TEC 265
Electrical Fundamentals
1.0 Credit Hour
Fall 2010
Berea College
Technology and Industrial Arts
Web Site: http://www.berea.edu/tia/default.asp

Class Meetings:
   Danforth TIA, Room B18
   MWF: 2:00pm – 3:50pm
   Open Lab: As scheduled

Instructor:
   Mark Patrick Mahoney, PhD

Office:
   Danforth Technology and Industrial Arts building
   Room 101C

Office Hours:
   8:00 am – 10:00 am, MWF
   Or by Appointment

Phone:
   (859) 985-3060 (office)
   (860)944-2505 (cellular)

Email:
   mark_mahoney@berea.edu

Mission:
The objective of the program is to provide students with a broad professional and liberal-arts education necessary for entrance into careers or into professional or graduate schools. Course work is provided in the areas of engineering graphics, manufacturing technology, electricity/electronics, power technology, graphic communication, photography, Appalachian crafts, quality control, computer integrated manufacturing, robotics, and CAD/CAM/CNC. Throughout the program, emphasis is placed on aspects of creativity, quality, originality, and inventiveness in solving problems of design and production.

Course Description:
The study of techniques necessary for the servicing and fabrication of common electrical and electronic systems common in manufacturing and industry. The student will learn how to measure capacitance and inductance; calculate and measure electrical power and
be able to measure voltage, current, resistance, continuity and leakage. The student will also be able to determine the relationship of voltage, current and resistance in electrical circuits; read and interpret electrical circuit diagrams; and inspect and service power sources.

Rationale:
To align student skills with the demands and expectations of the current educational and industrial focus toward science, mathematics, and engineering. Refer to the websites of Technology for All Americans (http://www.iteaconnect.org/TAA/TAA.html), the International Technology Education Association (http://www.iteaconnect.org), the Association of Technology, Management, and Applied Engineering (http://atmae.org/), and the Accreditation Board for Engineering and Technology (http://abet.org) for more information.

Course objectives:
Upon completion of this course each candidate should be able to:
- Demonstrate proper safety precautions related to equipment.
- Define voltage, resistance, current amperage, direct current, alternating current, and power supply.
- Identify electrical components and their associated values
- Interpret and create schematic diagrams of electrical circuits
- Explain the basic principles and operation of varied electrical/electronic components
- Implement Ohm's Law to calculate voltage, current, and resistance problems.
- Perform voltage, current, and resistance measurements using the proper measurement devices (both analog and digital meters).
- Create, calculate, and service simple series, parallel, and series-parallel circuits.
- Identify types of power sources (AC and DC).
- Describe and explain the concepts of both DC and AC power systems and associate circuits.
- Calculate values for AC and DC resistive, inductive, and capacitive components.
- Set up and execute varied laboratory exercises.
- Use meters to identify and measure results of AC and DC laboratory exercises.

Content covered:
The semester will be comprised of the following modules:
- Fundamentals of Direct Current
- Electronic Assembly
- Fundamentals of Alternating Current
- Inductance, Capacitance, and RCL Circuits
- AC Power and Motors
- Electronic Principles
These modules are tentative and will be modified as class progression requires.

Assessment:
Student overall performance will be compiled using the following criteria:
- Examination
  - Provided at the close of each module and the close of the course
  - Grades will be posted on Moodle as soon as they become available
  - Tests may be reviewed with the instructor during office hours or by appointment

- Laboratory work:
  - Varied projects will be assigned for both individual and team completion.
    - Detailed documentation will be required for each project
    - All written work shall be typed and may be submitted electronically or hardcopy
    - Those projects requiring schematics should be completed through available computer software and should include a detailed list of components and code key.
  - All documentation will be submitted at the completion of the assigned project in a neatly organized journal for review.

