ENGR1202 - Introduction to Engineering Practices and Principles II

(For electrical and computer engineering students)

“This is a Prospect For Success course, designed to help new students develop their inquiry skills in their first year at UNC Charlotte”

Catalog Data Applications in the disciplines of Electrical and Computer Engineering utilizing the tools and techniques specific to the major. Emphasis on analysis skills, mathematical skills, understanding of the profession/curriculum, and problem solving skills.

References ECE: All information is available on web – http://coesf.uncc.edu/jahudak/ under Engr 1202 and Mosaic version of AUTOCAD Information of the structure of the problem session/recitation section is also available on the web site, including grading and requirements. For the computer project, Moodle is available.

Goals ECE: By the end of the semester ECE students will have the information and training needed to complete a team project that incorporates problem solving, critical and creative thinking, project planning, and engineering design using the specific tools and techniques in both microelectronics clean room and computer labs. Students will also be able to communicate their proposed design in presentation form.

Prerequisite ENGR 1201 with a grade of C or better

Class Topics

**Electrical Engineering Project**
1. Introduction to electrical and computer engineering
2. Engineering units and semester project description
3. EM frequencies
4. Microelectronics and fabrication in clean rooms
5. Wireless technologies and wavelength including cellular, Bluetooth, Wi-Fi, RFID, and GPS
6. Electronic materials- silicon
7. Intro to clean room, safety, and clean room protocols
8. Conductor attributes and deposition techniques
9. Wavelength and antenna design
10. Photolithography and schematics
11. Wafer dicing
12. Global issues with technology
13. Presentation skills and using PowerPoint
14. Final exam review

**Computer Engineering Project**
1. Basic computer control module
2. Using the modular approach to computer controller design
3. Simple project with computer control modules
A problem session/recitation is required each week.

**Students will do 2 projects in the semester. Each project will take 5 weeks.** All students will get an introduction to both an electrical engineering and computer engineering.

Teams are required to submit a PowerPoint presentation of their completed clean room projects. Other topics include: mobile communications systems (mobile phone, Wi-Fi, Bluetooth, RFID) and frequency band considerations; basic antenna design; safety and clean room protocol; working in the microelectronics clean room; basic solid state devices theory; microelectronics tooling and fabrication; Computer related designs using building block modules, using AutoCAD, Excel, and PowerPoint; and proper presentations.

**Outcomes**

ECE: Using the team project, students will learn current mobile communications systems and their design. They will learn to create and fabricate a unique component of these systems using microelectronics fabrication tools and processes. They will also learn microelectronics fabrication methods, decision matrices using Excel, Students will be able to effectively present the results of the project. **ABET G**

**Computer Usage**

Electronic submission of homework assignments is required; also AutoCAD, PowerPoint, Word, and Excel

**Laboratory**

ECE: One – two hours per week will be lectures providing the information necessary to complete the projects. The second hour+ will be spent either in the microelectronics cleanroom lab or computer labs learning the techniques needed for completing their project.

**Design Content**

Students will be provided opportunities to develop proficiency in the engineering design process learned in ENGR 1201.

**Grading**

ECE: Attendance, homework, tests, 30% clean room project = 20%; recitation grade = 10%, computer project = 20%, final exam = 20%

**Follow-up Courses**

Courses for EE majors: communications, VLSI design and processing, photovoltaics, LEDs, solar cell fundamentals lab, and thin films for micro processing

Courses for Comp majors: programming, robotics, computer design

**Academic Integrity**

Students have the responsibility to know and observe the requirements of the **UNCC Code of Student Academic Integrity (2001-2003 UNCC Catalog, p. 275)**. This code forbids cheating, fabrication or falsification of information, multiple submissions of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty.

**Notes**

All materials submitted for grades (e.g. test and final problems, homework assignments) must represent the student's original work. Students may discuss homework problems, including comparing answers. Copying another student's work, or copying a solutions manual is strictly forbidden. It is the responsibility of every student to know and observe the requirements of the UNCC Code of
Student Academic Integrity. This Code forbids cheating, fabrication or falsification of information, multiple submissions of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty. Any student violating the Code will be subject to the penalties described in this document. If in doubt, please ask before you engage in any activity about which you are unsure.

**Instructor**

ECE: Mr. John Hudak