I. INTRODUCTION:

Welcome to EE301, Electrical Fundamentals and Applications. The objective of this course is to assist you in expanding your knowledge in the field of Electrical Engineering and to enhance your technical insight and problem solving skills. You will learn about electrical components, circuits, and concepts that are representative of those that you will see in the fleet. You will learn fundamental electrical circuit theory using reading assignments, lectures, and homework problems. You will also reinforce that knowledge by conducting practical laboratory exercises. The course design is both consistent with traditional engineering education and tailored to specific guidance provided by the Fleet. The knowledge that you gain during the next 18 weeks will be valuable to you, no matter what your future assignment is. The technical knowledge that you obtain will also benefit you in the future whether you choose to continue to serve in the military or pursue career options in the civilian community.

The course material is highly cumulative in nature and falling behind should be avoided. Whether you are a top student in technical subjects or one who is challenged by them, help is available via extra-instruction from your instructors, MGSP, or the Academic Center.

COURSE OBJECTIVES

1. Demonstrate the use of voltage sources, current sources and passive linear devices in DC and AC circuits
2. Use Ohm's Law, Kirchhoff's Voltage and Current Laws, power relations, Thèvenin's Theorem, and Maximum Power Transfer Theorem in fundamental DC and steady-state AC circuit analysis.
3. Demonstrate the use Thèvenin's Theorem and Nodal Analysis. Model circuits in terms of electrical equivalents and calculate values for equivalent elements.
5. Determine the parameters (resonant frequency, bandwidth, quality factor, etc.) associated with resonant circuits. Explain and plot the frequency response of circuits and various types of AC filter applications (low-pass, high-pass, band-pass, and band-reject filters).
6. Analyze and identify AC real power, reactive power, and apparent power. Demonstrate the concept of power factor correction.
7. Solve for the primary to secondary current and voltage relationships for an ideal transformer. Differentiate between specific transformer applications regarding safety and power transfer.

8. Compute voltage, current, and power relations in three-phase, wye, and delta circuits.

9. Analyze and explain DC motors and AC generators. Predict electrical and mechanical performance in terms of input power, output power, losses, and efficiency.

II. STUDENT REQUIREMENTS

Text Book: Introductory Circuit Analysis, 13th edition, by Robert L. Boylestad. Supplemental Material will be provided via the course web page.

A. Class preparation and prerequisites

EE301 is a basic electrical engineering course. However, it is based on the prerequisite courses that were taken in Mathematics and Physics during your 4/C and 3/C years. It is your responsibility to review the applicable prerequisite course material. Prior to each lecture, you are expected to have read the applicable reading assignment from the textbook. Your instructors may assign additional work at their discretion.

Calculators and electronic devices

Bringing a calculator to each class is required. The calculator should, at a minimum, have the capabilities of the TI-36X Pro (complex numbers, simultaneous equations, trigonometric functions, etc.). Calculators may be used for all labs, homework, quizzes and exams unless noted otherwise. NO NOTES OR SOLVED PROBLEMS MAY BE STORED IN YOUR CALCULATOR IN ANY FORM OR LOCATION! Calculators may not be shared during quizzes or exams. If your calculator fails, manual calculation will be required. The use of electronic devices such as notepad/laptop computers, smart phones, or similar devices is not permitted during quizzes or exams. The use of electronic devices during lectures is at the instructor’s discretion.

B. Homework

Homework will be assigned daily and will be collected and graded at your instructor’s discretion. It is to your benefit to complete all homework assignments on time. Refer to your instructor’s policy addendum for due dates. Homework solutions will be published on the course website the class following the assignment date. In addition to the daily homework assignments, your instructor may assign additional homework problems at his or her discretion.

C. Practical Exercises (Laboratories)

Practical exercises are included in most two-hour lessons. Students are required to print out and read through each practical exercise prior to the corresponding lesson. Additionally, many of the practical exercises have Pre-Lab calculations which must be performed prior to class. Practical exercises are available on the syllabus of the EE301 course website. There will be two practical exams to test your skills and knowledge.
obtained during the regular practical exercises. The two exams will comprise 6% (3% each) of your final grade.

D. Communications

Check your email daily for course updates. The instructors may use email, Blackboard, and the EE-301 course web page to communicate EE-301 course related information. The EE-301 web page is: http://www.usna.edu/EE/ee301

E. Section Leader

A section leader will be appointed with duties prescribed by individual instructors.

