academic advisor will distribute the materials to the responsible faculty members for their assessment.

5. The responsible faculty members will make their assessment within a week of the start of classes and communicate their decision to the ECE department chair.

6. The department chair will make a decision about course equivalency and enter the result into MIDS within two weeks of the start of the semester.

---

Here is an example:

<table>
<thead>
<tr>
<th>USNA course and description:</th>
<th>EE241</th>
<th>(3-2-4) The physics of semiconductor devices (p-n junction diode, bipolar and field effect transistors) is introduced. Device characterization in terms of appropriate external variables then leads to construction of small-signal and large-signal models. Emphasis is on practical electronic circuits such as amplifiers, filters, rectifiers, regulators and switching circuits.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exchange course and description:</td>
<td>ECE3001</td>
<td>This course begins with an introduction to the ideal operational amplifier and its applications. It then covers the operation of the pn-junction diode and the bipolar junction transistor (BJT) in DC, large-signal, and small-signal regimes. The course concludes with an introduction to field-effect transistors and the design, analysis, simulation, building, and testing of a two-stage audio amplifier. Laboratory exercises and computer-aided simulations using Cadence supplement the lectures with practical circuit analysis, design, construction and testing.</td>
</tr>
</tbody>
</table>

### Key Concepts/Skills:

- Operational amplifier circuits
- Diodes
- MOSFETs
- BJTs
- Laboratory exposure to electronic components

### Necessary Documentation:

- Syllabus
- Textbook
- Lab Assignments
- Lab Notebook/Reports
- Exams

### Responsible Faculty Member (initial plan)

Assoc. Prof. Samara Firebaugh

Enclosure (1)
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<tr>
<th>USNA course and description:</th>
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<td>Exchange course and description:</td>
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<td>Key Concepts/Skills:</td>
<td>●</td>
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<td>Necessary Documentation:</td>
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<td>Responsible Faculty Member (initial plan)</td>
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<tr>
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</tbody>
</table>

Department Chair Approval of Planned Course of Study: ________________________________

Enclosure (1)
Appendix G – Institution-wide Instructions and Notes

1. USNAINST 1531.33F Midshipman Academic Performance Reports
2. USNAINST 1531.39 Academic-Advising System
3. USNAINST 1531.49B Graduation and Degree Requirements
4. USNAINST 5420.36 Establishment of the Academy Effectiveness Board
5. USNAINST 7320.1US Naval Academy IT Asset Management Policies and Procedures
6. ACDEANINST 1531.56Q Plebe Advisor’s Handbook
7. ACDEANINST 1531.111 Plebe Academic Handbook
USNA INSTRUCTION 1531.33F

From: Superintendent

Subj: MIDSHIPMEN ACADEMIC PERFORMANCE REPORTS (MAPR)

1. Purpose. To publish guidance for the submission of Midshipmen Academic Performance Reports.

2. Cancellation. USNAINST 1531.33E

3. Information. No special markings appear because this instruction is a complete revision and should be read in its entirety.

4. Background. To fulfill the Naval Academy mission, each midshipman must be counseled and given direction toward attaining standards of performance required for graduation and becoming an officer in the naval service. Toward this end, midshipmen and those who counsel them need timely and useful information regarding academic performance. This information is also essential to the Academic Board in determining whether an academically deficient midshipman should be retained at the Naval Academy. The grades that midshipmen earn in the courses they take are essential but not sufficient information for this purpose. MAPR’s provide additional information needed to obtain a more complete assessment of a midshipman’s academic performance. They are submitted electronically by faculty members using the Midshipman Information Data System (MIDS) maintained by the Information Technologies Services Division.

5. Action

   a. MAPR Requirements. MAPR’s must be entered at the end of the interim marking periods for the fall and spring semesters and at the end of each week and for the end of any summer course for midshipmen with D or F grades. MAPR’s must also be entered at the end of an academic term, whatever the grade, when required by the Academic Board.

      The comments section of a MAPR is its most important part. Here, faculty members are asked to provide, as best they can, assessments of the midshipman’s academic ability, attitude, alertness, discipline, bearing and appearance, effort, initiative, interest, and officer potential. For interim grading periods, recommendations for improvement are appropriate when the MAPR is being submitted because of poor performance. MAPR’s submitted for the Academic Board should also include recommendations for retention or separation.

      Faculty members may write MAPR’s for any of their students at any marking period or at the end of the semester for any reason. Indeed, faculty members are encouraged to write MAPR’s that praise good performance.

      For details about the operation of a MIDS MAPR module, the user is urged to read the explanation provided by clicking on the Help button that appears at the bottom of the first screen of the module.

   b. MAPR Submission. Faculty members must use the MIDS module MAPR (Midshipman Academic Performance Report) – Enter located on the Faculty web menu in MIDS to submit MAPR’s. The schedule for submission of MAPR’s will be published by the Associate Dean for Academic Affairs.
The period for entering MAPR’s on MIDS will be controlled by the Registrar and may be determined by using the module **Access Dates – Query**, which is located on the General Academics web menu of MIDS. Directions for the use of **MAPR (Midshipman Academic Performance Report) – Enter** can be found on the start up screen of the module itself. The following guidelines apply.

1. Deadlines for MAPR submission will be set by departments in advance of the deadlines that appear in the module **Access Dates – Query** to assure smooth administration of the process. Faculty members must comply with these earlier deadlines.

2. MAPR’s cannot be written until grades have been entered.

3. Faculty members may update or delete MAPR’s that they have created for the current marking period. Older MAPR’s can only be viewed but not altered.

4. The modification of MAPR’s written by others is not allowed.

5. MAPR’s written at the end of a course include a data entry field following the comments section that faculty members should use to make recommendations for retention or separation.

6. Instructors may view MAPR’s for students in their sections regardless of who authored them. Members of the Academic Board may view all MAPR’s written at the end of the semester for midshipmen whose records they review.

The MAPR module will return a record list of all the faculty member’s students with their grades and, for each, an indication of whether or not a MAPR is required. Buttons will appear next to each midshipman’s name allowing the faculty member to enter a MAPR and update an existing MAPR for the current marking period, or view an existing MAPR.

c. Submission of MAPR’s by Associate Dean for Academic Affairs or Department Chairperson. In the event that it is not possible for a faculty member to enter a MAPR, the Department Chairperson or ADAA may enter a MAPR on behalf of the instructor. The MIDS module used is **MAPR (ADAA/Department Chair Only) – Enter**, located on the Academic Dean and Department Chair web menus in MIDS. This module can be used by the ADAA or Department Chair only. The following guidelines apply.

1. The guidelines of subparagraph 4a also pertain.

2. The Department Chair or ADAA cannot update MAPR’s originally created by another faculty member.

3. MAPR’s may be entered, deleted, or modified only during access dates determined by the Registrar.

d. Submission of Special MAPR’s. Faculty and staff may submit reports to the Academic Board about midshipmen who are not current students via the MIDS module called **MAPR’S (Special) Enter**. There are several different types of these special reports according to whether they are being submitted by an Academic Center adviser, a Dean, a faculty adviser, a coach, a department chair, an officer or faculty team representative, the Registrar, or other. The user may elect to write such a report for one of the midshipmen on the Academic Board list. This module appears on the Faculty, General Academics, and Academic Dean web menus in MIDS.

e. Query MAPR’s. The module **MAPR (Midshipmen Academic Performance Report) – Query** is available on the Academic Dean, Academic Center, Faculty, and Midshipmen web menus in MIDS. This module is used to query MAPR’s for any midshipman. Updates are not allowed since this is a query-only module. Midshipmen can view only their own MAPR.
f. Reports for tracking MAPR's. Several reports, located on the Corporate Documents page in Web Intelligence may be used to track submission of MAPR's.

/S/

J. L. Fowler

Distribution:
All Non-Mids (electronically)
USNA INSTRUCTION 1531.39

From: Superintendent

Subj: Academic-Advising System

Ref: (a) USNAINST 1531.16R

Encl: (1) Philosophy
(2) Objectives
(3) Organization and Responsibilities
(4) Midshipman Responsibilities
(5) The Study Skills Program
(6) Policies and Procedures
(7) Reports and Forms

1. Purpose. To promulgate instructions for organized and coordinated academic advising at the Naval Academy (USNA).

2. Scope. Enclosures (1) through (7) outline the purpose, objectives, organization, policies, and procedures of the academic-advising system designed to support the academic program outlined in reference (a).

3. Action

a. Members of the Naval Academy staff will comply with the spirit and intent of this instruction whenever advising/counselling midshipmen on academic matters.

b. Academic advising personnel designated in enclosure (3) will carry out the specific responsibilities assigned to them in the enclosure.

c. Midshipmen will carry out the general and specific responsibilities assigned to them in enclosure (4).

Distribution:
CC

E. C. WALLER
PHILOSOPHY

1. PROMISE. All academic advising should support the Naval Academy’s overall mission, which is to prepare midshipmen morally, mentally, and physically to be professional officers in the naval service. Evolving over the years from this mission has been a balanced emphasis on two general Academy pursuits: (a) undergraduate education, and (b) military indoctrination. A midshipman’s daily experience at Academy hall integrates both pursuits. Consequently, to be effective in supporting the Naval Academy’s overall mission, the Academy’s academic advising system aims to: (a) provide the academic advising normally offered in civilian schools to undergraduate students, and (b) accommodate the major institutional emphasis placed on military indoctrination of midshipmen. To satisfy these two general needs, the system is broad in scope.

2. SYSTEM REQUIREMENTS. The Naval Academy’s academic advising system must satisfy the following advising and counseling requirements:

   a. Undergraduate Education Advising
      (1) Undergraduate education advising rests on the concept that a student is responsible to develop himself through the undergraduate education process. The student must strive to grow intellectually, this growth process entails: (a) expanding one’s academic knowledge; (b) broadening one’s understanding of man, nature, and technology; and (c) developing an inquiring and reasoning outlook on life.
      (2) As Academic Adviser, or anyone else, cannot expand, broaden, or develop a student. The Academic Adviser’s role is to offer helpful and timely guidance to the student as he/she pursues academic opportunities. Such opportunities are extensive and range from classroom performance to academic major selection to graduate school qualification. Students should have the right to make decisions about pursuing such opportunities and must do the work to achieve their goals. Implied in this “right to choose” is the possibility that a student may not seek intellectual development and may or may not do the necessary academic work. Students who fail, having made such a choice, may well forfeit their right to continued academic enrollment.
      (3) In sum, an academic advising system designed for use in undergraduate education must recognize: (a) that students must develop themselves intellectually, and (b) that Academic Advisers should provide guidance to students in the form of information and advice.

   b. Military Induction Counseling
      (1) Military induction counseling provided at the Naval Academy arises directly from the Academy’s mission to prepare midshipmen for service as Naval/ Marine officers. The Academy provides midshipmen the indoctrination in naval customs, courtesies, discipline, and esprit required by the officer training mission.
      (2) Such military induction requires the frequent use of direct counseling. Through counseling, the military counselor, usually the Company Officer, actively strives to modify the midshipman’s attitude and behavior to conform to the desires of the institution. Company Officers issue explicit instructions, correct inappropriate behavior, and direct the pursuit of remedial courses of action. All of these forms of counseling seek to prepare midshipmen fully to assume their military leadership responsibilities as officers in the naval service.
      (3) At the Naval Academy, this induction counseling extends in scope beyond traditional military performance into academic performance. Academic work is a major part of a midshipman’s assigned duties. Through academic work, a midshipman reveals attitudes and patterns of behavior with respect to such desired officer characteristics as attention to duty, perseverance, and self-discipline. Company Officers therefore should evaluate a midshipman’s academic performance for these character qualities and provide the appropriate counseling to the midshipman. Such appropriate counseling includes directive counseling aimed at modifying attitudes and behavior that are not acceptable for officers of the naval service.
      (4) Thus, the academic advising system designed for the Naval Academy must include direct counseling of midshipmen by Company Officers specifically tasked to train future Naval/Marine officers.

3. SYSTEM CHALLENGE. As evident from the system requirements outlined above, the Naval Academy’s academic advising system must incorporate and reconcile: (a) academic advising traditionally required in meaningful undergraduate education, and (b) counseling necessitated by the Academy’s military indoctrination mission.
A. Such reconciliation is relatively easy for midshipmen who perform up to their academic potential—who pose the challenge to the Academy's academic advising system. Both the Academic Adviser and the Company Officer desire improved performance by the underachiever. Both acknowledge the ultimate, common goal of graduating a competent officer, but the two differ in their advising/counselling emphasis. The Academic Adviser strives to promote intellectual growth and the reasoning, self-reliant maturity that emanates from such growth. Since one must stimulate such growth through advising guidance and not force it by compounding directives, the Academic Adviser uses the advising approach to help the underachiever to improve. The Company Officer aims to instil achievement oriented officer qualities in midshipmen and must intrusively strive to modify undesired midshipman attitudes and behavior. Consequently, the Company Officer may feel obligated to use the more direct counselling approach to help the underachiever to improve.

c. If not understood and co-ordinated, these differing advising/counselling approaches to dealing with underachievers may lead to unintended interference by the Academic Adviser and Company Officer in the accomplishment of each other's goals. The underachieving midshipman and his/her Company Officer may interpret the Academic Adviser's approach as a laissez-faire willingness to tolerate poor performance and qualities which the institution does not find acceptable for a future officer. On the other hand, the underachieving midshipman and his Academic Adviser may feel the Company Officer's direct approach limits the opportunity a midshipman must have to develop his/her own intellectual maturity. To minimize such misunderstandings and unintended interference, both the Academic Adviser and Company Officer must understand the objectives being sought, and the approaches being used, by each other. The Academic Adviser should acknowledge the Company Officer's military indoctrination obligations and appreciate the necessity of directed remedial courses of action for some underachieving midshipmen. The Company Officer should support the Academic Adviser's objective of fostering the intellectual self-development of midshipmen and should resort to direct counselling when other efforts have failed.

4. System Co-ordination. An academic advising system at the Naval Academy must acknowledge and manage the differences (and possible tension) that sometimes arise between Academic Advisers and Company Officers. The Assistant Dean for Academic Affairs provides such managerial coordination and oversees all academic advising/counselling at the Naval Academy. He/she will monitor the advising/counselling approaches being employed by all involved personnel and must ensure that all approaches are consistent with the overall philosophy and objectives of the system.

5. System Principles. In conclusion, the following general principles form the basis of the Naval Academy's academic advising system:

a. The system must support the overall mission of the Naval Academy by coordinating the mission's myriad requirements for undergraduate academic advising and military indoctrination counselling.

b. Midshipmen should be responsible for their own academic accomplishments, intellectual growth, and character development during their undergraduate education experience.

c. Academic Advisers should be responsible for promoting the intellectual self-development of midshipmen by providing helpful and positive guidance to them about academic requirements and opportunities.

d. Company Officers should be responsible for ensuring midshipmen develop achievement oriented attitudes and habits required for service as a Navy/Marine officer. In seeking to modify the attitudes and behavior of underachievers, Company Officers should support the principles of self-development.

a. The Assistant Dean for Academic Affairs must carefully coordinate the academic advising system. He/she should be responsible for ensuring the academic advising and counselling provided all midshipmen personnel are consistent with the overall philosophy and objectives of the academic advising system.

e. Academic Advisers and Company Officers should work in tandem to coordinate their efforts in advising and counselling midshipmen.
OBJECTIVES

1. To support the mission of the Naval Academy by coordinating the mission induced requirements for undergraduate academic advising and military indoctrination counseling.

2. To provide all midshipmen with information on academic policies, procedures, and programs at the Naval Academy.

3. To assist midshipmen in choosing educational objectives commensurate with their interests and abilities.

4. To assist midshipmen in exploring the possible short and long range career consequences of their educational abilities.

5. To make midshipmen aware of the wide range of educational services and opportunities available at the Naval Academy that may be pertinent to their educational objectives.

6. To provide study skills instruction to midshipmen in need of such assistance.

7. To ensure the academic attitudes and behavior of midshipmen are consistent with the achievement oriented qualities required for Navy/Marine officer service.

8. To provide academic advising and counseling indoctrination to Academic Advisers, Company Officers, and others at the Naval Academy.

9. To provide an "Academic Adviser's Handbook" to all advising and counseling personnel.

10. To evaluate the effectiveness of the academic advising system.

Enclosure (2)
1. System Description

a. A central structure coordinates the academic advising system at the Naval Academy while various advisers and counselors provide primary advising services on a decentralized basis. This system, illustrated schematically in paragraph 2, recognizes both the military and academic aspects of the Naval Academy's undergraduate education experience as complimentary parts.

b. The primary advising personnel are the Academic Advisers. The primary counselors are the company officers, company strippers, and study skill advisers. The company officers coordinates the efforts of these primary counselors by carrying out the line responsibility assigned to him/her for all aspects of midshipman performance within his/her command. The Assistant Dean for Academic Affairs directs the central administration of the UMA-advising system through the Division Senior Academic Advisers, the Deputy Commandant of Midshipmen, and the study skills coordinator.

c. The advising system also includes the efforts of various support personnel who either counsel only as a secondary portion of their responsibilities, or who provide counseling services only to a limited sector of the midshipman population. Assistant Dean for Academic Affairs coordinates the work of the support personnel with the director of candidate guidance, the senior chaplain, the director of athletics, academic liaison officer, and the chairman of various academic committees.

2. Organizational Diagram of Academic Advising System. The organization of the academic advising system is shown on the following page.

3. Functional Descriptions of Academic Advising Agents

a. Office of the Academic Dean

1. Assistant Dean for Academic Affairs (ADAA)

2. Chairs the advising, counselling, validation, and majors committee (adviser's committee). See tasks for this committee listed below.


4. Ensures all midshipmen who graduate have fulfilled their academic requirements.

5. Ensures at least 80 percent of the midshipmen enroll in "technical" academic majors.

6. Approves all changes of major, except those directed by the academic board.

7. Publishes and updates the "majors program" booklets for each class.

8. Approves the reduced academic workload programs that are followed by midshipmen as a result of academic board decisions and/or prolonged illnesses.

9. Counsels midshipmen at their request who desire to change majors, drop courses, change course levels, and/or separate from USNA.

10. Approves all courses repeated by midshipmen.

11. Approves pre-registration, registration, and final exam schedule as prepared by the registrar.

12. Supervises the summer school program.

13. Supervises the premedical education program.


15. Coordinates academic advising amongst the academic dean, commandant of midshipmen, dean of admissions, and director of athletics.

16. Publishes a newsletter on items of common concern.

17. Provides guidance to the division senior academic advisers, commandant of midshipmen, and director of professional development in organizing and delivering indoctrination programs for academic advisers, company officers, and study skill advisers.

18. Coordinates academic advising procedures and programs with the registrar.
(2) Division Senior Adviser

(a) Serves as a member of the Advising, Counselling, Validation, and Majors Committee.

(b) Provides assistance to, and coordinates the efforts of, the Department Senior Academic Advisers under his/her cognizance.

(c) Provides indoctrination on the Naval Academy academic program, the academic advising system, and the duties of advisers to Academic Advisers in his/her division.

(d) Advises the Division Director and Department Chairmen on matters pertaining to the academic advising program.

(e) Accomplishes all other academic advising tasks assigned by the Division Director.

(3) Department Senior Adviser

(a) Coordinates all academic advising within the Department.

(b) Appoints Academic Advisers and assigns advisees to them as directed by the Department Chairman.

(c) Establishes criteria for predicting success in the major, or majors, under his/her purview.

(d) Counseling midshipmen identified as having limited potential in the major and those requesting a change into, or out of, the major.

(e) Assists the Division Senior Academic Adviser in the indoctrination of Academic Advisers.

(f) Provides guidance to Academic Advisers in the pursuit of their duties.

(g) Submits evaluation on the Academic Advisers in his/her department to the Department Chairman upon request.

(h) Identifies superior midshipmen achievers who may qualify for the Trident Scholar Program, Volunteer Graduate Education Program, or other special programs.

(4) Academic Adviser

(a) Guides advisees into the proper sequence of courses at pre-registration and registration.

(b) Checks each advisee's progress through the matrix of the major, assuring that prerequisites are fulfilled.

(c) Checks all advisee requests to drop or add courses.

(d) Maintains a record of the progress of each advisee.

