IDSY 1210
INDUSTRIAL MOTOR CONTROLS II
MASTER COURSE SYLLABUS

Instructors will provide students with additional course-specific information, including attendance/makeup policies, assignment/test scheduling, and instructor contact information, as necessary and appropriate.

Prerequisite(s):	None
Co-requisite(s):	None
Term(s) Offered:	Fall and Spring
Class Hours:	3
Lab Hours:	8
Credit Hours:	5

Course Description

This course introduces the theory and practical application for two-wire control circuits, advanced motor controls, and variable speed motor controls. Emphasis is placed on circuit sequencing, switching, and installation, maintenance, and troubleshooting techniques.

Course Competencies and Student Learning Outcomes

Industrial Safety

Order	Description
1	Perform Wear approved PPE (Shoes, eye wear, hard hats).
2	Perform Mount a lock-out tag for use with a padlock.

Two Wire Control Circuits

Order	Description
1	Install a motor control limit switch to control magnetic starters.
2	Adjust a motor control limit switch for proper operation.
3	Install a motor control proximity switch in a control circuit to detect the presence of metal.
4	Install a motor control proximity switch for use as a motion detector.
5	Calibrate a motor controller proximity switch for sensitivity.
6	Install a pressure switch to control a magnetic starter of a motor controller.
7	Adjust the range and differential settings for given pressure limits of a motor controller.
8	Install a motor controller temperature switch to control a heating element.
9	Adjust a motor controller temperature switch for a given range of temperature.
10	Install a motor controller float switch to operate a pump.
11	Adjust a motor controller float switch for given operating levels.
12	Install a motor controller photo switch in a control circuit to detect the presence of light.
13	Install a motor controller photo switch for use as a light detector.

14	Calibrate a motor controller photo switch for sensitivity.

Advanced Motor Controls

Order	Description
1	Identify the various types of timers used in motor control circuits.
2	Operate on-delay timers for applications in motor control circuits.
3	Operate off-delay timers for applications in motor control circuits.
4	Install a time delay relay for use in a motor control circuit.
5	Adjust the time on a time delay relay used in a motor control circuit.
6	Install a time delay relay and two magnetic starters to sequence the operation of two motors.
7	Install and operate a primary resistance starter motor controller.
8	Install and operate an auto-transformer starter in a motor control circuit.
9	Install and operate a wye-delta starter in a motor control circuit.
10	Install and operate a solid state starter in a motor control circuit.
11	Install various motor control components in a motor control center.

Variable Speed Motor Controls

Order	Description
1	Cite industrial applications of variable speed motor control circuits.
2	Define the parameters, torque, acceleration, deceleration, p.w.m., frequency, voltage/hertz ratio, boost, I.R. compensation, and high bus fault as applicable to variable speed motor controllers.
3	Describe how an AC frequency drive operates to vary motor speed.
4	Install an AC frequency drive to control motor speed.
5	Setup and calibrate an AC frequency drive to adapt to changing parameters.
6	Determine the interconnections needed for various AC motor speed applications on two speed motors.
7	Describe the relationships of torque and speed to series, shunt, and compound DC motors.
8	Diagram an armature rheostat variable speed circuit for DC motors.
9	Diagram compound variable speed DC motors.
10	Describe the methods used to obtain variable speed control of compound DC motors.
11	Install a DC variable speed drive for a DC motor.
12	Calibrate a DC variable speed drive for a DC motor.
13	Select the appropriate control cabinet for a variable speed motor control circuit.
14	Sketch floor plans for the installation of variable speed motor control systems.
15	Sketch the layout of electrical accessories and conductors used in variable speed motor control circuits.
16	Install components, wire control cabinets, operator's stations, and motors for variable speed DC and AC motor control circuits.
17	Explain the formulas for determining the synchronous speed of AC motors.
18	Diagram a bank of starters used to achieve speed ranges for AC motors.
19	Sketch circuits which use mechanical interlocks for starters in AC motor variable speed controllers.
20	Sketch circuits which use auxiliary contacts for interlocks between starters in AC motor variable speed controllers.
21	Sketch circuits which use pushbuttons for interlocks between starters in AC motor variable speed controllers.
22	Describe the timing factors of speed ranges for variable speed DC motor controllers.
23	Evaluate the use of DC motor and variable speed controllers in specific industrial applications.

Semiconductor Fundamentals

Required Textbook(s) and Materials

Students enrolled in this course are obligated to have the following:

Title: Electrical Motor Controls
Author: Rockis/Mazur 5th ed. (2014)
Publisher: American Technical Publishing
ISBN: 978-0-8269-1226-8

Title: Industrial Motor Control
Author: Herman/Alerich 7th ed. (2014)
Publisher: Delmar
ISBN: 978-1-133-69180-8

TI 30, TI 31, or TI 36 calculator (or equivalent)
Electrician Tools (see instructor for list)

Grading Scale

The grading scale is detailed in the *Catalog and Student Handbook* and listed below for reference. All faculty members follow this scale when assigning grades to reflect a given student's performance in the classroom.

