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Core Course Compendium

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ACADEMIC DEAN AND PROVOST INSTRUCTION 1531.21I

From: Academic Dean and Provost

Subj: THE CORE CURRICULUM

Encl: (1) Core Course Compendium

1. Purpose. To provide objectives and descriptions of the courses that comprise the core and divisional curricula at the Naval Academy.
2. Cancellation. Academic Dean Instruction 1531.21H. This directive is a complete revision and should be reviewed in its entirety; no special markings appear because revisions are extensive.
3. Background. The curriculum at the Naval Academy has undergone substantial change in the twelve years since the last version of this document. A new core program is now in place and the time seems appropriate to mark the point we have reached and to provide a benchmark for future assessment.

The core curriculum provides the central part of the educational experience of midshipmen. It is that part of the curriculum that is essentially common to all midshipmen in a graduating class. In total credits or number of courses, it is about two thirds of a midshipman's academic program. The core program contributes to the development of midshipmen as well-educated citizens and prepares them with the professional and technical background essential to assuming the duties of junior officers in the Naval Service.

The courses that are identified with the core program differ somewhat from major to major. The reason is that certain subjects that are covered in a core course for one major may be part of a major course requirement in another major. This booklet includes not only courses in the core but also courses that are classified as divisional requirements. These are courses in language studies and naval engineering that are required for all the majors of one or two divisions and are taken by 40% or more midshipmen in a graduating class.

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DIVISION I

ENGINEERING AND WEAPONS

EE301
Electrical Fundamentals and Applications
(3-2-4)

1. Specimen Text
 - a. Introductory Circuit Analysis, 9th edition, (by Robert L. Boylestad), Prentice Hall Publishing, 2000.
2. Prerequisites
 - a. Physics II (SP212 or SP222).
3. Objectives
 - a. Properly employ electrical engineering terminology and vocabulary.
 - b. Describe the behavior for sources, resistors, inductors, and capacitors.
 - c. Describe and utilize fundamental DC and steady state AC circuit analysis techniques including potential difference, current flow, and power transfer. Demonstrate computational skills in AC and DC circuit analysis.
 - d. Explain and calculate power consumption and power transfer in AC and DC circuits.
 - e. Construct electric circuits and measure electric quantities using meters and oscilloscopes.
 - f. Simplify and represent sophisticated electric circuits using simpler components.
 - g. Describe and calculate voltage, current, and power relations in three-phase, wye and delta circuits.
 - h. Describe energy conversion in transformers and typical applications and calculate associated parameters.
4.

<u>Course Content</u>	<u>Class Hours</u>
a. Course introduction and skills evaluation.	1
b. Basic analysis of series and parallel circuits including: sources, resistance, voltage, current, power, Kirchhoff's laws, dividers, and loading effects.	8
c. Analysis of series and parallel circuits using Nodal methods, Thevenin's theorem, and determining maximum power transfer.	4

d.	Characteristics of capacitors, inductors, and magnetism.	4
e.	Principles and techniques of AC circuit analysis including AC power transfer.	9
f.	RLC response, resonance, & filtering.	2
g.	Three phase power and transformers.	4
h.	Tests, review, & debrief.	9
i.	Final exam & review.	5

5.	<u>Laboratory Content</u>	<u>Lab Hours</u>
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a.	Introduction to laboratory workstations.	2
b.	Series & parallel DC circuit analysis, loading, and maximum power transfer.	10
c.	Oscilloscope and signal generator operations.	2
d.	DC transient analysis.	2
e.	AC circuits, resonance, and filtering.	6

6. Acquired Abilities. Upon completion of this course, the student should to be able to:

- a. Know and use the terminal characteristics for voltage sources, current sources, and passive linear devices in DC and AC circuits.
- b. Apply Ohm's Law, Kirchhoff's Laws, power relations, the superposition theorem, Thevenin's Theorem, and Maximum Power Transfer Theorem in fundamental DC and steady-state AC circuit analysis.
- c. Determine equivalent terminal characteristics of networks using Thevenin, Norton, and Superposition Theorems. Model circuits in terms of electrical equivalents and calculate values for equivalent elements.
- d. Describe and calculate capacitor and inductor transient behavior.
- e. Calculate parameters for periodic waveforms in the time and frequency domain.
- f. Perform an AC load power analysis for average power, reactive power, power factor, and apparent power. Apply the concept of power factor correction.
- g. Determine the frequency response for passive circuits.
- h. Analyze voltage, current, and power relations in three-phase, wye and delta circuits.
- i. Apply the primary to secondary current and voltage relationships for an ideal transformer. Differentiate between specific transformer applications regarding safety and power transfer.

EE302
Electrical Machines and Information Technology Systems
(3-2-4)

1. Specimen Text
 - a. Electrical Engineering Principles and Applications, 22nd Edition, (by Allan R. Hambley), Prentice Hall Publishing, 2001.
2. Prerequisites
 - a. EE301 or EE331.
3. Objectives
 - a. Describe the operating characteristics for linear machines, DC motors, and AC generators. Calculate steady state parameters and the response to changing conditions.
 - b. Describe binary numbers and how analog information is represented using digital signals.
 - c. Explain Boolean algebra and use analysis techniques to evaluate logic systems. Reduce complex logic systems using Boolean algebra and Karnaugh mapping techniques.
 - d. Describe the operation of sequential logic modules. Analyze and determine system response for a sequential logic circuit.
 - e. Describe computer architecture and the organization and operation of standard computer system elements. Explain basic parallel, pipelined, and RISC/CISC architectures.
 - f. Explain amplitude modulation/demodulation and how it is used to transmit information. Illustrate how a super-heterodyne AM receiver operates.
 - g. Describe how analog information is converted to digital information. List conversion advantages and disadvantages.
 - h. Explain how digital information is transmitted including specifics about satellite communications.
 - i. Describe networking terms, topologies, and protocols. Explain the function of networking hardware and the advantages of different transmission media.
 - j. Elucidate the factors affecting network performance and compare different network configurations.

4.	<u>Course Content</u>	<u>Class Hours</u>
	a. Linear machines, DC motors, and AC generators.	7
	b. Binary numbers, Boolean algebra, combinational logic, and sequential logic.	6
	c. Computer architecture, elements, organization, and operation.	3
	d. Amplitude modulation, demodulation, & super-heterodyne receivers.	5
	e. Analog and digital conversion and digital communications including satellites.	6
	f. Networking terms, topologies, protocols, hardware, connections, data flow, and performance.	9
	g. Tests and review.	4
	h. Final exam and review.	6
5.	<u>Laboratory Content</u>	<u>Lab Hours</u>
	a. DC motors and AC generators.	8
	b. Digital and sequential logic.	4
	c. Amplitude modulation and receivers.	4
	d. Digital/analog conversion.	2
	e. Satellite communications.	2
	f. Network simulation and performance evaluation.	2
6.	<u>Acquired Abilities</u> . Upon completion of this course, the student should to be able to:	
	a. Explain how DC motors and AC generators operate and calculate steady state parameters and the response to changing conditions.	
	b. Manipulate binary numbers and explain their use in modern computer and communication systems.	
	c. Use digital analysis techniques to evaluate logic systems and reduce complex logic systems using Boolean algebra and Karnaugh mapping techniques.	
	d. Determine sequential logic circuit response to different input conditions.	
	e. Describe standard computer architecture and explain how computer system elements are organized to perform complex operations. Demonstrate how parallel, pipelined, and RISC/CISC computer architectures enhance performance.	

- f. Describe how amplitude modulation is used to transmit information and methods for demodulation. Explain how a super-heterodyne AM receiver operates and illustrate the signal at each step in the process.
- g. Design basic analog to digital and digital to analog conversion circuits.
- h. Explain method used to transmit digital information including satellite communication specific.
- i. Describe networking terms, topologies, and protocols. Explain networking hardware functions and the advantages of different transmission media.
- j. Evaluate network performance and compare different network configurations.

EE331
Electrical Engineering I
(3-2-4)

1. Specimen Text
 - a. Introductory Circuit Analysis, 9th edition, (by Robert L. Boylestad), Prentice Hall Publishing, 2000.
2. Prerequisites
 - a. Physics II (SP212 or SP222).
3. Objectives
 - a. Develop the ability to understand and use electrical engineering terminology and vocabulary.
 - b. Develop computational skills in AC and DC circuit analysis.
 - c. Develop an understanding of power consumption and power transfer in AC and DC circuits.
 - d. Develop an understanding of electromagnetic and electrical machinery dynamics.
 - e. Develop the ability to construct electric circuits and to make measurements of electrical quantities using meters and the cathode ray oscilloscope.
4.

<u>Course Content</u>	<u>Class Hours</u>
a. Course introduction and skills evaluation.	1
b. Basic circuit analysis including: electrical sources (independent and dependent); applications of Kirchhoff's Laws and Joule's Law; nodal analysis; Thevenin's Theorem; source transformation, superposition principles; op-amp circuits.	8
c. First-order circuits including: I-V characteristics of inductors and capacitors; transient response; step response and pulse response.	5
d. Frequency domain analysis including: transformation between time and frequency domain; complex number manipulation (polar to rectangular or exponential forms), phasors.	4

e.	Power (AC + DC) including: instantaneous, average, and effective voltages and currents; instantaneous and average power; single-phase and three-phase AC distribution systems; power factor correction; maximum power transfer.	4
f.	Electromagnetics and electro-mechanical devices and energy conversion, including: transformers; generators; alternators; DC motors; three-phase induction motor; single phase induction motors.	19
g.	Tests.	4
h.	Examination.	3

5. Laboratory Content Lab Hours

a.	DC measurements and Kirchhoff's Laws.	2
b.	Thevenin's Theorem and Superposition.	2
c.	Use of the oscilloscope.	2
d.	Capacitors, inductors, and first-order circuit response.	2
e.	Impedance and network analysis.	2
f.	AC power and power factor correction.	2
g.	Generators.	2
h.	Motors.	2
i.	Lab practical.	2

6. Acquired Abilities. Upon completion of this course, the student should to be able to:

- a. Know and use the terminal characteristics of linear passive elements.
- b. Perform complete network analysis (including natural and forced responses) of DC and AC circuits.
- c. Determine equivalent terminal characteristics of networks using Thevenin, Norton, and Superposition Theorems.
- d. Calculate appropriate parameters of periodic waveforms in the time and frequency domain.
- e. Determine the frequency response of passive circuits.
- f. Perform an AC load power analysis; average power, reactive power, power factor, apparent power; be able to apply the concept of power factor correction.
- g. Analyze three-phase, wye and delta circuits.
- h. Apply the primary-secondary current and voltage relationships of an ideal transformer.
- i. Describe the operation of a linear machine as either a motor or generator.

- j. Explain and analyze the energy conversion process of motors and generators including induced voltages, current, and power using standard circuit models.
- k. Calculate speed changes and voltage buildup of DC machines using magnetization curves.
- l. Explain how to control the speed and direction of rotation of a DC motor and calculate the speed as conditions are varied.
- m. Describe the conditions that must exist to establish a rotating MMF, and to calculate the speed of this field.
- n. Analyze synchronous machines using equivalent circuits.
- o. Explain how an induction motor develops torque; be able to determine the slip of an induction motor and other machine dynamics.

EE332
Electrical Engineering II
(3-2-4)

1. Specimen Text
 - a. Introductory Circuit Analysis, 9th edition, (by Robert L. Boylestad), Prentice Hall Publishing, 2000.
2. Prerequisites
 - a. EE331.
3. Objectives
 - a. Develop fluency in the terminology of communication and digital circuit technology.
 - b. Develop an understanding of the behavior and application of first and second order filters.
 - c. Provide rudiments of transistor biasing.
 - d. Develop a working knowledge of amplifier small signal amplifiers including performance parameter calculations.
 - e. To present the terminal characteristics of common collector, emitter follower and differential amplifiers.
 - f. Develop an understanding for the characteristics of operational amplifiers and typical applications.
 - g. Provide the rudiments of radio receivers, transmitters, and the modulation and demodulation process.
 - h. Establish information about logic elements and digital devices that are basic for understanding microprocessor operation.
4.

<u>Course Content</u>	<u>Class Hours</u>
a. Transient response, frequency response, resonance, coupled circuits.	6
b. Diode, incremental models, BJT's, FET's, diode and transistor switching circuits.	6
c. Comparators, triggers, and rectifier circuits.	2
d. Small signal, feedback, and power amplifiers.	3
e. Radio frequency spectral analysis, attenuation, distortion, and noise.	2

f.	Radio communications, modulation, demodulation, and multiplexing.	3
g.	Digital logic, combinational, sequential, and arithmetic circuits.	6
h.	Digital instrumentation and digital communication.	2
i.	Microprocessors and memory.	2
j.	Operational amplifier applications.	1
k.	Tests.	3
l.	Examinations.	3

5.	<u>Laboratory Content</u>	<u>Lab Hours</u>
a.	First and second order circuits.	4
b.	Bijunction transistor amplifier.	2
c.	Switching circuits.	2
d.	Rectifier circuits.	2
e.	Power amplifiers.	2
f.	Communications and spectral analysis.	2
g.	Modulation.	2
h.	Combinational logic circuits.	2
i.	Microprocessors.	2
6.	<u>Acquired Abilities</u> . Upon completion of this course, the student should to be able to:	
a.	Understand the application of first and second order circuits used for filtering.	
b.	Draw and explain the incremental models of diodes and transistors.	
c.	Apply transistors and diodes for switching, triggering, and rectification.	
d.	Analyze transistor circuits used as small signal CE and CC amplifiers. Sketch signal waveforms at various points in the amplifier circuit.	
e.	Conceptually apply Fourier analysis of communication signals and show the effects of distortion and attenuation. Be able to calculate signal strengths of individual frequencies in a frequency spectrum.	
f.	Understand the application of transistors as modulators, diodes and filters as demodulators, and switching circuits as multiplexers used in communication circuits.	
g.	Know the function of radio transmitters and receivers. Explain AM and FM communication modes.	

- h. Understand conceptually the benefits and disadvantages of digital circuits used for communication and the associated signal processing.
- i. Construct truth tables for logic circuits using common logic.
- j. Synthesize logic functions from Boolean expressions.
- k. Understand the internal architecture of a microprocessor and how information is processed.
- l. Analyze circuits where the operational amplifier is used in typical applications such as an inverter, summer, follower, buffer, integrator or differentiator, and as the active element of filter circuits.

EM300
Principles of Propulsion
(3-2-4)

1. Specimen Texts

- a. Thermodynamics of Marine Engineering Systems, (Hawley, Wiggins, Vining, Lindler), Kendall Hunt Publishing Company, 2000.
- b. Steam Tables, Properties of Saturated and Superheated Steam, 18th printing, (by ABB Combustion Engineering), The Mailing Company Pubs.

2. Prerequisites

- a. Physics I (SP211 or SP221).

3. Objectives

- a. To develop an understanding of the interaction of the principles of fluid dynamics and thermodynamics in various fluid flow and transfer applications.
- b. To present the capabilities, limitations, advantages and disadvantages of internal combustion, gas turbine and steam turbine propulsion plants.
- c. To apply the principles of thermodynamics to each component of propulsion plants as well as to the entire thermodynamics cycle.
- d. To demonstrate the fundamentals of refrigeration and air conditioning devices.