(e) Checks the grades of advisees at each grading period.

(f) Reviews, as necessary with Department faculty members, the performance of advisees in major courses. Identifies and counsels midshipmen who may be in the wrong major or have the potential for substantial additional achievement (Trident Scholar, Volunteer Graduate Education Program [VGEF], etc.).

(g) Assists plebe advisees in the selection of an academic major. Counsels advisees who contemplate a change of major.

(h) Checks all advisees during their first and second class years to ensure they will complete the courses required for graduation.

(i) Maintains a counselling dialogue with all advisees aimed at stimulating their intellectual growth and academic achievement.

(j) May voluntarily submit a formal evaluation to the Registrar and appropriate Company Officer on any advisee. The evaluation comments upon the efforts and progress by the advisee toward intellectual growth and academic achievement.

(k) Coordinates the advising and counseling of midshipmen with the appropriate Company Officer.
(5) **Trident Scholars Committee**

(a) Interviews all Trident Scholar candidates approved for consideration by the Commandant of Midshipmen.

(b) Evaluates projects prepared by the Trident Scholar Candidate and his/her faculty mentor.

(c) Recommends to the Superintendent via the Academic Dean an order of preference for Trident Scholar selection.

(d) Reviews requests for midshipman release from the Trident Scholar Program.

(e) Reviews the semester-hour credits and grades awarded to Trident Scholars by Trident Scholar Advisers.

(6) **Advising, Counselling, Validation, and Majors Committee (Adviser's Committee)**

(a) Formulates the academic program for fourth class validators.

(b) Recommends administrative procedures for counselling and validation to the Academic Dean.

(c) Coordinates the resolution of validation and counselling problems among the academic departments.

(d) Assists and advises the Registrar in matters concerning registration.

(e) Faculty members on the committee assist and advise the Academic Board on the handling of academically deficient Midshipmen during the Board's end of semester deliberations. They counsel all midshipmen who appear before the Board and who fail courses.

(f) Advises and assists the Academic Dean in obtaining and maintaining the proper distribution of majors, by class, as directed by the needs of the naval service.

(g) Reviews and approves for the Academic Dean all assignments and changes of academic majors.

(5) Ensures the academic departments prepare and present academic major selection briefs to the fourth class:

(i) Meets at least once a month during the academic year to review progress grades and coordinate other academic matters as necessary.

(7) **Graduate Education Committee**

(a) Provides guidance for, and administration of, all graduate education programs applicable to midshipmen at USNA.

(b) Ensures that all potential graduate education candidates receive a comprehensive briefing on available graduate education programs and related subspecialty/B-code information.

(c) Coordinates and consolidates lists of recommended candidates submitted by cognizant departments for individual graduate education programs.

(d) Reviews qualification of all midshipmen recommended for scholarships and other graduate programs.

(e) Submits to the Superintendent, via the Academic Dean and Commandant of Midshipmen, the final recommendations for selection of midshipmen into graduate-education programs.

b. **Office of the Commandant of Midshipmen**

(1) **Deputy Commandant of Midshipmen**

(a) As a member of the Adviser's Committee, coordinates matters concerning the academic advising of midshipmen.

(b) Provides standards on academic counselling guidance to Battalion and Company officers.

(c) Provides an indoctrination program on academic counselling to Brigade Officers in coordination with the ADAA.

4
(2) Battalion Officer

(a) Ensures that Company Officers carry out required academic counselling.
(b) Reviews the academic progress of all midshipmen within the battalion after each marking period.
(c) Counsels academically deficient midshipmen referred by Company Officers.
(d) Monitors midshipmen class absences and ensures Company Officers take corrective action for excessive or unauthorized absences.
(e) Reviews academic summary reports prepared by Company Officers for the Academic Board.
(f) Observes all Academic Board hearings for assigned midshipmen.

(3) Company Officer

(a) Carries out all duties associated with his line responsibility for the overall performance of his/her midshipmen. Designates midshipman academic work as an assigned military duty. Holds midshipmen accountable for their successful accomplishment of this duty and their development of officer leadership qualities.
(b) Sets academic goals for his/her company.
(c) Monitors the academic progress and application of all midshipmen in his/her company.
(d) Sets standards for the proper study environment in the company area and monitors study habits. Refers individuals with poor study habits to the company Study Skills Adviser for counselling.
(e) Maintains academic counselling records on assigned midshipmen.
(f) Supervises the performance of the midshipman chain of command in the execution of its academic responsibilities.
(g) Notifies the Academic Dean and applicable course instructors of all hospitalized midshipmen. Helps to arrange extra instruction for them.
(h) Monitors midshipmen class absences. Initiates corrective action for excessive or unauthorized absences.
(i) Counsels academically deficient midshipmen.
(j) Awards/withholds midshipmen privileges based upon academic performance.
(k) Refers academically deficient midshipmen to Study Skills Adviser for assistance in determining reasons for poor academic performance and assistance in developing remedial program.
(l) Refers academically deficient midshipmen to faculty members for extra instruction as necessary.
(m) Coordinates academic counselling of midshipmen with the appropriate Academic Adviser.
(n) Prepares a comprehensive evaluation of each academically deficient midshipman based on his/her own observations and the evaluations submitted to him/her by the company Study Skills Adviser, Academic Adviser, and course instructors. Submits the evaluation to the Academic Board via the chain of command.
(o) Attends all Academic Board hearings involving academically deficient midshipmen within his/her company. Provides information and performance assessment requested by Board members.

(4) Company Midshipmen Chain of Command

(a) Monitors the academic progress of all midshipmen assigned to the company.
(b) Identifies and counsels all academically deficient midshipmen within the company.
(c) Ensures academically deficient midshipmen submit weekly academic summary reports to the Company Officer.
(d) Establishes a suitable study environment in the company area.
(e) Monitors the study habits and daily routine of academically deficient midshipmen.
(f) Ensures midshipmen in need of faculty extra instruction are encouraged to seek such assistance.
(g) Encourages superior academic achievement and improvement by assigned midshipmen. Makes recommendations on awarding and withholding privileges to the Company Officer.
(h) Provides special assistance to midshipmen on the execused squad and in the hospital.
(i) Maintains academic accountability records for the company in accordance with current directives.

(5) Extracurricular Activity (ECA) Officer Representative. Each ECA Officer Representative ensures midshipmen in his/her ECA do not devote an excessive amount of time to the extracurricular activity, to the detriment of their academic performance.

(6) Senior Chaplain. The Senior Chaplain is responsible for providing religious programs and counseling services for midshipmen.

(7) Battalion Chaplain. Each Battalion Chaplain accomplishes the following academic advising tasks:
(a) Counsels midshipmen who seek, or are directed by their Company Officers to seek, assistance in controlling emotions and/or frustrations which adversely affect their academic performance.
(b) Counsels all midshipmen who separate from USNA during the separation process.
(c) Provides Interpersonal Relationship Training (IPT) to fourth class midshipmen during Fleet Summer. The objectives of the training are to teach midshipmen how to challenge: (1) the institution, (2) themselves, (3) others, and (4) the future.

(8) Study Skills Coordinator
(a) Develops and supervises the Study Skills Program for midshipmen.
(b) Provides study skills classroom instruction for third and fourth class midshipmen.
(c) Prepares multimedia study skills materials for use by midshipmen in the Bancroft Hall and Nimitz Library Learning Centers.
(d) Prepares study skills TV tapes for broadcasting to Company Wardrobes.
(e) Selects midshipmen for participation in the Study Skills Program.

(9) Study Skills Adviser
(a) Meets with advisees on an individual basis as required to assess their study skills progress.
(b) Provides study skills instruction and counseling to advisees.
(c) Assigns study skills lessons to advisees. Monitors the completion of these lessons and evaluates advisee understanding of them.
(d) Consults with the advisee's Company Officer to check the academic progress of each advisee.
(e) Recommends extra instruction to advisees when it might be helpful to them.
(f) Consults with the appropriate Company Officer about any personal concerns which appear to be adversely affecting the study effectiveness of advisees.
(g) Refers advisees to the Study Skills Coordinator and/or appropriate Battalion Psychologist if standard instruction and counselling do not resolve their study skills problems. Coordinates these referrals with the advisees’ Company Officers.

(h) Informs the appropriate Company Officer of any attitude or behavioral deficiencies displayed by advisees which retard their study skills development.

(10) **Battalion Psychologist**

(a) Counsels midshipmen referred by Company Officers and Study Skills Advisors.

(b) Refers midshipmen to the Study Skills Coordinator for further counselling when necessary.

c. **Office of the Dean of Admissions**

(1) **Counselor**

(a) Provides general information about the USNA academic curriculum to USNA candidates.

(b) Recommends to USNA candidates the high school courses one should take to prepare for academic work at the Academy.

(2) **Minority Affairs Counselor**

(a) Provides to USNA minority candidates the same counselling services outlined above for Candidate Guidance counselors.

(b) Provides academic encouragement and informal counselling to minority midshipmen.

d. **Office of the Director of Athletics**

(1) **Academic Liaison Officer**

(a) A member of the Adviser’s Committee.

(b) Counsels varsity athletes. Such counselling addresses a midshipmen’s study hours, study environment, study skills, homework effort, extra instruction, varsity sport effects on academic performance, academic course goals, academic attitude, and planned remedial efforts.

(c) Assists varsity athletes in the selection of courses and sections consistent with majors requirements. Coordinates priority registration for athletes.

(2) **Varsity Sport Officer Representative**

(a) Reviews the academic grades of varsity athletes in assigned sport after each marking period.

(b) Counsels varsity athletes in assigned sport who are academically deficient.

(c) Refers academically deficient varsity athletes to the Academic Liaison Officer for further counselling.
1. General. The individual midshipman has academic responsibilities at the Naval Academy both as an undergraduate student and as an appointed naval officer preparing for commissioned service. In this latter sense, it is the military duty of each midshipman to develop a commitment to achieve academic excellence and to demonstrate initiative and perseverance in carrying it out. The intellectual growth and mental self-discipline midshipman acquire through the undergraduate education process directly support the development of achievement oriented leadership skills.

2. Specific Responsibilities. To support the twin objectives of intellectual and leadership growth, the Academy assigns several specific responsibilities to each midshipman. The Academy evaluates each individual or renews the need as necessary, to discharge these responsibilities and holds his/her accountable, through the Academic Board process, for failures in performing these duties. Specifically, each midshipman is responsible for accomplishing the following tasks:

a. Seeks out information about the major program and selects a major that challenges his/her abilities and interests.

b. Monitors his/her progress through the applicable major matrix, and confers with his/her Academic Adviser to ensure he/she does not fall behind the matrix.

c. Seeks advising as necessary from his/her Academic Adviser prior to pre-registration and pre-registers in a timely manner.

d. Seeks extra instruction from faculty members in any course as needed. Prepares properly for extra instruction by analyzing deficiencies in advance and having specific questions ready for the instruction.

e. Seeks counselling on study skills as needed or when academically deficient, and takes positive measures to revise study habits to assure academic success.

f. Takes academic program changes when directed by Academic Board or the Adviser’s Committee.

g. Initiates changes of courses or majors with appropriate approval in accordance with current academic instructions. Is familiar with instructions before initiating process.

h. Ensures his/her academic record satisfies all graduation requirements.

Enclosure (4)
Since 1967 a Study Skills Program has evolved at the Naval Academy from a one-on-one operation to a comprehensive, integrated program to assist midshipmen in their adjustment to a college level, technically oriented, academic program.

2. The Study Skills Program is a combination of training aids and personal counseling interviews. Among the training aids is a 43-minute video tape which covers most of the areas in which a midshipman can get bogged down. In addition, numerous film strips with accompanying audio tapes cover many facets of learning and studying, and a twelve-lesson Study Skills Program is available on the computer.

3. The majority of the midshipmen who receive assistance voluntarily participate in the Study Skills Program. Participation for some midshipmen is mandatory. These midshipmen include: (a) entering Plebes whose college board scores are below normal cut-off levels, or whose academic performance in high school indicate that they might encounter difficulty in the Naval Academy curriculum; and (b) all midshipmen retained at the most recent end-of-semester Academic Board if so ordered. The Academy encourages all midshipmen to make use of the facilities available, and to seek personal assistance at any time from the faculty in the Leadership and Law Department.

4. Study Skills Advisers interview all midshipmen in their assigned companies who participate in the Study Skills Program. The midshipmen then complete the following sequence of activities: (a) view the video tape; (b) view several of the film strips; and (c) use the computer assisted Study Skills Program for help in particular areas. Periodically, each midshipman reports to his/her Study Skills Adviser who reviews his/her activities and the amount of time spent studying and viewing the study skills materials. If one's academic performance does not improve, and/or one fails to follow the program, the Study Skills Adviser reinitiates the individual counseling. By the end of eight weeks, a midshipman will have completed most, if not all, of the material available. The Study Skills Adviser then encourages the midshipman to continue using the techniques pointed out in the study skills instruction materials, and to review any of the tapes and films which he/she may not have fully appreciated on first viewing.

5. All of the study skills aids are available in the Learning Center in Room 313 Bancroft Hall which is open from 0700 to 2300 every day. They are also available in the audiovisual section of limits Library. The Educational Resources Center plays the video tapes and film strips on the closed circuit TV for the convenience of the midshipmen. The Learning Center and Limits Library have forms available for the midshipmen to complete, indicating name, alpha number, company number, and which (if any) have been completed. While not every midshipman completes a form, most do, and the forms serve as a record of usage and a source for future recommendations. The Computer Assisted Study Skills program traps user numbers, and Study Skills officials can obtain the statistics at any time by using the proper password and user number.

6. Significant study skills assistance is available through individual counseling offered by the civilian faculty members in the leadership and Law Department, as well as by the Battalion Psychologists attached to that department. Experience has shown that most midshipmen difficulty come from lack of organization of time and effort. The main thrust of the program is to develop habits which will overcome these deficiencies and lead to better academic performance.

Enclosure (5)
POLICIES AND PROCEDURES

1. Adviser Induction

a. Necessity. The success of an academic advising system, no matter how well organized and coordinated, depends upon the knowledge, training and dedication of the advisers/counselors who work directly with the student. To develop these qualities necessary to be effective, an adviser must receive appropriate advising/counseling indoctrination.

b. Coordination. In the Naval Academy academic advising system, the ADAA coordinates this indoctrination.

c. Responsibilities. The following table lists the individuals responsible for providing indoctrination to the various academic advising and counselling personnel:

<table>
<thead>
<tr>
<th>Responsible Official</th>
<th>Advising Official</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division Senior Adviser</td>
<td>Department Senior Advisers</td>
</tr>
<tr>
<td>Academic Advisers</td>
<td>Academic Advisers</td>
</tr>
<tr>
<td>Deputy Commandant</td>
<td>Battalion Officers</td>
</tr>
<tr>
<td>Company Officers</td>
<td>Midshipmen Chain-of-Command</td>
</tr>
<tr>
<td>Study Skills Coordinator</td>
<td>Study Skills Advisers</td>
</tr>
<tr>
<td>Battalion Psychologists</td>
<td></td>
</tr>
</tbody>
</table>

2. Adviser Evaluation and Recognition. Since academic advising is an important part of the undergraduate education process, the command should appropriately recognize the efforts of those who advise/counsel midshipmen about academic affairs.

a. Academic Adviser Evaluation. Department Chairmen are responsible for evaluating the academic advising of all Academic Advisers within their department. Department Chairmen will recognize appropriately those Academic Advisers who excel.

b. Company Officer Evaluation. The Commandant of Midshipmen is responsible for evaluating the counselling of all Company Officers. The Commandant of Midshipmen will recognize appropriately those Company Officers who excel.

c. Study Skills Section Evaluation. The Director of Professional Development is responsible for evaluating the study skills counselling of the Study Skills Coordinator, Study Skills Advisers, and Battalion Psychologist. The Director of Professional Development will recognize appropriately those study skills counsellors who excel.

3. Academic Board Procedures

a. Midshipman Evaluations. Academic instructors and Company Officers prepare written evaluations of midshipmen required to appear before the Academic Board. The Academy encourages Academic Advisers also to provide evaluations on each midshipman. Academic instructors and advisees submit their evaluations through their respective Department Chairmen to the Registrar and forward copies of these evaluations to the Company Officers of the deficient midshipman. Company Officers review the instructor/adviser evaluations and submit their own evaluations to the Commandant's Performance Officer via their respective Battalion Officers.

b. Hearing Procedures. Battalion and Company Officers attend the Academic Board hearings for all midshipmen in their units required to appear before the Board. Both should be present in the Board meeting room before the midshipman enters the room to hear Board members brief the course. The Company Officer will sit in a chair reserved for him/her at the conference table. When directed, the midshipman will report to the Board by himself/herself. During the Board's separation retention voting, the Superintendent will excuse the midshipman from the room. Both the Battalion and Company Officer will remain in the room.

4. Extra Instruction

a. Midshipmen who voluntarily absent themselves from classes should not expect the faculty to cover all the missed material. It is the responsibility of the midshipman to make up this material, with assistance as necessary. For absence due to prolonged illness or emergency leave, the faculty will assist in reoccupying lost ground, but not for voluntary absence.

b. It is the responsibility of a midshipman seeking extra instruction to prepare properly for the extra-instruction period. Before the extra instruction, the midshipman should, at a minimum: read all pertinent assignments, write all assigned homework, analyze where difficulties
exist, and prepare specific questions for the instruction. Extra instruction is not a substitute for proper execution of course work or participation in class discussion.

c. It is a midshipman's responsibility to obtain extra instruction in any courses wherever it is needed. The midshipman personally arranges extra instruction with the instructor. Company Officers, Study Skill Advisers, and Squad Leaders may encourage midshipmen to seek extra instruction. The Academic Dean expects midshipmen who need help to ask for it. He/she also expects the faculty to respond quickly to requests for aid, providing additional assistance is consistent with the standards stated in paragraphs 4a and 4b.

5. Midshipmen Privileges. The Commandant of Midshipmen may authorize:

a. Extra liberty and other privileges to midshipmen whose academic performance warrants favorable recognition.

b. The withholding of privileges from midshipmen whose academic performance is deficient by institutional standards. Privileges he/she can withhold include (but are not limited to):

- liberty
- class rates
- wardroom privileges
- weekend event athletic attendance
- dining out privileges

6. Advising Plebes on Academic Major Selection. Plebe Academic Advisers are responsible for helping plebes to select an academic major. Additionally, the Assistant Dean for Academic Affairs is responsible for arranging academic majors briefs to the plebes of each battalion. Academic Advisers from all academic disciplines should participate in these briefs and should encourage plebes to contact them at any time for additional assistance. All academic advisers and counselors should strongly urge plebes to consider carefully the choice of an academic major.
1. USNA-INT-1531.199 Data Processing Academic Manual (DAPPM). The DAPPM lists the academic reports routine distributed to Naval Academy organizations and individuals. The manual also outlines instructions for processing changes in the academic, sports, and activities status of midshipmen.

2. Academic Adviser Reports. Academic Advisers can gain academic information about their advisees from the following computer reports:
   a. OnLINEx. The OnLINEx program provides the following information to Academic Advisers:
      (1) First, Second, Third, and Fourth Class Midshipman transcripts
      (2) First, Second, Third, and Fourth Class Midshipmen who have either taken or skipped courses
      (3) Transcripts for all midshipmen in each major.
   b. REGISTRX. The REGISTRX program provides the following information options to Academic Advisers and displays the following:
      Midshipmen in:
      Class, Company, Major, Course, Individual Mid, Pair of Courses, Sections
      Information about:
      Course, Course and Section, Department, All Courses, Absent Without Leave (AWOL), Major Totals, Under 15 Courses

3. Adviser Evaluations. Academic Advisers, if desiring to do so, may complete the applicable sections of the Midshipman Academic Performance Report NAV-USA-CA-1531.33 on each of their advisees required to appear before the Academic Board.

4. Academic Tracking Sheet. Company Officers complete Academic Tracking Sheets on each of their midshipmen required to appear before the Academic Board. An example of this tracking sheet follows on the next two pages.

