

Master Course Syllabus

Your College, Your Future



Established 1969

EEM 145 Control Circuits

Course Number	EEM 145
Course Title	Control Circuits
Credit Hours	3
Prerequisites	None
Course Description	This course is a study of the principles and applications of component circuits and methods of motor control
Course Objectives	<p>Students shall exhibit critical reasoning when confronted with technical day-to-day problems.</p> <p>Students shall be able to define and describe the purpose of various input/output devices used in control circuits.</p> <p>Students shall be able to interpret symbols used in electrical control circuit diagrams.</p> <p>Students shall be able to explain the the difference between 2 and 3-wire controls.</p> <p>Students will be able to create representative single-line, pictorial, schematic, and ladder diagrams when given a set of electrical control parameters such as: Jog Circuit controls, Hands-Off- Automatic controls, Timer controls Sequential Starting, Stopping, and Combination Starting/Stopping controls</p> <p>Students will be able to create Control Circuits using Allen Bradley and Siemens Programmable Logic Controllers.</p> <p>Students will be able to wire control circuits IAW given single-line, pictorial, schematic, or ladder diagrams.</p>
Course Developer	Drew Britt
Means of Instruction	Lecture, Lab
Required Textbook/Written Materials/Supplies	<i>See Booklist online for current book.</i>

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General Education Core Competencies

General Education Core Competencies	Course Methodology, Content and/or Assessment
<p>Communication: Students will be able to communicate effectively through reading, writing, speaking and listening.</p> <ul style="list-style-type: none"> • Prepare written documents in a professional manner. • Develop oral communication skills to present information in a professional and appropriate manner. • Demonstrate appropriate listening skills in one-on-one and small and large group settings. 	<p>Participation in class discussions is recommended and encouraged.</p> <p>The students will be required to read and interpret text and diagrams found in operation manuals to perform routine maintenance on mechanical devices.</p> <p>The students will be required to apply active listening skills to develop understanding of technical content delivered through lecture and class discussions.</p> <p>The Instructor will work with each individual student to assure quality workmanship.</p>

General Education Core Competencies	Course Methodology, Content and/or Assessment
<p>Mathematical Reasoning: Students will apply those mathematical skills appropriate to their program of study.</p> <ul style="list-style-type: none"> • Analyze and solve mathematical problems needed in the workplace, daily life and educational environment. • Interpret data using analytical methods. 	<p>Students will be able to calculate operating values for a variety of mechanical devices.</p> <p>Students will use appropriate NEC tables and formulas to calculate various electrical installation requirements for specific Control Circuit installations.</p> <p>The student will be able to interpret schematic circuit diagrams and timing tables to analyze the operation of a variety of control circuit solutions.</p>
<p>Critical Thinking: Students will employ effective processes for resolving problems and making decisions.</p> <ul style="list-style-type: none"> • Identify problems and potential causes. • Solve problems using basic research, analysis and interpretation. • Evaluate results of solutions and revise strategies as indicated by findings. 	<p>Students, when given a job scenario, will identify electrical control circuit installation deficiencies in accordance with the current edition of the NEC and the control circuit operation performance.</p> <p>Students when given a job site scenario will specify solutions to reported electrical control circuit installation deficiencies IAW the current edition of the NEC and all operation requirement specifications.</p>