4. Course Content

Class Hours

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|----|---|----|
| a. | Basic thermodynamics: first law, second law, steady flow and closed system processes. | 9 |
| b. | Perfect gas laws internal combustion engines. | 12 |
| c. | Gas turbines: Brayton cycle, compressors, turbines, combustors, single and split shaft turbines and ICRGTE. | 12 |
| d. | Steam tables and Mollier diagrams. | 3 |
| e. | Steam plant analysis: main engines, condensers, deaerating feed tank, boilers, pumps, nozzles and | |

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| | piping systems. | 6 |
| f. | Refrigeration and air conditioning systems. | 3 |
| g. | Fluid flow: Bernoulli's equation, head loss, pump work. | 4 |
| h. | Heat transfer: conduction and convection, heat exchangers. | 4 |
| i. | Laboratories: instrumentation, Diesel, gas turbine, Brayton computer model, steam refrigeration, pipe flow and heat exchanger. | 11 |
| j. | Electric propulsion. | 1 |
| k. | Tests. | 4 |
| l. | Examination. | 3 |
5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Apply the first and second laws of thermodynamics to components and thermodynamics cycles.
 - b. Use the steam tables, Mollier diagram and air tables to obtain thermodynamics properties.
 - c. Use fluid dynamics principles to evaluate piping system losses and pump requirements.
 - d. Use heat transfer principles to evaluate the performance of heat exchangers.
 - e. Calculate the thermal efficiencies for the Carnot cycle, Otto cycle, Diesel cycle, Brayton cycle, single shaft and split shaft gas turbine and Rankine cycle.

EN200
Principles of Ship Performance
(3-2-4)

1. Specimen Text
 - a. EN200 Course Notes Principles of Ship Performance, (Staff, USNA).

2. Prerequisites
 - a. NS100 and Physics I (SP211 or SP221) and 3/C cruise.

3. Objectives
 - a. Basic statics: To insure a fundamental understanding of force, equilibrium, centroids, and concepts such as moment of inertia, buoyancy, and flotation.
 - b. Stability: To understand several aspects of ship stability and the effects solid and liquid load variations have on both intact and damaged stability.
 - c. Ship survivability: To inform the student about those conditions which increase a ship's vulnerability to capsizing or sinking and how certain actions taken quickly can improve a ship's chance of surviving.
 - d. Strength of materials: To analyze the structural requirements of a ship by covering material properties and characteristics, stress, strain, beam bending, shear and moments, and how these influence the final design.
 - e. Resistance and powering: To examine the effects that frictional and wavemaking resistance have on effective horsepower. To expose the student to model testing and its role in predicting ship performance. To investigate propeller and cavitation concepts, overall propulsion efficiencies, and other powering related issues.
 - f. Seakeeping and maneuvering: To examine and model fundamental concepts associated with the motion of a ship in a seaway. To understand how a ship responds when its rudder is turned.
 - g. Submarines: To introduce the midshipman to the basics of submarine buoyancy, hull construction, stability, and performance characteristics.

- h. Engineering problem solving: To stress proper engineering problem solving techniques by emphasizing an analytical approach to solving encountered problems.

4. <u>Course Content</u>	<u>Class</u>	<u>Lab</u>
	<u>Hours</u>	<u>Hours</u>
a. Statics.	5	
(1) Free body diagram.		
(2) Moments, equilibrium, centroids, center of gravity, 2nd moment of area.		
b. Ship hydrostatics and stability.	20	12
(1) Table of offsets and curves of form.		
(2) Center of buoyancy and flotation.		
(3) Center of gravity.		
(4) Metacenter.		
(5) Inclining experiment.		
(6) Weight additions, removals, and shifts.		
(7) Cross curves of stability.		
(8) Righting arm and stability characteristics.		
(9) Free surface effect.		
(10) Damage stability.		
c. Ship materials, structure, and construction.	8	4
(1) Strength of materials (strength, toughness, ductility, brittleness, hardness).		
(2) Non-destructive testing.		
(3) Stress-strain relationships.		
(4) Material requirements.		
(5) Structural loading.		
(6) Beam bending theory.		
(7) Structural failure.		
(8) Ship structures.		
d. Resistance and powering.	7	4
(1) Components of hull resistance.		
(2) Powering predictions.		
(3) Hull and drive train efficiencies.		
(4) Propellers.		
(5) Cavitation.		

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| e. | Seakeeping and maneuvering. | 4 | 2 |
| | (1) Ocean waves. | | |
| | (2) Simple harmonic motion. | | |
| | (3) Ship motion in a seaway. | | |
| | (4) Rudder forces and ship turning. | | |
| f. | Submarines. | 3 | 2 |
| | (1) Submarine buoyancy. | | |
| | (2) Submarine construction. | | |
| | (3) Submarine stability. | | |
| | (4) Submarine resistance and maneuvering. | | |
| g. | Tests. | 2 | |
| h. | Review. | 1 | |
| i. | Final Examination. | 3 | |
5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Apply principles of statics to determine forces and moments.
 - b. Comprehend how a ship's hull form influences its hydrostatic properties.
 - c. Use principles of statics to determine a ship's equilibrium condition after weight additions, removals, and shifts.
 - d. Understand stability concepts and compute ship stability under various internal and external influences including: weight changes, flooding, damage, docking, grounding, and ballasting.
 - e. Understand material properties and be able to explain how these properties influence the materials selected for ship construction.
 - f. Explain the functions associated with a hull's structural members.
 - g. Use the principles of statics to solve for the internal and external forces and moments acting on a structural member and to predict the member's capability to resist these influences.
 - h. Understand the components of hull resistance and their effect on powering a ship.
 - i. Comprehend how model testing can help predict the power required to propel a ship at a desired speed.
 - j. Be familiar with ship propellers and how cavitation affects propeller performance.

- k. Know how a ship's rudder operates and how a ship behaves when turning.
- l. Explain how sea waves develop and propagate.
- m. Compute a ship's frequency of encounters with a wave system and predict its response.
- n. Understand the basics of submarine buoyancy, hull construction, stability, resistance, and maneuvering.

ES300
Naval Weapons Systems
(3-0-3)

1. Specimen Text

- a. Principles of Naval Weapons Systems, 1st Edition, (edited by CDR Joseph Hall,USN), Kendall-Hunt Publishing, 1999.

2. Prerequisites

- a. Calculus II (SM122 or SM162) and Chemistry II (SC112 or SC151) and Physics II (SP212 or SP222).

3. Objectives

- a. To provide an understanding of the basic purpose of current weapons systems through an analysis of the basic system functions:
- (1) Detect target
 - (2) Classify target
 - (3) Track target
 - (4) Assign weapons systems
 - (5) Neutralize target
- b. To provide an understanding of the fundamental steps required to solve a fire control problem regardless of the specific applications.
- c. To illustrate the integration of weapons systems through an introduction to diverse platforms and representative types of information processing systems.
- d. To provide an understanding of the primary damage mechanisms of both conventional and nuclear weapons.

4. Course Content

Class Hours

- | | |
|--|----|
| a. Sensor and detection systems: energy fundamentals, radar principles and systems, electro optics and infrared, electronic warfare, sonar principles and systems. | 10 |
|--|----|

b.	Tracking systems: automatic tracking, track-while-scan, electronic scanning and phased array.	7
c.	Weapon delivery systems: military explosives, nuclear effects, warheads, fusing, guidance, weapon propulsion, and launching systems.	8
d.	The fire control problem: reference frames and coordinates, miss-producing effects, prediction procedures.	3
e.	Electronic warfare and network centric warfare.	2
f.	Group weapon system project paper.	1
g.	Tomahawk Land Attack Missile presentation.	1
h.	Case studies.	1
i.	Homework, quizzes and exams.	4

5. Acquired Abilities

Upon completion of this course, the student should be able to:

- a. Use the max range equation to determine the distance between target and sensor at a given height.
- b. Know how the elementary dipole antenna transmits electromagnetic waves and how to calculate optimum antenna height.
- c. Know how to determine signal-to-noise ratio.
- d. Know how to calculate minimum discernable signal.
- e. Know how to calculate power gain, effective antenna aperture.
- f. Know how to calculate the combined speed between two contacts using doppler.
- g. Know how the moving target indicator determines target velocity.
- h. Know how to make phase difference computations.
- i. Know how to calculate the existence of a gray body.
- j. Use Stephan-Boltzman Law to determine the total power emitted for a body.
- k. Use Wein's Displacement Law, know how to calculate the maximum wavelength of a body at a given temperature.
- l. Understand what bandwidth factor means and how to calculate it.
- m. Utilize the max range equation for the IR sensor.

- n. Know how to calculate fuse safety and functional reliability by increasing safing and arming devices in either series or parallel.
- o. Balance the chemical equation for an explosion.
- p. Calculate oxygen balance from the chemical formula.
- q. Calculate relative strength using the berthelot approximation.
- r. Calculate fragment initial velocity following bomb detonation.
- s. Calculate the velocity of the fragment at a specific distance from the point of detonation.
- t. Calculate the damage and/or effects of a nuclear bomb.
- u. Combine multiple sound pressure levels in dB.
- v. Use the wenz curves to combine noise levels and determine the total ambient noise and the total noise level.
- w. Calculate transmission loss for a given range.
- x. Define figure of merit (FOM) and be able to calculate FOM for passive sonar and both active sonar noise-limited and reverberation-limited cases.
- y. Given FOM determine the propagation paths and ranges using a transmission loss curve.
- z. Know the advantages of towed array sonar system, and calculate directivity index of an array.

ES410
Control Systems and Their Application to Weapons
(3-2-4)

1. Specimen Text

- a. Control Systems Engineering, 3rd Edition, (Norman S. Nise), John Wiley & Sons, 2000.

2. Prerequisites

- a. ES300 and (SM212 or SM222) and (EE221 or EE331).

3. Objectives

- a. To provide an introduction to classical linear control system theory as it pertains to a variety of interdisciplinary problems involving primarily first and second order linear systems.
- b. To provide a unified approach to the mathematical modeling of electrical, mechanical, and combined systems.
- c. To investigate system stability and provide transient and steady-state analysis of system dynamic response to commanded inputs and disturbances.
- d. To provide the analytical tools and system simulation procedures through the use of computer simulation software and other laboratory exercises.

4. Course Content

Class Hours

- | | |
|--|----|
| a. Introduction to control systems. | 1 |
| b. Laplace transforms. | 3 |
| c. Modeling translational mechanical systems. | 3 |
| d. Modeling electrical systems. | 1 |
| e. Modeling rotational mechanical systems. | 3 |
| f. Block diagram notation and reduction principles. | 1 |
| g. Combined systems/modeling a DC Motor. | 3 |
| h. Poles, zeros and system response. | 4 |
| i. Stability and steady-state error. | 2 |
| j. Disturbances and superposition. | 1 |
| k. Root locus analysis and compensator design. | 9 |
| l. Frequency response techniques. | 12 |
| m. Control system simulation and design using MATLAB/SIMULINK. | 20 |

n.	Tests.	3
o.	Final Project.	10

5. Acquired Abilities

Upon completion of this course, the student should be able to:

- a. Solve ordinary, coupled, linear differential equations by laplace transform and matrix algebra.
- b. Determine system transfer functions.
 - (1) Define a transfer function.
 - (2) Graphically represent transfer functions in the s-plane.
 - (3) Represent transfer functions by block diagrams.
 - (4) Model simple mechanical, electrical, and electro-mechanical systems.
- c. Analyze system stability by Routh-Hurwitz criterion.
- d. Analyze the transient response.
 - (1) First order systems.
 - (2) Second order systems.
 - (3) Higher order systems.
- e. Analyze the steady-state response.
 - (1) Steady-state error.
 - (2) Static error constant.
 - (3) Disturbance error effects.
- f. Accomplish root locus analysis.
 - (1) Determination of system stability.
 - (2) Determination of system response.
 - (3) Compensator design.
- g. Accomplish frequency response analysis.
 - (1) Bode plot sketching.
 - (2) Determination of system stability.
 - (3) Determination of transfer function.
 - (4) Determination of static error constant.
 - (5) Compensator design.
- h. Perform simulation, analysis, and design of control systems using MATLAB/SIMULINK software.

DIVISION II

MATHEMATICS AND SCIENCE

SC111 & SC112
Foundations of Chemistry I & II
(3-2-4 & 3-2-4)

1. Specimen Texts

- a. Chemistry, 2nd ed., (McMurry & Fay), Prentice Hall, 1998.
- b. Solutions Manual Chemistry, 2nd ed., (McMurry & Fay), Prentice Hall, 1998.
- c. Some Naval Applications of Chemistry, 3rd ed., United States Naval Academy, 1993.

2. Prerequisites

- a. SC111: None.
- b. SC112: SC111.

3. Objectives

- a. To provide a broad background in chemistry to enable a midshipman to proceed in any physical science or engineering study both at the Naval Academy and the postgraduate level.
- b. To develop a critical thinking and systematic approach to problem solving in the classroom and laboratory using cooperative learning experiments.
- c. To introduce naval applications of chemistry throughout the course and provide an awareness of chemistry in military operations.
- d. To develop laboratory skills that reinforce and supplement the knowledge learned in the classroom.

4. Course Content

Class Hours

- | | |
|---|---|
| a. Atoms, molecules and ions. | 4 |
| b. Stoichiometry. | 4 |
| c. Gases. | 4 |
| d. Reactions in aqueous solutions. | 4 |
| e. Periodicity and atomic structure. | 4 |
| f. Ionic/covalent bonds, molecular structure. | 7 |
| g. Thermochemistry. | 5 |
| h. Gases/atmosphere/explosives. | 5 |

i.	Liquids, solids, phase changes.	2
j.	Naval fuels and lubricants.	2
k.	Polymers.	2
l.	Solutions.	3
m.	Kinetics.	4
n.	Equilibrium.	4
o.	Acid/base equilibrium.	5
p.	Applications of aqueous equilibrium.	4
q.	Thermodynamics.	5
r.	Electrochemistry/corrosion.	5
s.	Metals.	2
t.	Nuclear.	3
u.	Organic/biopolymers.	2
v.	Biochemistry/chemical Warfare.	2

5. Acquired Abilities. Upon completion of this course, a student should be able to:
- Classify matter as acids/bases, oxidizing/reducing agents, ionic/covalent compounds, and strong/weak electrolytes.
 - Explain the fundamental concepts of atomic and molecular structure and the interactions between atoms, molecules, and ions. Describe and calculate the macroscopic properties of gases, liquids, solids, and solutions (temperature, pressure, yields, phase changes, etc.).
 - Explain the fundamental laws of thermodynamics and kinetics for chemical and physical processes.
 - Identify the key regions of the electromagnetic (EM) spectrum and explain the interactions between EM radiation and matter (energy emission/absorption).
 - Apply the fundamentals of atomic and molecular structure to macromolecules (polymers/biopolymers). Explain the mechanism of action of chemical nerve agents.
 - Evaluate, qualitatively and quantitatively, the macroscopic properties of aqueous solutions (solubility, pH, properties of buffered systems, etc.).
 - Evaluate the macroscopic properties of metals (thermal and electrical conductivity, strength, reactivity, electrochemical potential) using the theories of atomic structure.

- h. Evaluate, qualitatively and quantitatively, the energy output of materials (nuclear and conventional explosives, nuclear and conventional fuel systems, fuel cells, batteries) in terms of the fundamental laws of thermodynamics. Design electrochemical systems and corrosion-prevention methodologies.