Enclosure (7)
<table>
<thead>
<tr>
<th>DATE</th>
<th>SUBJECT</th>
<th>COMMENTS, DECISION TAKEN, RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 AUS</td>
<td>Perf/Conduct</td>
<td>Discussed reversing last semester's Academic, Conduct &amp; Performance trends. Good crate!</td>
</tr>
<tr>
<td>08 SEP</td>
<td>Study Skills</td>
<td>During COT, Dr. Mann gave a Study Skills presentation.</td>
</tr>
<tr>
<td>22 SEP</td>
<td>Acad. Interview</td>
<td>Midshipman indicates a strong showing, expects 3.0 or above at 4 weeks</td>
</tr>
<tr>
<td>27 SEP</td>
<td>Grades</td>
<td>Achieved 3.0</td>
</tr>
<tr>
<td>14 OCT</td>
<td>Personal Prob.</td>
<td>Midshipman hospitalized in Ohio, injured in auto accident - condition critical. Unable to grant emergency leave, midshipman will take weekend (10/17). Chaplain notified.</td>
</tr>
<tr>
<td>21 OCT</td>
<td>Pers/Health</td>
<td>Midshipman's condition satisfactory, progress. Midshipman contracted heavy flu syndrome, 4 days SIR. Pers were called and advised of the above problems.</td>
</tr>
<tr>
<td>29 OCT</td>
<td>Acad. Acad.</td>
<td>Grades declined (as anticipated). E1, make-up work and video tapes were encouraged. Directed to drop Water Polo and French Club.</td>
</tr>
<tr>
<td>10 NOV</td>
<td>Acad. Acad.</td>
<td>Midshipman claims inability to study, unintentionally missed two classes, res: personal problems. Consulted with professors, academic advisor, Chaplain, and Clinical Psychologist. Appointments with Chaplain and Clinical Psychologist made.</td>
</tr>
<tr>
<td>17 NOV</td>
<td>Acad./Pers</td>
<td>Expects 12 weeks about 2.0, however, confident of improvement. Chaplain and Psych. helped greatly.</td>
</tr>
<tr>
<td>24 NOV</td>
<td>Acad. Acad.</td>
<td>Midshipman indicates continued problem, late on research term paper. Seems to have given up. Outlined study program over Army weekend, including returning to the Hall sorts.</td>
</tr>
<tr>
<td>1 DEC</td>
<td>Acad. Acad.</td>
<td>Fully complied with Army weekend study program, all papers completed. &quot;Light at the end of the tunnel.&quot;</td>
</tr>
<tr>
<td>4 DEC</td>
<td>Injury</td>
<td>Company football injury, operated on and pinned leg tendon. Attempting to maintain studies in hospital by phone. Anticipate out of class 5 week. Four professors indicate poor situation, but not impossible.</td>
</tr>
</tbody>
</table>
USNA INSTRUCTION 1531.49B

From: Superintendent

Subj: GRADUATION AND DEGREE REQUIREMENTS

Ref: (a) USNA Regulations
     (b) 10 U.S.C. (NOTAL)

1. Purpose. To publish instructions regarding requirements for the receipt of a degree and graduation.

2. Cancellation. USNAINST 1531.49A

3. Background. In order to fulfill its mission of preparing midshipmen morally, mentally, and physically to become officers in the Naval Service, it is necessary to set minimum standards for the achievement of that mission. In addition, this instruction provides special recognition for those graduates who meet certain academic standards.

4. Requirements. Per references (a) and (b), a midshipman at the Naval Academy must satisfactorily meet the following requirements to graduate and receive a degree:

   a. Complete or validate the required core, divisional, and majors courses specified in the matrix for the assigned major. Matrices are prepared and revised by cognizant academic departments and approved by the Executive Steering Committee.

   b. Achieve the required standards of performance in the prescribed summer training for each of the 4 years.

   c. Complete or validate a minimum of 137 semester hours, including a minimum of 90 semester hours in the core program, with a cumulative quality point rating (CQPR) of at least 2.00.

   d. Achieve the required standards of performance in:

      (1) Military performance
      (2) Honor
      (3) Conduct
      (4) Physical Education

   e. Accept a commission in the U.S. Navy or U.S. Marine Corps if it is proffered. In certain exceptional cases, agreed upon by the Department of the Navy and the Department of the Army or the Air Force, a midshipman may be allowed to accept a commission in the U.S. Army or the U.S. Air Force.

5. Degree Designation. Midshipmen who meet the requirements of paragraph 4 and who achieve a CQPR of at least 2.0 in all courses required for completion of the major's portion of the assigned major matrix will receive a Bachelor of Science in <MAJOR> degree. Those who meet the requirements of paragraph 4 but not this additional CQPR requirement will earn a Bachelor of Science degree with no designation. This policy will apply to the class of 2005 and all classes following.

/S/  
J. L. FOWLER

Distribution:
All Non-Mids (electronically)
USNA INSTRUCTION 5420.36

From: Superintendent

Subj: ESTABLISHMENT OF THE ACADEMY EFFECTIVENESS BOARD (AEB)

Encl: (1) Academy Effectiveness Board Membership and Charter

1. Purpose. To establish the Academy Effectiveness Board.

2. Cancellation. This is a new instruction and should be reviewed in its entirety.

3. Scope. The Academy Effectiveness Board is responsible for developing momentum in revising the U.S. Naval Academy assessment process and improving its overall effectiveness.

4. Action. It is the responsibility of the Academy Effectiveness Board to monitor and improve the Naval Academy’s overall effectiveness and report to the Superintendent.

/S/

RODNEY P. REMPT

Distribution:
All Non-Mids (electronically)
1. **Background.** A number of outside review groups, including the Naval Academy’s two major academic accreditation associations, found that the Academy lacked a comprehensive and integrated institutional effectiveness assessment plan, and therefore, was deficient in the implementation of institution-wide assessment processes. These reviews confirmed the findings of the Naval Academy’s own internal Institutional Self-Study.

2. **Purpose.** The purpose of the Academy Effectiveness Board (AEB) is to coordinate the development, maintenance, and execution of the Naval Academy’s Effectiveness Plan and its associated assessment process. The focus of the Board and the Plan will be the mission of the Naval Academy and our obligation to provide combat leaders of character. Such an institution-wide plan would provide an assessment-based framework for implementing the Academy’s current Strategic Plan, and would cover all three mission areas (mental, moral, and physical) as well as all mission-support functions related to our four-year leadership immersion program.

3. **Function.** The AEB will report directly to the Superintendent and the Senior Leadership Team. The AEB will work closely with the respective leaders of the Academy’s mission areas (Commandant, Academic Dean, and Athletic Director) and mission-support functions (including Admissions, Deputy Superintendent/Chief of Staff, Deputy for Finance and Chief Financial Officer, and Deputy for Information Technology Services). The AEB members will: (1) collaborate in planning and implementing effectiveness assessment within and among the Academy’s three mission areas; (2) provide models and support for the development and implementation of effectiveness assessment within the USNA mission-support functions; and (3) monitor the global, Academy-wide effectiveness assessment processes.

The Board co-chairs will represent their respective mission areas and serve as liaisons between the Board and the Senior Leadership Team and Superintendent. The Directors of Academic Assessment, Ethical Leadership Assessment, and Institutional Research will ensure that the work of the AEB is supported with valid, reliable, and timely data and the best professional practices of institutional effectiveness assessment appropriate to the Naval Academy’s mission. (A re-evaluation of the function and membership of the Board will be undertaken following a final decision on the overall institutional effectiveness assessment structure.)

   a. **Membership.** The members of the board will represent a cross-section of all areas of the Naval Academy program which directly or indirectly support the Naval Academy’s mission and serve as liaison between their respective organization and the AEB. Initial membership of the board is as stated below. A re-evaluation of the membership will be undertaken following a final decision on the overall institutional assessment and effectiveness structure. Board Membership is as follows:

   Vice Academic Dean (Co-chair)
   Deputy Commandant (Co-chair)
   Deputy Athletic Director (Co-chair)
   Director of Assessment, Center for Ethical Leadership
   Director, Institutional Research
   Director, Academic Assessment
   Strategic Planning Officer (Secretary)

Support Personnel: The following personnel are on call to assist the Board in their respective areas of expertise as necessary. The membership is supported by the following:

Director, Officer Development
Director, Professional Development
Director of Admissions
b. **Charter.** The purpose of the AEB is to coordinate the development, maintenance, and execution of the Naval Academy’s Effectiveness Plan and its associated assessment process. The board will report directly to the Superintendent and produce an annual academy-wide assessment for use by the Superintendent and the Academy’s senior leadership as well as monitor the assessment feedback process and procedures.

c. **Responsibilities.**

(a) **Schedule.** The AEB will meet as frequently as necessary, but not less than once each month, in order to develop and sustain a Naval Academy effectiveness assessment process.

(b) **Agenda.** The board co-chairs or secretary will prepare the agenda and will present the matters under consideration to the board. Any board member may recommend items for inclusion on the agenda. The agenda will be approved by the co-chairs and be distributed as far in advance as possible prior to the meeting to permit members to obtain an understanding of the subject matter. In this way, any discussions during the meeting can be directed to the substance of the agenda rather than gaining an understanding of what is intended. The AEB is responsible for developing momentum in revising the Naval Academy assessment process and improving its overall effectiveness.

(c) **Proceedings.** The co-chairs will submit to the Superintendent proceedings of each meeting prepared by the Secretary. The proceedings will list those present, outline briefly matters discussed, briefings given, pertinent comments by members, decisions reached, future action required, and the designated action officers. The AEB will produce an annual academy-wide institutional effectiveness assessment status report for use by the Superintendent and the Academy’s senior leadership in guiding overall USNA improvement efforts.

(d) **Decisions.** Decisions reached at board meetings will be briefly but clearly stated. Endorsement approval by the Superintendent formalizes board decisions. These board memoranda represent the authoritative record of Naval Academy decisions and policy. Endorsement approval of decisions may be signed only by the Superintendent.
USNA INSTRUCTION 5420.36 CHANGE TRANSMITTAL 1

From: Superintendent

Subj: ESTABLISHMENT OF THE ACADEMY EFFECTIVENESS BOARD (AEB)

Encl: (1) Academy Effectiveness Board Membership and Charter

1. **Purpose.** To update membership of the board.

2. **Action.** Remove enclosure (1) and replace with new enclosure (1).

3. **Cancellation.** When the required action has been taken.

Distribution:
All Non-Mids (electronically)

HELEN F. DUNN
Deputy Superintendent/Chief of Staff
USNA INSTRUCTION 7320.1

From: Superintendent

Subj: U.S. NAVAL ACADEMY INFORMATION TECHNOLOGY (IT) ASSET MANAGEMENT POLICIES AND PROCEDURES

Ref: (a) SECNAVINST 7320.10A (DON Personal Property Policies and Procedures)
(b) Clinger-Cohen Act- (40 U.S.C. 1401(3), Information Technology Management Reform Act)

Encl: (1) Sample Letter of Return
(2) DD Form 200 Preparation Instructions for IT Equipment

1. Purpose. To establish United States Naval Academy policies and procedures for IT asset management that meet accountability requirements established by references (a) and (b), and applicable Department of Defense (DOD) guidance.

2. Scope. This instruction is applicable to all Naval Academy Cost Centers. All IT equipment acquired for the purpose of supporting the Naval Academy’s mission is included.

3. Definitions

   a. As defined by reference (b), IT equipment is “any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information.” IT equipment includes, but is not limited to, desktop computers, laptops, tablet computers, workstations, servers, monitors, scanners, fax machines, projectors, printers, copiers, document cameras and digital cameras.

   b. IT equipment as defined above includes items purchased with investment funds, department funds, as well as items government owned, leased or received through research or gift funds. Responsibility and accountability of this equipment resides with the Naval Academy Cost Center possessing the item as indicated by the Cost Center Identification (ID) in the Information Technology Services Division’s (ITSD) Asset Management database.

      (1) Establishment of responsibility and accountability begins at the time of receipt by the Cost Center/Organization.

      (2) Termination of responsibility and accountability occurs when ITSD acknowledges receipt of returned IT equipment, in writing, via a Letter of Return, per enclosure (1) or ITSD accepts and cosigns a Cost Center/Organization Completed DD Form 200 following instructions shown in enclosure (2).

4. Policy updates. These policies and procedures shall be reviewed annually and updated as necessary by the Director ITSD.

5. Responsibilities. The following responsibilities are assigned:
a. ITSD Inventory Manager is responsible for establishing, implementing, and administering policies and procedures relating to IT equipment management and accountability to ensure proper management control and safekeeping of Naval Academy IT assets. This includes:

(1) Providing IT equipment management oversight to Cost Centers/Organizations.

(2) Verifying and reporting Cost Centers/Organizations are performing physical inventories as required.

(3) Ensuring all discrepancies found during physical inventory process are reconciled and documented.

(4) Ensuring all required documentation is retained from time of receipt until 36 months after the item is no longer on USNA’s inventory active records.

(5) Providing management information required to support property management or budget related decisions.

b. ITSD Physical Inventory Administrator (PIA) is responsible for coordinating the physical inventory process, reconciling the inventory findings with the database, and corresponding with the Cost Center/Organization contact to resolve any discrepancies. This includes:

(1) Establishing a schedule for physical inventory of all IT equipment holdings.

(2) Instructing and training responsible personnel about the physical inventory process.

(3) If requested, assist responsible personnel with the physical inventory.

(4) Entering adjustments into ITSD’s Asset Management database as a result of the physical inventory.

(5) Maintaining and updating inventory status until full compliance is established.

(6) Maintaining copies of completed DD Form 200’s and signed receipts.

(7) Issuing letter of compliance upon completion and reconciliation of physical inventory.

c. Naval Academy Cost Center and/or Organization Heads supported by ITSD are responsible for providing oversight for IT equipment management within their departments. This includes:

(1) Assigning Cost Center/Organization personnel to keep records and account for all IT equipment in the Cost Center/Organization’s possession.

(2) Ensuring assigned Cost Center/Organization personnel schedule, conduct and reconcile physical inventories as required, but at a minimum annually. This includes the timely completion of all DD Form 200’s.

d. Assigned Naval Academy Cost Center and/or Organization personnel are responsible for keeping records and accounting for all IT equipment assigned to the Cost Center/Organization. This includes:

(1) Ensuring physical inventories are scheduled with PIA, conducted and reconciled as necessary but at a minimum annually.

(2) Ensuring inventories are completed and reconciled within 30 days of start. This includes completion of all DD Form 200’s and or Letters of Return as necessary.
(3) Ensuring the data in ITSD’s Asset Management database remains current and accurate. This includes properly documenting and notifying ITSD of any receipts or losses in accordance with enclosures (1) and (2).

(4) Generating and maintaining copies of documentation for each receipt, return, and/or loss.

(5) Ensuring all IT equipment is properly barcoded and notifying ITSD when IT equipment received into the cost center/organization does not have a "Property of U.S. Navy" barcode attached.

(6) Providing ITSD with location and custodian of new equipment within 20 days of receipt into the organization or following any change in location or custodian.

(7) Ensuring the due care and safekeeping of IT equipment assigned to their custody and providing PIA access to IT equipment.

6. **Action.** This instruction is mandatory for use by all Naval Academy Cost Centers and/or organizations supported by ITSD.

/S/
J. L. FOWLER

Distribution:
All Non Mids (electronically)
SAMPLE LETTER OF RETURN

Date

From: [Enter Returning Department Name]
To: Information Technology Services Division

Subj: RETURN OF IT EQUIPMENT

Ref: (a) USNAINST 7320.1

Encl: (1) IT Equipment Return List

1. Per reference (a), it is requested that IT property records are adjusted to reflect the return of IT equipment listed in enclosure (1) from [enter Returning Department] to ITSD.

2. Request ITSD return a copy of the signed “ACKNOWLEDGEMENT OF RETURN.”

3. Enclosure (1) includes the barcode, make, model, and serial number for each item returned.

[Enter Returning Department Representative’s printed name]
Signature

---

ACKNOWLEDGEMENT OF RETURN

Date

From: Information Technology Services Department
To: [Enter Returning Department name]

1. ITSD acknowledges return of IT equipment in enclosure (1) and has made the required accountability/responsibility changes in the IT asset management database.

Signature

[Enter ITSD’s Representative’s printed name]

Enclosure (1)
## Equipment Return List

<table>
<thead>
<tr>
<th>Barcode</th>
<th>Make</th>
<th>Model #</th>
<th>Serial #</th>
<th>Building and Room Number (Current Location)</th>
<th>Remarks</th>
</tr>
</thead>
</table>
REPORT OF SURVEY, DD FORM 200 PREPARATION INSTRUCTIONS FOR LOSS/DESTRUCTION OF IT EQUIPMENT


2. The DD Form 200 is used to document the report of survey and certify the survey process when government property, specifically in this case IT equipment, is lost or destroyed. This form is the official document to support establishment of debt, relief from accountability, and adjustment to ITSD’s asset management database. This form is to be completed within 30 days of start of physical inventory or within 20 days of discovery of loss/destruction. Specific instructions for the preparation of the DD Form 200 are provided below.

Blocks 1-11e are completed by the custodian who was accountable for the IT equipment.

<table>
<thead>
<tr>
<th>Block</th>
<th>Entry Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enter date form prepared</td>
</tr>
<tr>
<td>2</td>
<td>Leave blank</td>
</tr>
<tr>
<td>3</td>
<td>Enter date loss discovered</td>
</tr>
<tr>
<td>4</td>
<td>Enter item barcode per IT accountability records</td>
</tr>
<tr>
<td>5</td>
<td>Enter item description to include manufacture and serial number</td>
</tr>
<tr>
<td>6</td>
<td>Enter quantity</td>
</tr>
<tr>
<td>7</td>
<td>Enter unit cost per receipt document</td>
</tr>
<tr>
<td>8</td>
<td>Enter total cost</td>
</tr>
<tr>
<td>9</td>
<td>Describe how the IT equipment was lost or destroyed. Additional pages can be attached if necessary.</td>
</tr>
<tr>
<td>10</td>
<td>Enter action to prevent future losses or destruction of IT equipment within Cost Center/Organization.</td>
</tr>
<tr>
<td>11a</td>
<td>Work address of person completing blocks 1-10</td>
</tr>
<tr>
<td>11b</td>
<td>Typed name of person completing blocks 1-10</td>
</tr>
<tr>
<td>11c</td>
<td>Enter phone number of person completing blocks 1-10</td>
</tr>
<tr>
<td>11d</td>
<td>Signature of person completing blocks 1-10</td>
</tr>
<tr>
<td>11e</td>
<td>Enter date signed</td>
</tr>
<tr>
<td>12</td>
<td>Mark “Responsible Officer”</td>
</tr>
<tr>
<td>12a-g</td>
<td>Self-explanatory, completed by USNA Cost Center Head/Organization Head.</td>
</tr>
<tr>
<td>13a-h</td>
<td>Self-explanatory, completed by ITSD’s Finance Director</td>
</tr>
<tr>
<td>14a-h</td>
<td>Self-explanatory, completed by ITSD’s Executive Director</td>
</tr>
</tbody>
</table>

3. Once the form is completed through Block 12g, cost centers/organizations are to route the form electronically to ITSD’s Finance Director. Once signed by ITSD’s Executive Director, the original will be retained by ITSD’s PIA, the ITSD IT Asset Management Database adjusted, and a copy emailed to the Cost Center/Organization IT Contact.
11 July 2011

**ADVISING RESOURCES**

There are many USNA publications that will assist the Plebe Adviser. It is important to keep current issues of the following resources readily available in order to provide the most accurate advising.

<table>
<thead>
<tr>
<th>TITLE</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration of Academic Programs</td>
<td>Academic Dean’s Office (X31586)</td>
</tr>
<tr>
<td>Catalog, U. S. Naval Academy</td>
<td>Dean of Admissions (X31844)</td>
</tr>
<tr>
<td>Majors Program, The</td>
<td>Associate Dean for Academic Affairs (X31586)</td>
</tr>
<tr>
<td>Plebe Academic Handbook</td>
<td>Center for Academic Excellence (X32935)</td>
</tr>
<tr>
<td>Strategies for Academic Success</td>
<td>Center for Academic Excellence (X32934)</td>
</tr>
</tbody>
</table>

**NOTES:** Ideas pertaining to content and format of this handbook were provided by many members of the National Academic Advising Association. Of particular assistance were colleagues at Penn State and the University of Delaware. Their help and permission to adapt materials have been invaluable.

