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American Public University System

The Ultimate Advantage is an Educated Mind

School of Public Service & Health
Name of Program: Explosive Ordnance Disposal Associates of Science
Course Number: HLSS 232
Course Name: Electronics, Electricity and Explosives
Credit Hours: 3
Length of Course: 8 Weeks
Prerequisite: None

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Instructor Information

Instructor:

Email:

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Course Description (Catalog)

This course offers Explosive Technicians, police or military, or other first responders a technical overview of incidents involving Hazardous Devices that may contain electrical and/or electronic components. This course is designed specifically to reveal the important differences between electricity and electronics (E&E) not only from the scientific and technical perspective, but in practical situational aspects of threats posed to any handler of suspicious devices by E&E.

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Topics include, but are not limited to: the fundamental principles of Alternating (AC) and Direct Current (DC) including series, parallel, and, series-parallel circuits; Hazardous Device Circuit Component Identification; Hazardous Device Circuit Component Operation and Capabilities; safety precautions and guidelines when dealing with circuits contained in terrorist devices in a logical and easy to digest manner. The course helps students better understand the technical aspects of circuit theory, components and capabilities.

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Course Scope

As a science based course for an Associate's degree program in EOD, this course offers a dynamic and information packed introduction to basic electricity and electronics theory. Recognition of how circuits work greatly improves the decision process for the responder. We examine general concepts behind circuitry functions. The course does not discuss any render safe decisions or doctrine that should only be made by competent bomb disposal technicians given the rules of engagement they follow as per governing organizations.

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Course Objectives

After successfully completing this course, you will be able to

CO-1 Identify with the nomenclature and definitions of key terms as they apply to electricity and electronics (E&E) with explosives Describe specific dates in relation to discovery, invention and use of various explosives.

CO-2 Discuss the history and background of electricity and electronics as typically found in hazardous devices List important scientists and inventors who played essential roles in explosives development.

CO-3 Explain the safety precautions to observe when conducting operations which involve hazardous devices that incorporate E&E devices.

CO-4 Restate the principles and theories of fundamental concepts of electricity.

CO-5 Restate the principles and theories of fundamental concepts of electronics.

CO-6 Select appropriate E & E web sites, and be able to interpret and apply information from these sites. Utilize available library sources to expand local knowledge of both benefits and limitations of resources

CO-7 Delineate between the theory, functioning and characteristics of series and parallel circuits.

CO-8 Cite examples of DC power sources most commonly utilized in hazardous devices.

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CO-9 Interpret circuit components most commonly used in hazardous devices.

CO-10 Recognize hazardous device electronic diagrams.

CO-11 Discriminate between Alternating Current (AC) and how it differs from Direct Current (DC)

CO-12 Describe how these roles have expanded in light of recent world events. Discuss how professional development and knowledge of E&E basic procedures reduces the impact of events following incidents of criminal, terrorist, and/or accidental intent.

CO-13 Perform a basic troubleshooting skills requiring knowledge of hazardous devices E&E to elect the proper course of action given the response atmosphere and material/s device encountered.

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Course Delivery Method

This course delivered via distance learning will enable students to complete academic work in a flexible manner, completely online. Course materials and access to an online learning management system will be made available to each student. Online assignments are due by Sunday evening of the week as noted and include Forum questions (accomplished in groups through a threaded forum), examination, and individual assignments submitted for review by the Faculty Member). Assigned faculty will support the students throughout this eight-week course.

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Course Resources

Required Course Textbooks: Kybett, Harry. *Electronics (A Self Teaching Guide)*, Second Edition. John Wiley & Sons, Inc. 1986.

Required Readings: <http://www.tpub.com/neets/book1/chapter1/>

Note: this is referred to as the Primary URL you are to use throughout the course

Additional Resources: Located in the resources section of the LMS

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Evaluation Procedures

Describe how you will evaluate your students for each graded activity.

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Grades for this course will be based upon the grading instruments provided below. The student – when directed by the instructor -- will respond to the posting of other students. The mid-term and final exams will be a composite of multiple choice questions and short essays.

The grade scale and due dates for each of the evaluation are provided below:

<u>Grade Instruments:</u>	<u>Points</u>	<u>% of Final Grade</u>
Discussion (Forum) Topics	05 pts	05%
Homework Assignments	15 pts	15%
Abstract Article	10 pts	10%
Research Paper	30 pts	30%
Mid-Term Exam	20 pts	20%
Final Exam	20 pts	20%
	100 pts	100%

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Course Outline

Please see the [Student Handbook](#) to reference the University's [grading scale](#).