SM121
Calculus I
(4-0-4)

1. Specimen Text
 - a. Calculus, Concepts and Contexts, 2nd edition, (by James Stewart), Brooks/Cole, 2001.
2. Prerequisites
 - a. None.
3. Objectives
 - a. To review algebra and trigonometry through their use in calculus.
 - b. To review and expand upon the concepts of functions and graphs.
 - c. To introduce the concepts of limit and continuity.
 - d. To study the concept of the derivative along with its graphical, numerical, and algebraic properties.
 - e. To study methods for evaluating derivatives.
 - f. To apply derivatives to a number of practical problems including optimization, related rates, graphing, etc.
 - g. To use the calculator to reinforce the above concepts and objectives in an appropriate manner.
4. Course Content Class Hours
 - a. Precalculus review. 2
 - b. Functions and graphs. 10
 - c. Limits and continuity. 5
 - d. The concept of the derivative. 12
 - e. Rules and methods for evaluating derivatives. 12
 - f. Applications of the derivative. 13
 - g. Tests. 4
 - h. Final examination. 3
5. Acquired Abilities. Upon completion of this course, the student should be able to:
 - a. Describe functions numerically, algebraically, verbally, and graphically.
 - b. Find domain and range of functions.
 - c. Identify symmetry: even and odd functions.
 - d. Use and interpret the absolute value function.
 - e. Build new functions from old with function arithmetic.

- f. Transform (by shift and stretch) and compose functions.
- g. Identify the geometry of combining or transforming functions.
- h. Find appropriate viewing windows in graphing functions.
- i. Use zoom and trace features of graphing calculators to solve equations approximately.
- j. Define parametric equations.
- k. Sketch parametric curves.
- l. Convert between parametric and cartesian equations.
- m. Describe properties of exponential functions.
- n. Use exponential functions to model growth and decay.
- o. Describe inverse functions numerically, algebraically, verbally, and graphically.
- p. Define logarithms and use properties of logarithms.
- q. Test for one-to-one functions.
- r. Describe the tangent line as a limit of secant lines.
- s. Show local linearity by zooming in on a graphical calculator to get the tangent line.
- t. Describe average versus instantaneous rates of change.
- u. Describe the limit numerically, analytically, verbally, and graphically.
- v. Evaluate limits using limit laws to break down complicated functions.
- w. Compute two-sided and one-sided limits numerically, algebraically, and graphically.
- x. Identify when limits don't exist.
- y. Define continuity algebraically, verbally, and graphically.
- z. Determine points of continuity.
- aa. Give several types of examples of discontinuity.
- bb. Apply the Intermediate Value Theorem to obtain information about solutions of equations.
- cc. Define and find horizontal and vertical asymptotes.
- dd. Compute infinite limits.
- ee. Define the derivative algebraically.
- ff. Employ the definition to evaluate the derivative.
- gg. Find an equation for the tangent line.
- hh. Approximate the derivative given discrete data.
- ii. Verbally describe physical meanings of derivatives (first and second) with units.
- jj. Sketch the graph of the derivative from the graph of the original function.
- kk. Describe the derivative as a function rather than a single slope at a point.

- ll. Use the tangent line to linearly approximate a function.
- mm. Use derivatives to determine monotonicity and concavity of the graph.
- nn. Use derivatives to determine local extrema and points of inflection.
- oo. Sketch the graph of a function (up to vertical shift) from the graph of the derivative.
- pp. Differentiate polynomials, exponentials, and trigonometric and logarithmic functions.
- qq. Use the product rule and chain rule for differentiation.
- rr. Apply the derivative as a rate of change in the natural and social sciences.
- ss. Find derivatives implicitly and by logarithmic differentiation.
- tt. Approximate small increments with differentials.
- uu. Solve related rates problems.
- vv. Find local and global extrema.
- ww. Be familiar with the Extreme Value Theorem.
- xx. Apply the Mean Value Theorem.
- yy. Apply the first and second derivative tests to classify extrema.
- zz. Use derivatives to identify monotonicity and concavity.
- aaa. Use derivative information to sketch curves.
- bbb. Use L'Hospital's rule to find the limit of certain quotients.
- ccc. Solve optimization word problems.
- ddd. Use Newton's method and describe it geometrically.
- eee. Use direction fields to sketch antiderivatives.
- fff. Compute elementary antiderivatives.
- ggg. Employ notation for and determine derivatives of higher order.
- hhh. Use technology, graphing calculator, for symbolic calculation and for analyzing graphs and charts of data.

SM122
Calculus II
(4-0-4)

1. Specimen Text

- a. Calculus, Concepts and Contexts, 2nd edition, (by James Stewart), Brooks/Cole, 2001.

2. Prerequisites

- a. Calculus I (SM121 or SM131 or SM161).

3. Objectives

- a. To study the concept of integration and develop standard techniques of integration.
- b. To learn approximation techniques for integrals and how to evaluate improper integrals.
- c. To apply the concept of the integral to a variety of geometric and physical problems.
- d. To study the fundamentals of first order ordinary differential equations including modeling, direction fields, approximate solutions, and exact solutions for separable and linear equations.
- e. 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.
- f. To introduce vectors and vector algebra.
- g. To use the calculator and computer algebra system to reinforce the above concepts where appropriate.

4. Course Content

Class Hours

- | | |
|--|----|
| a. Concept of the integral. | 8 |
| b. Methods of integration. | 8 |
| c. Applications of the integral. | 12 |
| d. Differential equations. | 11 |
| e. Numerical sequences and series. | 5 |
| f. Power, Taylor and Maclaurin series. | 5 |
| g. Vectors and vector algebra. | 5 |
| h. Tests. | 4 |
| i. Final examination. | 3 |

5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Understand the notion of a Riemann sum.
 - b. Use Riemann sums to approximate areas and distances.
 - c. Define definite integrals.
 - d. Distinguish between area and signed area.
 - e. Use the linearity and comparison properties of the integral.
 - f. Interpret and use both parts of the Fundamental Theorem of Calculus.
 - g. Compute definite integrals with substitution handling the limits of integration both ways.
 - h. Compute definite integrals using integration by parts.
 - i. Integrate rational functions by using partial fraction decompositions.
 - j. Approximate integrals with left and right endpoints, midpoints, trapezoids, and Simpson's rule.
 - k. Identify relative sizes of approximations and exact integrals geometrically.
 - l. Define and evaluate both types of improper integrals.
 - m. Find areas between curves represented by functions of either x or y .
 - n. Sketch graphs and find areas enclosed by curves given by equations in polar coordinates.
 - o. Find volumes of revolution by slicing and by using concentric shells.
 - p. Find arc length by integration.
 - q. Use integration to solve physical problems related to work, hydrostatic pressure, and/or center of mass.
 - r. Translate word problems into appropriate differential equation models for RL or RC electric circuits using Kirchoff's law; for heating and cooling problems using Newton's Law of Cooling; for population and radioactive material involving exponential growth and decay; etc.
 - s. Distinguish between the general solution and an initial value solution to a differential equation.
 - t. Sketch direction fields and from them solution curves.
 - u. Identify geometrically equilibrium behavior and long-term behavior of solutions.
 - v. Use Euler's method to approximate solutions to differential equations.
 - w. Solve separable first order differential equations.
 - x. Solve first order linear differential equations using an integrating factor.

- y. Define sequence and limit of a sequence and find the limit. Know basic properties.
- z. Define infinite series and the notion of the sum. Know basic properties. Explain the divergence of the harmonic series.
- aa. Define geometric series.
- bb. Use the divergence test, the alternating series test, and the ratio test for convergence.
- cc. Define power series.
- dd. Represent functions with power series.
- ee. Determine the radius of convergence of a power series.
- ff. Obtain power series representations by differentiating and integrating given series.
- gg. Obtain Taylor and Maclaurin series for functions.
- hh. Add vectors, subtract vectors, multiply vectors by scalars.
- ii. Represent vectors graphically and interpret vector algebra graphically.
- jj. Evaluate the dot product of two vectors.
- kk. Use the dot product to find the scalar and vector projection of one vector upon another.
- ll. Evaluate the cross product of two vectors and interpret the result geometrically.
- mm. Use technology (such as the TI92 calculator and the Maple Computer Algebra System) to reinforce the above objectives where appropriate.

SM221
Calculus III with Vector Fields
(4-0-4)

1. Specimen Text
 - a. Calculus, Concepts and Contexts, 2nd edition, (by James Stewart), Brooks/Cole, 2001.
2. Prerequisites
 - a. Calculus II (SM122 or SM162).
3. Objectives. To study and apply:
 - a. Analytic geometry in two and three dimensions.
 - b. Vector algebra in two and three dimensions.
 - c. The differential calculus of functions of several variables.
 - d. The integral calculus of functions of several variables.
 - e. Vector calculus in three dimensions and the theorems of Gauss and Stokes.
 - f. Computations and graphics using a Computer Algebra System (CAS) and calculator for visual and numerical reinforcement of the above objectives where appropriate.
4.

<u>Course Content</u>	<u>Class Hours</u>
a. Analytic geometry and vector algebra.	10
b. The calculus of curves in space.	4
c. Multivariate differential calculus.	12
d. Multivariate integral calculus.	11
e. Vector calculus and fundamental theorems.	14
f. Computer Algebra System application.	3
g. Tests.	4
h. Final examination.	3
5. Acquired Abilities. Upon completion of this course, the student should be able to:
 - a. Analyze curves, surfaces, and regions in three-dimensional space, sketch them by hand, and use the CAS to produce more accurate renderings.
 - b. Use the algebra of vectors, especially the scalar and vector products to describe lines and planes, etc.

- c. Parameterize curves and surfaces in three-dimensional space using rectangular, cylindrical, and spherical coordinate systems, as appropriate.
- d. Determine the tangent vector to a curve and find the arc length.
- e. Determine the domains and ranges of multivariate functions and determine points of discontinuity.
- f. Find equations for planes that are tangent to given surfaces.
- g. Understand and apply the definitions and geometrical interpretations of partial and directional derivatives.
- h. Apply the Chain Rule for differentiating composites of multivariate functions.
- i. Compute and interpret the gradient of scalar-valued functions of two and three variables.
- j. Interpret partial derivatives geometrically.
- k. Use curl and divergence to analyze vector fields.
- l. Understand and apply the definitions of multiple and iterated integrals to compute areas, volumes, and mass.
- m. Change variables in an iterated integral to simplify its evaluation.
- n. Parameterize curves, surfaces, and regions of three space using rectangular, cylindrical, and spherical coordinates.
- o. Understand and compute line integrals of vector fields over curves.
- p. Understand and apply the Fundamental Theorem for the integration of conservative vector fields over curves and determine their potential functions.
- q. Understand and apply the theorem of Green for the integration of a vector field around a closed path.
- r. Understand and apply the Fundamental Theorem of Stokes for the integration of curl fields over closed surfaces.
- s. Understand and apply the Fundamental Theorem of Gauss for the integration of divergence fields over solid regions.
- t. Compute the flux of a vector field through a surface and the circulation of a vector field around a curve.
- u. Where appropriate, use a CAS (Maple), or calculator to compute and/or plot the entities in a-t above.

SM223
Calculus III with Optimization
(4-0-4)

1. Specimen Text
 - a. Multivariable Calculus, (by James Stewart), Brooks/Cole, 2001.
2. Prerequisites
 - a. Calculus II (SM122 or SM162).
3. Objectives. To study and apply:
 - a. Analytic geometry in two and three dimensions.
 - b. Vector algebra in two and three dimensions.
 - c. Differential calculus of functions of several variables.
 - d. Optimization techniques in several variables.
 - e. Integral calculus of functions of several variables.
 - f. Technological tools (computers and/or calculators) for visualization and numerical approximations in multivariable calculus.
4. Course Content Class Hours

a. Analytic geometry and vector algebra.	10
b. Vector Functions and Space-curves.	6
c. Multivariate differential calculus.	13
d. Optimization techniques.	7
e. Multivariate integral calculus.	13
f. Computer/calculator applications.	3
g. Tests.	4
h. Review for final examination.	2
5. Acquired Abilities. Upon completion of this course, the student should be able to:
 - a. Analyze curves, surfaces, and regions in three-dimensional space, sketch them by hand, and use a computer and/or calculator for more accurate renderings.
 - b. Understand and employ the algebra of vectors, including the scalar and vector products.
 - c. Represent curves (including lines and conic sections), surfaces (including quadrics), and regions of three space using rectangular, cylindrical, and spherical coordinates, as appropriate.

- d. Compute a tangent vector to a curve and a normal vector to a surface.
- e. Compute arclength of a curve in three dimensions.
- f. Determine domain and ranges of multivariate functions.
- g. Find partial derivatives of multivariate functions.
- h. Determine functions whose graphs are the planes tangent to given surfaces.
- i. Find and use linear approximations to multivariate functions.
- j. Understand and apply the definitions and geometric interpretations of partial derivatives.
- k. Apply the Chain Rule for differentiating compositions of multivariate functions.
- l. Compute and interpret the gradient of scalar-valued functions.
- m. Use partial derivatives to visualize geometric features of the graphs of functions of several variables.
- n. Use numerical methods to approximate values of partial derivatives.
- o. Use partial derivatives to solve extrema problems.
- p. Apply the method of Lagrange multipliers to solve extrema problems.
- q. Understand and apply the definitions of multiple and iterated integrals to compute areas, volumes, and mass.
- r. Set up and evaluate multiple integrals in Cartesian, polar, cylindrical, and spherical coordinates.

SM230
Probability with Naval Applications
(3-0-3)

1. Specimen Text.
 - a. Elementary Probability and Statistics, A Calculating Approach, (by John Turner), Wiley Custom Services, 2002.
2. Prerequisites
 - a. Calculus II (SM122 or SM162).
3. Objectives
 - a. Provide a background in the language and techniques of probability.
 - b. Show how probability can be applied to naval problems.
 - c. Introduce discrete and continuous random variables.
 - d. Demonstrate the connections between different aspects of probability, such as between conditional probability and random variables.
 - e. Provide an introduction to the notion of statistical inference and its relation to probability.
4. Course Content Class Hours
 - a. Conditional probability and Bayes Theorem. 9
 - b. Bernoulli process and binomial random variable. 6
 - c. Basics of statistical inference. 4
 - d. Poisson process and exponential random variable. 5
 - e. Sums and the normal distribution. 7
 - f. Uniform distribution and simulation. 2
 - g. Tests and review. 6
 - h. Final examination. 3
5. Acquired Abilities. Upon completion of this course, the student should be able to:
 - a. Set up the Venn diagram for a conditional probability problem.
 - b. Apply Bayes Theorem.
 - c. Discuss the application of Bayes Theorem to the searching problem.
 - d. Use the binomial, hypergeometric, Poisson, and normal CDF to solve problems.

- e. Use the binomial and Poisson CDF to solve for the number of trials and waiting time required for a given event.
- f. Find prediction bounds, confidence bounds, and test hypotheses for the binomial, negative binomial, Poisson, Erlang, and normal distributions.
- g. Apply the Markov property to various distributions and understand the particular importance of the exponential in this case.
- h. Compute the probabilities associated with the sum of two independent discrete random variables.
- i. Compute means and standard deviations of general discrete random variables.
- j. Use the normal CDF to find probabilities.
- k. Apply the Central Limit Theorem to the binomial and general discrete random variables.
- l. Compute probabilities from the uniform distribution.
- m. Compute the probabilities associated with a function of a random variable.
- n. Simulate discrete random variables and interpret the results.

SM212
Differential Equations
(4-0-4)

1. Specimen Text
 - a. Differential Equations with Boundary-Value Problems, 5th edition, (by Dennis Zill and Michael Cullen), Brooks/Cole, 2000.
2. Prerequisites
 - a. Calculus III (SM221 or SM223).
3. Objectives
 - a. To provide the standard methods for solving differential equations as well as methods based on the use of series and Laplace transforms.
 - b. To demonstrate how differential equations can be useful in solving many types of problems. In particular, to show how to translate problems into the language of differential equations, to find or numerically approximate the solution of the resulting differential equation subject to given conditions, and to interpret the solutions obtained.
4. Course Content Class Hours

a. Introduction.	1
b. First order differential equations.	4
c. Applications of first order differential equations.	3
d. Higher order linear differential equations.	7
e. Laplace transforms.	7
f. Applications of higher order differential equations.	6
g. Series solutions.	6
h. Systems of differential equations.	4
i. Fourier Series and boundary-value problems.	11
j. Numerical methods of approximating solutions.	5
k. Tests.	4
l. Final Examination.	3
5. Acquired Abilities. Upon completion of this course, the student should be able to:
 - a. Classify differential equations in terms of the concepts: ordinary, partial, order, linear.
 - b. Verify that a relation is a general solution or a particular solution of a differential equation.