“Strategies for Academic Success” is a document that can be viewed on the website for the Center of Academic Excellence.
MESSAGE FROM THE ACADEMIC DEAN AND PROVOST

I would like to convey my gratitude to all of you who serve as plebe advisers. The importance of academic advising cannot be overstated.

One of the most worthwhile activities for a faculty member at the Naval Academy is plebe advising. Good advising pays high dividends, and when that advising begins during the fourth class year, the dividends are even richer. Informed plebes can make better decisions about the choice of an academic major, the choice of particular courses or course sequences, and special opportunities such as placement in honors sections.

Equally important is the mentoring relationship that can be established with midshipmen. Many of us can attest to the positive impact of an effective and caring adviser from our own undergraduate years. It is my hope that our midshipmen have the opportunity to establish that kind of relationship with faculty advisers. The foundation for these relationships must be established early in the academic careers of all midshipmen.

This handbook, prepared by the Academic Center, will prove to be an invaluable aid as you perform the very important task of plebe advising.

ANDREW T. PHILLIPS
Academic Dean and Provost
ACADEMIC DEAN AND PROVOST INSTRUCTION 1531.56Q

From: Academic Dean and Provost

Subj: PLEBE ADVISING HANDBOOK 2011 - 2012

1. Purpose. To provide information and guidance to plebe academic advisers.


3. Information. The plebe academic advising program exists to help fourth class midshipmen adjust to the academic program at the Naval Academy and to choose suitable majors. This instruction contains information that will assist plebe academic advisers.

4. Action. The Director of Plebe Programs is responsible for the organization and conduct of the plebe advising program. Questions about this program should be addressed to the director. Plebe academic advisers are responsible for providing accurate and timely advice to plebes on matters concerning academic assistance for course work, pre-registration, registration for plebe year courses, and the selection of majors. They should make every effort to be academic mentors to their advisees. Plebe academic advisers will use this instruction for guidance and consult the primary references listed herein as necessary. Plebe advisers must keep in mind that academic policies and procedures might change during the year and that they must stay abreast of changes that are reflected in other instructions.

ANDREW T. PHILLIPS

Distribution:
Plebe Academic Advisers
Division Directors
Department Chairs
Director, AcCenter
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PLEBE ACADEMIC ADVISING

At colleges and universities throughout the nation the value of academic advising has come into focus. It has been found that good advising during the first year contributes significantly to student retention and subsequently to completion of a degree program.

Each plebe adviser at the Naval Academy should be aware of and make an effort to carry out the responsibilities listed on the next page. Advisers should also support the mission of the Naval Academy which includes helping midshipmen develop the below listed attributes.

USNA Mission Statement

To develop midshipmen morally, mentally, and physically and to imbue them with the highest ideals of duty, honor and loyalty in order to graduate leaders who are dedicated to a career of naval service and have potential for future development in mind and character to assume the highest responsibilities of command, citizenship and government.

USNA Midshipmen Attributes

- Technically and academically proficient professionals with a commitment to continual learning.
- Critical thinkers and creative decision makers.
- Effective communicators.
- Adaptable individuals who understand and appreciate global and cross-cultural dynamics.
- Role models dedicated to the traditions and values of the Naval Service and the constitutional foundation of the United States.

ROLE OF THE PLEBE ADVISER

There are significant differences between advising plebes and advising upper class midshipmen (1/C, 2/C, and 3/C) who are committed to specific academic majors. Plebes, even the best students, must adjust from the less rigorous demands of high school to the pressure of the Naval Academy's program. Plebe advisers can offer valuable advice regarding how their advisees can make this transition.

A major attraction of the Naval Academy for most applicants is the Academy's superb curriculum and the opportunities it provides for individual intellectual growth. Yet advising during the year can be critical to a midshipman’s success at the Naval Academy. A plebe adviser should serve as a valuable resource about the Naval Academy's academic programs to fourth-class midshipmen.

The role of the plebe academic adviser is more than consultative in nature. It is the plebe adviser's responsibility to guide and direct, as well as offer advice.
RESPONSIBILITIES OF THE PLEBE ADVISER

1. To provide plebes with sound academic advice.

2. To assist plebes in a thoughtful approach to the choice of a major.

3. To emphasize the plebe's responsibility for satisfying degree requirements and to encourage midshipmen to be actively involved in planning their own education.

4. To be familiar with published academic rules and regulations of the Academy and to maintain an up-to-date academic advising reference file.

5. To establish adequate availability throughout each semester and meet with each advisee as follows:
   
   a. First session after Plebe Summer in early September to assess the start of the student’s academic program, plan ahead, and provide advice about pre-registration and to begin discussion about major selection.
   
   b. After each grading period both semesters to discuss ramifications of academic performance and to offer guidance as appropriate including a further discussion about major selection.
   
   c. In early January soon after plebes input their preliminary selections of majors to discuss those preferences in light of the plebes’ original desires and their academic performance to date.
   
   d. During the period when plebes declare their majors in March, the advisers should confirm with their advisees that their choices of major are appropriate.

6. To discuss with plebes their academic performance and the implications of that performance.

7. To establish a working relationship with advisees' company officers and the midshipman 1/C academic officers.

8. To refer plebes to appropriate sources of information and service.

9. To encourage plebes to seek Extra Instruction (EI) as early and as often as needed.

10. To encourage plebes to view their education as valuable to their future success as officers.

11. To instill in plebes a desire to be lifetime learners.

12. To consult with the Center for Academic Excellence, also known as the “Academic Center”, the special plebe adviser for high validators, or with the department senior academic adviser concerning difficult advising questions. Advisers should feel free to consult with the Director of Plebe Programs or the Associate Dean for Academic Affairs (ADAA) concerning unusual
circumstances.

13. To provide general guidance on study skills necessary for success in college.

14. To reinforce the importance of the plebes’ development of honor, integrity and the sense of mutual respect.

RESPONSIBILITIES OF THE PLEBE

1. To be aware that the responsibility for meeting major and degree requirements is the midshipman's. The adviser can suggest, recommend, and remind the midshipman of rules and requirements, but the advisee has the primary responsibility for meeting these requirements. Midshipmen must be actively involved in planning their own education.

2. To inform the adviser of important changes which directly affect academic performance.

3. To consult with the academic adviser at least once before the pre-registration process during the fall semester, and whenever the adviser requests a meeting.

4. To be familiar with the published academic rules and regulations of the Academy.

5. To discuss with the academic adviser unsatisfactory academic performance and its implications and to develop a plan for improvement.
ACADEMIC BOARD

January Academic Board

The records of plebes who fail more than one course or fail a remedial course or who earn a semester QPR (SQPR) below 1.5 may be presented to the January Academic Board. Plebes who are retained by the Academic Board record review or have a low QPR but are not reviewed by the Academic Board must be seen by the Academic Review Council (composed of the Vice Academic Dean, the Deputy Commandant and the Director of Plebe Programs). Plebe advisers do not normally participate in the Academic Board and Academic Review Council process. However, an adviser may provide an input to the Academic Board, if desired, by submitting a Special Midshipman Academic Performance Report (MAPR) using the MIDS MAPR (Special) Enter module.

May Academic Board

Plebes who have a semester QPR below 1.5, or a second SQPR below 2.0, or who fail a third course or two courses in the spring semester are subject to be reviewed by the Academic Board.

Plebes select an academic major and are assigned a new adviser prior to the end of the spring semester. Nevertheless, plebe advisers are welcome to submit Special MAPRS for their former advisees to the Academic Board.

CENTER FOR ACADEMIC EXCELLENCE (CAE)

The CAE, also known as the Academic Center, offers a full range of academic support services. The office locations and phone numbers are listed on page 28 and descriptions of the available services appear below:

Learning Skills – Courses, individual sessions and workshops designed to help midshipmen become more successful students.

Learning Skills Course: a non-credit course offered in group and individual sessions throughout the academic year. The course meets one period a week for five weeks and covers the following topics:

- Time Management
- Goal Setting
- Reading
- Note Taking Skills
- Test Taking Skills
- Stress Management

Individual Sessions – provide one-on-one assistance to midshipmen on specific topics.

Plebe Programs – This provides two services designed specifically for plebes:
Plebe Advising – The Plebe Advising Program provides academic advice and study skills instruction to plebes to help them adjust to the academic demands of the Naval Academy. Two faculty advisers are assigned to each company during plebe summer and continue to work with the plebes in that company throughout the academic year. Plebes are assigned a permanent academic adviser when they declare a major in the spring.

Plebe Intervention – The Plebe Intervention Program attempts to identify plebes who may encounter academic difficulties at the Naval Academy and works with them to reduce or eliminate those difficulties. Services provided for these midshipmen include academic effectiveness classes and individual counseling from their assigned Academic Center adviser. Academic Center staff members are assigned as the advisers for all the fourth class participants. Most of the plebes are identified during plebe summer, while some are selected after performing poorly during the academic year.

Tutoring Services – The CAE provides a wide range of tutorial support for those trying to improve their academic performance. Small group and individual support is provided to assist midshipmen in reaching their academic goals.

Midshipmen Group Study Program (MGSP) – MGSP sessions are weekly review sessions facilitated by a group leader. The study sessions are designed to allow midshipmen in the same class to review course material, solve problems, and gain an understanding of course concepts. MGSP leaders have successfully completed the course and received training in cooperative learning and group facilitation. They meet with the course instructors before MGSP sessions to prepare materials. Then, they hold weekly study sessions tailored to the needs of the instructors’ courses.

Evening Tutoring – Professional tutoring is available to all students on a first-come-first-served basis. Although walk-ins are accepted, priority is given to those who sign up. The goal of the tutoring encounter is to address the specific content, study, and problem-solving skills with which the individual student is struggling. Tutoring is available for chemistry, mathematics, physics, engineering and foreign languages, as well as other courses needed. These tutoring sessions are conducted in convenient locations during study hours. Appointments are required to meet with a tutor. To meet with a tutor, midshipmen should follow the guidelines described below:

1) The midshipman should first seek Extra Instruction (EI) from the course instructor.
2) If additional assistance is needed and/or the midshipman would like to meet with a tutor during the evening, he/she can schedule an appointment through the Evening-Tutoring link on the Academic Center’s website.
3) The midshipman and tutor will receive an email once the appointment has been scheduled.

Following a tutoring session, the tutor will complete session notes. These session notes will be provided to instructors once a week via email. Midshipmen can sign up for more than one appointment per night and can schedule appointments 30 days in advance.
Extra Help Classes – Extra Help classes provide weekly scheduled supplemental instruction to students who are potentially academically at-risk. The courses are taught by Academic Center faculty who teach departmental courses in their discipline. Based on the departmental syllabus, the course instructors reiterate course material, review homework problems and provide exam review. Registration is voluntary and attendance is mandatory. The course caps range from 8-10 students. Enrollment can be completed by the adviser or by contacting the Extra Help course instructor. Extra Help courses currently available:

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<td>XS112 – Extra Help Chemistry II</td>
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<td>XS005 - Extra Help Precalculus</td>
<td>XS121 – Extra Help Calculus I</td>
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<td>XS121 - Extra Help Calculus I</td>
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<td>XS221 - Extra Help Calculus III with Vectors</td>
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<td>XS223 – Extra Help Calculus III with Optimization</td>
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<td>XS211 – Extra Help Physics I</td>
<td>XS212M – Extra Help Differential Equations</td>
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<td>XS301 – Extra Help Electrical Fundamentals</td>
<td>XS212P – Extra Help Physics II</td>
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ACADEMIC MAJORS

All midshipmen must complete one of the 22 approved majors. A Bachelor of Science is awarded upon completion of all graduation requirements both academic and non academic. If, in addition, the midshipman earns a CQPR of at least 2.0 in the major, the degree will be designated with the name of the major.

**Division I Majors**

- Aerospace Engineering
- Computer Engineering
- Electrical Engineering
- General Engineering
- Mechanical Engineering
- Naval Architecture
- Ocean Engineering
- Systems Engineering

**Major Codes**

- EAS, EASA
- ECE
- EEE
- EGE
- EME
- ENA, ENAH
- EOE, EOEH
- ESE, ESEH

**Division II Majors**

- Chemistry
- Computer Science
- General Science
- Information Technology
- Mathematics
- Oceanography
- Operations Research
- Physics
- Quantitative Economics

**Major Codes**

- SCH
- SCS
- SGS
- SIT
- SMA, SMP, SMAH, SMPH
- SOC, SOCH
- SMO
- SPH, SPA, SPAA
- SQE
Division III Majors

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<tr>
<td>Political Science</td>
<td>FPS, FPSC, FPSP, FPSI</td>
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* A minor in Language Studies is also offered. See page 17 for details.

ACADEMIC ORGANIZATION

Responsibility for directing the Naval Academy is vested in the Superintendent. The Superintendent is assisted by the Commandant of Midshipmen, who is responsible for directing the military and physical training and the administration of the Brigade of Midshipmen, and the Academic Dean and Provost, who as the chief academic officer, is responsible for the entire academic program.

The three academic divisions, including two professional divisions and their respective departments are listed below:

Division of Engineering and Weapons

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Division of Mathematics and Science

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Division of Humanities and Social Sciences

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ACADEMIC PROBATION

A plebe is placed on academic probation after the fall semester if he or she was academically deficient but retained by the Academic Board or if his or her fall semester QPR was below 2.00. USNAINST 5420.24G defines what constitutes academic deficiencies.

PLACEMENT AND VALIDATION EXAMS

Placement Exams

During plebe summer, the Mathematics and English departments administer examinations to determine which level of a course to place each fourth class midshipman. Plebes should be encouraged to do their best on these examinations.

Validation Exams

The process by which credit is awarded for previous work done elsewhere equivalent to that which is covered in courses at the Naval Academy is called validation. Credit is given toward graduation requirements, but grades and quality points are not awarded for validated subjects. Most academic courses (except SM005 and HE101) in the curriculum may be validated. Most validation takes place during plebe summer according to a schedule of exams arranged by the Associate Dean for Academic Affairs. However, midshipmen may validate a course at any time that is mutually convenient to all parties concerned.

Note: Normally, a midshipman is permitted only one attempt to validate a course. Questions about validation should be directed to the senior academic adviser or chair of the department concerned. In general, you should encourage your plebes to take validation exams in any subject for which they are qualified. This will enable them to take advantage of opportunities such as honors programs, VGEP, and the Trident Scholar Program during their upper-class years. Also, many plebes fail to take the language validation exams seriously. This is a mistake. Validation offers several advantages. It permits midshipmen to have a lighter academic load or to take additional courses without overload or summer school. Language validations can prove very valuable, particularly to upper-class midshipmen in Groups I and II majors who want to switch to a Group III major. After 3/C year, such a switch is very difficult without language validations.
Language validation will also facilitate the acquisition of a language minor and provide flexibility in the matrix for a student who is a Group III major. Validated language courses can also satisfy humanities/social sciences requirements.

**CALENDAR OF IMPORTANT DATES FOR PLEBE ADVISING**

Key activities for plebes and plebe advisers that take place each year are provided on this and the following page. Specific dates for a given year will be made available to plebe advisers through normal channels, including electronic mail and yearly academic calendars.

### 9 July

1645 - 1745

ADAA briefs academic program to Class of 2015

### 18-25 July

Academic Counseling & Registration (ACR). Two-hour meeting of plebe advisers with plebes to discuss course placement for fall semester. At least one adviser per platoon should attend. Discuss major selection and solicit plebe major interests.

### 3-5 August

Two-hour meeting of plebe advisers with plebes for academic "Psych-up" and initial study skills discussion before beginning of classes. Provide fall semester schedules to advisees. This is a good time to establish contact with the company officer/SEL (if this has not been done earlier). At least one adviser per platoon should attend.

### Mid September

Plebes must consult with their advisers prior to pre-registration for spring semester. Perhaps company officers/SELs can designate a time for you to meet with them as a group in Bancroft Hall, to be followed by individual appointments as you deem necessary. Pages 22-24 pertain.

### Early October

Review 6-week grades of plebe advisees. Arrange meetings, as necessary, with those having difficulty. Consider referrals to the Academic Center and to the Writing Center. Encourage plebes to seek EI, and remind them to review pages 8-9 of the Plebe Academic Handbook.

### Mid-November

Review 12-week grades of plebe advisees. Same action as at 6-week point.

### Late-November

Plebe Registration for spring semester. Provide guidance to advisees about the registration process. Refer to page 24 for additional information.

### Late December

Review advisees’ final grades in order to counsel them after expiration of Christmas leave.

### Early January

Consider attending the Majors Briefings with your advisees on 9 January.
Meet with your advisees ASAP after the briefings to discuss their preliminary selections of major in light of their declared interests when they arrived at USNA. Review fall semester grades of your plebes to determine if their academic performance fits well with the preliminary selections of majors.

Late February
Review second semester 6-week grades. Follow procedure you established in fall.

Early March
Final meeting with advisees to ensure they will make well informed and realistic selections of major. Explain that they will be assigned a new adviser after major selection. Indicate what involvement, if any, you elect to have with them during the remainder of their plebe year. See page 17 for additional information.

Mid March
Plebes select academic majors. Plebes will be assigned new advisers in major departments. Your continued involvement is at your discretion. Consider passing along to the new adviser information about your advisee.

CHEMISTRY DEPARTMENT EXTRA INSTRUCTION (EI)

The Chemistry Department offers scheduled EI sessions in the evenings (Monday thru Thursday) during both the fall and spring semesters. These are conducted by faculty on a voluntary basis and the times and nights offered are determined by the faculty members involved. The schedule for evening EI sessions for plebe chemistry will be published by the Chemistry Department early each semester.

COMPANY OFFICERS AND SENIOR ENLISTED LEADERS (SELS)

Company Officers and Senior Enlisted Leaders can have a powerful influence on the lives of the fourth class midshipmen. Through the upper-class chain of command they have close contact with the plebes in their company. It is important that a close relationship exist between the plebe adviser and Company Officer and the SEL.
COMMUNICATION WITH PLEBES AND THEIR CHAIN OF COMMAND

The best way for an adviser to contact an advisee is to send an e-mail message. An alternate means of communication is to call the Company Mate-of-The-Deck who can deliver a message to the plebe. Company officer and SEL phone numbers and email addresses are listed below.

**Note:** It is always appropriate to include the Company Officer and/or SEL as a “Copy to” on your email if you desire their assistance in the matter or feel they should have a “head’s up”.

**COMPANY OFFICER AND SENIOR ENLISTED LEADER (SEL) INFORMATION**

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E-mail addresses for the Senior Enlisted Leaders are similar to the Company Officer addresses. Replace the “ofcr” in the address with “asst”.
MIDSHIPMEN INFORMATION SYSTEM (MIDS)

Advisers should become proficient in retrieving information from the Midshipmen Information System (MIDS). MIDS is the institution’s enterprise system for all information on a midshipman from Induction to Graduation and Commissioning.

Using your internet browser, go to the MIDS home page at https://mids.usna.edu. A link to the MIDS system is also on the USNA intranet homepage. On the MIDS Home Page, there are functional menus. Clicking a functional menu takes you to modules related to that functional area.

Each web module has a Help button at the bottom, left-hand corner of the page with instructions specifically for using that module.

Descriptions of USNA business processes that are supported by specific MIDS modules are accessible by clicking the About MIDS link on the left side of the MIDS homepage. Each business process includes the scope, references, definitions, an overview and a list of specific MIDS modules needed to support each business process.

USNA intranet homepage: http://intranet.usna.edu
MIDS homepage: https://mids.usna.edu
About MIDS homepage: http://www.usna.edu/AboutMIDS

The most useful MIDS functional menu for Plebe Advisers is FACULTY. A brief description of the important modules under the FACULTY functional menu follows.