Evaluation Summary
Examinations: 100 points each
Laboratory Work: 100 points each

Total possible points = 1000
(may be adjusted per total points obtained)

A = 1000 - 900
B = 899 - 800
C = 799 - 700
D = 699 - 600

Required Materials:
Textbook:
Laboratory Manual:
Calculator:
  TI 83 or equivalent
Notebook
Writing Utensils
Project Materials
  (advance notice will be given prior to use)

Expectations:
Academic Dishonesty:
  Students are expected to be scrupulous in their observance of high standards of honesty in regard to tests, assignments, term papers, and all other procedures relating to class work. Academic dishonesty as used here includes, but is not limited to, plagiarism, cheating on
examinations, theft of examinations or other materials from an instructor's files or office or from a room in which these are being copied, copying of an instructor's test material without the permission of the instructor, theft of computer files from another person, or attributing to one's self the work of others, with or without the others' permission. Falsification of an academic record with intent to improve one's academic standing shall also be construed to be academic dishonesty. (Any suspected violation will be reported to the Director of Academic Services and/or the Student Admissions and Academic Standing Committee)

Disability Services:
A Disability Services Coordinator is available to assist students with disabilities in anticipating and planning for their full participation in the academic, labor, and social programs of Berea College. The Coordinator acts as a liaison with other College departments and offices in arranging responses appropriate to the student's particular situation. Some of the services available to qualifying students with disabilities include: communication with faculty and adviser regarding student needs; accessible classroom and housing; determination of appropriate accommodations; classroom accommodations or modifications; assistance with obtaining recorded textbooks; peer tutors; extended testing time; and information and referral for additional services.

Students who have a disability that may prevent them from fully demonstrating their abilities should contact the Disability Services Coordinator, Cindy Reed at (859) 985-3212, or e-mail cynthia_reed@berea.edu, to discuss accommodations necessary to ensure full participation in this course. Upon request, this syllabus can be made available in alternative forms.

Non-Discrimination Policy:
It is the policy of Berea College not to discriminate on the basis of race, color, religion, national or ethnic origin, age, sex, disability, or sexual orientation in its educational programs, admissions practices, scholarship and loan programs, athletics and other school-administered activities or employment practices. This policy is in compliance with the requirements of Title VII of the Civil Rights Act of 1962, Title IX of the Educational Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, regulations of the Internal Revenue Service, and all other applicable federal, state and local statutes, ordinances and regulations.

Questions or complaints regarding discrimination should be referred to the office or committee responsible for the activity concerned, e.g. sports, student labor, academic courses. In addition, the College has appointed compliance officers under provision of law regarding sex and handicap discrimination. The Vice President for Business and Administration is Section 504 Coordinator. Questions or complaints in the area of handicap discrimination should be referred to Steve Karcher in 230 Lincoln Hall, at ext.3131. Dreama Gentry is Title VII/Title IX Coordinator. Sex discrimination questions or complaints may be directed to her at the GEAR UP office in the Middletown School, 439 Walnut Meadow Road, via email at dreama_gentry@berea.edu, or by phone at 985-3853.

Technology Commitment:
Student are expected to demonstrate an acceptable competence in the use of education technology as a tool to help future students learn and to have conceptual understanding of how knowledge, skills and dispositions related to educational and information technology are integrated across the curriculum, instruction, assessments and evaluations.
Attendance:

It is extremely imperative that you attend every scheduled class meeting on time and prepared. The following guidelines have been developed to aid in that condition:

- A reduction of one letter grade will be administered for each additional absence beyond the maximum allotment of three course absences (unexcused) during the duration of the course.
- After six absences, no credit will be earned for the course (excused or unexcused). Special circumstances to this rule must be presented to and approved by the instructor prior to the attaining the absence maximum.
- Arriving late to class (more than 5 minutes after the start of class) on three occasions is equivalent to an absence regardless work preformed and/or extended time committed.
- To avoid penalty of an absence, a student must be actively engaged in the class activity and not just simply present.
- If a student were to arrive to class and be unable to participate due to reasons either not discussed or considered inappropriate by the institution, a penalty of an absence will be administered.
- The student must remain in the class throughout the duration of the class unless otherwise excused by the instructor.
- If a student is to be absent (excused), proper notification must be made at least 24 hours in advance with appropriate documentation using the communication medium provided.
- In the case of an emergency, later notification is acceptable; however documentation will be required within three days of the absence to be excused.
- Material, Exams and/or Projects that are missed by a student due to an unexcused absence will not be re-submitted or allowed to be “made up.”