<u>Week</u>	<u>Topic</u>	<u>Learning Objectives</u>	<u>Readings</u>	<u>Assignment</u>
1	History and safety precautions for E&E used in hazardous devices.	<p>CO- Week 1</p> <p>Explain the general electrical safety precautions to observe when conducting operations which involve hazardous devices.</p> <p>Discuss the history and background of electricity and electronics used in hazardous devices.</p> <p>Define the role of the 1st responder in relation to incidents involving hazardous explosives.</p> <p>Explain the safety precautions to observe when conducting operations, which</p>	<p>Primary URL listed under the primary text source</p> <p>http://www.tpub.com/neets/book1/chapter1/</p>	<p>Complete Introduction Forum 1 (250 words)</p> <p>Complete Assignment 1 (Assignment Section)</p>

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		<p>involve static electricity</p> <p>Discuss the electromagnetic radiation (EMR) safety concerns when conducting operations dealing with electrically initiated devices.</p>		
2	Fundamentals of electricity	<p>CO-2</p> <p>Discuss the parts of a electrical system</p> <p>State the laws of electrical charges</p> <p>Describe current flow of electricity</p> <p>Recall the term's insulator, conductor, & semi conductor</p> <p>Explain Static Electricity</p> <p>Underline the Difference in Potential (Voltage)</p> <p>Restate the Primary Sources of Producing Voltage</p> <p>Differentiate among the terms voltage, current , and resistance</p> <p>Discuss electric current flow</p>	<p>Primary URL listed under the primary text source</p> <p>http://www.tpub.com/neets/book1/chapter1/</p>	<p>Begin Forum 2</p> <p>Complete Assignment 2</p>
3	DC Electrical Circuits and Measurements	<p>Describe the theory, functioning and characteristics of a series, parallel, series/parallel circuit</p> <p>Explain how the voltmeter, ammeter, and ohmmeter are connected to a circuit</p> <p>Define Ohm's law and the power equation</p> <p>Demonstrate the proper method to solve math problems with a calculator</p>	<p>Kybett , Chapter 1</p>	<p>Complete Forum 2</p> <p>Complete Assignment 3</p>

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		<p>Explain how to calculate power using the power formulas</p> <p>Specify problem solving methods finding current, voltage and resistance</p> <p>Identify circuit problems with resistors in different configurations</p>		
4	<p>Circuit Components Mid-Term Exam</p>	<p>CO-4</p> <p>Discuss the different types of resistors</p> <p>Identify resistor value by color code and size</p> <p>Define Mechanical Switches</p> <p>Explain the operation of a transistor</p> <p>List the different types of transistor</p> <p>Describe the operation of a diode</p> <p>Discuss Mechanical Switches</p> <p>Underline different types of diode</p> <p>Translate Integrated Circuit (IC) Timers</p> <p>Interpret Electrical Contacts/Relays</p>	<p>Primary URL listed under the primary text source http://www.tpub.com/neets/book1/chapter1/</p>	<p>Begin Forum 3</p> <p>Complete Assignment 4</p> <p>Complete Mid Term Open Book Exam</p>
5	<p>DC Electrical Energy Sources Abstract Due</p>	<p>CO-5</p> <p>Describe how to properly connect batteries in series, parallel, and combination configurations</p> <p>Discuss the purposes of different configurations of battery connections</p> <p>Explain the different Batteries that supply</p>	<p>Primary URL listed under the primary text source http://www.tpub.com/neets/book1/chapter1/</p>	<p>Complete Forum 3</p> <p>Submit Abstract Writing Assignment (Assignment Section)</p> <p>Select you Essay paper topic (based on</p>

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		<p>power to a DC circuit</p> <p>Discuss Capacitors</p> <p>Describe basic types of batteries</p> <p>Restate the effect of capacitors in series and parallel</p>		<p>Course Objectives and/or EOD/Bomb Squad profession)</p>
6	<p>Electrical Symbols and Diagrams</p>	<p>CO-6</p> <p>Define the parts of an electrical system</p> <p>Identify schematic electrical symbols</p> <p>Discuss how to diagram a simple electrical circuit</p> <p>Describe Basic Electrical Symbols</p> <p>Practice reading and drawing Basic Schematic Diagrams</p> <p>Practice reading and drawing Basic Block Diagrams</p> <p>Practice reading and drawing Basic Wiring Diagrams</p>	<p>Primary URL listed under the primary text source</p> <p>http://www.tpub.com/neets/book1/chapter1/</p>	<p>Complete Forum 4</p> <p>Complete Assignment 6</p>
7	<p>Alternating Current (AC)</p> <p>Research Paper Due</p>	<p>CO-7</p> <p>Define alternating current (AC)</p> <p>Explain the difference between AC and DC</p> <p>Identify how AC can be delivered to various locations.</p> <p>Discuss the basic structure of matter</p> <p>Describe why a general knowledge of matter principles helps one to comprehend electricity and electronic circuit functions</p> <p>Explain the directional</p>	<p>Primary URL listed under the primary text source</p> <p>http://www.tpub.com/neets/book1/chapter1/</p>	<p>Complete Forum 5</p>

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		flow of electrons		
8	Final Exam			Complete Forum 6 Complete Final Exam Submit Essay Paper

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Policies

Please see the [Student Handbook](#) to reference all University policies. Quick links to frequently asked question about policies are listed below.