- c. Find general solutions to first order differential equations that are exact, separable, or linear.
- d. Find solutions subject to given conditions.
- e. Plot the direction field and isoclines associated with a first order ordinary differential equation and superimpose solutions to linear differential equations.
- f. Write algorithms to approximate solutions to first order differential equations using the Euler and modified Euler methods.
- g. Set up, solve, and interpret first order differential equations arising in problems related to Newtonian mechanics, heat conduction, and population dynamics.
- h. Use the operator notation.
- i. Solve homogenous linear differential equations.
- j. Solve nonhomogeneous differential equations by the method of undetermined coefficients.
- k. Find Laplace transforms of given functions.
- l. Find Laplace transforms using tables.
- m. Find inverse Laplace transforms of functions.
- n. Use Laplace transforms to solve linear differential equations.
- o. Find inverse Laplace transforms using method of partial fractions and the method of convolution.
- p. Solve vibrating spring problems using standard methods and Laplace transform methods.
- q. Solve electric circuit problems using standard methods and Laplace transform methods.
- r. Recognize qualitative differences in the behavior of solutions to linear and nonlinear differential equations.
- s. Find series solutions of differential equations using the Taylor series method.
- t. Find power series solutions of differential equations.
- u. Solve Bessel's equation.
- v. Solve systems of differential equations by operator methods and Laplace transforms.
- w. Write a system of higher order equations as a system of first order equations and solve numerically.
- x. Solve electric networks which involve more than one branch using standard methods and Laplace transforms.
- y. Interpret heat-flow problems as boundary-value problems.
- z. Solve boundary-value problems using the method of separation of variables.
- aa. Obtain Fourier Series expansions of given functions.
- bb. Solve heat-flow problems using Fourier Series.

SP211
General Physics I
(3-2-4)

1. Specimen Text
 - a. Physics for Scientists and Engineers, 3rd edition, (by Douglas C. Giancoli), Prentice Hall, 2000.

2. Prerequisites
 - a. Chemistry II (SC112 or SC151). Coreq: Calculus III (SM221 or SM223 or SM251) or approval of department chair.

3. Objectives. To present the following physical principles and physical phenomena:
 - a. Kinematics.
 - b. Dynamics.
 - c. Newton's law of universal gravitation.
 - d. Work and energy.
 - e. Momentum.
 - f. Rotational kinematics.
 - g. Rotational dynamics.
 - h. Fluids.
 - i. Oscillations.
 - j. Waves.
 - k. Sound.

4. Course Content. Class Hours
 - a. Introduction to Physics. 1
 - b. Kinematics. 5
 - c. Newton's Laws. 6
 - d. Newton's Law of Universal Gravitation. 2
 - e. Work and Energy. 6
 - f. Momentum. 5
 - g. Rotation. 5
 - h. Fluids. 3
 - i. Oscillations and waves. 3
 - j. Sound. 5
 - k. Laboratory (complementary to lecture). 24
 - l. Exams. 4
 - m. Final exam. 3

5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Describe what physics is and how physical law is established.
 - b. Make order of magnitude estimates of physical phenomena.
 - c. Define position, displacement, average and instantaneous velocity, average and instantaneous acceleration.
 - d. Solve one- and two-dimensional kinematics problems involving constant acceleration.
 - e. Analyze uniform circular motion and relative motion.
 - f. Explain what force and mass are, list common forces. and identify action-reaction pairs of forces.
 - g. State Newton's laws and apply them to problems.
 - h. State Newton's law of universal gravitation and Kepler's laws and apply them to orbital motion.
 - i. Define work, kinetic energy, potential energy and power; state the law of conservation of energy and use it to solve dynamics problems.
 - j. Identify linear momentum; state the law of conservation of linear momentum and use it to solve problems involving elastic and inelastic collisions.
 - k. Locate the center of mass for a collection of particles.
 - l. Differentiate between average and instantaneous angular velocity and between average and instantaneous acceleration.
 - m. Relate angular velocity and acceleration to linear velocity and acceleration and solve rotational kinematics problems.
 - n. Define torque, rotational inertia, angular momentum and rotational kinetic energy and solve rotational dynamics problems.
 - o. State the law of conservation of angular momentum and use this principle to solve problems.
 - p. Define pressure, quote the equation for variation of pressure with depth in a fluid and point out the relationship between that equation and Pascal's principle and Archimedes' principle or buoyancy.
 - q. Reproduce the equation of continuity and Bernoulli's equation, explain how they apply to airfoils and sailboats, and use them to solve problems.
 - r. Characterize oscillations plus simple and damped harmonic motion and forced vibrations.

- s. Differentiate between longitudinal and transverse waves and explain reflection, transmission, and interference of waves, the Doppler effect and beats.
- t. Solve problems involving vibrating strings and air columns.
- u. Operate laboratory equipment such as a sonic ranger (motion detector), force sensor and signal generator.
- v. Collect, organize and analyze experimental data and show how that data can be used to verify physical law and understand physical phenomena.

SP212
General Physics II
(3-2-4)

1. Specimen Text
 - a. Physics for Scientists and Engineers, 3rd edition, (by Douglas C. Giancoli), Prentice Hall, 2000.
2. Prerequisites
 - a. Physics I (SP211 or SP221) or approval of department chair.
3. Objectives. To present the following physical principles and physical phenomena:
 - a. Electrostatics.
 - b. Resistance and capacitance.
 - c. Simple circuits and RC circuits.
 - d. Magnetostatics.
 - e. Electrodynamics.
 - f. Inductance and RL circuits.
 - g. Maxwell's equations and electromagnetic radiation.
 - h. Geometrical optics.
 - i. Physical optics.

<u>4. Course Content</u>	<u>Class Hours</u>
a. Introduction to electricity.	1
b. Coulomb's law and electrostatics.	7
c. Capacitance and dielectrics.	2
d. Resistance and simple circuits.	4
e. RC circuits.	1
f. Magnetostatics.	4
g. Faraday's law and inductance.	4
h. RL and RC circuits.	2
i. Maxwell's equations and EM waves.	2
j. Geometrical optics.	5
k. Physics optics.	5
l. Laboratory (complementary to lecture).	24
m. Exams.	4
n. Final exam.	3

5. Acquired Abilities. Upon completion of this course, the student should be able to:

- a. Distinguish between electric insulators and conductors.
- b. State Coulomb's law and use it to calculate the electric force between charges.
- c. Define electric field and calculate it using both Coulomb's Law and Gauss's Law.
- d. Recognize electric dipoles and solve problems involving them.
- e. Describe the motion of a charged particle in an electric field.
- f. Define electric potential difference, electric potential, electric potential energy difference and electric potential energy.
- g. Write and use the relationship between electric potential and electric field.
- h. Identify a capacitor and define capacitance.
- i. Solve problems involving capacitance networks.
- j. Relate resistivity and resistance and use Ohm's law.
- k. Solve problems involving resistance networks.
- l. State Kirchhoff's rules and use them to solve multi-loop circuits and develop the equations for a series RC circuit.
- m. Define magnetic field and find the magnetic force on moving charges and currents.
- n. Use the Biot-Savart Law and Ampere's law to find the magnetic field for simple current configurations.
- o. State Faraday's law and use it to solve problems and discuss generators and power transmission.
- p. Define self-inductance and solve problems involving LR and LC circuits.
- q. Quote Maxwell's equations and show how they give rise to electromagnetic radiation.
- r. Define index of refraction and use Snell's law to solve problems involving the effect of the index of refraction on the propagation of light.
- s. State the laws of reflection, use them to develop equations that describe images formed by spherical mirrors and use all equations to solve problems involving the reflection of light.
- t. Characterize thin lenses and solve problems involving images formed by them.
- u. Discuss diffraction of light and solve problems involving single- and double-slits.
- v. Explain thin-film interference and solve relevant problems.
- w. Characterize a diffraction grating and a Michelson interferometer and solve problems involving them.

- x. Discuss polarization and solve relevant problems.
- y. Use a digital multimeter.
- z. Use electric equipment such as batteries or power supplies and voltmeters and ammeters interfaced with a computer.
- aa. Collect, organize and analyze experimental data and show how that data can be used to verify physical law and understand physical phenomena.

DIVISION III

HUMANITIES AND SOCIAL SCIENCES

FC101 & FC102
Basic Chinese I & II
(3-0-3 and 3-0-3)

1. Specimen Text

- a. Integrated Chinese, Level 1 Part 1, Textbook, (Yao et al.), Boston: Cheng & Tsui, 1997.
- b. Integrated Chinese, Level 1 Part 1, Workbook, (Yao et al.), Boston: Cheng & Tsui, 1997.
- c. Integrated Chinese, Level 1 Part 1, Character Workbook, (Yao et al.), Boston: Cheng & Tsui, 1997.

2. Prerequisites

- a. FC101: None.
- b. FC102: FC101.

3. Objectives

- a. To teach basic pronunciation of Mandarin Chinese through the Romanized spelling system.
- b. To teach basic vocabulary on everyday topics.
- c. To teach basic grammatical patterns so that the students can express ideas and interpret meanings by following these patterns.
- d. To develop basic communication skills by means of dialogues and monologues.
- e. To establish native speech and culture patterns, and to develop awareness of differences between the Chinese and Western cultures.
- f. To teach reading and writing of square characters commonly used in the Chinese writing system, beginning with the basic strokes and radicals, and to develop students' abilities of generating and interpreting connected written texts in such characters.

4. Course Content

- a. Introduction of the Mandarin sound system and practice of the 400+ basic syllables with the 4 lexical tones.
- b. Practice of basic vocabulary items around various conversation topics, as presented in the texts.
- c. Practice of dialogues given in the texts and dialogues extended from the text models to the students' real-life situation.

- d. Discussion of grammatical notes and cultural traces involved in the texts.
 - e. Practice of grammatical patterns.
 - f. Practice of reading and writing characters.
 - g. Doing exercises in the workbook in and out of class.
 - h. Practice using various supplementary vocabulary items to express ideas in daily conversations.
5. Acquired Abilities. Upon completion of the two courses, students should be able to:
- a. Pronounce Mandarin words and sentences in acceptable pronunciation.
 - b. Know how to use the Mandarin alphabetic spellings to pronounce and transcribe new words.
 - c. Read and write about 300 characters and know their meanings in grammatical and discourse contexts.
 - d. Know approximately 300 vocabulary items, to include approximately 100 grammatical function words and approximately 200 content words.
 - e. Know how to use the learned vocabulary items in appropriate sentence patterns, following basic grammar rules in forming noun and verb phrases, affirmative and negative statements and questions, in word order, and in the use of grammatical markers.
 - f. Know how to perform basic speech acts such as greeting, getting to know people, describing people, objects and events, getting and receiving information, talking about time, schedule, and daily activities, talking about likes and dislikes, expressing personal feelings and ideas, making and declining offers, and making appointments.
 - g. Demonstrate understanding and awareness of cultural differences involved in basic language use and daily communication.
 - h. Demonstrate familiarity with certain basic aspects of the Chinese people and Chinese culture.

FC201 & FC202
Intermediate Chinese I & II
(3-0-3 and 3-0-3)

1. Specimen Text
 - a. Integrated Chinese, Level 1 Part 2, Textbook, (Yao et al.), Boston: Cheng & Tsui, 1997.
 - b. Integrated Chinese, Level 1 Part 2, Workbook, (Yao et al.), Boston: Cheng & Tsui, 1997.
 - c. Integrated Chinese, Level 1 Part 2, Character Workbook, (Yao et al.), Boston: Cheng & Tsui, 1997.

2. Prerequisites
 - a. FC201: FC102.
 - b. FC202: FC201.

3. Objectives
 - a. To continue training in the students' all-round language abilities of listening, speaking, reading and writing.
 - b. To enrich students' vocabulary coverage and grammar mastery, so that they can understand and express more complicated ideas in a wider range of topics.
 - c. To consolidate and strengthen students' ability of reading and writing Chinese characters, to the extent that they do not have to constantly rely on alphabetical spellings for pronunciation and communication.
 - d. To enhance students' cultural exposure by supplementing more culture-loaded language contents and more culture-oriented activities.

4. Course Content
 - a. Continued oral practice of dialogues, monologues and larger group discussions around textbook topics and extended speech situations.
 - b. Continued oral and written practice of new vocabulary items, their usage, and new grammatical patterns.
 - c. Enlarged amount of character reading and writing practice, with frequent tests of character memorization.
 - d. Extended and more integrated practice of course materials in addition to the workbook exercises.

- e. Introduction and exposure to authentic language materials from supplemented resources and discussion of their cultural contents as related to native language use.
5. Acquired Abilities. Upon completion of the two courses, students should be able to:
- a. Reach a better level of fluency and accuracy in both their receptive (listening and reading) and expressive (speaking and writing) skills.
 - b. Use another 300-400 new vocabulary items in their interpretation and expression of ideas.
 - c. Handle more sophisticated grammatical structures and idiomatic sentence patterns in longer and more comprehensive discourses.
 - d. Know a total of approximately 800 Chinese characters in their meanings, pronunciations, and their usage at both word level and sentence level.
 - e. Have the ability to perform a full range of speech acts as needed in native-like speech situations, and can communicate with native speakers, with relative ease, on common, daily-life topics.
 - f. Demonstrate a better understanding of and familiarity with the Chinese culture, people and society.

FF101 & FF102, Basic French I & II
FG101 & FG102, Basic German I & II
FS101 & FS102, Basic Spanish I & II
3-0-3 and 3-0-3

1. Specimen Text

a. FF101 & FF102, Basic French I & II:

- (1) Debuts text + Listening Comprehension CD, Book and CD Edition, (by Siskin), McGraw-Hill, 2002.
- (2) Debuts - Workbook/Lab Manual: Part I, Workbook Edition, (by Siskin), McGraw-Hill, 2002.
- (3) Debuts - Student Audio CD Program: Part I, Audiocassette edition, (by Siskin), McGraw-Hill, 2002.

b. FG101 & FG102, Basic German I & II:

- (1) Deutsch. Na Klar. An Introductory German Course, textbook, workbook, audio program, 3rd Edition, (by Di Donato, Cyde and Vansant), McGraw-Hill, 1999.

c. FS101 & FS102, Basic Spanish I & II

- (1) Entrevistas: An Introduction to Language and Culture, 2nd edition, Text & Listening Comprehension Tape +DC_R workbook/LM Part 1 and Part 2, by Davis, Siskin & Ramos), McGraw-Hill, 2000.

2. Prerequisites. (Note: FL is used in the following for FF, FG, or FS).

- a. FF101: None.
- b. FF102: FF101.
- c. FG101: None.
- d. FG102: FG102.
- e. FS101: One year of Senior High School Spanish.
- f. FS102: FS101.

3. Objectives. These courses aim to:

- a. Develop students' basic functional ability in speaking, listening, reading, and writing.
- b. Stimulate students' interest in foreign cultures and tolerance of cultural difference.
- c. Familiarize midshipmen with other beliefs and values.

