

ENGR1202

Introduction to Engineering Practices and Principles II

Course Syllabus

CATALOG DATA Applications in the disciplines of Civil, Computer, Electrical, and Mechanical Engineering utilizing major-specific tools and techniques. Emphasis on analysis and mathematical skills, understanding of profession/curriculum, and problem solving skills.

- REFERENCES**
- CE:
1. Bowen, James (ed). 2002. *Introduction to Computing for Civil Engineers* 2002. Prentice Hall Pub., Upper Saddle River, NJ. (required)
 2. Ressler, Stephen J. 2001. *Designing and Building Fire-Folder Bridges* Produced by the US Mil. Acad. West Point, NY. (required)
Available at: <http://bridgecontest.usma.edu/manual.htm>.
 3. Hanselman and Littlefield. 2001. *Mastering MATLAB 6, A Comprehensive Tutorial and Reference* Prent. Hall Pub., Upper Saddle River, NJ.(optional)
 4. Magrab. 2000. *An Engineers Guide to MATLAB* Prentice Hall Pub., Upper Saddle River, NJ. (optional)
 5. MATLAB: <http://www.mathworks.com> (optional)
 6. Oakes, Leone, and Gunn. 2000. *Engineering Your Future* 2nd Ed., Great Lakes Press, Okemos, MI (optional)

ECE: http://www.ece.uncc.edu/research/clean_room

- ME:
1. Pro/Engineer 2001 Instructor, by David S. Kelley
<http://www.mhhe.com/engcs/drawgr/kelley/>
 2. *Engineering Graphics Text and Workbook* by Craig and Craig:
http://www.sdcpro.com/sdcpublications/pb_egw.htm

- COURSE GOALS**
- CE: By the end of the semester, working in and outside of class, students will be able to:
- use MATLAB and MS EXCEL to solve quantitative problems in future classes.
 - create a MATLAB script that analyzes the forces in the members of a 2-D truss.
 - convert between physical properties expressed in English or SI unit systems.
 - apply the concept of dimensional consistency in engineering equations.
 - explain what Civil Engineers do.
 - explain the sub-disciplines within Civil Engineering.
 - design, construct, and test a balsa wood bridge.
 - Prepare/present oral & written presentations on balsa wood bridge project.

ECE: By the end of the semester 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 specific tools and techniques required in the microelectronics cleanroom. Students will also be able to communicate their proposed design in both oral and written form.

- ME: Students will be introduced to the engineering design process and, by the end of the semester, be able to:
- use a computer aided design (CAD) tool to evaluate a design before tooling/manufacturing process begins.
 - read & understand an engineering drawing, and to produce the same.
 - know the process of creating individual components, creating an assembly of these components and a kinematic model of the final assembly.

PREREQUISITE	ENGR 1201 with a grade of C or better
CLASS TOPICS	<p>CE: MATLAB, EXCEL, forces in the members of a 2D truss, unit conversions, Civil Engineering as a profession, sub-disciplines within Civil Engineering</p> <p>ECE: Teams are required to submit a verbal and written report of the project. Other topics include: mobile (cellular) communications systems and frequency band considerations; basic antenna design; safety and cleanroom protocol; working in the microelectronics cleanroom; basic solid state devices theory; microelectronics tooling and fabrication; using AutoCAD, Excel, and PowerPoint for proper presentations and reports</p> <p>ME: Pro/E features such as holes and cuts, revolved protrusions, rounds and chamfers, parent/child relations, the 3 R's, sketcher tools and datum planes, revolved features, patterns and copies, sweeps, blends, creating drawings, assembly fundamentals and assembly operations; also pencil graphics including orthogonal projections, isometric views, auxiliary views, and sectional views and introduction to engineering design.</p>
OUTCOMES	<p>CE: Students will learn and be expected to apply more MATLAB features. Teams of students will also complete a civil engineering design project using MATLAB.</p> <p>ECE: Using the team project, students will learn about current mobile phone systems and their design. Students will learn to create and fabricate a unique component of this system using microelectronics fabrication tools and processes. They will also learn microelectronics fabrication methods, cost analysis using Excel, and presentation skills using PowerPoint and Word.</p> <p>ME: Students will be able to create and read standard engineering drawings and model an air engine using Pro/E in preparation for future design courses. The air engine model will be assembled using the software and evaluated kinematically.</p>
COMPUTER USAGE	Electronic submission of homework assignments is encouraged. AutoCAD, PowerPoint, Word, and Excel (ECE); Pro/E (ME)
LABORATORY	<p>CE: MATLAB computer labs as needed</p> <p>ECE: One hour per week will be lectures providing information necessary to complete the project. The second hour will be spent in the microelectronics cleanroom lab learning the techniques needed for fabricating their project.</p> <p>ME: Computer labs as needed/scheduled</p>
DESIGN CONTENT	Students will be provided opportunities to develop proficiency in the engineering design process learned in ENGR 1201.
GRADING *	<p>CE: There will be one in-class exam (20%) during the class and one comprehensive in-class final examination (20%). There will also be a bridge design project (20%), including the construction of a balsa wood bridge, and written and oral presentations describing the bridge design. Ten sets of homework problems (50%) will be assigned and graded.</p> <ul style="list-style-type: none"> • Best 3 of 4 (exam, final, competition, presentation) 60% • Best 8 of 10 (homework) 40%

GRADING* (CONTINUED)	ECE:	<ul style="list-style-type: none"> • Attendance, homework, safety test 40% • Final exam 20% • Tem verbal presentation 20% • Team written report 20%
	ME:	<ul style="list-style-type: none"> • Attendance and homework 65% • Midterm exam 15% • Final Exam 20%

FOLLOW-UP COURSES

CE: Sophomore design lab

ECE: Courses in communications, VLSI design and processing, and thin films for microprocessing

ME: Sophomore design lab

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, <http://www.uncc.edu/catalog/yr2001-03/student%20conduct.htm>). This code forbids cheating, fabrication or falsification of information, multiple submissions of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty. 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. 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.

NOTES

Students are responsible for meeting all class deadlines (e.g. completing homework assignments, taking tests and finals). Students must appear at the designated time for tests and finals to receive any credit unless PRIOR approval is granted for an alternate time. You will not be granted alternate test or final times thereafter.

COORDINATOR

CE: Dr. Jim Bowen
 ECE: Mr. John Hudak
 ME: Mr. Jeff Raquet

* Grading policy may be modified by the instructor for respective course sections.