[Drop/Withdrawal Policy](#)

[Plagiarism Policy](#)

[Extension Process and Policy](#)

[Disability Accommodations](#)

Writing Expectations

Describe your writing expectations.

Citation and Reference Style

Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Late Assignments

Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. As adults, students, and working professionals, I understand you must manage competing demands on your time. Should you need additional time to complete an assignment, please contact me before the due date so we can discuss the situation and determine an acceptable resolution. Routine

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submission of late assignments is unacceptable and may result in points deducted from your final course grade.

Netiquette

Online universities promote the advancement of knowledge through positive and constructive debate – both inside and outside the classroom. Forums on the Internet, however, can occasionally degenerate into needless insults and “flaming.” Such activity and the loss of good manners are not acceptable in a university setting – basic academic rules of good behavior and proper “Netiquette” must persist. Remember that you are in a place for the rewards and excitement of learning which does not include descent to personal attacks or student attempts to stifle the Forum of others.

- **Technology Limitations:** While you should feel free to explore the full-range of creative composition in your formal papers, keep e-mail layouts simple. The Sakai classroom may not fully support MIME or HTML encoded messages, which means that bold face, italics, underlining, and a variety of color-coding or other visual effects will not translate in your e-mail messages.
- **Humor Note:** Despite the best of intentions, jokes and especially satire can easily get lost or taken seriously. If you feel the need for humor, you may wish to add “emoticons” to help alert your readers: ;-), :), ☺

Disclaimer Statement

Course content may vary from the outline to meet the needs of this particular group.

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Online Library

The Online Library is available to enrolled students and faculty from inside the electronic campus. This is your starting point for access to online books, subscription periodicals, and Web resources that are designed to support your classes and generally not available through search engines on the open Web. In addition, the Online Library provides access to special learning resources, which the University has contracted to assist with your studies. Questions can be directed to librarian@apus.edu.

- **Charles Town Library and Inter Library Loan:** The University maintains a special library with a limited number of supporting volumes, collection of our professors’ publication, and services to search and borrow research books and articles from other libraries.
- **Electronic Books:** You can use the online library to uncover and download over 50,000 titles, which have been scanned and made available in electronic format.

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- **Electronic Journals:** The University provides access to over 12,000 journals, which are available in electronic form and only through limited subscription services.
- **Tutor.com:** AMU and APU Civilian & Coast Guard students are eligible for 10 free hours of tutoring provided by APUS. [Tutor.com](http://tutor.com) connects you with a professional tutor online 24/7 to provide help with assignments, studying, test prep, resume writing, and more. Tutor.com is tutoring the way it was meant to be. You get expert tutoring whenever you need help, and you work one-to-one with your tutor in your online classroom on your specific problem until it is done.

Request a Library Guide for your course (<http://apus.libguides.com/index.php>)

The AMU/APU Library Guides provide access to collections of trusted sites on the Open Web and licensed resources on the Deep Web. The following are specially tailored for academic research at APUS:

- Program Portals contain topical and methodological resources to help launch general research in the degree program. To locate, search by department name, or navigate by school.
- Course Lib-Guides narrow the focus to relevant resources for the corresponding course. To locate, search by class code (e.g., SOCI111), or class name.

If a guide you need is not available yet, please email the APUS Library: librarian@apus.edu.

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Turnitin.com

Turnitin.com is a web-based [plagiarism](#) prevention application licensed, for campus use, through the APUS Online Library. The quick submit option lets faculty upload and check suspicious papers, without requiring student to create their own Turnitin.com profiles.

Turnitin.com analyzes electronic submissions of student writing, compares them to the contents of a huge online database, and generates a customized Originality Report. The database used to produce this analysis contains a massive collection of documents available on the Internet from both free and commercial sources, as well as the full texts of all other papers that have been previously submitted to Turnitin.com.

Similarity index is based on the amount of matching text to a submitted paper:

Blue =	no matching text
Green =	one word to 24% matching
Yellow =	25 -49% matching text
Orange =	50-74% matching text

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Red = 75-100% matching text

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