FF101 & FF102, Basic French I & II
FG101 & FG102, Basic German I & II
FS101 & FS102, Basic Spanish I & II

- d. Encourage midshipmen to assess their own values through their knowledge of a foreign language.
- e. Enhance students' understanding of the nature of language as a structured mode of expression and a form of social behavior.
- f. Develop the basic tools for self-expression and collaborative interaction.
- g. Refine students' interpersonal and social skills.
- h. Foster communication, cooperation, and negotiation through the learning of a foreign language.
- i. Help midshipmen develop the ability to hypothesize about a cultural system based on language factors.

4. Course Content

- a. Video narrative, audio exercises, readings, written exercises for grammar practice, compositions, electronic forums, and regular interaction in the foreign language.

5. Acquired Abilities. Upon completion of these courses, students should be able to:

- a. Express basic practical needs in the foreign language.
- b. Engage in simple conversations on topics such as self and family, personal preferences, or daily activities.
- c. Negotiate basic situations in a culturally appropriate manner.
- d. Understand the gist and some details of straightforward narrative or expository texts.
- e. Comprehend and apply grammatical rules to sentence structures.
- f. Listen for specific information and control what is heard at a basic level.
- g. Perform writing tasks such as list-making or filling out forms; compose coherent short texts in paragraph or dialogue form.
- h. Demonstrate awareness of basic customs, values, and ways of life in the foreign culture.
- i. Understand the nature of language both as a discipline and as real-world behavior.
- j. Acquire the resources to search for information on selected topics.
- k. Personalize learning strategies.

FF201 & FF202, Intermediate French I & II
FG201 & FG202, Intermediate German I & II
FS201 & FS202, Intermediate Spanish I & II
(3-0-3 and 3-0-3)

[NOTE: Since the prerequisites, objectives, types of materials used, content studied, and skills acquired are generally similar for these three languages closely related to English, they are combined into a single description here. The abbreviations TL (target language) and TC (target culture) stand for the respective languages and cultures.]

1. Specimen Texts/Materials. All sections of a course use the same textbooks both semesters.
 - a. FF201-FF202:
 - (1) Bravo! Student Text, 4th edition, (by Muyskens), Heinle & Heinle, 2001.
 - (2) Bravo, Workbook / Lab Manual, 4th edition, (by Muyskens), Heinle & Heinle, 2001.
 - (3) Bravo, Lab Audio CD's, 4th edition, (by Muyskens), Heinle & Heinle, 2001.
 - (4) Bravo, System-D CD, 4th edition, (by Muyskens), Heinle & Heinle, 2001.
 - b. FG201-FG202:
 - (1) Fokus Deutsch Intermediate, Student Edition + Listening Comprehension Audio CD, (by Doschfritz et al.), McGraw-Hill, 1999.
 - (2) Schaums Outlines: German Grammar, 3rd Edition, Elke Gschossmann-Hendershot, McGraw-Hill, 1997.
 - (3) Collins Unabridged German-English / English German Dictionary, 4th edition (Terrell et al.), HarperCollins, 1999.
 - c. FS201-FS202:
 - (1) Recuerdos - Intermediate Spanish, Edition, (by Oscar Ozete), Harcourt College Publishers, 2001.
2. Prerequisites
 - a. FF201: FF102.
 - b. FF202: FF201.
 - c. FG201: FG102.
 - d. FG202: FG201.
 - e. FS201: FS102.

f. FS202: FS201.

3. Objectives

- a. Reinforce, broaden and deepen midshipman communication skills (listening, speaking, and, with increasing emphasis, reading and writing) and cultural proficiency to ensure successful interaction in an environment where the TL is spoken.
- b. Continue developing midshipman knowledge and accuracy in grammar and usage across a wider range of registers in the spoken and written varieties of the TL.
- c. Enrich midshipmen's active vocabulary in the TL and extend it to more abstract domains.
- d. Familiarize midshipmen with salient aspects and varieties of the TCs and ways of life, and foster their awareness and appreciation of cultural differences.
- e. Enable midshipmen to converse as well as express and support their opinions on a greater range of topics in a culturally sensitive manner in travel, social, academic and professional settings.
- f. Teach midshipmen to research, comprehend, summarize and report on current events and issues affecting the regions where the TL is spoken through online, print and broadcast resources.
- g. Prepare midshipmen to understand the perspective of the countries where the TL is spoken on their past and present relations with the United States.
- h. Guide the midshipmen to acquire efficient and effective strategies for consulting reference works and primary sources in the TL.
- i. Teach midshipmen how to understand and interpret appropriately documentary and feature films from the TC and to discuss them in speaking and writing in the TL.
- j. Give midshipmen the experience and motivation to continue building knowledge of the TL and TC through individual study or upper-level coursework.

4. Course Content

- a. Continue developing midshipmen's language and cultural competence from Advanced Beginner to Intermediate Level in speaking, listening, reading and writing.

FF201 & FF202, Intermediate French I & II
FG201 & FG202, Intermediate German I & II
FS201 & FS202, Intermediate Spanish I & II

- b. Acquire and reinforce grammar and vocabulary in the context of authentic materials.
 - c. Understand and interpret current cultural information from the Internet, from texts developed by instructor, and from documentaries, videotaped news, films, and print sources.
 - d. Acquire language and assess performance through daily homework practicing all four skills, individual and group oral presentations (including a formal briefing on a topic of cultural, academic or professional interest), numerous Internet-based spoken and written assignments, compositions, debates, quizzes, mid-term exams, and an oral and written final examination.
 - e. Address topics such as political, social, educational and cultural institutions, compared with their U.S. counterparts; salient figures, works and movements in literature, music and the arts; cultural traditions and history; travel, sports and leisure activities; interpersonal relations; challenges to society such as growing multiculturalism, economic disparities, the environment; economy and geography of the target regions.
5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Acquire more challenging grammatical structures and vocabulary.
 - b. Conduct research with resources in the TL and present the results orally and in writing.
 - c. View, understand, discuss and interpret visual materials (films, videos, print media, websites) presented in class.
 - d. Understand, appreciate and discuss cultural differences.
 - e. Write compositions on a variety of topics with a broader range of rhetorical devices, vocabulary and structures.
 - f. Deal with everyday situations of increasing complexity in the TL.
 - g. Become familiar with popular culture, life style and values of the TC.
 - h. Converse in a professional manner in the TL with appropriate fluency, structures and vocabulary.
 - i. Prepare for immersion in a country where the TL is spoken for study, travel, or professional assignments.

FJ101 & FJ102
Basic Japanese I & II
3-0-3 and 3-0-3

1. Specimen Text
 - a. Nakama 1 with Student Audio CD, Book and CD edition, (by Seiichi Makino), Houghton Mifflin, 1998.
 - b. Nakama 1: Workbook/Lab Manual 1, (by Seiichi Makino), Houghton Mifflin, 1998.

2. Prerequisites
 - a. FJ101: None.
 - b. FJ102: FJ101.

3. Objectives. Goals of the beginning Japanese courses are to:
 - a. Develop basic communication skills to exchange information and ideas on topics of current, public, and personal interest.
 - b. Develop basic literacy skills to comprehend and interpret written messages on familiar topics.
 - c. Develop students' understanding of socially and culturally acceptable language and behavior.
 - d. Encourage students to critically examine their own language system and cultural values.
 - e. Provide students with a learning environment and strategies fostering communication and cooperation.
 - f. Connect with other disciplines of interest to students.

4. Course Content. Includes but not limited to:
 - a. Small-group and pair work involving interviews, dialogues, and conversations, individual oral presentations, reading and writing memos and short messages in Japanese, sending and viewing email in Japanese, listening to CDs and audio tapes, viewing videos on various cultural topics, a field trip, a movie night, conversation table, and interacting with Japanese guests.

5. Acquired Abilities. Upon completion of the beginning Japanese courses, student should be able to:

- a. Conduct basic everyday communication in Japanese.
- b. Engage in conversations on various topics including self, school, community, routine activities, and weather.
- c. Understand critical elements of the Japanese language to communicate meanings in various situations.
- d. Read and write 46 Hiragana and 46 Katakana letters.
- e. Read and write approximately 150 Kanji compound words.
- f. Read and write short memos and messages in Japanese.
- g. Send and view emails in Japanese.
- h. Scan general meaning and extract detail from semi-authentic and authentic texts and materials on selected topics.
- i. Use the Kanji dictionary.
- j. Demonstrate understanding of customs associated with formal and informal communications.

FJ201 & FJ202
Intermediate Japanese I & II
3-0-3 and 3-0-3

1. Specimen Text
 - a. Nakama 2 with Student Audio CD, (by Seiichi Makino), Houghton Mifflin, 2000.
 - b. Nakama 2: Workbook/Lab Manual 2, (by Seiichi Makino), Houghton Mifflin, 2000.

2. Prerequisites
 - a. FJ201: FJ102.
 - b. FJ202: FJ201.

3. Objectives. Goals of the intermediate Japanese courses are to:
 - a. Develop further communication skills to express feelings and thoughts on a variety of topics.
 - b. Develop further literacy skills to comprehend and interpret written messages on a variety of topics.
 - c. Expand students' understanding of important elements of a cultural system.
 - d. Encourage students to compare the critical elements of the language system and cultural values studied with their own language and cultural values.
 - e. Develop necessary learning skills and strategies to continue the Japanese language study independently.
 - f. Encourage students to engage in the language study for personal enjoyment and enrichment.

4. Course Content. Includes but not limited to:
 - a. Small group and pair work for interviews, dialogues, and conversations, reading and writing memos and short messages in Japanese, sending and viewing messages using Japanese email, listening to CDs and audio tapes to practice listening, viewing videos on various cultural topics, a field trip, a movie night, conversation table, and hosting Japanese guests.

5. Acquired Abilities. Upon completion of this course, the student should be able to:

- a. Communicate more complex personal feelings and attitudes in both spoken and written language.
- b. Demonstrate use of a variety of levels and styles in both written and spoken language with increasing accuracy.
- c. Read and write additional 200 Kanji compound words.
- d. Develop ideas and plan, draft, revise, proofread, and edit his or her own work and that of other students.
- e. Use appropriate language and gestures that reflect cultural understanding in an expanding variety of cultural contexts.
- f. Use language skills and cultural knowledge to expand knowledge in other academic disciplines.

FR101 & FR102
Basic Russian I & II
(3-0-3 and 3-0-3)

1. Specimen Text

- a. Natchalo: When in Russia, book 1, 2nd Edition, (by Ervin, Lubensky, and Jarvis), McGraw-Hill, 2002.
- b. Workbook and Manual to Accompany Nachalo: When in Russia...Book 1, 2nd Edition, (by Ervin, Lubensky, and Jarvis), McGraw-Hill, 2001.
- c. Nachalo: Book 1 Student Audio Cd Program, 2nd edition, (by Ervin, Lubensky, and Jarvis), McGraw-Hill, 2002.
- d. Video Guide to Accompany Nachalo: When in Russia, 2nd Edition, (by Ervin, Lubensky, and Jarvis), McGraw-Hill, 1996.
- e. The Pocket Oxford Russian Dictionary, 2nd Edition, (by Howelett, Coulson, Rankin, Thompson), Oxford University Press, 2000.
- f. 501 Russian Verbs, 2nd Edition, (by Beyer), Barron's Educational Series, 2001.

2. Prerequisite

- a. FR101: None.
- b. FR102: FR101.

3. Objectives

- a. Provide midshipmen with basic communication skills necessary for survival in a Russian-speaking environment.
- b. Motivate midshipmen to become proficient in all four skills: listening, speaking, reading, and writing.
- c. Develop the basic tools for self-expression and collaborative interaction.
- d. Develop midshipman understanding of the language as a structured mode of expression and form of social behavior.
- e. Stimulate midshipman interest in Slavic culture and tolerance of cultural difference.
- f. Familiarize midshipmen with beliefs and values in Russia, and in the Community of Independent States.
- g. Enable midshipmen to converse in cultural appropriate manner.
- h. Encourage midshipmen to assess their own values through their knowledge of the Russian language.

- i. Help midshipmen to develop the ability to hypothesize about a cultural system based on language factors.
- j. Foster communication, cooperation, and negotiation through the learning of the Russian language.

4. Course Content

- a. Video narrative, audio exercises, readings, writing exercises for grammar practice, phonetic practices in lab, compositions, electronic forums, and regular interaction in the Russian language.

5. Acquired Skills. Upon completion of both basic courses, midshipmen are expected to:

- a. Learn to recognize new characters and sounds of the Cyrillic or Russian alphabet.
- b. Learn the correct pronunciation and writing of the Cyrillic letters.
- c. Understand and apply fundamental rules of grammar and syntax.
- d. Listen for specific information and control what is heard at basic level.
- e. Initialize a variety of language functions that will allow them to interact with another at a basic level.
- f. Express basic practical needs in the Russian language.
- g. Learn to initiate and sustain conversation on topics such as self and family, friends, students' life, free-time activities, daily routine, and situations typically encountered by tourists.
- h. Enable to understand the gist and some details of the spoken language and narrative or expository texts.
- i. Perform writing tasks such as list making or filling out forms; compose coherent short texts in paragraph or dialogue form.
- j. Understand the nature of language in both as a discipline and as real-word behavior.
- k. Recognize and use cultural appropriate gesture when interacting with Russian people.
- l. Personalize learning strategies.

FR201 & FR202
Intermediate Russian I & II
(3-0-3 and 3-0-3)

1. Specimen Text

- a. Natchalo: When in Russia, textbook 2 (with tapes, workbook, and video guide), 2nd Edition, (by Ervin, Lubensky, and Jarvis), McGraw-Hill, 2002.
- b. Workbook and Manual to Accompany Nachalo: When in Russia...Book 2, 2nd Edition, (by Lubensky), McGraw-Hill, 2002.
- c. Nachalo: Book 2 Student Audio Cd Program, 2nd edition, (by Ervin, Lubensky, and Jarvis), McGraw-Hill, 2002.
- d. 501 Russian Verbs, 2nd Edition, (by Beyer), Barron's Educational Series, 2001.

2. Prerequisite

- a. FR201: FR102.
- b. FR202: FR201.

3. Objectives

- a. Enhance midshipman basic functional ability in using the Russian language to sustain regular conversation.
- b. Motivate midshipmen to become proficient in all four skills: listening, speaking, reading and writing.
- c. Further integrate the knowledge acquired in basic Russian courses with new vocabulary, grammar and cultural information.
- d. Develop midshipmen's abilities to understand and use idiomatic Russian in communication.
- e. Foster communication, cooperation, and negotiation through the learning of the Russian language.
- f. Encourage midshipmen to analyze and assess their own values through their knowledge of the Russian language.
- g. Help midshipmen to develop the ability to hypothesize about cultural system based on language factors.
- h. Familiarize midshipmen with Russian beliefs and values in order to stimulate the tolerance of cultural difference.
- i. Deepen through the learning of the language midshipman knowledge of the society, and the life style in Russian and the Community of Independent States.

4. Course Content

- a. Video narrative, audio exercises, readings, written exercises for grammar practice, phonetic practices in lab, composition, electronic forums, and regular interaction in Russian.

5. Acquired skills. Upon completion of both intermediate courses, students are expected to:

- a. Learn idiomatic expressions and a great number of new Russian words used for everyday situations.
- b. Develop confidence in their ability to communicate their needs and ideas in idiomatic Russian.
- c. Communicate information about themselves, formulate question, and negotiate daily routines matters in an appropriate cultural manner.
- d. Better understand and apply rules and principles that govern sentence structures.
- e. Develop the ability to understand the spoken language at average tempo on a variety of topics.
- f. Enable creative writing based on material covered in the course.
- g. Acquire the resource to search for information on selected topic.
- h. Develop the understanding of the Russian language both as a discipline and as real-word behavior.
- i. Demonstrate awareness of basic customs, values, and ways of live in Russia and the Community of Independent States.

