

COURSE INFORMATION

Summer 2009

EGR 120

Introduction to Engineering

Pre-requisite: none

Co-requisite: MTH 173

Credits: 2

Lecture Hours: 2/week **Lab Hours:** 2/week

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Course Description:

EGR 120 provides an introduction to the engineering profession and also provides the student with an introduction to the engineering design process, including team design projects. Information will be provided to assist students in selecting an engineering discipline (such as mechanical engineering, electrical engineering, etc.).

Topics presented include a description of the profession, education of the engineer, career opportunities, local college transfer information, professionalism, engineering ethics, engineering problem solving, data collection and analysis, and engineering design. The course includes the use of Microsoft PowerPoint and the use of Microsoft Excel for engineering problem solving with applications such as generating tables of calculations, graphing, and linear regression. A significant portion of the course is also related to teamwork. Students will work in teams on using the BOEBOT, a robot based on the Parallax BASIC Stamp microprocessor. Team projects will include simple programming of the robot, controlling devices and sensors, and navigating the robot on a course as part of a competition. The object-oriented nature of sensors that are controlled by a microcontroller will be emphasized.

Course Objectives:

The general objectives of EGR 120 are:

1. to introduce information about engineers, engineering disciplines, and the engineering profession.
2. to introduce standards and studies in engineering ethics
3. to introduce students to some Engineering resources available via the Internet.
4. to provide an introduction into Microsoft Excel with an emphasis on Engineering problem solving to equip the student to use this software in later courses
5. to introduce the concepts of regression and the determination of empirical formulas representing graphical data
6. to introduce students to the importance of teamwork in the engineering profession and to give them an opportunity to work on team projects
7. to introduce students to the engineering design process and to have them use portions of the process toward the design of a product.
8. to provide an introduction to Microsoft PowerPoint
9. to introduce students to the Parallax BOEBOT, a robot based on the BASIC Stamp microprocessor.
10. Students will also be introduced to various types of devices and sensors that can be controlled using the BOEBOT, with an emphasis on the object-oriented nature of the devices.
11. Students will participate in team projects involving the BOEBOT, including a final competition.

Grading:

Course grades will be computed based on the following percentages:

Test #1 (Homework #1-5, Media #1-4)	15%
Test #2 (Excel)	15%
Homework Assignments (10)	40%
Media Assignments (4)	5%
Team Assignments (6)	25%

Course Material:

1. **Lecture Notes** - This is an important source of information for this course. Material covered in lecture may not be found in the textbook. If any lectures are missed, the student should try to obtain the notes from another student.
2. **Textbook:** The following text is required for the course:
Saeed Moaveni. Engineering Fundamentals – An Introduction to Engineering, 3rd Edition. Toronto, Ontario: Nelson, a division of Thomson Canada Limited, 2007 (ISBN: 9780495082538)
3. **File storage** – A USB memory device (flash drive) is recommended for storing files.
4. **Calculator** - Engineering students at TCC are required to have one of the following calculators:
 - TI - 85 • TI - 86 • TI - 89 • TI - 92
 - HP - 48 • HP - 49 • HP-50 • Voyage 200

The type of calculator is not critical for EGR 120, but is quite important in later EGR courses as TCC. Check with your instructor for more information.

Homework:

EGR 120 introduces the student to many software-related topics, and thus the instructor will give a large number of computer-related assignments that focus on engineering problem solving. In general, each assignment is due one week from the day it was assigned. Late assignments will be penalized 10 points per week (for any part of a week) and no assignments will be accepted more than two weeks late or after the last day of class.

Media Assignments:

4 movies will be shown during the course. A media assignment will be given with each movie where the student will be asked questions related to the movie or asked to discuss issues related to the movie. The media assignment will be due one week after the movie was shown. If a student misses class when a movie was shown, the movie may be viewed in the LRC (library) on the Virginia Beach Campus.

Team Assignments:

The last few weeks of the course involve a significant amount of teamwork. It is critical that all team members be present for each of the team exercises. Students will not receive credit for any team assignments that occurred during their absence.

Absence:

Absence during team projects is critical as described above. If a student misses a class during other parts of the course, it is the student's responsibility to obtain any information, assignments, etc., given during class. Missed test results in a grade of 0 unless the student notifies the instructor prior to class or within 24 hours of the class with an adequate reason. Notification may be made by phone or by email.

Tentative Course Outline/Schedule

Date	Topic(s)	Reading	Homework Assignment(s)
May 19	<u>Engineering Profession</u> - TCC Engineering curriculum, <u>Movie:</u> "21 st Century Jet: The Building of the 777 (Part 1: To Design a Plane)"	Chapter 1,2	HW #1 (papers on transfer and career choices & disciplines) Media #1
21	<u>Engineering Organizations</u> - Engineering degrees, functions of an engineer, engineering disciplines, levels of technical professionals, <u>Movie:</u> "To Engineer is Human"	Chapter 1,2	HW #2 (Engineering resources on the internet) Media #2
26	<u>Engineering Organizations</u> - Engineering societies, accreditation (ABET), Professional Engineering registration. <u>Movie:</u> "Get Licensed, Get Ahead"	Chapter 1,2	Media #3
28	<u>Engineering Ethics</u> - <u>Movie:</u> "Incident at Morales"	Chapter 5	HW #3 (Ethics case study)

Tentative Course Outline/Schedule (continued)