MAPR (Midshipman Academic Performance Report) - QUERY

To read and/or print the six week, twelve week, or end of term Midshipman Academic Performance Reports (MAPRs) and Special MAPRs for your advisees you should:

1. Enter the Alpha or Last Name of Midshipman in the appropriate box or in the Adviser Name Box click on your name.
2. Click the Find button;
3. Click the Alpha located next to the line of the MAPR you want to view and/or print.
4. To view Special MAPRs change the query criteria for Special MAPRs: to Include or Special MAPRs Only.
MATRICES - QUERY CURRENT MIDSHIPMEN

Selecting this module prior to the declaration of major in mid-March will display the courses the midshipman took the previous semester and/or the courses the midshipman is currently taking. Validated courses will also be displayed. The module may also be used to display any midshipman's academic record in any major. Selection of this module after declaration of major displays the midshipman's matrix. To use this module you should:

1. Click the down arrow located next to GROUP;

2. Select either “Manually Entered Alphas”, “Company” or “Adviser”;
   - If you selected “Manually Entered Alphas” you must click the rectangle located below “Alpha Number” and then enter one or more alphas before clicking “Submit”;
   - If you selected “Company” or “Adviser” you must scroll down and enter the Company or select the “Adviser” in the Adviser Box, and then click on the appropriate “Class Year” prior to clicking “Submit”.

MIDSHIPMEN - QUERY ACADEMIC INFORMATION

This versatile module will display midshipmen background information (Date of Birth, Feeder Source, High School attended) military and academic standings with QPRs, CQPRs, honors, academic probation, and all marking period academic course grades that have been recorded. Validated courses will be shown. This module also has a DISPLAY MIDSHIPMAN MATRIX button, if desired. To use this module you should:

1. Enter alpha, last name of midshipman, company or adviser as appropriate
   - Note: If entering a company number or adviser name, click the down arrow next to the “In Brigade” box and select “YES”;

2. Click the “Find” button;

3. Click the alpha of the midshipman whose record is desired;

4. Scroll down to view all displayed information;

5. Click the “Display Midshipman Matrix” button if desired.

PRE-REGISTRATION - QUERY BY MID, MAJOR, OR ADVISER

Plebe Advisers should use this module to check the accuracy of the preregistration entries made by their advisees for the spring semester. To use this module you should:

1. Enter alpha, last name or company of your advisee or enter your name as adviser and;

2. Click the “Find” button;

3. Click the alpha of the midshipman whose pre-registration record you want to see.
SCHEDULES - QUERY MIDSHIPMEN

This module will display the current semester schedule, a previous semester schedule or the next semester schedule including free periods of midshipmen.

SCHEDULES – QUERY POTENTIAL MID SCHEDULES

This very powerful module can be used by midshipmen and advisers during the registration process to help determine what possible schedules would be available for a midshipman for the next semester.

EMAIL

The Naval Academy uses a single email system, Mirapoint, for all midshipmen, faculty and staff. It also provides internet availability. Users can access their email at https://usnaemail.usna.edu using a browser or via email clients such as Outlook. In addition to its email functionality the Mirapoint message server also provides collaboration tools, including group calendaring, scheduling and address book.

For assistance on how to use this new email system, contact your department IT Representative. IT representatives are listed at http://intranet.usna.edu/IRC/reps/CRUList.htm

Using Lists to send mail to several users

A group is a list of users or resources you can send messages to. Use groups to send a message to several users or resources by typing the group name in the To, BC, or CC text boxes. There are two types of groups: public and personal.

A public mailing list is created by the system administrator and allows for wide distribution of information to many users. To view these mailing lists go to: http://intranet.usna.edu/IRC/usnamail/DistributionLists.htm

Email users also have the capability to create their own personal mailing lists.

CURRICULUM REQUIREMENTS

The curriculum requirements at the Naval Academy have been developed to provide each midshipman with the skills and knowledge necessary for the performance of duties as a junior officer in the U.S. Navy or Marine Corps. Refer to ACDEANINST 1531.59B, The Majors Program or run Matrices-Query Major Requirements on MIDS for specific requirements.
HONORS LISTS

Honors Lists will be published to recognize midshipmen who performed in an exemplary manner during the previous semester. Grade reports available to midshipmen indicate whether they have earned these honors.

Honors Lists are published at the beginning of the fall and spring semesters. Lists effective during the fall semester are based on grades earned during the preceding spring semester. Similarly, the spring semester lists celebrate performance for the prior fall semester.

Superintendent's List – Midshipmen who meet the following criteria will be placed on the Superintendent's List:

SQPR of at least 3.4 with no grade below “C” and the following grades:
- “A” in Conduct
- “A” in Military Performance
- “A” or “B” in Physical Education
- “A” or “B” on PRT

Recognition of Superintendent's List – Midshipmen on the Superintendent's List will receive the following recognition:

1. Letter from the Superintendent
2. Qualified to wear gold star on uniform
3. Notation on grade report

Dean's List - Midshipmen who do not meet all the criteria for the Superintendent's List and who meet the following criteria will be placed on the Dean's List:

SQPR of at least 3.4 with no grade below "C" and the following minimum grades:
- “B” in Conduct
- “B” in Military Performance
- “C” in Physical Education
- “C” on PRT

Recognition of Dean's List – Midshipmen on the Dean's List will receive the following recognition:

1. Letter from the Academic Dean and Provost
2. Qualified to wear bronze star on uniform
3. Notation on grade report

Commandant's List – Midshipmen with semester QPR of at least 2.9, grades of at least “B” in aptitude, “A” in conduct, “B” in physical education and “B” on PRT will be placed on the Commandant’s List.
LANGUAGE MINOR

To acquire a minor in French, German, or Spanish a midshipman must complete or validate twelve credits at the 300/400 level. For Arabic, Chinese, Japanese or Russian, at least twelve credits at the 200 level or above are required. Foreign language courses taught in English do not count. A 3.0 average in language courses must be earned to receive the minor.

Validation of two or more semesters of a language is necessary for a student to pursue a minor, unless the student is willing and able to take more than the required number of courses that his or her matrix demands.

A special waiver of the requirement to take HH216 enables some Division I & II majors to complete a language minor without overloading. Midshipmen may obtain the form to request this waiver from the Language Studies Department. To qualify for consideration, a midshipman:

1. must validate the sequence of FL101-FL102-FL201-FL202 in French, German or Spanish or FL101-102 in Arabic, Chinese, Japanese or Russian;
2. have a CQPR of 3.0 or better in plebe humanities-social science courses;
3. have to overload to complete the language minor absent receiving the waiver

* Waivers are granted on a case-by-case basis by request, contingent upon completion of the minor; waivers are not automatic.

Attainment of a language minor could lead to an overseas summer training assignment and could result in future duty assignments associated with the particular language proficiency.

MAJOR SELECTION

The plebe class selects majors in early March prior to Spring Leave. This is a significant decision. A midshipman’s choice of major influences his or her academic performance at USNA and may also have an impact on his or her naval career and post naval professions. Unfortunately, some plebes make a poor choice of major either because they: don't properly research their choice of major; select a major because of a misconception; underestimate the degree of difficulty of a major; or misjudge their own aptitude.

The plebe adviser can and should help their advisees make well informed and wise selections of major. To do this the adviser must have established good relationships with their advisees. They should understand their advisees’ academic backgrounds, their strengths/weaknesses, their ambitions, interests, and their goals.

You will begin the process of providing information to plebes about major selection in mid July at the ACR sessions and in early August at the AA/SS sessions.

During the January intersessional period, all plebes will receive a briefing on the majors program from the Associate Dean for Academic Affairs. Following this presentation, plebes may visit as many departments as desired to explore majors of interest to them. Plebes should take full advantage of this two-hour block of time to learn about the majors program of the Naval Academy. It would be appropriate for the plebe advisers to also attend this briefing with their company and mingle with their advisees.

Shortly after the plebe majors’ briefings described above, plebes will be required to indicate their (non-binding) preferences. To do so, they log onto MIDS, and from the Midshipmen menu, they
ACDEANINST 1531.56Q
11 July 2011

select “Major-Enter Preliminary Preferences.” Plebes will use the module “Major-Declare” when they select their majors in March.

Data concerning plebe preferences for majors will be available to plebe advisers through a MIDS ad hoc query or Web Intelligence Report.

There are two MIDS modules, located on the “Faculty” menu, that are useful when advising plebes concerning major selection. The module MATRICES – QUERY CURRENT MIDSHIPMEN displays plebes’ matrices within the different majors. To use this module, you should select “Temp Major Change” in the Group Box, type in the alpha number of your advisee and select the appropriate major in the “Major for Temporary Change” box, and finally click on the appropriate year in the “Class Year for Temporary Change” box. The module MATRICES – QUERY MAJOR REQUIREMENTS, similar to the other module, will also display the number of credit hours associated with each course. Also, clicking on a course number will display course variations as well as the course prerequisites.

While completion of a major is a graduation requirement of the Naval Academy, the selection of a major is not entirely free. The availability of resources, both personnel and material and the needs of the Naval Service could constrain choices. In past years, almost all plebes have been assigned their first choice of major.

Starting with the Class of 2013, the Secretary of the Navy has mandated that the Naval Academy must graduate 65% of the class as STEM (Science, Technology, Engineering, Mathematics) majors. Consequently, there will be an effort for USNA to attract candidates who are interested in majoring in a STEM discipline as well as developing programs to assist students to achieve success in these majors. Certain initiatives to facilitate meeting the 65% goal have been developed.

Changes of major if made prior to the start of the fall semester of 3/C year can be expedited by the gaining department by sending an email to AcSched@usna.edu as follows:

Subject line: MIDREC: W.T. Door (alpha number)
Text:
Change Major to ________
Change Adviser to ________
For Semester 111: Drop (list course or courses)
Add (list course or courses)
cc: ADAA

After the start of the fall semester and continuing on until graduation, a midshipman must be enrolled in a major and must follow the matrix of that major. Changes of major which require the addition of one or more courses will be constrained by the rules governing the addition of courses. Changes of major require approval by the Associate Dean for Academic Affairs, the company officer, the adviser and the old and new department senior advisers or department chairs. Midshipmen may not drop courses required by their current major in anticipation of a change in major.
THEODORE J. BENAC” MATHEMATICS LAB

The Mathematics Resource Lab is located in Chauvenet Hall room 130. There is an extensive collection of reference calculus textbooks in this room and it is staffed by Mathematics Department faculty during periods 1 through 6 each class day. Of course midshipmen should arrange EI first with their own instructors. However, in the situation where that is not possible, they can drop by the MATH LAB during the day to receive guidance in solving mathematics problems. Additional information about resources and programs available through the Mathematics Department can be found at www.usna.edu/MathDept.

PLEBE YEAR

Plebe Summer

Plebe summer is the transition period where the candidates admitted to the Naval Academy are trained to be midshipmen. This seven-week period can be stressful and may test the courage and commitment of the new midshipmen.

The very demanding pace of the Plebe Indoctrination Program prepares the plebes for the return of the Brigade in mid-August and builds the foundation for development of some of the qualities that can turn midshipmen into outstanding naval officers. Teamwork, self-discipline, time management, physical conditioning and the ability to think clearly under pressure are emphasized during the summer.

A typical day during Plebe Summer begins with a 0530 wake-up followed by a 45-minute physical education program or PEP starting at 0600. After breakfast and until lights out at 2200, the plebes are led through a demanding training schedule by the first class Plebe Summer Detail. Activities range from spending several hours per day learning how to sail, fire the rifle and pistol, and drill, to receiving classroom instruction on military courtesy, Naval Academy customs and traditions, the Honor Concept and many other topics. The days are long and challenging with little leisure time.

Plebes receive little formalized instruction or guidance from the members of the Summer Detail concerning academics. The main focus of the plebes during the summer is adjusting to and trying to survive the daily demands placed upon them. Because of this, the time that the plebe advisers are scheduled to be with their platoons is precious and very important. In a relatively short period of time after Induction Day, plebes must make the transition from secondary school to college and from civilian to military life. Plebe advisers are essential in helping their midshipmen make this double transition.

Academic Year

Approximately one week after the conclusion of Parents’ Weekend, the academic year commences for the Brigade of Midshipmen. At this time a new set of challenges is established for the fourth class midshipmen.

The first month of the fall semester is particularly stressful for the plebes. It often takes at least
this much time for plebes to adjust to the tough academic demands while also trying to adjust to the new standards set by upper class midshipmen in Bancroft Hall. A number of plebes may view their professional demands to be a more immediate and important consideration than their academic demands during the first few weeks of the semester.

This emphasis on the professional side will gradually shift in favor of academics as the plebes' experience and professional knowledge increases. It is imperative for plebes to try to find a balance between the academic and professional realms and to develop sound time management skills to achieve overall success.

The normal routine for plebes during the academic year is very busy and demanding. A typical daily schedule is shown below:

**Daily Schedule**

<table>
<thead>
<tr>
<th>Weekday</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>0530</td>
<td>Earliest rising time.</td>
</tr>
<tr>
<td>0530</td>
<td>Earliest individual, group, or team workout.</td>
</tr>
<tr>
<td>0630</td>
<td>Reveal, all hands out of racks until after morning formation.</td>
</tr>
<tr>
<td>0630-0655</td>
<td>Fourth class instruction period primary (except during exam week).</td>
</tr>
<tr>
<td>0655-0745</td>
<td>X Period for exams given during Academic Reserve Periods.</td>
</tr>
<tr>
<td>0700-0710</td>
<td>Morning formation (mandatory for all hands).</td>
</tr>
<tr>
<td>0720</td>
<td>Breakfast (mandatory for all hands).</td>
</tr>
<tr>
<td>0755-0845</td>
<td>First period.</td>
</tr>
<tr>
<td>0755-0910</td>
<td>Eighth period (when scheduled).</td>
</tr>
<tr>
<td>0855-0945</td>
<td>Second period.</td>
</tr>
<tr>
<td>0955-1045</td>
<td>Third period.</td>
</tr>
<tr>
<td>0955-1110</td>
<td>Ninth period (when scheduled).</td>
</tr>
<tr>
<td>1055-1145</td>
<td>Fourth period.</td>
</tr>
<tr>
<td>1130</td>
<td>Early meal for oncoming watch section.</td>
</tr>
<tr>
<td>1205</td>
<td>Formation (Mon, Tue, Wed, Thu, Fri).</td>
</tr>
<tr>
<td>1215</td>
<td>Noon meal (Mon, Tue, Wed, Thu, Fri).</td>
</tr>
<tr>
<td>1250-1320</td>
<td>Company Training (Mandatory for all hands when scheduled).</td>
</tr>
<tr>
<td>1250-1320</td>
<td>Company Officer/SEL/Commander time. (Mon, Wed &amp; Thu).</td>
</tr>
<tr>
<td>1330-1420</td>
<td>Fifth period.</td>
</tr>
<tr>
<td>1330-1445</td>
<td>Tenth period (when scheduled).</td>
</tr>
<tr>
<td>1430-1520</td>
<td>Sixth period.</td>
</tr>
<tr>
<td>1530-1620</td>
<td>Seventh period (when scheduled).</td>
</tr>
<tr>
<td>1545-1800</td>
<td>Physical mission period (drill, intramural, varsity sports).</td>
</tr>
<tr>
<td>1830</td>
<td>Evening formation.</td>
</tr>
<tr>
<td>1840</td>
<td>Evening meal.</td>
</tr>
<tr>
<td>1900-2000</td>
<td>Midshipmen activity period Tue &amp; Thur (CRPs, BSAs, ECAs, club sport meetings, voluntary academic events. Other events scheduled during this period must be approved by the Commandant).</td>
</tr>
<tr>
<td>1900-1930</td>
<td>Fourth class instruction period - alternate (except during exam week).</td>
</tr>
<tr>
<td>2000-2300</td>
<td>Study period.</td>
</tr>
<tr>
<td>2300</td>
<td>Taps, lights out (Mon - Thu).</td>
</tr>
</tbody>
</table>
2400 Taps, lights out on Friday.

**Saturday**  
0730 Event  
0730 Reveille.  
0630-0730 Morning meal.  
0800-1200 Saturday morning training.  
1200 Formation, noon meal, town liberty.  
1700-1830 Evening meal.  
2400 Liberty expires for plebes not on weekend liberty.

**Sunday**  
0700-0900 Morning Meal.  
0800-1300 Plebes may sign out with Company CDO to attend off-yard services.  
1100-1300 Brunch.  
1800 Formation.  
1810 Evening Meal.  
2000-2200 Study period.  
2300 Taps, lights out.

**Intramural Period**

All midshipmen must participate in some sort of athletic activity at least three times a week during mandatory intramural sports period 1545-1800. This requirement can be satisfied by midshipmen playing a varsity or club sport, or being a member of a battalion or company intramural team. During the fall and spring, midshipmen normally practice drill or march in parades on Mondays, Wednesdays, and Fridays from 1545-1800.

**Professional and Military Duties**

All fourth class midshipmen must participate in the Plebe Professional Program administered by the first, second, and third class midshipmen in the plebes’ chain of command. The focal point of this program is the Plebe Midshipman Qualification Standards (MQS).

Plebes must memorize a series of basic facts (rates) and other information as directed by the midshipmen chain of command. Most plebes wake up at 0530 during the weekdays to get ready for their morning “come arounds” where they may have to recite rates, summarize newspaper articles, or present information on professional topics. Another very trying time for plebes is the period preceding noon meal. Once again, the fourth class must be ready to give professional reports or recite information that they were assigned to memorize.

**Study Period**

Mandatory study period (2000-2200 Sunday - Friday) is intended to be observed by all plebes. This reserved time in Bancroft Hall is meant to provide an atmosphere free of excessive noise and disruptions. However, it is usually advisable for plebes to study away from Bancroft Hall and the distractions that are liable to occur there. The library and all academic buildings remain
open for study during the evening study periods.

PREREgISTRATION

The Registrar’s office, using results of the validation and placement exams administered during the summer, preregisters and registers plebes for the fall semester. Preregistration for the spring semester takes place in mid-September. Plebes will preregister for the fall semester of the Third Class year in March, after major selection occurs. Plebe advisers are only responsible for spring semester preregistration that is conducted in the fall.

During the preregistration period, midshipmen must first see their advisers and then preregister on the computer. To do so, they log onto MIDS, and from the Midshipmen menu, they will select “Courses – Preregister”. To verify their Preregistration, they select “Courses - Query Preregistration”. It is imperative that plebe advisers arrange to meet with their advisees prior to the commencement of the plebe preregistration period, either individually or in a group, to provide guidance and approval for them to preregister.

For the large majority of plebes, the courses they will take in the spring are the sequels to the courses they are taking in the fall. Advisers should consult the departmental handouts they received during the Plebe Advising Training Session for guidance and to the table “Typical Plebe Year Matrix”, which appears on page 23 of this handbook. Plebes will automatically be preregistered for Physical Education (PE102). For some plebes who have validations, the preregistration process is more complicated. It is recommended that the adviser consult with the Department Senior Adviser, the special Plebe Adviser for high validators, the Director of Plebe Programs or the Associate Dean for Academic Affairs for advice on how to deal with preregistration for students with multiple validations. Be very careful about plebe requests to overload, drop a course, or to take an advanced course during the spring semester. Such requests must be referred to the Associate Dean for Academic Affairs for approval.

In consideration of the challenges faced by plebes in and out of the classroom, their academic loads will be strictly limited to not more than 11 courses and about 35 credits for fourth class year. In a few instances, the ADAA may approve a plebe’s request to take one additional course in the spring if the midshipman achieves an excellent record in the fall semester (3.40 QPR and no Aptitude, Conduct or PE problems) and his or her adviser recommends approval. A request to overload can be submitted to the ADAA via the Director of Plebe Programs after 12 week grades are posted. If the plebe meets the above criteria the request will receive tentative approval and the adviser can add an additional course to the plebe’s preregistration file prior to commencement of registration. After final fall semester grades are recorded the adviser must confirm that the plebe has met the criteria to overload. If the criteria are not met, the adviser must drop the additional course from the schedule.

Preregistration is a crucial academic evolution. Its principal purposes are to allow the midshipmen and their advisers to plan ahead and to provide information to the departments on the demand for their resources: instructors, courses, and facilities. If a student is not preregistered properly, then he or she will not be able to successfully run the Registration program until the preregistration errors are corrected. Consequently, it is wise for the adviser to monitor the preregistration process (select the Faculty menu on MIDS and click on
“Preregistration – Query by MID, Major or Adviser” to ensure it is done accurately and on time. Preregistration errors should be corrected by the adviser by filling out a MIDREC card and directing the advisee to carry it directly to the Academic Scheduling Office. For simple changes, advisers may send a MIDREC via email by following the format on the Academic Scheduling Office Homepage – http://www.usna.edu/AccSchedules.