FX101 & FX102
English for Non-Native Speakers I & II
(3-0-3 and 3-0-3)

1. Specimen Text
 - a. Writing Clearly: An Editing Guide, 2nd Edition, (by Lane, J & Lange, E.), Heinle & Heinle, 1999.
 - b. Drama: A Pocket Anthology, 2nd Edition, (by RS Gwynn), Penguin/Longman, 2002.
 - c. Vice and Virtue in Everyday Life (selected essays and stories), 3rd Edition, (by Sommers), Harcourt Brace Jovanovich, 1993.
 - d. Lend Me your Ears: Great Speeches in History (selections) photocopies, (by Safire), Norton & Co, 1992.
 - e. Our Town, Paperback, (by Wilder), Perennial, 1998.
 - f. Cold Mountain, Paperback, (by Frazier), Vintage, 1998.
 - g. Of Mice and Men, Paperback, (by Steinbeck), Bantam, 2000.
 - h. The Joy Luck Club, paperback, (by Tan), Prentice Hall, 1994.
 - i. In the Lake of the Woods, Paperback, (by O'Brien), Penguin, 1995.

2. Prerequisites
 - a. FX101: Approval by department chair.
 - b. FX102: FX101.

3. Objectives
 - a. Promote communication skills necessary for living in an English-language environment with emphasis on American culture and values.
 - b. Promote reading for knowledge and pleasure.
 - c. Provide the opportunity to practice all four language skills: listening, speaking, reading and writing.
 - d. Enable midshipmen from a broad range of backgrounds to understand American culture through literature and discussion.
 - e. Explore each others' cultures to foment understanding.
 - f. Learn to analyze both poetry and prose.

- g. Develop rhetorical skills of argument in both writing and speech.
- h. Familiarize midshipmen with typical genres of literature in English.
- i. Increase vocabulary and confidence in spoken and written English.
- j. Attain confidence as an analytical reader.

4. Course Content

- a. Reading literary works, novels, poetry, short stories, essays.
- b. Writing expository essays.
- c. Speeches and oral presentations.
- d. Other writing assignments.
- e. Quizzes, tests, exams.

5. Acquired Skills

- a. Practice English vocabulary and pronunciation.
- b. Recognize and identify structural and stylistic elements of literature, such as genres and figures of speech.
- c. Formulate ideas informally in discussion.
- d. Express and argue ideas persuasively in writing, with an emphasis on concrete examples.
- e. Apply rules of grammar and punctuation effectively.
- f. Take useful lecture notes.
- g. Prepare outlines and bibliographies.
- h. Write paragraphs and essays in standard American English.
- i. Compare and contrast characters and themes in literature.
- j. Critique film versions of some texts.
- k. Research topics in the library and on the Internet.

FP 130
United States Government and Constitutional Development
(3-0-3)

1. Specimen Text

Instructors must choose one of the following texts:

- a. American Government, Seventh Edition, (Lowi, Theodore, and Benjamin Ginsburg), W.W. Norton Publishing Co, 2002.
- b. American Government: Continuity and Change, (O'Connor, Karen, and Larry Sabato), The interactive edition plus study wizard CD-ROM package, Addison Wesley Longman, Inc, 2000.
- c. The American Democracy, (Patterson, Thomas), Text plus CD-ROM plus study guide, McGraw Hill Publishing, 2000.

The Department has adopted one supplementary reader and one ethics reader. Instructors must incorporate both:

- d. The Lanahan Readings in the American Polity, (Serow, Ann G., and Everett C. Ladd (eds.)), Lanahan Publishers, Inc, 2000.
- e. The Lanahan Readings in American Government, Ethics, and Decision-Making, (Serow, Ann G. (ed.)), Lanahan Publishers, Inc, 2001.

2. Prerequisites

- a. None.

3. Objectives

- a. Prepare midshipmen to exercise authority decisively within the framework of the U.S. Constitution, American values, and the rule of law.
- b. Prepare midshipmen with a comprehensive understanding of the U.S. Constitution, the institutions of American government, and American values ready to take the commissioning oath with full awareness of its significance.

- c. Prepare midshipmen to recognize the origins of political and cultural diversity in keeping with American values and constitutional traditions.
- d. Prepare midshipmen to subordinate political self-interest to the common objectives of the American government.
- e. Prepare midshipmen to serve in international settings as ambassadors of American democratic ideals capable of explaining the key constitutional principles, values, processes, and institutions of the American government.

<u>4. Course Content</u>	<u>Class Hours</u>
a. Foundations of democratic government in America.	2
c. Separation of powers.	1
d. Federalism.	1
e. Political culture.	2
f. Political socialization.	1
g. Political parties.	2
h. Political participation.	2
i. Campaigns and elections.	2
j. Interest groups and pluralism.	2
k. Political action committees.	1
l. Communications media.	2
m. Public opinion.	1
n. Congress.	2
o. Presidency.	2
p. Bureaucracy.	2
q. Judiciary.	2
r. Civil liberties.	2
s. Civil rights.	2
t. The policy process.	1
u. Social policy.	2
v. Economic policy.	2
w. Foreign policy.	2
x. Exams.	2
y. Ethics issues and case studies.	3

- 5. Acquired Abilities. Upon completion of this course, the student should be able to:
 - a. Understand the belief system in the American political culture that promotes the rule of law and democracy and provides the tensions and contradictions that generate political disputes.

- b. Understand the basic principles built into the Constitution to allow self-government while limiting the powers of government to protect individual freedom.
- c. Understand the key role of the Bill of Rights in the achievement of American political ideals.
- d. Understand the constitutional roles and strengths and weaknesses of the American governmental institutions (Congress, the Presidency, the Judiciary, and the Bureaucracy) in achieving the broad goals of the constitutional processes of governance.
- e. Examine the nature of political discourse and decision-making in American politics, comparing an empirically derived picture with our ongoing struggle to achieve the American political ideals.
- f. Understand the nature of politics by examining one's own beliefs and interests to explore their origin, consistency, and validity, leading to a fuller comprehension and appreciation of the political views of others.
- g. Distinguish between governing principles and self-interest.
- h. Understand how the American governmental institutions create policy in the areas of economic policy, social welfare, and foreign policy.
- i. Trace the main contours of public policies in the modern era.
- j. Understand the political processes that result in governmental decisions and the responsibilities of the individual within that system.
- k. Emphasize the ethics of public service and the special confidence and trust of those who serve the people by working for the government.
- l. Possess the habit of considering the ethical aspects of official decision-making "up-front" as part of the special trust of being an officer, government employee, or political leader.
- m. Understand the responsibilities of good citizenship at all levels of political participation.
- n. Apply the scientific method to human behavior and political phenomena to develop individuals with the mental agility to think beyond their own preconceptions and individual experiences.
- o. Apply the core values and principles of the U.S. Constitution to governmental decision-making and problem solving.
- p. Develop oral communication as a key to effective decision-making and leadership.

- q. Emphasize writing as a process that focuses thought and forces clear, determined choices.
- r. Apply both the traditional and empirical methods of social science research to important questions concerning the American government.

HE101
Practical Writing
(3-0-3)

1. Specimen Text
 - a. The Holt Handbook, 6th edition, (by Kirszner and Mandell), Harcourt College Publishers, 2002.
 - b. Webster's Collegiate Dictionary, 10th edition, Merriam-Webster Incorporated, 1993.
 - c. Instructor-selected texts, which may include:
 - (1) A collection of essays.
 - (2) A style guide.
2. Prerequisites
 - a. Placement by department chair.
3. Objectives
 - a. To develop the ability to communicate effectively in writing.
 - b. To learn to write clearly, accommodating considerations of subject, audience, and purpose for writing.
 - c. To gain experience in using basic forms and formats for expository prose.
 - d. To develop practical writing skills that can be applied toward subsequent Academy study and future professional duties.
4. Course Content
 - a. Principles of composition (the sentence, the paragraph, the whole essay; organization and development; review of grammar and usage).
 - b. Principles of editing (practice in proofreading, revising, rewriting).
 - c. Practice in using rhetorical approaches (exemplification, definition, description, classification, analysis, comparison/contrast, cause/effect, argumentation).
 - d. Analytical reading of expository prose (as bases for class discussion, as models for imitation, as examples of techniques and approaches).

5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Read mature expository prose with better understanding.
 - b. Organize and compose a brief explanatory essay that covers a specific topic and addresses a particular audience.
 - c. Apply with competency the conventional principles of effective composition and correct usage.
 - d. Write clearly.

[NOTE: The items under "Course Content" above will be taught and practiced through a discussion-assignment-laboratory sequence in which one class meeting each week will be a writing workshop. In these sessions, the practical applications of writing and the mechanics of editing and revising will be emphasized. Hence, although reading assignments will accompany and lead into writing tasks, more than twice as much time will be devoted to writing practice than to the discussion of the content of reading assignments.]

HE111
Rhetoric and Introduction to Literature I
(3-0-3)

1. Specimen Text
 - a. The Holt Handbook, 6th edition, (by Kirszner and Mandell), Harcourt College Publishers, 2002.
 - b. Webster's Collegiate Dictionary, 10th edition, Merriam-Webster Incorporated, 1993.
 - c. Instructor-selected texts including a collection of essays, a collection of short stories, and a collection of plays.

2. Prerequisites. Satisfactory completion of HE101, if required, and:
 - a. HE101, if placed in this course, otherwise none.

3. Objectives
 - a. To write effectively through preparation of a series of short writing assignments.
 - b. To read and analyze mature expository prose through the study of the essay, the short story, and dramatic literature.
 - c. To understand and appreciate literary genres as formal expressions of cultural and human values.

4. Course Content Class Hours

While instructors of HE111 are allowed flexibility in the ordering and pacing of course topics, the following summary is typical:

a.	Review/overview of sentence structure, paragraph structure and development, organizational principles, and grammar and usage.	9
b.	Approaches to expository writing--the essay.	7
c.	Principles of proofreading, editing, revising.	3
d.	Elements of short fiction.	6
e.	Writing themes about literature.	2
f.	The short story in analysis.	6
g.	Critique of graded themes.	2
h.	Elements of drama.	4
i.	Drama in analysis.	6

5. Acquired Abilities. Upon completion of the course, the student should be able to:
 - a. Write effectively, organizing thoughts and ideas and putting them on paper in such a way as to communicate effectively.
 - b. Read analytically, understanding the value of literature as an expression of cultural and human values.

HE112
Rhetoric and Introduction to Literature II
(3-0-3)

1. Specimen Text

- a. The Holt Handbook, 6th edition, (by Kirszner and Mandell), Harcourt College Publishers, 2002.
- b. Webster's Collegiate Dictionary, 10th edition, Merriam-Webster Incorporated, 1993.
- c. Instructor-selected texts, which may include a collection of poetry and/or three to five novels.

2. Prerequisites

- a. HE111.

3. Objectives

- a. To write effectively through preparation of a series of writing assignments.
- b. To read and analyze mature writing through the study of poetry and the novel.
- c. To understand and appreciate literary genres as formal expressions of cultural and human values.

4. Course Content

Class Hours

While instructors of HE112 are allowed flexibility in the ordering and pacing of course topics, the following summary is typical:

- | | |
|--|----|
| a. Language of poetry. | 3 |
| b. Forms of poetry. | 3 |
| c. Poetry in analysis. | 10 |
| d. Elements of the novel. | 6 |
| e. Studies in the novel. | 14 |
| f. Principles of proofreading, editing, revising. | 2 |
| g. Critique of graded themes. | 2 |
| h. Research procedures, writing techniques, documentation. | 3 |
| i. Other appropriate research assignments. | 3 |

5. Acquired Abilities. Upon completion of this course, the student should have reinforced and refined those abilities acquired in HE111.

HH104
American Naval History
(3-0-3)

1. Specimen Texts

- a. Readings in American Naval Heritage (ed. Department of History, U.S. Naval Academy), Harcourt Custom Publishers, 2002.
- b. Instructor-selected readings, including:
 - (1) Readings that emphasize the development of strategic thought and practice.
 - (2) Readings that emphasize the development of the navy as an institution.
 - (3) Readings that place the navy within the context of national and international affairs.

2. Prerequisites

- a. None.

3. Objectives

- a. The primary objective of this course is to examine the historical development of the naval profession and American strategic thought in response to national and international events.
- b. Another objective of HH104 is to improve oral and written communication skills.
- c. The course also seeks to sharpen the critical and analytical skills needed by future officers not only to evaluate what they read, but also to deal with many of the day-to-day problems they will face in their professional and personal lives.

4. Course Content

Topical and Chronological Divisions:

- a. The antecedents and origins of the navy to 1798.
- b. The navy in the age of sail, 1798-ca. 1840.
- c. The steam and sail navy, ca. 1840-ca. 1880.
- d. The emergence of America as a naval power, ca. 1880-1945.
- e. The Cold War navy, 1945-1991.
- f. The post-Cold War navy, 1991-.

5. Course Description

a. This course examines the antecedents, origins, and development of the United States Navy and Marine Corps in the service of American continental and global interests. It examines the development of naval strategies and policies in their historical context and provides examples of the application of strategic thought.

6. Acquired Abilities. Upon completion of this course, the student should be able to:

- a. Evaluate problems dealing with national strategy and policy, the navy's role in world affairs, interservice relations, and civil-military relations in their historical contexts.
- b. Demonstrate an increased understanding of the history of the United States Navy.
- c. Appreciate the basic elements of historical research.
- d. Demonstrate a firmer grasp of critical and analytical skills.
- e. Improve written and oral communicative skills.

HH205
Western Civilization: Culture, Ethics, and Society to 1776
(3-0-3)

1. Specimen Texts

- a. Western Civilization, (Spielvogel), Wadsworth Publishing, 2002.
- b. Supplementary readings including:
 - (1) Plato, (Davidson et. al), McGraw Hill, 1965.
 - (2) Plutarch, (Plutarch, et. al), Random House, 2001.
 - (3) The Bible,
 - (4) Raoul of Cambrai, (ed. Abels), American Heritage Custom Publishing, 1998.
 - (5) Machiavelli, (Machiavelli, et. al), Penguin, 1979.
 - (6) Hobbes, (ed. Tuck), Oxford University Press, 2002.
 - (7) Enlightenment philosophies, (Specific titles chosen by the instructor)

2. Prerequisite

- a. None.

3. Course Objectives

- a. To convey basic knowledge of the western cultural and political heritage.
- b. To heighten geopolitical awareness by examining the impact of western values in the West's interaction with other cultures.
- c. To explore the interplay of rights and responsibilities, merit and reward, citizen and state.
- d. To foster critical thinking and effective writing about the issues in the course.

4. Course Content

Class Hours

- | | |
|--|----|
| a. Classical origins of western values (may include Near Eastern material). | 15 |
| b. Judaic, Christian, and Islamic values and cultures through the Middle Ages. | 15 |
| c. Renaissance, Reformation, and Enlightenment. | 15 |

5. Course Description

- a. HH205 examines the historical origins, evolution, and effects of key cultural, political, social, moral, and religious traditions in the West from the classical period through the Enlightenment.
- b. This course traces tensions between individual and community, critical practical and moral choices made by individuals and societies, and the ethical legacy of the past and its meaning today. It explores concepts of duty, loyalty, and command as well as conflicts of authority. Examining the role of material assets, demographics, and transport in the transformation of human society and in conflicts between societies lead the student to a new level of geopolitical awareness. The course integrates that study of the material conditions of human life with an understanding of historical concepts of deity and spiritual purpose.

