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

Electrical engineering project (Instructor Hudak) is available on the 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 and MATLAB, Moodle is available.

Goals

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, intro to clean room safety and protocols
2. Microelectronics and fabrication in clean rooms. Wireless technologies and wavelength including cellular, Bluetooth, Wi-Fi, RFID, and GPS
3. Wavelength and antenna design
4. Photolithography and schematics
5. Wafer dicing
6. Global issues with technology
7. Presentation skills and using PowerPoint
8. Final exam review

**Computer Engineering Project**

1. Basic computer Engineering Concepts
2. Using the modular approach to computer controller design
3. Simple project with computer control modules

**MATLAB Project**

1. MATLAB Introduction (basic math knowledge arithmetic, matrix, complex numbers, equations)
2. MATLAB arrays, matrix, vector, and matrix operations
A problem session/recitation is required on specified weeks. The Prospect for Success inquiry assignment is part of this session. More detail on this assignment will be available on Moodle.

**Students will do 3 projects in the semester. One project will be an electrical engineering project in the Cameron clean room, one will be a computer project, and one will be a MATLAB project. Projects will last for about 5 weeks. Each project will be split, with 1/3 of the class doing each project at a time. Students will be exposed to both an electrical engineering and computer engineering related project.**

For the electrical engineering project students are required to submit a PowerPoint presentation of their completed antenna project. 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.

The Computer Engineering project is described in a separate document available on Moodle.

The MATLAB project will be a combination of MATLAB programming as well as basic SIMULINK implementation. The final project will be described in a separate document in Moodle.

Outcomes

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 matrixes using Excel, Students will be able to effectively present the results of the project. **ABET G**

This course is also part of the college's Prospect for Success (PFS) freshman curriculum. PFS is intended to foster academic engagement via three specific learning outcomes: *Commitment to Success, Inquiry,* and *Cultural Awareness.* Two of the PFS learning outcomes are measured in ENGR/ETGR 1201:

- **Commitment to Success:** Students will identify specific and realistic goals for their collegiate experience, develop or exhibit strategies for achieving those goals, and recognize the need to make change in light of experience.
- **Cultural Awareness**: Students will demonstrate an understanding of themselves, and of others, as individuals whose worldview and capacities are shaped by culture and experience and a willingness to take the worldview and capacities of others into consideration.

*Inquiry* is integrated into ENGR 1202 E01 as part of the second semester of the student's freshman curriculum. Thus, by the end of the freshman year students will reflect upon and enhance their personal understanding and meaning of each PFS outcome. **ABET G**

**Computer Usage**

Electronic submission of homework assignments is required; AutoCAD, PowerPoint, Word, Excel, MATLAB, SIMULINK

**Laboratory**

One to two hours per week will be lectures providing the information necessary to complete the projects. The second hour+ will be spent in the microelectronics cleanroom lab or computer labs (Computer and MATLAB sections) 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**

Electrical engineering clean room project = 20%; computer project = 20%; MATLAB project = 20%; recitation grade = 10%; final exam = 20%; attendance, activities (professional meetings) = 10%.

**Follow-up Courses**

Courses for EE majors: communications, VLSI design and processing, photovoltaic’s, 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. 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 and Student Conduct

Missing Class/Assignments: Throughout the semester, a student may miss classes/assignments/quizzes/exams due to many reasons. Most of the reasons will not be accepted as an "excused" absence. That is why a few of the assignments are dropped when determining your final grade. For example:

- ECGR or other class exam review sessions: All class and exam times take precedence over any review sessions.
- University sponsored activity: All class and exam times take precedence over any University-sponsored activity.
- Business trips: If you miss an assignment/quiz because you were on a business trip, you miss out on the assignment/quiz points.
- Illness: If you miss an assignment/quiz because you were ill, you miss out on the assignment/quiz points.

Course Calendar: Refer to the web page: http://www.registrar.uncc.edu/calendar.htm for the academic calendar.

Syllabus Revisions: The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be by announcement in class and/or by email to your UNCC email address.