The plebe year academic program for most plebes will look like the “Typical Plebe Year Matrix”. Students will also take a one-hour non-credit Physical Education class each semester. Most plebes who take FP130 during the fall semester will take HH104 during the spring semester, and vice versa. FP130 and/or HH104 may be delayed to a future semester for plebes selected to take a critical language course or perhaps for certain other reasons.

<table>
<thead>
<tr>
<th>Typical Plebe Year Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Semester</strong></td>
</tr>
<tr>
<td>SM121</td>
</tr>
<tr>
<td>SC111</td>
</tr>
<tr>
<td>HE111</td>
</tr>
<tr>
<td>FP130</td>
</tr>
<tr>
<td>NS101 NL110</td>
</tr>
<tr>
<td>PE101/PE111</td>
</tr>
<tr>
<td>18 Credit Hours</td>
</tr>
</tbody>
</table>

Approximately half the class will take 18 hours including NL110 and NS101 in the fall while the other half of the class will take 17 hours including SI110. In the spring semester the process is reversed. Other fall semester courses that plebes may be placed into due to their performance on summer placement exams are:

Precalculus, SM005 (4-0-4). This is a four credit hour course taken by approximately 60 plebes (who are normally Academic Center advisees). These students will take SM121A during the spring semester and SM122 during summer school. SM005 will count as a free elective for the majors where a free elective is depicted in the matrix.

Calculus I, SM121A (4-1-4). This is a four credit course that meets five days a week for students who need more mathematics reinforcement.

Calculus I, SM131 (3-0-3). This is a three credit course for students who have some prior
calculus course work and almost validated one semester of calculus.

Calculus with Computers I, SM161 (5-0-5). This course teaches programming using MATLAB and emphasizes an algorithmic approach. Completion of both SM161 and SM162 counts also for a free elective for the majors where a free elective is depicted in the matrix.

Practical Writing, HE101 (3-0-3). This three credit hour course, which will take the place of a HUM/SS or free elective, will be taken by approximately 60 students. These midshipmen must take HE111 in the spring semester and should take HE112 as soon afterward as is practical given the constraints of their majors. They and their advisers should consider delaying other courses such as NE203, HH215 or NN200 if present in the fall schedule, to make room for HE112 in the fall of youngster year. NE203 or NN200 should not, however, be delayed beyond youngster year.

PRIVACY OF MIDSHIPMEN RECORDS

Midshipman academic records are protected by the Privacy Act. They may not be disclosed by faculty members to anyone but members of the faculty or staff who have a need to know, as part of their responsibilities. These records may not be disclosed to third parties including the parents, guardians, or congressional staff without written consent of the midshipman. This consent, if any, is recorded in the MIDS module “Midshipmen-Query General Information.”

If you have any questions or concerns regarding the implementation of this policy, contact the Privacy Act Coordinator.

REGISTRATION

Registration is scheduled during the middle of November for the upcoming spring semester and during the middle of April for the upcoming fall semester. From the point of view of the midshipmen, this is the time when they may seek particular schedules or instructors. Midshipmen preregister and register in every semester except the last.

Plebes will need some instruction on the registration process. You should provide guidance to your plebes before they register or tell them to seek advice from upper classmen.

Plebe advisers should not approve midshipman requests to change their schedules merely for personal convenience or preference. Registration is the time for midshipmen to exercise their preferences. Keep in mind that midshipmen often do not receive the schedule that they requested when they registered. This could be due to midshipmen induced errors when they registered or simply due to unforeseen reasons (bad luck). There are only a few valid reasons to change a midshipman's schedule. Examples: an error exists and a course must be deleted or added; a
The advisee should be copied on the email and the message should follow this example:

Subject line: MIDREC; LAST NAME, FIRST, MI, ALPHA
Body of text: Keep it simple, list changes to be made. Example:
   Drop XX____
   Add XX_____ 
A few explanatory notes may be added, if necessary.

**REPEATING COURSES**

Midshipmen are allowed to repeat courses where a “D” was earned as the final grade. This is especially a good idea for struggling midshipmen to do if they earned a “D” in Chemistry or Calculus during the fall semester of plebe year. The grade that is earned in the course that is repeated is the grade that will count in the computation of the student’s CQPR. However, the grade that was earned the first time that the course was taken is the grade that will count towards the Order of Merit (OOM). In most cases when a midshipman fails a course, that course must be repeated if the course is needed for graduation. Repeating courses normally results in mandatory summer school assignments unless the student has validations and/or the sequence of courses in the matrix is not affected.

**SENIOR ACADEMIC ADVISERS**

Each academic department appoints a senior academic adviser who is responsible for the overall coordination of academic advising within the department. The departmental senior academic advisers listed at http://www.usna.edu/AcDean/advisers/senioradvisers.html are an important source of accurate advising information.

**SPECIAL PLEBE ADVISERS**

Advising plebes who validate many courses is quite different from advising other plebes. For this reason, we assign these plebes to one or more experienced faculty members who will advise the high validators. These special plebe advisers can be an important resource for advisers who...
have students with special concerns relating to graduate degree programs and for selecting spring courses when validations are involved.

Since advising international plebes sometimes presents unique challenges, one or more faculty members will be assigned as the adviser for these students.

**STUDY SKILLS**

In spite of the fact that the Naval Academy’s admission standards are among the highest in the country, some midshipmen will experience academic difficulty. Although there are numerous causes for poor academic performance, failure to manage time and develop suitable learning strategies are the most common. Study techniques that worked in high school are not always effective at the Naval Academy.

Study skills materials are contained in *Strategies for Academic Success*. Midshipmen can read this manual by visiting the Academic Center website at www.usna.edu/AcCenter. If midshipmen need more assistance, the Academic Center provides a wide range of instruction to help them improve their learning strategies. Services provided include Academic Effectiveness Classes and individual appointments. Current information about study skills course offerings can be obtained by calling the Academic Center at 3-2936 or visiting the Academic Center website.

**SUMMER SCHOOL**

Summer school allows midshipmen who fall behind in progress through their major matrices to catch up with their classmates. It also permits midshipmen to improve their CQPR by repeating a course in which they earned a grade of D or F. Some midshipmen use summer school to take additional courses or to lighten their course load during the fall or spring semesters. In some cases, summer school is mandated by the Academic Board or Advisory Board. If a plebe desires to attend summer school on a voluntary basis, he or she will have to wait until the spring when summer training assignments are made before submitting a summer school request via MIDS. Normally when a midshipman takes a summer school course on a voluntary basis, he or she does so during what would have been a leave period. Grades received during summer school are factored into the CQPR, but not the OOM (order of merit). Repeating a course in which a D or an F was earned results in a replacement. The newer grade replaces the D or F when calculating the CQPR. However, the original grade is not removed from the midshipman’s record (official transcript).

**VARSITY ATHLETES**

Varsity athletes occasionally miss classes and study periods. This has the potential of creating academic difficulties. Plebe advisers should be aware of this and counsel their athletes
accordingly. If problems arise, advisers should consult with the NAAA office at 3-2238 which is concerned with the academic progress of athletes.

WRITING CENTER

The Writing Center is available for help with writing assignments. The center is located in room G20 Sampson Hall and offers one-on-one writing tutorials (by appointment) during all academic periods and during the weekends and evenings (by appointment only). You may make appointments by e-mail at: wcenter@usna.edu or by calling 3-6239, however, the preferred method for midshipmen to schedule an appointment is to use the internet at: www.usna.edu/EnglishDept/Writing_Center_Intranet/wcenter.htm.
# ACADEMIC CONTACTS

## ACADEMIC DEAN AND PROVOST’S OFFICE

<table>
<thead>
<tr>
<th>OFFICE</th>
<th>NAME</th>
<th>PHONE</th>
<th>LOCATION</th>
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<tbody>
<tr>
<td>Academic Dean &amp; Provost</td>
<td>Dr. Andrew T. Phillips</td>
<td>3-1583</td>
<td>Admin Bldg 206</td>
</tr>
<tr>
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<td>Dr. Michael C. Halbig</td>
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<td>Nimitz 061</td>
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<td>Admin Bldg 207C</td>
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<tr>
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<td>Capt. Danny Rozek, USMC</td>
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## CENTER FOR ACADEMIC EXCELLENCE

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<td>Director</td>
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<td>STEM Instructor</td>
<td>Mr. Douglas L. Bishop</td>
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## REGISTRAR

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<td>3-6386</td>
<td>Nimitz 228B</td>
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<td>Mrs. Tammie Sutton</td>
<td>3-6385</td>
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PLEBE ACADEMIC HANDBOOK

CLASS 2015

ACADEMIC YEAR 2011 – 2012
# FIRST SEMESTER, FALL 2011

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Classes Begin (Monday Class Schedule)</td>
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<tr>
<td>Labor Day (No Classes)</td>
<td>09/05/11</td>
</tr>
<tr>
<td>Preregistration</td>
<td>09/16/11-09/23/11</td>
</tr>
<tr>
<td>Academic Reserve Period</td>
<td>09/26/11-09/30/11</td>
</tr>
<tr>
<td>Football v Air Force</td>
<td>10/01/11</td>
</tr>
<tr>
<td>Six Week Grades Due</td>
<td>10/04/11</td>
</tr>
<tr>
<td>Columbus Day Observed (No Classes)</td>
<td>10/10/11</td>
</tr>
<tr>
<td>Academic Reserve Period</td>
<td>10/31/11-11/04/11</td>
</tr>
<tr>
<td>Twelve Week Grades Due</td>
<td>11/08/11</td>
</tr>
<tr>
<td>Veterans Day Observed (No Classes)</td>
<td>11/11/11</td>
</tr>
<tr>
<td>Registration for Second Semester</td>
<td>11/18-11-12/10/11</td>
</tr>
<tr>
<td>Thanksgiving Leave (begins after last class/military obligation)</td>
<td>11/23-11-11/27/11</td>
</tr>
<tr>
<td>Classes End</td>
<td>12/09/11</td>
</tr>
<tr>
<td>Football v Army</td>
<td>12/10/11</td>
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<tr>
<td>Review and Examination Period</td>
<td>12/12-11-12/20/11</td>
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<td>Grades Due</td>
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# SECOND SEMESTER, SPRING 2012

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<td>01/06/12-01/09/12</td>
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<tr>
<td>4/C Majors Briefings</td>
<td>01/09/12</td>
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<tr>
<td>Classes Begin</td>
<td>01/10/12</td>
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<tr>
<td>Martin Luther King, Jr. Day (No Classes)</td>
<td>01/16/12</td>
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<tr>
<td>Academic Reserve Period</td>
<td>02/13-12-02/17/12</td>
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<tr>
<td>Washington's Birthday (No Classes)</td>
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<tr>
<td>Six Week Grades Due</td>
<td>02/22/12</td>
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<tr>
<td>4/C Majors Selection</td>
<td>03/05-12-03/08/12</td>
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<tr>
<td>Spring Break (begins after last class/military obligation)</td>
<td>03/10-12-03/18/12</td>
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<td>4/C Preregistration</td>
<td>03/20-12-03/23/12</td>
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<td>Memorial Day</td>
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<tr>
<td>Induction Day of Class of 2016</td>
<td>06/28/12</td>
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MESSAGE FROM THE ACADEMIC DEAN AND PROVOST

Congratulations on your willingness to embark on a path of service to your fellow citizens. We who serve our country, whether in uniform or in civilian clothes, have agreed to set aside for the present the possibility of pursuing more lucrative non-governmental careers in order to give something back to the nation that has provided us the tremendous opportunities that we enjoy today. One need only travel abroad to appreciate what a great country we have; but it will remain great only if citizens like you and I are willing to help protect our way of life.

Your journey in service to your country leads through Annapolis and the United States Naval Academy; but this is not your destination. This is a time for you to prepare for what comes next. We want you to dedicate your best efforts here in Annapolis to develop yourself morally, mentally and physically for the privilege of leading sailors and Marines. That developmental process includes completing the requirements for a baccalaureate degree in an academic program focused on the needs of the Navy and Marine Corps. We are confident that you will find this academic program challenging and stimulating. Some of you may experience temporary setbacks. Do not give up and do not be satisfied with achieving the minimum requirement. The Naval Academy is all about striving for excellence, not for the minimum. The faculty and staff assembled here are ready to help you succeed and, if you are willing to work hard enough, they will help you achieve your best, even in the most challenging aspects of the program.

This Academic Handbook is one of the many resources designed to help you achieve success in the academic part of your four-year developmental process. I encourage you to become familiar with its contents and freely consult the faculty and staff to whom it may lead you. Responsibility for academic success ultimately rests with each midshipman. Take on that responsibility as a personal challenge. Make the most of your time, strive for excellence rather than mediocrity, and employ all the resources we will provide you to prepare yourself for the great honor and adventure represented by service to your country as an officer in the Navy or Marine Corps. Welcome Aboard, shipmate!

Andrew T. Phillips
Academic Dean and Provost
From: Academic Dean and Provost

Subj: ACADEMIC HANDBOOK FOR THE CLASS OF 2015

1. Purpose. To provide information about the academic curriculum, policies and programs for the members of the fourth class.

2. Information. The Academic Handbook for the Class of 2015 is designed to be a convenient source of academic program information for fourth class midshipmen. By consulting this handbook, plebes will be informed about important academic topics and will be better prepared for the academic year.

3. Action. The Director of Plebe Programs is responsible for the conduct of the plebe advising program and for the annual revision of this handbook. Plebe advisers are expected to become familiar with this handbook and discuss its contents with their advisees. Lastly, midshipmen in the Class of 2015 are expected to read this handbook and refer to it for guidance as appropriate.

ANDREW T. PHILLIPS

Distribution:
Commandant of Midshipmen
OINC 4/C Regiment
Director, Academic Center
Plebe Academic Advisers
Company Officers
Senior Enlisted Leaders
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I. INTRODUCTION

I.1 What is the purpose of this manual?

The purpose of this manual is to be a source of information for fourth classmen about the academic programs at the Naval Academy. This manual contains information about basic requirements, sources of help, rules and regulations.

I.2 What departments and majors are there, how are they organized, where are they located?

The four-year academic program at the Naval Academy leads to a Bachelor of Science degree. You will pick a major in the second semester of plebe year. The plebe year is approximately the same for everyone, as will be explained later in this chapter.

There are five divisions at the Academy. At another university, they might be called colleges. They are the Division of Engineering and Weapons, the Division of Mathematics and Science, the Division of Humanities and Social Sciences, the Division of Professional Development and the Division of Officer Development. The Divisions of Professional and Officer Development do not currently offer majors. The divisions, departments, the majors they offer, and the location and phone numbers for each are listed on the following pages.

<table>
<thead>
<tr>
<th>Division I: Engineering and Weapons</th>
<th>Department</th>
<th>Major(s)</th>
<th>Building</th>
<th>Room</th>
<th>Phone Ext</th>
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<tr>
<td>Aerospace Engineering</td>
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<td>Mechanical Engineering</td>
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<td>Engineering (NAOE)</td>
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<td>Operations Research</td>
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### Division III: Humanities and Social Sciences

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<td>36250</td>
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<tr>
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<td>Arabic Chinese</td>
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<td>Political Science</td>
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*Languages and Cultures also offers minors in seven languages: Arabic, Chinese, French, German, Japanese, Russian, and Spanish.

### Division IV: Professional Development

<table>
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<td>Seamanship and Navigation</td>
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<tr>
<td>Career Information &amp; Officer Accessions</td>
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### Division V: Leadership Education & Development

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### Department of Character Development & Training

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I.3 What other academic offices might I visit and where are they located?

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<th>Title</th>
<th>Name</th>
<th>Phone</th>
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<tr>
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Center for Academic Excellence

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<td>Tutoring Coordinator</td>
<td>LCDR Kathleen O’Leary, USNR</td>
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<td>Dr. John Moulis</td>
<td>36386</td>
<td>Nimitz 228B</td>
</tr>
<tr>
<td></td>
<td>Mrs. Tammie Sutton</td>
<td>36385</td>
<td>Nimitz 228A</td>
</tr>
</tbody>
</table>

Physical Education Department

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Phone</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Education Department</td>
<td>Marking Officer</td>
<td>35564</td>
<td>Macdonough Hall</td>
</tr>
</tbody>
</table>

II. ACADEMICS IN THE PLEBE YEAR

II.1 What is my matrix?

After you select a major toward the end of plebe year, your matrix is a table of the courses which you are required to take to graduate. The matrix for each class and each major may be displayed by running the MIDS program Matrices - Query Current Midshipman as explained on page 12. The program allows
you to query any majors you are interested in so that you may assess your options. Descriptions of all matrices can also be found on the web at www.usna.edu/AcDean.

II.2 What courses do I take in the plebe year?

The plebe year curriculum is common for most midshipmen at the Academy. The exceptions to the common curriculum are for plebes who validate one or more courses and for plebes who need reinforcement in a particular area and are placed into a developmental course. If you fall into the latter category, there are specific plans to help you catch up. Finally, some courses have different versions. These variations will be described, later.

You will most likely take six academic courses in one semester and five in the other semester of your plebe year. In addition, you will take a physical education (PE) course each semester. Plebes whose overall performance in the fall semester is outstanding may be permitted by the Associate Dean of Academic Affairs to take an additional course in the spring semester.

**Typical Plebe Year**

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculus I</td>
<td>Calculus II</td>
</tr>
<tr>
<td>SM121</td>
<td>SM122</td>
</tr>
<tr>
<td>4-0-4</td>
<td>4-0-4</td>
</tr>
<tr>
<td>Chemistry I</td>
<td>Chemistry II</td>
</tr>
<tr>
<td>SC111</td>
<td>SC112</td>
</tr>
<tr>
<td>3-2-4*</td>
<td>3-2-4</td>
</tr>
<tr>
<td>English I</td>
<td>English II</td>
</tr>
<tr>
<td>HE111</td>
<td>HE112</td>
</tr>
<tr>
<td>3-0-3</td>
<td>3-0-3</td>
</tr>
<tr>
<td>US Government</td>
<td>US Naval History</td>
</tr>
<tr>
<td>FP130</td>
<td>HH104</td>
</tr>
<tr>
<td>3-0-3</td>
<td>3-0-3</td>
</tr>
<tr>
<td>Seamanship</td>
<td>Cyber I</td>
</tr>
<tr>
<td>NS101</td>
<td></td>
</tr>
<tr>
<td>1-2-2</td>
<td></td>
</tr>
<tr>
<td>Prepare to Lead</td>
<td></td>
</tr>
<tr>
<td>NL110</td>
<td>SI110</td>
</tr>
<tr>
<td>2-0-2</td>
<td>2-2-3</td>
</tr>
<tr>
<td>Physical Education</td>
<td>Physical Education</td>
</tr>
<tr>
<td>PE101/PE111</td>
<td>PE102</td>
</tr>
<tr>
<td>0-1-0</td>
<td>0-1-0</td>
</tr>
<tr>
<td><strong>Total Credit Hours</strong></td>
<td><strong>Total Credit Hours</strong></td>
</tr>
<tr>
<td>18</td>
<td>17</td>
</tr>
</tbody>
</table>

*Note: The first digit of the triplet represents the number of lectures per week. The second digit represents the number of hours, if any, spent in lab. The final digit is the value in credit hours for that course. SC111 has three class meetings for lecture, two lab hours, and you will earn four credits for passing this course.*
II.2a Plebe Year Professional and Officer Development Courses

NL110 (Preparing to Lead), NS101 (Seamanship) and SI110 (Cyber I) are required of all plebes. The semester in which you take the plebe leadership course and seamanship course will determine whether you will have a six course or a five course semester.

II.2b Plebe Year Humanities and Social Science Courses

FP130 (U.S. Government and Constitutional Development) and HH104 (American Naval History) are required courses. In some situations these courses may be delayed until upper class years. Most plebes in one regiment will take FP130 in the fall while most plebes in the other regiment will take HH104. Each regiment will take the remaining course in the spring. HE111 and HE112 (Rhetoric and Introduction to Literature I and II) are normally taken during plebe year. You may be placed in HE101 (Practical Writing) for the first semester; this is a course designed for those whose writing skills need improvement. If you are enrolled in HE101 for the first semester, you will take HE111 in the second semester and HE112 as soon as possible thereafter. HE101 may be used as a humanities-social science elective. Two such electives are required by all majors at the Academy. If you are enrolled in HE101, you will not fall behind in your matrix, nor will you have to attend summer school.