6. Acquired Abilities. Upon completion of the course, the student should be able to:

- a. Understand and discuss the development of western values and culture.
- b. Read original documents and later interpretations with a critical eye, fostering critical writing and argumentation.
- c. Move beyond simple narrative description to include analysis and synthesis of various types of evidence.
- d. Exhibit a broadened understanding of human social, ethical, and legal systems from which current ethical issues can be examined.

HH206
Civilization and the Atlantic Community
Culture, Ethics, and Society Since 1776
(3-0-3)

1. Specimen Texts

- a. Nation of Nations, (by Davidson et. al), McGraw Hill, 2002.
- b. Classics of Western Thought, (ed. by Knoebel), Harcourt Brace, 1988.
- c. The American Political Tradition, (by Hofstadter), Knopf Publishing Group, 1989.
- d. A Crack in the Wall, (by Kruger), International Publishing Corp.
- e. Looking Backward, (by Bellamy), Dover Publications, Inc., 1996.
- f. U.S. Constitution.
- g. The Whiskey Rebellion, (by Slaughter), Oxford University Press, 1988.
- h. Coming to America, (by Daniels), Harper Trade, 2002.
- i. Narrative of the Life of Frederick Douglas, (by Douglas), Dover Publications, 1995.
- j. Great War and Modern Memory, (by Fussell), Oxford University Press, 2000.
- k. Worldly Philosophers, (by Heilbromer), Simon & Schuster, 1979.

2. Prerequisites

- a. HH205.

3. Objectives

- a. To deepen the student's understanding of contemporary western values and ethics, especially in modern America.
- b. To establish an historical perspective for assessing the choices made in the past and evaluating current social, cultural and ethical dilemmas in their historical context.
- c. To examine the moral and ethical implications of the impact of modernity on all facets of society.
- d. To improve intellectual skills through the rigors of historical analysis.

- e. To cultivate leadership skills suited to periods of dynamic change with an emphasis on geopolitical complexities.
- f. To develop clear, organized and thoughtful writing skills that will be the basis for future professional writing.

4.	<u>Course Content</u>	<u>Class Hours</u>
a.	American and French Revolutions (enlightenment context).	15
b.	Impact of science and technologies on values of Western societies.	15
c.	Integration of the West with the rest of the world.	15

5. Course Description

- a. HH206 pursues the study of Western values and ideas from the American Revolution to the present. In this course, the intellectual and ethical legacy of Europe is examined as a major influence upon the development of American culture. Particular emphasis is placed on the impact of Enlightenment ideas on the American and French revolutions (including an examination of the U.S. Constitution), the impact of the Industrial Revolution on the values and ideas of Western society and on the integration of the West with the world in the 20th century.

6. Acquired Abilities. Upon completion of this course, the student should be able to:

- a. Understand and respect the ethical underpinnings of contemporary American culture.
- b. Develop an appreciation for how cultures change historically and understand how and why particular values are important to different societies.
- c. Understand the impact industrialization has on modernity.
- d. Use historical examples and evidence to clarify present problems.
- e. Distinguish opinion from scholarly research, recognize rhetorical devices of advocates and defend against them.

DIVISION IV

PROFESSIONAL DEVELOPMENT

NL112
Leadership and Human Behavior
(2-0-2)

1. Specimen Text
 - a. Leadership and Human Behavior, 3rd edition (edited by LT Todd Finkler, USN), Pearson Custom Publishing, 2001.
2. Prerequisites
 - a. 4/C standing.
3. Objectives
 - a. To describe the basic thought process and develop individual thought processes to improve leadership related decision-making.
 - b. To examine different factors affecting individual performance, including stress and sleep deprivation, and apply techniques to minimize the negative effects.
 - c. To distinguish between different personalities of individuals and apply that knowledge to motivating the entire team.
 - d. To introduce the basics of motivation and evaluate the effectiveness in different leadership situations.
 - e. To distinguish between leadership and followership and determine the importance of followership.
 - f. To explain the importance of communication and apply techniques in leadership related negotiations.
 - g. To familiarize midshipmen with the characteristics of the naval profession and demands of honor placed upon its members as a result of its special responsibilities.
 - h. To explain the importance of professional standards and their inherent necessity within the naval service.

4. <u>Course Content</u>	<u>Class Hours</u>
a. Introduction to naval leadership and methods of study.	2
b. Human development: Trust and social changes.	2
c. Understanding people: Personalities.	4
d. Factors that affect performance.	7
e. Followership.	2

f.	Motivation.	3
g.	Communication.	2
h.	Conflict management and negotiation.	3
i.	The naval profession.	2
j.	Exams.	2

5. Acquired Abilities. Upon completion of this course, the student should be able to:

- a. Explain why knowledge of human behavior is valuable to a military leader.
- b. Describe critical thinking and its importance to the decision-making of the leader.
- c. Describe the importance of trust in effective military leadership.
- d. Describe some of the leadership challenges related to psychosocial development in a military with 50% of its personnel in the 17-25 year old range.
- e. Explain the concept of personality typing as a tool for both professional and personal interactions and describe its implications for your relationships and leadership performance.
- f. Explain the benefits and liabilities of different problem-solving approaches.
- g. Describe the nature and function of both short-term and long-term memory and how to enhance its effectiveness.
- h. Describe the research-validated approaches to managing time and reducing procrastination.
- i. Explain the importance of time management to your success as a naval officer.
- j. Describe the implications of sleep deprivation in operational environments.
- k. Describe the primary sources of stress, the implications of stress for health, and the primary strategies for coping with stress.
- l. Explain why it is important for a leader to be able to gauge the amount of stress both they and their personnel are under and determine the effect of this stress on performance.
- m. Describe the difference between leadership and followership and explain the dual role of leader and follower with which naval officers are confronted and how to cope with it.
- n. Explain the role of senior enlisted personnel in training junior officers.

- o. Apply the concepts of operant conditioning to the processes used to shape the behavior of military personnel.
- p. Define conformity and identify the factors that increase or decrease the influence of the majority and minority.
- q. Outline Maslow's Hierarchy of Needs theory of human motivation and describe how it could impact your approach to leadership.
- r. Define and discuss the fundamental attribution error and its complications for leadership.
- s. Explain the bystander effect and diffusion of responsibility and describe a strategy for reducing these phenomena in operational environments.
- t. Describe how a leader's listening abilities affect you as a follower, and listening techniques you could practice as a leader in order to help your subordinates.
- u. Describe the major components of persuasive communication and give examples of how you might use this information to heighten your effectiveness.
- v. Discuss the meaning and significance of emotional intelligence in leadership.
- w. Identify each of the strategies for coping with conflict and determine the situations in which they might be used.
- x. Describe the naval officer in terms of the characteristics or a professional.

NE203
Ethics and Moral Reasoning for the Naval Leader
3-0-3)

1. Specimen Text
 - a. Ethics for Military Leaders, 3rd edition, (edited by Dr. George Lucas), New York: Pearson Publishing, 2000.
2. Prerequisites
 - a. 3/C standing.
3. Objectives
 - a. To examine moral reasoning through familiarization with the major traditions of ethical thought.
 - b. To describe varieties of moral theory including relativism, utilitarianism, Kantianism, divine command, natural law, and virtue ethics, and the underlying philosophical positions of each.
 - c. To apply moral reasoning to recent history in the armed forces and to examples that one is likely to encounter at the Academy and in the fleet as a junior officer.
 - d. To examine the virtues central to the military officer and the various ways in which these virtues might be justified and applied.
 - e. To critique beliefs, arguments, assumptions and reasoning in one's own thinking, the media and in the course texts.
4. Course Content

	<u>Class Hours</u>
a. Course overview and introduction.	1
b. How to engage in moral reasoning.	2
c. Moral relativism theory.	6
d. Constitutional ethics.	3
e. Utilitarianism theory.	3
f. Virtue ethics.	3
g. Truth-telling and deception.	3
h. Concept of rights and liberty.	6
i. Theories of justice.	3
j. Natural law theory.	3
k. Divine command theory.	3
l. The justification and conduct of war.	6

- m. Stoicism. 3
- n. Exams. 4

5. Acquired abilities. Upon completion of this course, the student should be able to:

- a. Demonstrate familiarity with central concepts in prevailing theoretical approaches to morality: utilitarianism, duty ethics, virtue ethics, natural law, and divine command theories.
- b. Demonstrate knowledge of range of practical moral dilemmas arising in the profession of arms.
- c. Demonstrate ability to analyze moral problems and apply appropriate theoretical approaches to the resolution of such problems.

NL302
Leadership: Theory and Application
(2-0-2)

1. Specimen Text
 - a. Leadership Theory and Application, 3rd edition (edited by LCDR Gene R. Andersen, USN and LCDR Daniel B. Drake, USN), Pearson Custom Publishing, 2001.
2. Prerequisites
 - a. 2/C standing.
3. Objectives
 - a. To understand the organizational theory approach to leadership study.
 - b. To understand the types and use of power and differentiate between commitment and compliance.
 - c. To understand the importance of reflection to naval leaders.
 - d. To describe the various types of perceptual biases and errors and their impact on leadership.
 - e. To understand the importance of communication to leadership and the need for active listening and non-verbal communication skills.
 - f. To be able to display assertive behaviors.
 - g. To understand the importance of vision to leadership and be able to develop a vision.
 - h. To distinguish between transformational and transactional leadership and understand the circumstances under which each is most effective.
 - i. To describe the role of technical competence, peer leadership, delegation, and goal setting in becoming an effective division officer.
 - j. To understand the importance of followership and be able to describe characteristics of good followers.
 - k. To describe the nature of groups and some of the positive and negative behaviors highly cohesive groups may display.
 - l. To describe effective performance and personal counseling.
 - m. To distinguish directive and non-directive counseling techniques.
 - n. To understand Maslow's Hierarchy of Basic Needs and how a leader may use these needs as motivation.

- o. To describe Herzberg's Two-Factor Theory of Motivation and compare and contrast with Maslow's Theory.
- p. To understand the role that task characteristics and organizational characteristics play in leadership situations.
- q. To define organizational culture and know the characteristics of supportive command climates.
- r. To distinguish constructive and destructive personal conflict and strategies for coping with conflict.
- s. To understand the effects of stress on the decision-making process.
- t. To describe the qualities of effective combat leaders.
- u. To use the case method to study and apply course objectives to various leadership scenarios.

4.	<u>Course Content</u>	<u>Class Hours</u>
	a. Course introduction overview.	3
	b. The leader.	9
	c. The followers.	8
	d. The situation.	8
	e. Semester review.	1
	f. Exams (6-week, final).	4

5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Effectively apply the objectives to various leadership situations in Bancroft Hall and the Fleet.
 - b. Recall and cite specific incidents and case studies discussed to amplify and illustrate the objectives.
 - c. Use the experiences and lessons presented by the instructors and the text to forge successful careers as Navy and Marine Corps Officers.

NL400
Law for the Junior Officer
(2-0-2)

1. Specimen Text
 - a. NL400 - Law for the Junior Officer, CD-ROM,
(Maintained by Leadership, Ethics and Law Department).

2. Prerequisites
 - a. 1/C standing or permission of department chair.

3. Objectives
 - a. To provide midshipmen with practical information that will help them solve some of the legal issues they will confront as junior officers in the Navy and Marine Corps.
 - b. To acquaint midshipmen with the military justice system.
 - c. To provide the midshipmen with an understanding of the various administrative procedures in the military such as non-punitive measures, non-judicial punishment, and administrative separations.
 - d. To introduce midshipmen to basic principles of international law, the law of the sea, law of armed conflict and U.S. standing rules of engagement.

4.

<u>Course Content</u>	<u>Class Hours</u>
a. Introduction to military law and the sources of law.	1
b. Military investigations.	3
c. Search and seizure.	4
d. Self-incrimination.	2
e. Non-punitive measures and non-judicial punishment.	2
f. Administrative separations.	3
g. Courts-martial.	3
h. Military offenses.	3
i. International law.	1
j. Law of the sea.	1
k. Law of armed conflict.	2
l. Rules of engagement.	2

5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. To have an understanding of the military justice system and its unique role in the Naval Services.
 - b. To discern the tension between the oft-competing interests of unit good order and discipline and fairness to the individual.
 - c. To conduct a preliminary inquiry investigation into the allegations of violations of the UCMJ.
 - d. To understand the different types of criminal and administrative investigations.
 - e. To conduct a command investigation, such as a JAGMAN and if necessary make line of duty/misconduct determinations.
 - f. To conduct and evaluate a lawful search and seizure of evidence.
 - g. To properly advise a military suspect of his/her rights under law prior to obtaining a statement from the suspect.
 - h. To understand the administrative separation process for both enlisted and officer personnel and for them to be able to advise their command on administrative discharge options.
 - i. To understand the role and function of the various elements of the military justice system - i.e. non-punitive measures, non-judicial punishment, and courts-martial.
 - j. To have a basic knowledge of some of the common military offenses, which are punishable under the UCMJ.
 - k. To understand the basic concepts and sources of international law.
 - l. To comprehend the foundation of law of the sea and the different concepts that makes up that body of law.
 - m. To understand the basic principles of the law of armed conflict such as combatants and non-combatants, targeting, weapons, and war crimes.
 - n. To be familiar with the concepts and sources of rules of engagement and how they are utilized in the fleet.

NS100
Fundamentals of Naval Science
(3-2-4)

1. Specimen Texts

- a. Fundamentals of Naval Science, 11th edition, (Seamanship and Navigation Department), Kendall/Hunt Publishing Company, 2003.
- b. Navigation Rules, COMMANDANT INSTRUTION M16672.2D, (U.S. Coast Guard), U.S. Government Printing Office, 1999.
- c. Seamanship - Fundamentals for the Deck Officer, (David O. Dodge and S. Kyriss), Naval Institute Press, 1981.
- d. Marine Navigation, 4th edition, (Richard R. Hobbs), Naval Institute Press, 1998.
- e. The American Practical Navigator, Bowditch, (National Imagery and Mapping Agency (NIMA)), National Imagery and Mapping Agency, 2002.

2. Prerequisites

- a. 4/C standing.

3. Objectives

- a. Familiarize 4/c midshipmen with the fundamentals of chart end electronic navigation and piloting; nautical rules of the road; maneuvering board techniques; seamanship; marine propulsion; and damage control.
- b. Provide 4/c midshipmen with the required skills to carry out their tasks during 3/c yard patrol craft summer cruise.

4. Course Content

Class Hours

- | | |
|---|----|
| a. Piloting, navigation and electronic navigation. | 26 |
| b. Nautical rules of the road. | 9 |
| c. Maneuvering boards piloting, navigation and electronic navigation. | 9 |
| d. Seamanship, marine propulsion and damage control. | 25 |

5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Identify the main types of chart projections and digital charts, instruments and equipment used in marine navigation.
 - b. Plot a track and conduct basic coastal navigation and piloting using paper and Digital charts.
 - c. Be familiar with the definitions involved in Inland and International Rules of the Road, as well as specific lights, dayshapes, and sound signals.
 - d. Use a maneuvering board to obtain solutions to contact tracking, stationing, intercept, and wind problems.
 - e. Be familiar with the fundamentals of seamanship, marine propulsion systems, damage control, and radiotelephone procedures.
 - f. Be successful during the summer underway training onboard a yard-patrol craft.

NN204
Navigation and Piloting
(2-2-3)

1. Specimen Texts

- a. Seamanship - Fundamentals for the Deck Officer, (David O. Dodge and S. Kyriss), Naval Institute Press, 1981.
- b. Marine Navigation, 4th edition, (Richard R. Hobbs), Naval Institute Press, 1998.
- c. The American Practical Navigator, Bowditch, (National Imagery and Mapping Agency (NIMA)), National Imagery and Mapping Agency, 2002.
- d. Longitude, (Dava Sobel), Penguin Books, 1995.

