

EDMM 2001

Applied Electricity

Syllabus

Course Description:

A hands-on foundation exploring and applying fundamental electrical and electronics theory to practical application in everyday industrial settings is demonstrated and evaluated. An emphasis will be placed on the control of various motion actuators and, how to troubleshoot a common industrial power system.

Prerequisite: General Physics I & II

Textbooks: DeWalt Electrical Professional Reference (2011 Code)

ISBN-13: 9781111545147

Programmable Logic Controllers with ControlLogix by Jon Stenerson

ISBN-13: 978-1435419476

Course Objectives: Students who successfully complete this course will:

1. Develop fundamental techniques for and be able to troubleshoot common power system circuits.
2. Be able to safely use the tools and software employed in troubleshooting live and dead circuits while conducting system analysis.
3. Be able to identify and select a wide range of actuators including electric motors for various applications.
4. Be able to select the proper power requirements for a given application including wire conductors, insulators and system control features.

Course requirements:

- Attend all lectures, labs, field trips and demonstrations, more than two unexcused absences will result in a reduction of grade.
- Participate in class discussion, group activities and projects.
- Use the library, internet, and supplemental reference materials frequently.
- Utilize lab equipment, materials, and tools to complete lab exercises.

Evaluation:

Homework..... 100 points

Laboratory activities..... 520 points

Laboratory notebook..... 40 points

Quizzes..... 60 points

Mid-term exam.....80 points

Final exam.....200 points

Grading scale

93 – 100 %	A
87 – 92	BA
82 – 86	B
77 - 81	CB
72 – 76	C
67 – 71	DC
62 – 66	D
61 & below	E

Syllabus/course outline

Week / Lecture Topic

1. Course introduction, simple power circuits.
2. Ohms law, circuit symbols.
3. Lock out tag out procedures.
4. Soldering basics.
5. Branch circuits, common applications.
6. Utility calculations, blueprint reading.
7. National Electrical Code.
8. Industrial power distribution systems.
9. AC motors, DC Motors.
10. Motor control diagrams; NEMA, IEC.
11. Ladder blueprints, schematics.
12. Timers, timer functions.
13. Sinking and sourcing control circuits.
14. Advanced industrial control.

Laboratory:

The purpose of the laboratory is to experience techniques and methods employed in industrial electrical system troubleshooting and how to select and maintain reliable system components & materials while using approved standards

Week / Laboratory

1. Safety, review of laboratory equipment, procedures, demonstration of simple power circuits, meter principals.
2. Measuring ohms, resistance, current, voltage ampere, watts, Exercise using analog and digital multimeter, oscilloscope, and introduction to breadboards.
3. Simple power circuit continued, LOTO exercise.
4. Solder project, circuit examination exercise.

5. Wiring devices, branch circuits.
6. Facility blueprints, facility systems.
7. NEC circuit calculations, NEC application.
8. Magnetism, industrial power, transformers.
9. AC motor characteristics, DC motor characteristics, motor project.
10. Motor control devices, applications.
11. Motor control; two wire, three wire.
12. Timers, automatic input devices.
13. 24-volt industrial control circuits, sinking and sourcing exercise.
14. Advanced industrial motion control.