II.2c Plebe Year Mathematics Courses

Unless you validate two or more semesters of calculus, you will take one mathematics course each semester of plebe year. SM121 (Calculus I) followed by SM122 (Calculus II) is the most common sequence. You may be assigned to SM121A for the fall and/or SM122A for the spring. These courses have an extra hour of class each week and are intended for those who need more mathematics reinforcement.

If you have prior differential calculus experience, you may be assigned to SM131 which is a Calculus I course for those who have had some calculus but did not validate. Midshipmen who validate Calculus I will take Calculus II (SM122) in the first semester.

You may have the opportunity to take SM161, which is Calculus I with Computers. This course integrates calculus with basic computer science. If you complete both SM161 and SM162 (Calculus II with Computers), you not only complete your Calculus I and II requirement, but you also get credit for a free elective, which exists in the matrices of many majors.

If your basic mathematics skills are weak you may be assigned to SM005 (Precalculus) for the first semester. If you are assigned to SM005 you will take SM121A in the second semester and take Calculus II in summer school after plebe year. However, the SM005 course can be used as a free elective in majors which have a free elective spot. Therefore, if you are enrolled in SM005, you may be one course ahead of your matrix prior to the start of the first semester of youngster year.

II.2d Plebe Year Chemistry Courses

You will most likely take SC111 and SC112 (Foundations of Chemistry I and II) during plebe year. If you have a strong chemistry background, you may validate one semester of chemistry and be assigned to SC151 (Modern Chemistry) in the first semester of your plebe year. Passing SC151 completes the requirement of one year of basic chemistry. Alternately, you may take SC112 in the spring semester.

II.3 What do letters after the course number mean?
You may see designators such as P, V, or S after the course numbers for a particular course. 
P indicates a section for plebes only.  V indicates a course for validators of the prerequisite.  Plebes are 
often placed in such special sections rather than placing them in regular sections with upper class 
midshipmen.  S indicates an Honors Section of a course.  You may be placed in or invited into such a 
section.  If you have any questions about such placement, talk to your adviser or to a representative of the 
department offering the course.

II.4 Core Curriculum.

In four years at the Naval Academy, you are required to take certain core courses to make sure you are 
well prepared for any career path in the naval service and that you are well-educated.  These core courses 
are common to all majors and comprise the largest component of the academic program.  The core program 
provides you with a balanced education that prepares you not only for immediate service in the Navy or 
Marine Corps but also for your return to civilian life.  Since all graduates earn a Bachelor of Science 
degree, the core features substantial components in mathematics, science, and engineering, whatever your 
major may be.

III. VALIDATION OF COURSES

Validation permits you to earn course credit for previous work done elsewhere.  You may receive 
validation credit by scoring well on a USNA validation exam or by providing appropriate documentation of 
Advanced Placement or college-level course work.

There are several advantages of validation.  For example, if you validate a course, you can enroll in the 
next course in the same subject, take care of another curriculum requirement, repeat a course where a low 
grade was earned, carry a lighter academic load, facilitate work toward a language minor or dual major. 
Midshipmen who take advantage of validation in their early years and meet a high standard of academic 
performance may have the opportunity to pursue study abroad, independent research, honors programs, or 
master's degree studies in their upper class years at the Academy.

You may be afraid that validation will place you in a course for which you are unprepared.  This is 
rarely the case.  However, if you think you are in “over your head” as a result of validation, speak to your 
instructor or the chair of the department offering the course and discuss your concerns.  Validation is not 
mandatory and midshipmen may decline validation credit.

IV. HELP

IV.1 What types of behaviors lead to academic success at USNA?

1) STAY AWAKE, ALERT, AND PARTICIPATE IN CLASS!  Class participation will be a 
component of your grade in most courses.

2) Take notes in class and REVIEW them.  Taking notes without reviewing them merely diminishes 
your attention in class.

3) Do all homework problems even if your professor does not collect them.

4) Develop and follow a sound time management plan.

5) Start research for projects and papers early.
6) Read assignments in the course syllabus, BEFORE going to class. Even if you don’t fully understand the reading, the class discussion will be far more meaningful if you have had some acquaintance with the material.

7) Study outside the Hall if necessary. Avoid environments that will distract you.

8) Do not be satisfied with just “being SAT.” USNA is about excellence, not mediocrity.

9) Keep all your notes, class work, quizzes/tests organized in a notebook or folder.

10) Get to know your professors on an individual basis! The two of you will benefit.

11) Try to get at least 6 hours of sleep a night; most people don’t function well on less.

IV.2 What can I do if I am having academic problems?

1) See your instructor early and often for Extra Instruction (EI). This is the first and most important action you should take when you encounter academic problems. If you are not grasping the concepts taught in class, see your instructor. If your instructor cannot provide enough assistance, you might visit with the department chair to learn what other sources of help are available. Seeking help is not a sign of capitulation; it is a mature response to a need. Don’t be embarrassed to ask for help. The faculty has a higher regard for midshipmen who seek assistance than those who should seek help but do not.

2) Attend weekly Midshipmen Group Study Program (MGSP) review sessions. MGSP sessions are designed to allow midshipmen in the same class to review course material, solve problems, and gain an understanding of course concepts. MGSP is facilitated by upper class group leaders who have successfully completed the course and hold weekly study sessions tailored to the needs of the instructor’s courses. For more information and to see which courses have scheduled MGSP sessions visit: www.usna.edu/AcCenter/MGSP.

3) Keep your Chain of Command informed about your academic problems. Often your Chain of Command can provide information about other sources of help.

4) See your Company Academic Officer. The Academic Officer is a first class midshipman who is a resource in helping you find solutions to your academic problems.

5) Your Academic Adviser is the key person you should talk to about academics. Plebe advisers will provide the necessary guidance and support to help you be successful.

6) For extra help in Mathematics: Visit the Theodore J. Benac Mathematics Lab. This resource is located in Chauvenet Hall room 130. There is an extensive collection of reference calculus textbooks in this room and it is staffed by Mathematics Department faculty during periods 1 through 6 each class day. Of course midshipmen should arrange EI first with their own instructors. However, in a situation where that is not possible, drop by MATH LAB during the day to receive guidance in solving mathematics problems. Additional information about resources and programs available through the Mathematics Department can be found at www.usna.edu/MathDept.
7) For extra help with Written Assignments: Visit the Writing Center to receive help on any of your writing assignments. The center is located in room G-20 Sampson Hall and offers one-on-one writing tutorials (by appointment or on a walk-in basis) during all academic periods and during weekends and evenings (by appointment only). Midshipmen should schedule an appointment by accessing www.usna.edu/EnglishDep/Writing_Center_Intranet/wcenter.htm, by email at wcenter@usna.edu or by phone at 3-6239.

8) For extra help in Chemistry: A midshipman’s first source of extra help in chemistry is his or her chemistry instructor. In addition, midshipmen are welcome to visit the Chemistry Resource Room located in Michelson Hall room 100 (adjacent to the lobby on the fountain side of the building). Chemistry faculty members volunteer their service first through sixth period each class day and several evenings per week. A schedule of Resource Room availability will be posted in all plebe chemistry classrooms at the start of each semester. The Chemistry Resource Room contains several PC’s (loaded with the standard midshipman software packages and connected to the Internet), printers, small group study tables and several chemistry education resources. Midshipmen are encouraged to drop in to the Chemistry Resource Room to study with classmates, to get help on Web-based homework or lab reports, or simply to print out learning objectives. Midshipmen are also encouraged to become involved in a weekly MGSP session where they can learn from classmates and an upper class MGSP leader. Additional information can be found at www.usna.edu/AcCenter/, www.usna.edu/MGSP and www.usna.edu/ChemDept.

9) You can sign up for a Learning Skills Class to improve your learning strategies or get study skills help at www.usna.edu/AcCenter. Then click on the link to schedule a meeting with the instructor. Please note, individual appointments and group sessions are available. Click on Learning Skills Sessions, complete the form, and you will receive an e-mail from the Learning Skills Director to schedule a convenient meeting time.

10) Sign up for an appointment with a subject matter tutor. Tutors provide small group or individual support in the evenings. Before creating an appointment, students are encouraged to seek extra instruction with their instructor first. Use the evening tutoring link located on the Academic Center’s web site, www.usna.edu/AcCenter to find available meeting times with the tutor. Each appointment is scheduled for 30 minutes but successive appointments can be scheduled.

11) Nimitz Library is an essential resource. The library contains more than half a million volumes, an extensive CD-ROM network, a multi-media laboratory, computer rooms, and several group study rooms. Through Nimitz Library you have access to other libraries in the Washington and Baltimore areas. You can also use your personal computer to conduct a search for library materials from your room at www.usna.edu/Library.

12) Extra Help Classes – Extra help classes provide weekly scheduled supplemental instruction to students who are potentially academically at-risk. The courses are taught by Academic Center faculty who teach departmental courses in their discipline. Based on the departmental syllabus, the course instructors reiterate course material, review homework problems, and provide exam review. Registration is voluntary and attendance is mandatory. The course caps range from 8-10 students. Enrollment can be completed by the adviser or by contacting the Extra Help course instructor. Extra Help courses are currently available for chemistry, mathematics and physics. Visit the Academic Center, 2nd deck Nimitz, or www.usna.edu/AcCenter for additional details.
IV.3 Whom can I see for personal problems?

1) You can visit a Battalion Chaplain by stopping by the offices located on the zero deck. The Chaplain Center located in the Levy Center of Mitscher Hall not only provides daily religious services but Chaplains are also responsible for pastoral counseling. Conversations with the Chaplains are strictly confidential. To contact a chaplain by phone you should call the chaplain office at 3-1100.

2) You can visit the Midshipmen Development Center which is located in 8th wing, seaward side of Bancroft Hall on the first deck. A full range of counseling services is offered to help midshipmen with adjustment, interpersonal, and stress-related problems. Individual and group counseling as well as services for special needs are provided by doctoral-level psychologists. You can refer yourself to the Midshipmen Development Center by visiting in person, by making an appointment by phone at 3-4897 or via the web at www.usna.edu/MDC. In many cases, counseling will be confidential between you and the psychologist; this will be explained to you.

3) You should inform your first class mentor and the chain of command of problems that may affect your performance. Remember that there are many people at USNA who care about you and who are available to talk with you. These include academic advisers, instructors, coaches, officer and faculty representatives, sponsors, etc.

V. MAJOR SELECTION

The core program allows midshipmen the freedom to choose any major and then to seek assignment to any warfare specialty. Nevertheless, given the needs of the Naval Service, you are encouraged to choose a major in mathematics, science, or engineering - if you have the interest and ability to succeed in a technical major.

V.1 What should I consider when choosing a major?

USNA majors require midshipmen to take anywhere from 30 to 54 credits. Make sure you spend enough time researching the different majors that may interest you. Your academic interests, strengths and weaknesses, and to a lesser degree your naval career and post-naval career desires should guide your consideration. Here is the bottom line: **Choose a major that you will enjoy studying and in which you can succeed.**

The following majors are available as initial choices for the class of 2015:

<table>
<thead>
<tr>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAS Aerospace Engineering</td>
<td>SCH Chemistry</td>
<td>FLA Arabic</td>
</tr>
<tr>
<td>EEE Electrical Engineering</td>
<td>SCS Computer Science</td>
<td>FLC Chinese</td>
</tr>
<tr>
<td>ECE Computer Engineering</td>
<td>SGS General Science</td>
<td>FEC Economics</td>
</tr>
<tr>
<td>EGE General Engineering</td>
<td>SIT Information Technology</td>
<td>FPS Political Science</td>
</tr>
<tr>
<td>EME Mechanical Engineering</td>
<td>SMA Mathematics</td>
<td>HEG English</td>
</tr>
<tr>
<td>ENA Naval Architecture</td>
<td>SMO Operations Research</td>
<td>HHS History</td>
</tr>
<tr>
<td>EOE Ocean Engineering</td>
<td>SOC Oceanography</td>
<td></td>
</tr>
<tr>
<td>ESE Systems Engineering</td>
<td>SPH Physics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQE Quantitative Economics</td>
<td></td>
</tr>
</tbody>
</table>
V.2 How do I find information about prospective majors?

Information about the majors offered at the Academy will be provided during Plebe Summer and will include three sets of briefings before the fall semester begins.

All plebes must attend the Majors Briefing during the January Intersessional Period. You should start thinking about your potential major during the fall semester. During the Majors Briefing you will have the opportunity to visit with representatives of any academic department that has a major program.

Several companies sponsor a Majors Night for plebes. These events give you a chance to talk with the upperclassmen about their experiences in their majors. If offered in your company, make sure you participate.

Most departments will invite you to an Open House where you can learn more about their majors. Again, take advantage of this opportunity and be prepared to ask questions.

Visit departments during your free periods or after school to become more acquainted with the majors you are considering. Also, find out from the chair of that department which professors will be teaching during your free periods. Arrange to sit in on one or more classes associated with the major in which you are interested.

It is not sufficient for you to know a little about the subject matter studied in a major. You must also try to determine what being a midshipman in this major really means and what the daily work entails. In particular, learn as much as you can about the very first course you will take in the majors that interest you. Midshipmen who become unsatisfied with their majors invariably point to that first course as the reason they wish to change their major.

Information about the majors may be found on the Dean’s web pages, the departmental web pages, the Naval Academy catalog, or from modules in MIDS. The module Matrices – Query Major Requirements is particularly useful. By using this module you can click on a course which will reveal important information about the course.

Finally, meet with your plebe year academic adviser prior to choosing a major. Your adviser will be able to review your academic performance and discuss your interests, goals, and help you with this important decision.

VI. COMPUTERS

VI.1 What is MIDS?

The Midshipman Information Database System (MIDS) is the institution’s enterprise system for all information on a Midshipman from Induction to Graduation and Commissioning.

Using your internet browser, go to the MIDS home page at https://mids.usna.edu. On the MIDS Home Page you will find several functional menus. Clicking a functional menu takes you to modules related to that functional area.

Each web module has a Help button at the bottom, left-hand corner of the page with instructions specifically for use of that module.
Descriptions of USNA business processes that are supported by specific MIDS modules are accessible by clicking the About MIDS link on the left side of the MIDS homepage. About MIDS can be reached directly at http://www.usna.edu/AboutMIDS.

VI.2 How can I use my computer to get information on my grades, academic record, etc.?

All faculty, staff and midshipmen can use the links on the General Academics functional menu. Some of the commonly used General Academics links are the following:

- ECAs - Query
- Final Exams - Query Midshipmen Schedule
- Final Exams - Query Section Schedules
- Majors - Query by Class
- Offered Courses and Sections - Query
- Schedules - Query Midshipmen
- Schedules - Query Potential Mid Schedules
- Sections - General Query

Only midshipmen have access to some of the links on the Midshipmen functional menu. Some of the more commonly used Midshipmen links are the following:

- Absences and Excuses - Query
- Academic Information - Query
- Access Dates (for Midshipmen) - Query
- Courses - Preregister
- Courses - Query Preregistration
- Courses - Register
- Excuses - Enter
- MAPR (Midshipman Academic Performance Report) - Query
- Major - Declare
- Major - Enter Preliminary Preferences
- Matrices - Query Current Midshipman
- Matrices - Query Major Requirements
- Midshipman Leave – Enter
- Midshipman Leave – Sign Out/Sign In
- Midshipman - Performance Record
- PE Course and PRT Scores - Query
- PE Mark - Query
- Personal Information - Maintain
- Schedules - Query Midshipmen
- Schedules - Query Potential Mid Schedules
- Summer School - Preregister
- Summer Training - Assignments
- Summer Training - Query Training Schedules

Access to certain programs is limited in time. You will be notified when to run these programs. The Access Dates (for Midshipmen) – Query module reveals the times of access.
VI.2a Majors

To view your academic program for the entire four years, click Matrices - Query Current Midshipman. The matrix contains information about the courses you have taken and the courses you will take according to your major. The matrix is a very useful planning tool for selecting a major or considering a change of major.

To enter a tentative major preference, click Major - Enter Preliminary Preferences.

To declare your final major preference, click Major - Declare.

VI.2b Classes and Registration

To plan for next semester use Schedules - Query Potential Mid Schedules to see available courses and sections.

To preregister for next semester, click Courses - Preregister. You must see your adviser first. Failure to preregister on time may incur significant penalties.

To register for next semester, click Courses - Register.

To view your past, current or future schedule, click Schedules - Query Midshipmen.

VI.2c Class Attendance

If you will be absent, tardy, or leave a class early, you must use the Excuses - Enter program to record your excuse. This must be done on or before the day in question and up to 24 hours after the instructor has entered the attendance. You should inform your chain of command if you know you will be absent from a class. You should also inform your instructor of forthcoming absences. After the 24 hour period passes, the excuse can be entered by your company academic officer.

To see your absences and excuses for the semester, click Absences and Excuses - Query.

VI.2d Grades and Performance

If you want to know all about your academic, PE, conduct, or military aptitude grades, and rank in class by marking period and semester, click Academic Information - Query.

If you want to know what faculty have said about your performance in a particular course after six weeks, twelve weeks, and end of semester, click MAPR (Midshipman Academic Performance Report) - Query. Comments must be entered if your performance was deficient but may be entered in other circumstances as well.

VI.2e Final Exams

If you want to know when your final exams are scheduled, click Final Exams – Query Midshipmen Schedule on the General Academics page. Do not make any travel commitments prior to knowing your personal exam schedule. The Fall exam schedule is usually available by 15 October and the Spring exam schedule is usually available by 15 March.
If you want to know a course’s final exam schedule, click Final Exams - Query Section Schedules from the General Academics page.

VI.3 Can I access the MIDS system when on leave or at my sponsor’s house?
Yes, the MIDS system is available by going to https://midsweb.usna.edu.

VI.4 Can I get library information about books, periodicals or films through my computer?
Yes, you can visit the USNA Library homepage at www.usna.edu/Library. This site will allow you to learn what books, periodicals, films and other documents the library has available. You may also access this site via the USNA homepage at www.usna.edu/ clicking on the Library link.

VI.5 Where can I get help in using my computer?
First, ask a shipmate. Each company has a Midshipman Information Systems Liaison Officer (MISLO) who can help you. If you can’t get the help you need in Bancroft Hall, contact the Information Resource Center (IRC) at 3-3500. The IRC is located in Ward Hall and available Monday through Friday, 0700-1630. If the staff there can’t help you, they will call on specialists who can. The IRC Web Page at http://intranet.usna.edu/IRC/ features an extensive FAQ library of the following subjects: Internet, Network, Naval Academy Data Network (NADN), standard USNA Software, and World Wide Web.

VI.6 How do I get my computer fixed?
If your computer has a hardware problem, take it to the Midshipmen Computer Repair Center (MCRC) located in the Fourth Wing basement at room 4B05. The facility is manned Monday through Friday, 0730-1600. The phone number is 3-5482.

VII. ACADEMIC REQUIREMENTS

VII.1 Preregistration and Registration.
Preregistration is essential for academic planning. It allows you and your academic adviser to plan your academic future and it is critical to the departments in allocating their faculty and resources for the next semester. Preregistration is a requirement, not a preference, and ALL midshipmen must preregister within the announced time line. Midshipmen must first meet with their advisers to ensure they preregister for the correct courses. They then enter the courses to be taken in the following semester in MIDS. In accordance with ACDEANINST 1531.59B, paragraph 12a., “If a midshipman fails to preregister on time, the ADAA may deny registration privileges to that midshipman and, instead, register him or her directly without regard to the midshipman’s preferences”. For the first semester of fourth class year, preregistration is done for you. Preregistration for second semester will occur in mid-September. Preregistration for the first semester of third class year will occur in April after you have selected a major. You preregister by running Courses - Preregister on MIDS. It is important for you to list the correct courses when you preregister. Errors must be corrected prior to registration.

Registration occurs during the latter part of each semester. At registration, midshipmen may request certain sections of the courses they will take next semester. This means you can run the computer program Courses - Register and ask for a section that meets during a preferred time of day or a section
taught by a certain professor. It should be understood that there is no guarantee that you will be assigned to
a requested section. Consult with upper classmen to learn more about how the process works.