Disability Services/Special Needs: If you have a documented disability and require accommodation in this course, contact the Disability Services office, located in Fretwell building, room 230. Phone 704/687.4355 (voice/TDD). Information about available services can be found at: http://www.ds.uncc.edu. Students in this course seeking accommodations to disabilities must first consult with the Office of Disability Services and follow the instructions of that office for obtaining accommodations. Please initiate this process and inform me during the first two weeks of class.

Diversity: UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socioeconomic status.

Cell Phones, PDAs and Such: Please note that portable phones, pagers, and late arrivals are disruptive to the instructor and to your peers. The use of cell phones, beepers, or communication devices is disruptive and is therefore absolutely prohibited during class. Turn off your cell phone while in class. Except in emergencies, students using such devices must leave the classroom for the remainder of the class period. This penalty will be at the sole discretion of the instructor.

Laptop Computers: we know that some of you may wish to take notes directly on your computer and we have no problem with that. If however, you choose to access your email, search
the web, play solitaire or other games, or instant messenger your friends during class, you will be asked to leave the room for every transgression, and may lose course points. This penalty will be at the sole discretion of the instructor.

Communications using Moodle: It is preferred that you ask specific technical and class organizational questions via Moodle. That way, the Instructor, TAs, or classmates have the ability to answer faster than just sending an email to an individual.

Communication: we will try and answer emails and phone calls received during the hours of Monday – Friday, 9 am to 4 pm within 48 hours. If you email and/or call at any other times, it is strictly a random chance that I’ll respond in a timely manner. You should check your UNCC email every day as that is the primary way that we will communicate with you when not in class. When communicating with me via email, please put in the subject line the course number so we can readily identify who you are. If your communication via email is rude, has grammatical, and/or spelling mistakes, we will not respond at all. If we have not responded to your email within 48 hours as stated within the conditions above, perhaps you need to resend it and/or reword it. You are to conduct yourselves in a professional manner at all times.

Orderly, Productive and Professional Classroom Conduct: we will conduct this class in an atmosphere of mutual respect. we encourage your active participation in the classroom. Each of us may have strongly differing opinions on the various topics of class discussions. Remember that not everyone shares these beliefs and opinions and these may be statements about personal beliefs, values, and opinions rather than fact. The conflict of ideas is encouraged and welcomed. The respectful and open-mindedness of ideas of others, including mine, is similarly welcomed. However, we will exercise my responsibility to manage the discussions so that ideas, comments, and arguments can proceed in an orderly, productive, and professional manner. You should expect that if your conduct during class seriously disrupts the atmosphere of mutual respect we expect in this class, you will be asked to leave the class, will not be permitted to participate further, and will have your final grade deducted by 10 points for each and every occurrence.

Turnitin.com: As a condition of taking this course, some required assignments maybe subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. No student papers will be submitted to Turnitin.com without a student’s written consent (http://www.legal.uncc.edu/turnitinconsentform.pdf) and permission. If a student does not provide such written consent and permission, the instructor may: (i) require a short reflection paper on research methodology; (ii) require a draft bibliography prior to submission of the final paper; or (iii) require the cover page and first cited page of each reference source to be photocopied and submitted with the final paper.

Sexual Harassment: All students are required to abide by the UNC Charlotte Sexual Harassment Policy (http://www.legal.uncc.edu/policies/ps-61.html) and the policy on Responsible Use of University Computing and Electronic Communication Resources (http://www.legal.uncc.edu/policies/ps66.html). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

Religious Accommodations for Students: UNC Charlotte Policy #134 in part states: Students who, acting in accordance with this Policy, miss classes, examinations or other assignments
because of a religious practice or belief must be provided with a reasonable alternative opportunity to complete such academic responsibilities. It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a Request for Religious Accommodation Form to their instructor prior to the census date for enrollment for a given semester. The census date for each semester (typically the tenth day of instruction) can be found in UNC Charlotte’s academic calendar. A student who submits a Request for Religious Accommodation Form after the census date must show good cause for the late submission, and the late submission itself may be taken into account in determining whether the student has a religious practice or belief requiring accommodation and whether granting the request would create undue hardship. (http://legal.uncc.edu/policies/ps-134.html). Read the policy webpage for specific details and the form.