Date	Topic(s)	Reading Assignment	Homework Assignment(s)
June 02	<u>Significant Figures & Units</u>	Chapter 6	HW #4 (Significant digits and units)
04	<u>Significant Figures & Units</u>	Chapter 6	
09	<u>Microsoft Equation Editor and Microsoft Draw</u>		HW #5 (Microsoft Equation Editor and Microsoft Draw)
11	<u>Engineering Problem-Solving using Excel</u> Overview of spreadsheet features, formulas, functions, absolute and relative cell addresses, Excel equations, tables, formatting, adding diagrams (Microsoft Draw) and text equations (Microsoft Equation Editor) to spreadsheets	Chapter 14, Sections 1-5	HW #6 (Excel)
16	Test #1: through dimensions and units (HW #1-4)		
18	Possible substitute – Instructor will be out of town		
23	<u>Engineering Problem-Solving using Excel</u> x-y (scatter) graphs; linear, exponential, power, and polynomial regression; correlation coefficient; use of log scales.	Chapter 14, Sections 6,8	HW #7 (Excel)
25	<u>Engineering Problem-Solving using Excel</u> Graphing curves with multiple x and or y values, reversing x and y axes, histograms, look-up tables and functions, statistical functions, matrices and matrix operations, other types of graphs in Excel.	Chapter 14, Sections 6-8	HW #8 (Excel)
30	<u>Engineering Communication</u> – reports, oral communication, PowerPoint presentations	Chapter 4	HW #9 (PowerPoint)
July 02	<u>Engineering Design</u> – the Design Process, teamwork, standards, scheduling, divide class into teams for remainder of course	Chapter 3	Team #1 (ASEE Model Design Competition)
07	<u>BASIC Stamp BOEBOT</u> – Why study robots?, robot applications, overview of hardware & software (compiler), overview of sensors and applications, object-oriented nature of sensors and other devices, emphasize importance of teamwork on labs. Basic Stamp commands and simple programs.	Online manuals & class handouts	HW #10 (BOEBOT worksheet) Team #2: (Simple programming to control LEDs)
09	<u>BASIC Stamp BOEBOT</u> – PULSOUT and PAUSE commands, servos (unmodified and modified), applications of servos, calibrating servos	Online manuals & class handouts	Team #3 (Calibrating servos)
14	<u>BASIC Stamp BOEBOT</u> – controlling the BOEBOT, calculating distances using wheel revolutions (dead reckoning), turning, navigating a course	Online manuals & class handouts	Team #4 (navigating a track using dead reckoning – extra credit to fastest team)
16	<u>BASIC Stamp BOEBOT</u> – controlling the BOEBOT using tactile sensors (whiskers), navigating a course, subprograms	Online manuals & class handouts	Team #5 (navigating a track using whiskers – extra credit to fastest team)
20	<u>BASIC Stamp BOEBOT</u> – controlling the BOEBOT using infrared sensors to follow a line on a track, navigating a course	Online manuals & class handouts	Team #6 (navigating a track using infrared sensors – extra credit to fastest team)
23	Test #2: Practical test on Excel		

General Information

TCC College and Student Handbook

Students are responsible for being aware of the policies, procedures, and student responsibilities contained within the current edition of the Tidewater Community College Catalog and Student Handbook. Students should familiarize themselves with the College's policies regarding misconduct and inclement weather policies found in the Student Handbook.

Last Day to Withdraw Without Academic Penalty

You may withdraw from a course without academic penalty during the first 60% of a session and receive a grade of "W"(withdrawal). The last day to withdraw without academic penalty is **June 30, 2009**. After that date, the student will receive a failing grade of "F" or "U". Exceptions to this policy may be made ONLY when initiated by the instructor and approved by the division dean; ONLY if you are able to document mitigating circumstances; and ONLY if you were making satisfactory progress in the course. **Students are advised to discuss attendance irregularities with the instructor. Do not simply stop attending. Failure to properly complete the withdrawal procedure may result in the assignment of "F" or "U" grades to your permanent record.**

Disability Services Statement

Disabilities Services of Tidewater Community College provides students, faculty, and staff programmatic and physical access in a supportive atmosphere and in accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act of 1990. In appreciation of the unique talents and needs of students with disabilities and chronic health issues, Disabilities Services further provides an array of services designed to enhance all educational experiences. *Students with disabilities or chronic health problems are encouraged to identify themselves to a Disability Services [DS] Counselor as early as possible. DS Counselors are on all campuses. Students with documented disabilities may qualify for academic accommodations such as more time on tests, sign language interpreting or Braille.*

Emergency Procedures

In the event of a bomb threat, tornado, or fire, students and staff may be asked to evacuate the building or move to a secure location within the building. Evacuation routes for movement to an external location or to a shelter within the building are posted at the front of the room. Students should review the maps and make sure that the exit route and assembly location for the building are clearly understood. If you have a disability that may require assistance during an evacuation, please let your faculty know at the end of the first class.

Cheating

College rules state that a student may be subjected to disciplinary action for academic cheating, plagiarism, or assisting in cheating or plagiarism. Disciplinary penalties include college dismissal or suspension. In addition, cheating, plagiarism, or assisting such activity is a most serious form of academic misconduct, and will in the sole discretion of the faculty member result in a grade of F on the work or for the course. A single act of cheating may subject a student to both a failing grade in the course, and student disciplinary action perhaps involving suspension or dismissal from TCC.