Suggested steps to complete the registration process are as follows:

• A week or two prior to registering, use the **Courses - Query Preregistration** link on MIDS to
  ensure that your listing of courses for the next semester is correct.

• Use the **Offered Courses and Sections - Query** link on MIDS – GENERAL ACADEMICS to
  check section information and names of professors for your courses.

• Use **Schedules - Query Potential Mid Schedules** link on MIDS to determine what schedules for
  the next semester are possible based on your requests.

• Use the **Courses - Register** link to request enrollment in the courses for the next semester. When
  you register, you may elect for the computer to assign a random schedule or you may select your section(s)
  from a pull down menu in hopes of being placed into a specific section for one or all of your courses. If
  you desire the computer to assign you a section at random, leave the section(s) blank then click the
  **UPDATE** button, **SUBMIT** link and finally **SUBMIT** again. Your schedule request will be considered
  when the registration software processes groups of request each day.

• After registering, you should periodically check the **Schedules - Query Midshipmen** module to
  learn what your next semester schedule is. Remember, this schedule is subject to change and may change
  at any time prior to the first day of class.

• To change your schedule you must contact your adviser who will fill out a Midshipman Record
  Change (MIDREC) card, IF there is a **valid** reason for the change.

**VII.2 What time will my classes meet?**

The academic day is divided into six periods of 50 minutes each with 10 minutes between classes to
allow for movement between buildings. The seventh period is rarely used.

<table>
<thead>
<tr>
<th>Daily Schedule</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0755-0845</td>
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Some three credit classes will meet twice a week for 75 minutes each during eighth, ninth or tenth
periods.

For inclement weather or emergency schedules, see [www.usna.edu/AcDean/schedules/durations.html](http://www.usna.edu/AcDean/schedules/durations.html).
VII.3 What are the rules and regulations governing class attendance and decorum?

VII.3a Class Attendance

ATTENDANCE OF ACADEMIC CLASSES IS A MILITARY OBLIGATION, AND YOU ARE REQUIRED TO ATTEND CLASSES. Routine medical and dental appointments must be scheduled during free periods. If you have a conflict regarding class attendance, resolve this through your chain of command PRIOR TO CLASS. Conduct action will be taken for unauthorized absence from class.

Common courtesy dictates that you inform your instructor(s) when you know in advance that you will be missing a class. Whether your absence from class is justified or not, you are still responsible for turning in assignments and making up the lessons missed.

When you miss class for any reason, authorized or not, you are also required to log onto MIDS and record the reason for missing class. This action must be completed on or before the day the class is missed. Specific policies will be dictated by the Company Academic Officers.

VII.3b Classroom Decorum

Academic classes are military evolutions, and you are expected to conduct yourself in a military fashion during class. You are expected to be alert and respectful of your classmates and the faculty. You must be well-groomed and in the uniform of the day. You are not allowed to eat, smoke, or chew tobacco or gum in classrooms, lecture halls, terminal rooms, laboratories, and corridors of all academic buildings. Drinks are allowed in classrooms, but must be stowed in bookbags while transiting between classes. The lab deck lobbies of Michelson, Chauvenet, Luce, and Rickover Halls may be used for reading and study, but these areas are not lounges and you should present a dignified appearance in these public areas.

Midshipmen should address civilian professors with as much respect as they address a military professor. Many of the civilian professors outrank the military professors. When meeting a mixed group of civilian and military professors make sure to salute the officers as well as render a verbal greeting to the entire group, for example, “Good afternoon ladies and gentlemen.” If you know a professor’s title you should greet him or her with that title. Many civilian professors prefer to be called Professor as opposed to Sir/Ma’am.

VII.4 What is a section leader?

In each class your instructor will assign a section leader. The section leader will be responsible for taking muster and reporting absences to the instructor. The section leader will also call the class to attention at the beginning and end of each class period. If the instructor fails to show up within a few minutes of the start of class, the section leader should report this to the department office. The class should not depart unless dismissed by a member of the faculty.

VII.5 How are my grades determined?

In each class you will be assigned a letter grade of A, B, C, D or F (A denotes excellence and F denotes failure) which corresponds to a numerical Quality Point Equivalent (QPE) of 4.0, 3.0, 2.0, 1.0, or 0.0 respectively. Your Quality Point Rating (QPR) is computed by multiplying the QPE for a course by its credit hours and dividing the sum of these products for all the courses you take in a semester by the total number of credit hours attempted. A cumulative QPR (CQPR) is maintained for all academic grades
earned. A cumulative QPR of 2.0 is an absolute requirement for graduation and commissioning. A cumulative QPR of at least 2.0 in your major courses is required to receive a B.S. with your major designated on the diploma. Grades received in Physical Education do not count toward the QPR or CQPR but do factor into the Order of Merit. An explanation of Order of Merit appears on page 20.

You will be assigned a progress grade in each course after the sixth and twelfth week point of each semester. These grades are used for information and guidance to you, your adviser and your chain of command. They do not appear on your permanent transcript. At the end of the semester you will receive a semester QPR (SQPR), which is a part of your permanent record. Only the final grade you earn in a course appears on your permanent transcript.

**VII.6 How important are grades at USNA?**

The academic performance of midshipmen has several important implications. The higher your grades and class standing, the more likely you will:

- RECEIVE YOUR DESIRED SERVICE ASSIGNMENT

- Be selected for programs like Trident Scholar, VGEP, Medical School, or one of several graduate scholarships available upon graduating from USNA.

Conversely, poor academic performance will lower your chances for getting your desired service selection and may result in REDUCED PRIVILEGES AND LIBERTY or separation.

**VII.6a Academic Honors**

Each semester, lists are published to recognize midshipmen whose academic and overall performance during the previous semester has been exemplary. These lists are the Superintendent's List, the Commandant's List, and the Dean's List. The Superintendent’s and Dean’s Lists are published on the Dean’s webpage at [www.usna.edu/AcDean/honorlists/honorlists.html](http://www.usna.edu/AcDean/honorlists/honorlists.html).

Inclusion on the Superintendent's List or Commandant's List makes you eligible for special privileges as outlined in Midshipmen Regulations. Criteria are as follows:

**Superintendent's List:**
- SQPR of 3.4 or higher with no grade less than “C”.
- “A” in Aptitude for Commission and Conduct.
- “A” or “B” in Physical Education.
- “A” or “B” on PRT.

**Commandant's List:**
- SQPR of 2.9 or higher.
- “A” or “B” in Aptitude for Commission.
- “A” in Conduct.
- “A” or “B” in Physical Education.
- “A” or “B” on PRT.

**Dean's List (excludes those on Superintendent’s List):**
- SQPR of 3.4 or higher with no grade less than “C”.
- “A” or “B” in Conduct and Aptitude for Commission.
“C” or better in Physical Education.
“C” or better on PRT.

VII.6b Academic Deficiencies

There are different definitions of academic deficiency. The more common is that used in Bancroft Hall by your chain of command to determine eligibility for weekend liberty and movement orders. By this definition you are UNSAT if your QPR (six-week, twelve-week or end-of-semester) is less than 2.00 or if you have two or more “D”s or at least one “F”. If you fall in this category, you will not be allowed to participate in voluntary movement orders without the Commandant's permission. You will also be provided specific guidance by your Company Officer aimed at helping to improve your academic performance. This will probably include guidance pertaining to Extra Instruction, number of hours studied, and place of study.

If a midshipman's CQPR is below 2.0 at the completion of a semester, probation for the following semester is automatically imposed. A midshipman is also on automatic probation for the semester following two consecutive semesters in which the semester QPR is below 2.00, even if the CQPR is above 2.0.

USNAINST 5420.24G accordingly states that you are academically deficient if you:

- have a semester QPR below 1.50.
- fail two or more courses in one semester.
- fail any course after two or more prior course failures.
- fail to earn a 2.00 in summer school whether attended voluntarily or not.
- fail to remove probation.
- fail to fulfill any condition as prescribed by the Academic Board as the result of a previous deficiency.
- fail to successfully complete all requirements for graduation by the end of that semester in which you are scheduled to graduate.
- fail two or more courses behind the number of courses required by the end of a given semester according to that major's program matrix.
- fail to achieve the required standards in prescribed summer training.
- are deficient in physical education at the end of a semester or receive failing grades in conduct and military aptitude.
- fail a remedial course such as HE101, SM005 or HE344 (when directed to meet a writing deficiency)

Midshipmen deficient at the end of an academic term are separated from the Naval Academy unless retained by the Academic Board.

VII.6c Academic Boards

The Academic Board meets at the end of each academic term to review the cases of midshipmen who are deficient as defined in USNAINST 5420.24G. The Academic Board is composed of the Superintendent, the Academic Dean and Provost, the Commandant, and others appointed by the Superintendent. The Board reviews the academic records, MAPRs and COMPRs of deficient midshipmen, and makes a decision for retention or separation. Midshipmen who are retained by the Academic Board must report to the Advisory Board. This Board will carry out the decisions of the Academic Board and make changes to a midshipman’s academic and summer training programs as appropriate. Midshipmen
who are not retained by the Academic Board are permitted to appeal their case in person with their chain of command present, before the Academic Board.

VII.6d Academic Review Council

In conjunction with the January Academic Board, the Academic Review Council (ARC) composed of the Vice Academic Dean, the Deputy Commandant and the Director of Plebe Programs will meet with designated plebes with low QPRs and with plebes who were retained during the Academic Board record review. The purpose of the Academic Review Council is to provide encouragement and advice to help plebes improve their academic performance.

VII.6e MAPRs/COMAPs/Special MAPRs

Both military and civilian faculty are concerned about your military bearing and service suitability as well as your academic performance. In some classes, appearance and attitude may significantly affect your class participation grade. Instructors provide information about their students to company officers.

MAPR (Midshipman Academic Performance Report) is a MIDS module through which instructors provide information about a midshipman's academic performance. At the six and twelve week point, instructors will write MAPRs on every midshipman who has a D or an F in their courses. This includes your standing in the class, how much EI you have attended, and general comments on your effort and performance in class. These MAPRs are accessible to you, your adviser, and your company officer. At the end of the semester, every instructor will write MAPRs on each of his/her midshipmen whose record is to be reviewed by the Academic Board.

COMAP (Company Officer Midshipman Academic Performance Report), abbreviated COMAP in MIDS, is used by your Senior Enlisted Leader (SEL), Company Officer and Battalion Officer to provide their recommendation and comments to the Academic Board. These are completed at the end of the semester for all midshipmen whose record is reviewed by the Academic Board.

SPECIAL MAPRs can be submitted by faculty or staff to communicate information about midshipmen who are reviewed by the Academic Board.

MAPRs AND COMAPs ARE EXTREMELY IMPORTANT TO THE ACADEMIC BOARD IN DETERMINING IF AN ACADEMICALLY DEFICIENT MIDSHIPMAN SHOULD BE RETAINED AT THE NAVAL ACADEMY. Midshipmen should be familiar with the content of these MAPRs and COMAPs.

VII.7 What are final exams and reading days?

All courses, with a few exceptions approved by the Academic Dean and Provost, conduct a three hour final examination during the six or seven day examination period at the end of each semester. These final examinations usually count between 25% and 40% of your grade in a course. See your individual course syllabus for the weighting in each class.
Following the last day of classes in each semester, there may be a one or two day Academic Review and Study period. During this period, faculty members are available to assist midshipmen in course review. No other activities requiring midshipmen attendance may be scheduled during this period.

VII.8 How is my order of merit determined?

Your overall standing in your class is called the Order of Merit (OOM). Your OOM is used in assigning the lineal number that will establish your relative seniority once commissioned.

Your OOM is determined by your performance in academics, aptitude for commissioning, conduct, physical education, and athletics. Grades are assigned in each of these areas and weighted to calculate a total score for each of the eight regular semesters at the Naval Academy.

The academic component of the OOM is based on your semester QPR’s with bonuses for semesters with greater than 19 credit hours, Trident projects, VGEP, and extra courses. Semesters below 15 credit hours are penalized. USNAINST 1531.51 series contains a detailed explanation of the calculations involved. Grades earned during summer school do not affect the OOM. These grades do affect your CQPR, however. Likewise, grades earned when courses are repeated will not affect the OOM, but will change the CQPR. The OOM is described at https://www.usna.edu/acdean/usnainst/OOM/pdf.

VII.9 How many credits must I take each semester?

The minimum academic load in any semester is 15 credit hours. In a few special cases (generally a severe illness, accident, or for midshipmen in academic extremis and for those who are permitted to graduate late), the Academic Board may authorize a midshipman to carry less than 15 credit hours. There is an OOM penalty for a semester in which the academic load is fewer than 15 credits, whether approved by the Academic Board or not. Carrying more than 23 credits requires the approval of the Associate Dean for Academic Affairs.

During most semesters you can expect to carry 15-19 credits, depending on your progress through your major. Your actual time in class will vary from the number of semester hours due to lab periods included in many courses. Your time in class will be the sum of lecture-recitation hours and lab hours. Lab periods are typically scheduled for two consecutive class periods, but these two hours usually count as one credit hour.

VII.10 How do I drop or add a course?

Dropping or adding a course after the semester has begun must be discussed with your academic adviser. Dropping a course requires written approval of your academic adviser and the Associate Dean for Academic Affairs. The deadline to drop a course is the last day of the week in which the second marking period grades are submitted. Certain constraints apply. Falling two or more courses behind in your major will result in an academic deficiency and may result in your being separated. Remember that you will not be allowed to drop below 15 credits unless you have special permission from the Academic Board or the Academic Dean when the Academic Board is not in session.

Adding a course requires the written approval of your academic adviser, the instructor, the department chair, and the Academic Scheduling Officer. You can add a course prior to the 15th calendar day of the semester. For further details on making changes to your academic schedule, see your academic adviser.

VII.11 Are Academic Programs offered over the summer?
Several core courses and a few electives are offered during summer school. Summer school enrollment can be mandatory or voluntary. Mandatory summer school attendance is directed by the Academic Board or Academic Advisory Board because of academic deficiencies. If you began mathematics with SM005, you must attend summer school after plebe year to complete the academic requirements of fourth class year. Mandatory summer school may, in some circumstances, take the place of summer training. Your company officer can provide further information on the relationship between mandatory summer school and the summer professional training program.

If space is available, you have leave at the same time and you have the prerequisites, voluntary summer school may be elected. Voluntary summer school allows you to get ahead of your major matrix in order to prepare for VGEP, the Trident Scholars Program, a double major, a language minor, or to lighten your academic load in a future semester. You can also improve your CQPR by repeating a course in which a “D” or “F” was earned. You will still be required to complete all required summer professional training.

Information about summer school is posted on the Academic Dean’s web site and is also sent via e-mail to all midshipmen during the spring semester each year.

**VIII. SPECIAL ACADEMIC OPPORTUNITIES**

**VIII.1 What special academic programs does USNA have?**

For additional information on the below listed special programs, check out the various links on the Academic Dean’s web site at www.usna.edu/AcDean/program.html.

**VIII.1a Language Minor**

You can minor in French, German, or Spanish by completing or validating 12 credits at the 300/400 level (usually four courses). You can minor in Arabic, Chinese, Japanese or Russian with 12 credits at the 200 level or above. Courses taught in English do not count. You must also earn a 3.0 average in your language courses. See the chair of the Language Studies Department for more information.

**VIII.1b Dual Major**

You can double major at USNA. You have to complete the requirements for a single major, and then add any requirements for the second major that are different. You need to enroll in at least five courses (15 credits) in the second major that you did not use in meeting the requirements for the first major. Of the five required additional courses for a double major, you must enroll in four of them at the 300 level or above.

**VIII.1c Research Courses**

Most departments offer research courses for advanced students. After you have selected your major, check with your new academic adviser for individual department programs and their requirements. Typically, you must be a first or second classman and meet additional requirements set forth by the department.

**VIII.1d Honors Programs**
Nine majors have more challenging honors tracks that can let you participate in advanced courses and activities. Admission is usually based on academic standing both overall and within a major. See your academic adviser. The majors with honors tracks are: Applied Mathematics, Economics, English, History, Mathematics, Naval Architecture, Ocean Engineering, Oceanography, Political Science, and Systems Engineering.

VIII.1e Trident Scholar Program

The ultimate undergraduate research experience at USNA is the Trident Scholars Program. A Trident Scholar undertakes a yearlong research project for which the Scholar may receive credit equal to several courses. As with independent research courses, students must submit a proposal and maintain an appropriate academic standing. Talk to your academic adviser about selection criteria and available Trident projects.

VIII.1f Voluntary Graduate Education Program

If you want to get a head start on graduate education, you will be interested in the Voluntary Graduate Education Program (VGEP). If you are selected to participate in VGEP, you can devote your second semester of first class year, the summer after commissioning, and the following autumn to pursue a master’s degree at any number of local colleges and universities. You must be well ahead in your matrix to participate in VGEP. The time to start thinking about this is during plebe year; talk to your academic adviser about this long range plan. A briefing on VGEP is given to midshipmen fourth class in January each year. See the VGEP briefing slides on the Graduate Education Blackboard by logging onto the USNA Home Page Blackboard and scrolling down to see the “grad ed menu”. The Graduate Education Office is in Michelson, 384, and can be reached at 3-6334 or via yard mail, stop 9G.

VIII.1g Exchange Programs

If selected for this program, you may spend the fall semester of your first class year, an entire semester during second-class year, or the spring semester of third-class year as an exchange student at the Military Academy, Air Force Academy, Coast Guard Academy, or one of several service academies or civilian universities in foreign countries. See your chain of command for more information.

VIII.2 Can I attend graduate school upon graduation from the Academy?

Yes, you can enter a master’s program from the Academy. Selection is highly competitive. The Graduate Education Office can give you information about available scholarship programs.

You can enter the Medical or Dental Corps and attend medical or dental school straight from the Academy. Every year up to 15 midshipmen are selected for this program. Academic performance is the most important criterion used for selection. Also of great significance is the motivation for a career in Navy medicine or dentistry and performance in nonacademic areas. If you are interested in these programs, you should speak with your academic adviser and the chair of the Premedical/Predental Advising Committee, Professor C. Kinter, at 3-6629.
IX. PLAGIARISM

Plagiarism is treated very seriously at the Naval Academy. Committing Plagiarism is an honor offense which could lead to separation. It is important for you to read and understand the following statement.

USNA STATEMENT ON ACADEMIC PLAGIARISM

STANDARD

Academic plagiarism is the use of the words, information, insights, or ideas of others without crediting them through proper citation. Unintentional plagiarism, or sloppy scholarship, is academically unacceptable; intentional plagiarism is dishonorable. You can avoid plagiarism by fully and openly crediting all sources used.

GUIDELINES

1) Give credit where credit is due. Inevitably, you will use the other people’s discoveries and concepts. Build on them creatively. But do not compromise your honor by failing to clearly acknowledge where your work ends and that of someone else begins.

2) Provide proper citation for everything taken from others. Such material includes interpretations, ideas, wording, insights, factual discoveries, charts, tables, and appendices that are not your own. Citations must guide the reader clearly and explicitly to the sources used, whether published, unpublished, or electronic. Cite a source each time you borrow from it. A single citation, concluding or followed by extended borrowing is inadequate and misleading. Indicate all use of another’s words, even if they constitute only part of a sentence, with quotation marks and specific citation. Citations may be footnotes, endnotes, or parenthetical references.

3) Recognize the work of others even if you are not borrowing their words. Theories, interpretations, assessments, and judgments are all intellectual contributions made by others and must be attributed to them.

4) Paraphrase properly. Paraphrasing is a vehicle for conveying or explaining a source’s ideas and requires a citation to the original source. A paraphrase captures the source’s meaning and tone in your own words and sentence structure. In a paraphrase, the words are yours, but the ideas are not. It should not be used to create the impression of originality.

5) Cite sources in all work submitted for credit. Your instructor may also require you to identify the contributions of others in drafts you submit only for review. Ask your instructor for his or her citation requirements and any discipline-specific attribution practices.

6) Be cautious when using web-based sources, including Internet sites and electronic journals. There is a common misperception that information found on the Internet does not need to be cited. Web-based information, even if anonymous, must be appropriately cited. Do not cut and paste or otherwise take material from websites without proper citation.

7) Provide a citation when in doubt. Always err on the side of caution.