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<p>Technology Utilization: Students will apply knowledge of computers on a level compatible with job and/or educational demands.</p> <ul style="list-style-type: none"> • Demonstrate a basic knowledge of computer applications including word processing, spreadsheets, databases, and presentation software. • Use basic operating system functions competently (e.g. store and retrieve data, load software). • Demonstrate communication and research skills through use of the internet. 	<p>Students will utilize computer skills to research and generate solutions to electrical control circuit installation challenges that are consistent with requirements of the current edition of the NEC and the job specifications sheet.</p> <p>Students will use basic computer skills to program, simulate and upload PLC Control circuits Logic to Allen Bradley or Siemens PLC's.</p>
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General Education Core Competencies	Course Methodology, Content and/or Assessment
<p>Interpersonal Skills: Students will deal effectively and appropriately with others.</p> <ul style="list-style-type: none"> • Interact well with individuals and groups from diverse backgrounds and cultures. • Work with others in situational analysis, problem solving, and task accomplishment. • Demonstrate respect for the rights, work, and views of others. 	<p>Can work effectively with other students in completing assignments as a project team.</p> <p>Is able and willing to instruct less experienced students in completing work assignments.</p> <p>Is willing and able to explain the nature of a problem and the action taken to recommend necessary adjustments or repairs.</p> <p>Demonstrates flexibility in assigned shared responsibilities.</p> <p>Interacts well with individuals from diverse backgrounds and cultures while refraining from discriminatory practices. (ex. Gender)</p>
<p>Professionalism: Students will exhibit professionalism through observances of a code of ethics, a sense of responsibility, good habits, and a positive attitude.</p> <ul style="list-style-type: none"> • Demonstrate personal and business integrity and ethics. • Recognize, manage, and cope with the transitions of change. • Utilize informational resources for lifelong learning. 	<p>The student will have to show the ability and proper attire, to project professionalism in the industrial/ mechatronics field.</p> <p>Be eager for a lifelong learning career.</p>

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College Policies

Policy Type	Policy Description
Attendance Policy	<p>It is the policy of Williamsburg Technical College that there are no excused student absences. Students are required to attend 90% of the scheduled contact hours of class. If more than 10% of scheduled contact hours are missed, the student will be dropped for excessive absences. Additionally, if a student is absent from every scheduled class of a course during the first two weeks of a term, the student will be dropped as a "no show" from that course.</p> <p>Individual instructors may set higher required attendance and tardy standards but must include those standards in their course syllabus and announce their standards in both the first- and second-class meetings each semester.</p> <p>Class rosters will be final as of the end of the second week of classes. For specific procedures related to this policy, refer to WTC Procedure D-23.1.</p> <p>Students may withdraw from a class at any time on or before the "Last Day to Withdraw" date published in the academic calendar by submitting an Add/Drop/Withdrawal form to the Student Affairs Office. A student can only receive a "WP" grade if withdrawal is completed on or before the "Last Day to Withdraw" date.</p>
Policy Type	Policy Description
Policy for Students with Disabilities	<p>The Student Affairs Division provides counseling and support services which help students with disabilities to pursue academic programs of their choice and participate fully in campus life.</p> <p>The AVP for Student Affairs can arrange counseling, special parking, priority registration, and other reasonable services needed by students with disabilities. Students with disabilities are encouraged to contact the AVP for Student Affairs to discuss needs and concerns as they arise.</p>
Policy for Academic Misconduct	<p>All forms of academic dishonesty including, but not limited to, cheating on tests, plagiarism, collusion, and falsification of information will call for discipline. See the Student Code & Grievance Procedure in the Williamsburg Technical College Catalog for details.</p>

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Grading Policy	<p>The College operates on the semester hour system, and the following symbols are used in grading:</p> <p>A-- Excellent B -- Above Average C -- Average D -- Passing F -- Failure I -- Incomplete WF -- Withdrawal while failing WP -- Withdrawal while passing</p>
Policy for Class Safety and Emergencies	<p>Injuries must be reported to the AVP for Student Affairs immediately. Insurance claim forms are available in the Student Affairs division. Please refer to the college catalogue for more information on how Williamsburg Technical College addresses safety and emergency issues. For additional information, contact Student Affairs at 843.355.4162.</p> <p>Students taking coursework at off-site locations are responsible for reading and adhering to all safety instructions and guidance at the off-site location.</p> <p style="text-align: center;">Health Services and First Aid</p> <p>Williamsburg Technical College is a commuter institution; therefore, infirmary facilities are not provided. Basic first aid for minor injuries is available, and first aid kits are located in various departments of the College. Major illness or injury will be treated by health professionals. The campus is located adjacent to Williamsburg Regional Hospital.</p> <p>Each student is covered by accident insurance at no additional cost. This group insurance covers the student while on campus and during college-sponsored group travel.</p>