2. Prerequisites

- a. NS100 and LANTPATRAMID.

3. Objectives

- a. The course is designed to further the beginning piloting learned during the first course, NS100, and applied during the summer cruise aboard the YPs.
- b. A short review, followed by advanced navigation topics, provide midshipmen with the tools necessary to stand watch as an Officer of the Deck (OOD) on any naval ship. The topics include areas of celestial navigation as well as the newest technology used for fleet applications.

4. Course Content

Class Hours

- | | |
|---|----|
| a. Piloting, navigation and review
electronic navigation. | 23 |
| b. Sunrise, sunset/celestial
theory/celestial navigation. | 20 |
| c. Weather/storm avoidance/tides
& currents/voyage management system
and integrated bridge systems. | 18 |

5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Identify and be able to use the main types of celestial navigational instruments and equipment used in marine navigation.
 - b. Plot a celestial fix and understand the basic fundamentals of celestial navigation.
 - c. Be familiar with tide and current characteristics and the effects that they have upon safe navigation.
 - d. Understand the basics of land navigation and the relationship between charts and maps, with increased emphasis on joint-service operations and the understanding of a grid coordinate system for naval surface fire support and strike mission planning.
 - e. Use a marine sextant to shoot an observed body and learn how to read the instrument for a correct (hs) value.
 - f. Be familiar with the fundamentals of calculating a ship's latitude by observing the sun during noon, local apparent noon, and polaris.
 - g. Be able to calculate sunrise and sunset using the nautical almanac.
 - h. Be familiar with the electronic chart display system and voyage management system.

NS310
Strategy & Tactics
(1-2-2)

1. Specimen Texts

- a. On War, (Carl Von Clausewitz), Penguin Books, 1982.
- b. The Art of War, (Sun Tzu), Shambhala Publications, Inc., 1991.
- c. The American Way of War, (Russell F. Weigley), Indiana University Press, 1973.
- d. Roots of Strategy, Book 4, (David Joblonsky), Stackpole Books, 1999.

2. Prerequisites

- a. NN204.

3. Objectives

- a. Introduce the history of classical strategic thought.
- b. Describe how principles of warfare established by classical strategists influenced the development of U.S. National Strategy.
- c. Analyze the changes wrought in warfare tactics and strategy as a result of major national and world conflicts.
- d. Analyze the changes wrought in warfare tactics and strategy as a result of major changes in technology and force structure.
- e. Introduce the tactical employment of naval forces in the primary naval warfare areas.

4. Course Content

Class Hours

- | | |
|--|----|
| a. Current U. S. policy and doctrine. | 4 |
| b. Strategic concepts. | 8 |
| c. Applying strategic concepts to history. | 7 |
| d. Current tactics. | 14 |
| e. Tactical labs. | 4 |

5. Acquired Abilities. Upon completion of this course, the student should be able to:

- a. Describe Clausewitz's view of warfare and its place as an instrument of national policy.

- b. Describe Jomini's principles of warfare and explain how they influenced early American strategy.
- c. Demonstrate how the ideas of Clausewitz and Jomini impacted strategy used during the American Civil War.
- d. Describe Mahan's theories on naval warfare and how they were applied during World War I.
- e. Compare Corbett's view of warfare to that of Clausewitz.
- f. Analyze the changes wrought in warfare and strategy by World War I.
- g. Explain the development of airpower theory led by Mitchell and Douhet and describe its impact on World War II.
- h. Describe the changes in naval tactics generated by the creation of the aircraft carrier as observed during the Battle of Midway.
- i. Explore the relationship between politics and military action as established by the principle of deterrence in the Cold War and the concept of revolutionary warfare in Vietnam.
- j. Describe the challenges of joint operations in modern warfare and explain the importance of cooperation amongst the military services.
- k. Explain the importance of command and control in today's military environment.
- l. Understand the concept of forward presence and recognize the role of the navy during military operations other than war.
- m. Understand the tactical employment of naval forces in the primary naval warfare areas such as air warfare, surface warfare, undersea warfare, expeditionary warfare, and strike warfare.
- n. Be familiar with the platforms and weapon systems associated with each of the primary warfare areas.
- o. Describe basic tactical warfare concepts and apply them to battle scenarios in the primary naval warfare areas.

NS401
Surface Warfare Junior Officer Practicum
(2-2-3)

1. Specimen Texts

- a. Watch Officer's Guide, 14th edition, (James Stavridis), Naval Institute Press, 2000.
- b. Guide To Naval Writing, 2nd edition, (Robert Shenk), Naval Institute Press, 1997.
- c. Blue Jacket's Manual, 22nd edition, (Thomas J. Cutler), Naval Institute Press, 1998.
- d. Division Officer's Guide, 10th edition, (James Stavridis), Naval Institute Press, 1995.
- e. Service Etiquette, 4th edition, (Oretha D. Swartz), Naval Institute Press, 1988.
- f. Network Centric Warfare, 2nd edition, (Alberts, Garska, Stein), CCRP Publications, 2000.
- h. America's Team - The Odd Couple, (Frank Aukofer, William P. Lawrence), The Freedom Forum First Amendment Center, 1995.

2. Prerequisites

- a. 1/C standing.

3. Objectives

- a. To prepare 1/C Midshipmen who have selected Surface Warfare to succeed during their initial Division Officer sea tour. This course provides information on the duties and responsibilities required of a junior officer in the surface community.

4. Course ContentClass Hours

- | | |
|---------------------------------|----|
| a. Naval science. | 14 |
| b. Shiphandling. | 14 |
| c. Naval leadership. | 6 |
| d. Surface warfare platforms. | 4 |
| e. Naval writing. | 4 |
| f. Joint warfare. | 3 |
| g. Information technology. | 3 |
| h. Military sociology. | 2 |
| i. Operational risk management. | 1 |

5. Acquired Abilities. Upon completion of this course, the midshipmen should be able to:
 - a. Discharge their division officer duties and responsibilities with the utmost professionalism and competence.
 - b. Possess a sound fundamental knowledge of naval science, shiphandling, and seamanship.

NS402
Submarine Junior Officer Practicum
(2-2-3)

1. Specimen Texts

- a. Guide To Naval Writing, 2nd edition, (Robert Shenk), Naval Institute Press, 1997.
- b. Blue Jacket's Manual, 22nd edition, (Thomas J. Cutler), Naval Institute Press, 1998.
- c. Division Officer's Guide, 10th edition, (James Stavridis), Naval Institute Press, 1995.
- d. Service Etiquette, 4th edition, (Oretha D. Swartz), Naval Institute Press, 1988.
- e. Submarine, (Tom Clancy), Berkley Books, 1993.
- f. Thunder Below, (Eugene B. Fluckey), University of Illinois Press, 1992.
- g. America's Team - The Odd Couple, (Frank Aukofer, William P. Lawrence), The Freedom Forum First Amendment Center, 1995.

2. Prerequisites

- a. 1/C standing.

3. Objectives

- a. Prepare the first class midshipman for their first junior officer tour in the submarine force.
- b. Establish a mentoring environment to enhance maximum professional growth for the midshipman.
- c. Refresh the basics cognitive knowledge of calculus and physics to better ensure positive success at naval nuclear power school via technical skills reinforcement.

4. Course Content

Class Hours

- | | |
|--|---|
| a. Military sociology. | 3 |
| b. Junior officer responsibilities. | 6 |
| c. Network centric warfare/information technology. | 3 |
| d. Joint warefare. | 2 |
| e. Submarine platforms, missions and Weapons. | 6 |

f.	Routine operations and procedures.	6
g.	Operational risk management.	3
h.	Shiphandling.	3
i.	Professional development(writing, qualifications and career path).	6
j.	Submarine heritage.	6
k.	Study skills and time management.	2
l.	Etiquette.	2
m.	Oral presentation.	4

5. Acquired Abilities. Upon completion of this course, the student should be able to:

- a. Have basic knowledge required to successfully begin the Nuclear Power pipeline, and understand the majority of challenges they expect to face during their first junior officer sea tour.
- b. Be instilled with the proper focus and attitude to better ensure personal and professional success in the submarine community.
- c. Understand better the need to utilize physical, mental and leadership skills to both lead and grow within the United States Submarine Force.

NS403
Aviation Junior Officer Practicum
(2-2-3)

1. Specimen Texts

- a. Flight Rules & Regulations (CNATRA), Naval Air Training Command, U.S. Government Printing Office, 1999.
- b. T-34C Aircraft Systems Familiarization Workbook (CNATRA), Naval Air Training Command, U.S. Government Printing Office, 1998.
- c. The Naval Aviation Guide, 5th edition, (Richard R. Burgess), Naval Institute Press, 1996.
- d. Service Etiquette, 4th edition, (Oretha D. Swartz), Naval Institute Press, 1988.
- e. America's Team - The Odd Couple, (Frank Aukofer, William P. Lawrence), The Freedom Forum First Amendment Center, 1995.

2. Prerequisites

- a. 1/C standing.

3. Objectives

- a. To build the professional and technical foundation necessary for the junior officer to succeed and excel in naval aviation training.

4. Course Content Class Hours

- | | |
|---|---|
| a. Training pipeline review. | 1 |
| b. Aviation community overview. | 1 |
| c. Squadron organization/divo leadership. | 2 |
| d. Military sociology. | 4 |
| e. Practical aviation labs. | 8 |
| f. Information technology. | 4 |
| g. Flight rules & regulations. | 4 |
| h. Aviation physiology. | 2 |
| i. Naval air safety. | 3 |
| j. NATOPS & NavAir Pubs. | 2 |
| k. Aircrew coordination training. | 3 |
| l. T-34C aircraft systems. | 5 |
| m. Oral presentations. | 4 |
| n. Future of naval aviation. | 1 |
| o. Joint warfare/IT warfare. | 4 |

5. Acquired Abilities. Upon completion of this course, the student should be able to:
- a. Demonstrate competent knowledge of naval aviation organization, missions and training pipeline.
 - b. Demonstrate an understanding of the sociological aspects of military service, military-societal relations, and the social dynamics affecting the military service.
 - c. Demonstrate an understanding of the seven basic Aircrew Coordination Training (ACT) skills, Naval Aviation Safety programs, and Naval Aviation governing publications.
 - d. Illustrate, in detail, FAA airspace classifications, locations of specific airspace types, determine the requirements for entry into those airspaces and classify the branches of ATC.
 - e. Demonstrate thorough understanding of the basic aircraft turbine engines.
 - f. Demonstrate general understanding of basic aerodynamic principles, operations, and some basic procedural theory.
 - g. Demonstrate basic knowledge of joint warfare concepts and a basic understanding of future developments in naval aviation.

NS404
Marine Corps Junior Officer Practicum
(2-2-3)

1. Specimen Texts

- a. Guide To Naval Writing, 2nd edition, (Robert Shenk), Naval Institute Press, 1997.
- b. The Marine Officer's Guide, 6th edition, (Kenneth W. Estes,), Naval Institute Press, 1996.
- c. Marine: A Guided Tour of a Marine Expeditionary Unit, (Tom Clancy), Berkley Books, 1996.
- d. NS404 Marines Junior Officer Practicum, 4th edition, Kendall/Hunt Publishing Company, 2000.
- e. Commander's Tactical Handbook, MCRP 3-11.1.A., (U.S. Marine Corps), U.S. government Printing Office, 1995.
- f. America's Team - The Odd Couple, (Frank Aukofer, William P. Lawrence), The Freedom Forum First Amendment Center, 1995.

2. Prerequisites

- a. 1/C standing.

3. Objectives

- a. To educate 1/C midshipmen who have selected Marine Corps in the high standards of professional knowledge, esprit-de-Corps, and leadership required of them as company grade officers in the operating forces.

4. Course Content

Class Hours

- | | | |
|----|--|----|
| a. | History and organization of the Marine Corp. | 3 |
| b. | Warfighting. | 5 |
| c. | Combined arms. | 12 |
| d. | Tactical planning. | 11 |
| e. | Information technology. | 1 |
| f. | Public affairs (media relations). | 2 |
| g. | Amphibious operations. | 2 |
| h. | Military sociology. | 6 |
| i. | Techniques of military instruction. | 4 |
| j. | Officer administration. | 2 |
| k. | Navy/Marine Corps customs and courtesies. | 3 |

5. Acquired Abilities. Upon completion of this course, the midshipmen should be able to:
 - a. Understand the duties and responsibilities of a Marine Corps Officer.
 - b. Possess the professional knowledge and leadership Skills required to succeed at the basic school and during the initial segment of their first tour in the operating forces.

NS405
Naval (Special Warfare) Junior Officer Practicum
(2-2-3)

1. Specimen Texts

- a. Guide To Naval Writing, 2nd edition, (Robert Shenk), Naval Institute Press, 1997.
- b. Blackhawk Down, (Mark Bowden), Atlantic Monthly Press, 1999.
- c. The Ugly American, (Eugene Burdick, William J. Lederer), W.W. Norton & Co, 1999.
- d. America's Team - The Odd Couple (Frank Aukofer, William P. Lawrence), The Freedom Forum First Amendment Center, 1995.

2. Prerequisites

- a. 1/C standing.

3. Objectives

- a. To prepare 1/C midshipmen who have selected naval special warfare to succeed at basic underwater demolition/seal (BUD/S) training and during their initial seal team tour.

4. Course Content

Class Hours

- | | |
|---------------------------------------|----|
| a. History/structure (NSW and other). | 12 |
| b. Sociology. | 2 |
| c. Information technology. | 2 |
| d. NSW skills. | 12 |
| e. Case study. | 6 |
| f. Mission planning. | 9 |
| g. Guest speakers. | 3 |
| h. Book review. | 2 |
| i. General military instruction. | 5 |

5. Acquired Abilities. Upon completion of this course, the midshipmen should be able to:

- a. Possess a sound fundamental knowledge of the history and structure of NSW and other U.S. special operations forces.

NS405

- b. Plan and brief a NSW specific mission using the NSW mission planning guide format.
- c. Have a thorough understanding of their role as a NSW officer.

NS406
Restricted Line and Staff Corps Junior Officer Practicum
(2-2-3)

1. Specimen Texts

- a. Guide To Naval Writing, 2nd edition, (Robert Shenk), Naval Institute Press, 1997.
- b. The Naval Officer's Guide, 10th edition, (William P. Mack), Naval Institute Press, 1991.
- c. America's Team - The Odd Couple, (Frank Aukofer, William P. Lawrence), The Freedom Forum First Amendment Center, 1995.

2. Prerequisites

- a. 1/C standing.

3. Objectives

- a. To prepare 1/C midshipmen who have selected for the Restricted Line/Staff Corps to include the Supply Corps, Medical Corps, Civil Engineer Corps, Intelligence, Cryptology, and non-naval services. The course will prepare students to meet the initial challenges of their community.

4. Course content.

Class Hours

- | | |
|---------------------------------------|----|
| a. Officer administrative skills. | 12 |
| b. Sociology. | 2 |
| c. Information technology. | 2 |
| d. Community mentoring. | 12 |
| e. Case study. | 6 |
| f. Community training and transition. | 9 |
| g. Guest speakers. | 3 |
| h. Book review. | 2 |
| i. General military instruction. | 5 |

5. Acquired Abilities. Upon completion of this course, the midshipmen should be able to:

- a. Possess a sound fundamental knowledge of the functions, administrative duties, and leadership roles of an officer.

- b. Complete mentoring with a member of their new community and present a brief on their experiences.
- c. Have of thorough understanding of their role as a Restricted Line and Staff Corps office.