Grade	Numerical Equivalent	Grade Point
A/A*	90-100	4
B/B*	80-89	3
C/C*	70-79	2
D/D*	60-69	1
F/F*	0-59	0

Effective Summer Quarter 2006, Athens Technical College replaced the S/U grading system used for learning support classes with an A*-F* grading system. The registrar uses an asterisk (A*, B*, C*, D*, F*, W*, WF*, WP*) to designate learning support course grades on transcripts and grade reports because these grades are not components of the term grade point average.

Academic Support Center:

The Academic Support Centers of Athens Technical College (ATC) provide free tutoring for enrolled students. Both instructors and peer tutors provide tutoring in almost all subjects offered by the college. Information about the Center is accessible via the ATC website at http://www.athenstech.edu/StudentDevelopmentServices/AcademicSupportCenter. To find out the specific services available on the Athens, Greene, and Walton Campuses, please call (706) 583-2839. To contact the Academic Support Center on the Elbert County Campus, please call (706) 213-2129.

Attendance

Regular class attendance is important and expected. The college considers both tardiness and early departure from class as forms of absenteeism. Students absent from class for any reason are still responsible for all work missed. Instructors have the right to determine whether work missed can be made up and have the liberty to set reasonable expectations for attendance based on frequency of class meetings and on the instructional delivery method, subject, type, and level of the class. Class attendance policies will be clearly stated for students by their respective instructors on separate documents (course outlines/schedules) or appendices to the master syllabus.

Course Withdrawal

Students may withdraw from a course without academic penalty until the midpoint of the term. Students withdrawing after the midpoint of the term receive grades of WP – Withdrawal Passing, or WF – Withdrawal Failing. Students who stop attending class(es) without formally withdrawing risk earning a final grade of F, which will appear on the academic

transcript. Withdrawing from a course may impact financial aid status, academic standing, and GPA. Refer to the ATC *Catalog and Student Handbook* for further details. http://www.athenstech.edu/Catalog/

Course Technology

Course addendum will provide details concerning the use of technology in the course. Course schedule types include **web-enhanced** – taught face-to-face; **online** – taught online using the internet, may require proctored exam; **hybrid** – class time is split between face-to-face and online; **video conference** – taught at two or more campus locations simultaneously with instructor located at one of the classroom locations. More details are available on the Athens Technical College website. http://www.athenstech.edu/eLearning/CourseList.cfm

Continuation of Instruction

In the event of severe weather or other emergency, students will be expected to continue participating in learning activities via ANGEL, Athens Technical College email, or other modality. Instructors will provide a plan for the continuation of instruction.

Work Ethics:

To fulfill the responsibility to teach essential workplace ethics, the college provides students instruction in, and evaluates students on, the following ten work ethics traits: attendance, character, teamwork, appearance, attitude, productivity, organizational skills, communication, cooperation, and respect. To best equip students for successful workplace experiences in their chosen profession, instruction and evaluation takes place in the context of their program of study.

Academic Honesty

Academic honesty is expected at all times. Any student found to have engaged in academic misconduct such as cheating, plagiarism, or collusion is subject to disciplinary sanctions as outlined in the Student Code of Conduct detailed in the ATC *Catalog and Student Handbook* . See the following link for the complete Academic Honesty policy.
http://www.athenstech.edu/StudentAffairs/AcademicHonesty/Academic%20Honesty.pdf
Students are also advised to complete the tutorial on Academic Honesty available here:
http://www/athenstech.edu/StudentAffairs/AcademicHonesty

Americans with Disabilities Act

It is our goal at Athens Technical College to provide equal access to education for all students. Any student with a documented disability is eligible to receive reasonable academic adjustments and auxiliary aids in the classroom and/or for testing at Athens Technical College, as long as appropriate documentation of the disability has been submitted to the Disability Services Office in a timely manner. Students can access the application packet on our website.
http://www.athenstech.edu/CurrentStudents/orientation/files/disability_services_application.pdf

Cell Phones and Electronic Devices

Cell phone use in the classroom for non-instructional purposes, with the exception of receiving emergency notifications, is prohibited.

Food/Drinks in Classroom

Food and beverages (other than water) are not allowed in classrooms/labs.

Communication with ATC Faculty and Staff

Students, faculty, and staff must use Athens Technical College email and ANGEL accounts for all college-related communications. Students are obligated to check their email and ANGEL accounts on a regular basis, preferably daily.

Warranty of Graduates

The Technical College System of Georgia warranties every graduate of technical programs in which students may earn technical certificates of credit, diplomas, or associate degrees. The warranty guarantees that graduates demonstrate the knowledge and skills and can perform each competency as identified in the industry-validated standards established for every program of study. If one of our graduates educated under a standard program or his/her employer finds that the graduate is deficient in one or more competencies as defined in the course/program standards, Athens Technical College will retrain the employee at no instructional cost to the employee or the employer. This guarantee is in effect for

two years after graduation.

TEACH Act

According to the TEACH Act of 2002, Athens Technical College is obligated to advise you that instructional material included in this course may be subject to copyright protection. As such, you must not share, duplicate, transmit, or store the material of this course beyond the purpose and time frame explicitly stated in the syllabus of your course. If you are not certain whether a particular piece of material is covered by copyright protection, you should contact your instructor and obtain his/her written clarification. Failing to observe copyright protection is a violation of law.