

9-2013

## EET 234T.01: Automatic Controls

Steve Shen

University of Montana - Missoula, [steve.shen@montana.edu](mailto:steve.shen@montana.edu)

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**Missoula College UM**  
**Department of Applied Computing and Electronics**  
**Course Syllabus**

**EET 234T AUTOMATIC CONTROLS**

Credit: 4

Prerequisite: EET 205 Solid State Electronics I

Syllabus Last Revised: August 2013

**Meetings:**

Lectures Mon, Wed & Fri 2:10PM – 3:00PM; Lab Thu 1:10PM to 3:00PM  
Classroom: HB05

**Faculty Contact:**

Steve Shen - [steve.shen@umontana.edu](mailto:steve.shen@umontana.edu)

Phone: (406)243-7914

Office Hours: Monday 11:00AM to 12:00PM

Wednesday 3:00PM to 4:00PM

Thursday 12:00PM to 1:00PM

Location: 905 South Avenue, Griz House 8 (Modular – East side COT campus)

**Final Exam:** Tuesday December 10, 2013 from 1:10PM to 3:10PM in HB05

**Course Description**

**EET 234T Automatic Controls 4 cr.** Offered autumn. Prereq., EET 205. Explores the theory, terminology and components used in automatic control of industrial machines and processes. Uses the servomechanism as a representative control system to analyze open-loop, closed-loop, proportional, integral, and differential control strategies. The use of transducers and computers in automatic control systems in the industrial control setting is emphasized.

**Course Overview**

This course introduces the terminology, concepts, and the fundamental methods of analysis and design of automatic industrial control systems. The course is designed to provide students with an understanding and appreciation of some of the theoretical concepts behind control system elements and operations without much need of advanced mathematics and theory. Typical topics in process control, such as analog and digital signal conditioning, thermal, mechanical and optical sensors, final control, discrete-state process control, controller principles, analog controllers, digital control and control loop characteristics, and etc. are covered in the course.

**Learning Outcomes**

1. To present the fundamentals of the methods of analysis and design of automatic control of industrial machines and processes.
2. To present concepts of measurement, manipulation, and control of automatic controls

in the industrial setting.

### **Required Materials**

- Terry Bartelt, *Industrial Automated Systems, Instrumentation and Motion Control*, Delmar, Cengage Learning, 2011
- Lab Manual on the CD to accompany the textbook
- EET 234T Toolkit (available in the Bookstore)

### **Assessment**

Grades will be weighted and graded as follows:

Homework Assignments	20%
Attendance	10%
Lab Exercises	20%
Midterm Exam	20%
Final Exam	30%

#### Grading Scale:

90-100%	A
80-89%	B
70-79%	C
60-69%	D

### **Topic Outline** (subject to change)

- I. Introduction to Industrial Control Systems
- II. Interfacing Devices
- III. Thyristors
- IV. The Controller Operation
- V. DC Motors
- VI. AC Motors
- VII. Servo Motors
- VIII. DC Drives
- IX. AC Drives
- X. Temperature Control
- XI. Process Control Methods
- XII. Industrial Detection Sensors and Interfacing
- XIII. Elements of Motion Control
- XIV. Fundamentals of Servomechanism

### **Academic Integrity:**

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the

University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at: [http://life.umt.edu/vpsa/student\\_conduct.php](http://life.umt.edu/vpsa/student_conduct.php)

Using the Web to research materials and concepts is an integral part of learning in the twenty-first century. Studying with other students is a productive method of learning. A certain amount of collaborating on concepts with other students and using resources found on the Internet in an assignment is recommended. Copy and paste is not acceptable. It is expected that each student will input his/her assignment into the computer, and each student must be able to explain any assignment turned in. Collaboration on exams is strictly forbidden.

### **Dropping and Adding Courses or Changing Sections, Grading or Credit Status**

University Policy for dropping courses or requesting grading/credit status changes can be found in the catalog: <http://www.umt.edu/catalog/acad/acadpolicy/default.html> Students should become familiar with all academic policies

### **Disability Accommodations:**

Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please contact me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator. For more information, visit the Disability Services website at <http://www.umt.edu/dss> or call 406.243.2243 (voice/text).

### **Changes to Syllabi:**

NOTE: Instructor reserve the right to modify syllabi and assignments as needed based on faculty, student, and/or environmental circumstances. If changes are made to the syllabus, amended copies will be dated and made available to the class.

### **Cell Phone and other Electronic Communication Devices Policy:**

All electronic communication devices must be tuned off and stowed away prior to the start of class.

### **Attendance Policy:**

Regular classroom attendance is expected.

### **Exam, Project, and Assignment Policy:**

All exams are to be taken on the assigned date and time. Projects and assignments are due at the start of class on the assigned date and time. Late assignments will be accepted at the instructor's discretion. Rescheduling of an exam will be approved at the discretion of the instructor and only in extraordinary situations.

### **Learning Management System:**

It is the responsibility of the student to access and familiarize herself/himself with the Learning Management System (LMS) for the course (Moodle). Access & training is available through UOnline <http://umonline.umt.edu>