III. COURSE ADMINISTRATION

A. Absence/Makeup Policy

If you know you will miss a class, notify your instructor ahead of time. Being absent does not absolve you of your responsibility to complete all assigned work. Arranging for make-ups of exams, quizzes, or practical exercises is the responsibility of the student. All midshipmen are required to take the exams at the time prescribed by the Academic Dean. The allowance of make-up exams will be reviewed on an individual basis by the course coordinator and the ECE Department Chair, and will be in accordance with the Commandant’s Priorities. Elective surgery including LASIK or PRK shall not be scheduled where such surgery and the worst-case required recovery period would interfere with taking a midterm or final exam at the scheduled date and time.

B. Extra Instruction (EI)

All instructors are available to provide EI. Whenever possible, please schedule your EI in advance during your instructor’s scheduled office hours. You should come to EI prepared to ask specific questions and bring relevant class notes and homework with you. Later course material builds upon the basic concepts taught during the first six weeks of the course. If you do not understand the basic concepts and how to apply them, it is strongly suggested that you ask questions during class and obtain EI from your instructor.

C. Quizzes

Quizzes will be given at the instructor’s discretion. You can expect a minimum of one quiz per grading period.

D. Examinations

We will have two 50-minute exams during an X-Period and one 3-hour final exam. These exams will be common exams for all sections of EE 301. Exams will test the concepts delineated in the course objectives and may or may not resemble examples worked in class, homework problems, and/or quiz problems. One of the goals of the class is to develop your skills in applying past knowledge to new problems.

You are not allowed to discuss any information about the exam with anyone until your instructor allows you to do so. To do otherwise would be a violation of the Brigade Honor Concept.
E. Formula Sheets

A standardized formula sheet will be provided online at the beginning of the course for use during quizzes and exams. No other materials may be used on the course exams. I encourage you to reference this while you work on homework; this will ensure that you are very familiar with the equation sheet layout by the time you take your first exam. The course formula sheet will be provided to you during each of the examinations.

F. Grades

Numeric grades are calculated based on the following computation. Your instructor will assign a letter grade based on the calculation below and your overall demonstration of EE knowledge during the semester.

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<thead>
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<th>Weight</th>
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<tr>
<td>6 Week Exam</td>
<td>20%</td>
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<tr>
<td>12 Week Exam</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>40%</td>
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<tr>
<td>DC Practical Exam</td>
<td>3%</td>
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<tr>
<td>AC Practical Exam</td>
<td>3%</td>
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<tr>
<td>Homework, Quizzes, Labs, etc.</td>
<td>14%</td>
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<tr>
<td>Total</td>
<td>100%</td>
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Standard letter grade assignments will be given for the course. There will be no exam curving.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>&gt;=90%</td>
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<tr>
<td>B</td>
<td>80% - 89.99%</td>
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<tr>
<td>C</td>
<td>70% - 79.99%</td>
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<tr>
<td>D</td>
<td>60% - 69.99%</td>
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<tr>
<td>F</td>
<td>less than 60%</td>
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The instructor reserves the right to adjust your final grade based on his/her evaluation of your overall course performance including preparation, effort and participation.

G. Documentation

Plagiarism is the act of presenting someone else’s work or ideas as your own. Examples include (but are not limited to) copying homework from a colleague or from a solution manual, copying computer code, copying text or figures from the Internet, or using another’s data in a lab report. It is your responsibility to use proper documentation to always give credit where it is due.

Collaboration is encouraged on homework. However, all parties must acknowledge collaboration with a statement of “Help given/received to/from________” on the first page of the assignment. Examples of acceptable collaboration include discussion of how to approach a problem and discussion of reasonable order of magnitude for a result. It is strictly forbidden to copy another person’s work or to provide your work (in any format) to someone else. Please ask your instructor for guidance if you are in doubt.
If a classmate requests help on an assignment you may not provide them your work or answers – you may interactively work with them which will enhance each student’s understanding.

Plagiarism is a dishonorable act. It diminishes both the perpetrator and the institution. Err on the side of too much documentation, and if you have any questions ask your instructor.

H. Course Evaluations

Our objective is to make this a meaningful course for you. We will listen to any concerns or feedback that you may have. We are open to suggestions that will enhance your learning experience and improve our instructor’s performance. The comments made by students in the end-of-course evaluations are crucial to our assessment of our instructors and our course. Please provide us with constructive comments that we can use to enhance the educational experience of future students.

CDR Jesse Atwood, USN
Course Coordinator