

Official TCC Course Syllabus

Discipline Prefix: EGR	Course Number: 120	Course Title: Introduction to Engineering	
	Course Section: N05B		
Credit Hours: 2	Lecture Hours: 1	Clinical Hours:	Lab Hours: 2
Contact Hours: 3	Studio Hours:	Semester: Spring 2012	
Meeting Days/Time/Location: Tuesdays 7:15 – 9:45 PM, Room H-151, Advanced Technology Center			

Instructor Information

Name: Paul E. Gordy, PE

Office Location: H-115, Advanced Technology Center

Office Hours: As posted on office door and on course Blackboard site

Contact Information: 757-822-7175

Course Website (optional): www.faculty.tcc.edu/PGordy

Blackboard site: <http://learn.vccs.edu>

Instructor email address (college or VCCS): PGordy@tcc.edu

Course Information

Course Description

Introduces the engineering profession, professional concepts, ethics, and responsibility. Reviews hand calculators, number systems, and unit conversions. Introduces the personal computer and operating systems. Includes engineering problem-solving techniques using computer software.

Prerequisites and/or Co-requisites

Prerequisites: MTH 164, MTH 166, or Placement into MTH 173

Co-requisites: None

Required Course Texts and Supplementary Materials

Stephan. Thinking Like An Engineer – An Active Learning Approach. Prentice Hall. (ISBN: 978-0-13-606442-8)

Course Learning Outcomes

- Demonstrate a knowledge of the engineering profession, including engineering disciplines, societies, accreditation, and licensing
- Use the NSPE Code of Ethics to discuss case studies in engineering ethics
- Demonstrate a basic understanding of the engineering design process
- Demonstrate proficiency in Excel for graphing and analyzing engineering data and for engineering problem solving
- Describe basic concepts associated with working in teams
- Gain familiarity with the architecture and programming of a microprocessor, such as the BASIC Stamp or the Arduino Uno.
- Describe various types of peripheral devices to be controlled by a microprocessor, including, servos and sensors (such as infrared optical sensors, ultrasonic rangefinders, temperature and humidity sensors)
- Develop and implement algorithms for programming the BASIC Stamp based robot
- Participate in team-based robotic experiments

Topics Covered in the Course

- Introduction to the Engineering profession, including engineering disciplines, societies, accreditation, and licensing
- The engineering design process and teamwork
- Engineering problem solving
- Using Microsoft Excel for engineering problem solving and for graphing and analyzing data
- Microprocessor hardware and software
- Microprocessor-based robot, such as the BASIC Stamp robot (BOEBOT)
- Controlling peripheral devices with a microprocessor, including, servos and sensors (such as infrared optical sensors, ultrasonic rangefinders, temperature and humidity sensors)
- Team project – communicating with a microprocessor
- Team project – controlling servos
- Team project – using sensors
- Team competition – navigating a robot on a track using various methods of navigation
- Team reports/presentations

Description of Assignments/Assessments

Homework Assignments – Individual assignments

Team Assignments – Team assignments based on team robotics projects. It is critical that all team members be present for all team exercises. No credit will be given to team members that are absent during a team exercise.

Media Assignments – Individual media worksheet assignments based on videos viewed in class, online, or in the Learning Resources Center

Test #1 – Written test based on Homework Assignments #1-5 and related class notes.

Test #2 – Computer-based exam on Excel taken during the final exam period for the course

Grade Policy

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%

Grades will be based on the following scale:

- A: 90 – 100
- B: 80 – 89
- C: 70 – 79
- D: 60 - 69
- F: 0 – 59

Final grades are made available to each student within the Student Information System (SIS) now web delivered via MyTCC or SIS.

Based on the progression of the course, the grade distribution for each assignment may change. However, if changes are made, I will notify students in a timely manner and in writing.

Course Schedule

The following course schedule may change due to the progression of the course. The course schedule may change at the discretion of the instructor; however, students will be notified in writing when any changes/additions are made to the schedule.

Week	Topic(s)	Reading Assignment	Homework Assignment(s)
T, Jan 10	<u>Engineering Profession</u> - TCC Engineering curriculum, Engineering disciplines, levels of technical professionals, <u>Video</u> : "21 st Century Jet: The Building of the 777 (Part 1: To Design a Plane)"	Chapter 1	HW #1 (paper of transfer and career choices and schedule of classes for BS degree) Media #1
T, Jan 17	<u>Engineering Organizations</u> - Engineering societies, accreditation (ABET), Professional Engineering registration. <u>Video</u> : "Get Licensed, Get Ahead"	Chapter 1	HW #2 (Engineering resources on the internet) Media #3
T, Jan 24	<u>Engineering Ethics</u> - NSPE Code of Ethics, ethics case studies <u>Video</u> : "To Engineer is Human"	Chapter 2	HW #3 (Ethics Case Studies) Media #2
T, Jan 31	<u>Engineering Ethics</u> - the "Ethics Challenge" game, ethics case studies, <u>Video</u> : or "Gilbane Gold" or "Incident at Morales"	Chapter 2	Media #4
T, Feb 7	Significant Digits and Systems of Units	Chapters 5, 10-12	HW #4 (Significant Digits and Systems of Units)
T, Feb 14	<u>Microsoft Equation Editor and Microsoft Draw</u>		HW #5 (Microsoft Equation Editor and Microsoft Draw)
T, Feb 21	Engineering Problem-Solving using Excel Overview of spreadsheet features, formulas, functions, absolute and relative cell addresses, tables, formatting, adding diagrams (Microsoft Draw) and equations (Microsoft Equation Editor) to spreadsheets Test #1 – Week 1-5 material (HW #1-4 & related topics)	Ch. 13-16	HW #6 (Excel)
T, Feb 28	Engineering Problem-Solving using Excel x-y (scatter) graphs; linear, exponential, power, and polynomial regression; correlation coefficient; use of log scales	Ch. 13-16	HW #7 (Excel)
Mar 5-11	Spring Break – No classes		
T, Mar 13	Engineering Problem-Solving using Excel Graphing curves with multiple x and or y values, Histograms, lookup tables and functions, statistical functions, matrix calculations	Ch. 13-16	HW #8 (Excel)
T, Mar 20	<u>Engineering Communication</u> – reports, oral communication, PowerPoint presentations	Chapter 4	HW #9 (PowerPoint)
F, Mar 23	Last day to withdraw without academic penalty		
T, Mar 27	<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. Divide class into teams for the remainder of the semester.	Online manuals & class handouts	HW #10 (simple worksheet – gather info from manuals and identify components of the BOEBOT) Team Assignment #2 (Communicating with the BOEBOT)
T, Apr 3	<u>BASIC Stamp BOEBOT</u> – PULSOUT and PAUSE commands, servos (unmodified and modified), applications of servos, calibrating servos	Class notes & handouts	Team Assignment #3 (Calibrating servos)
T, Apr 10	<u>BASIC Stamp BOEBOT</u> – controlling the BOEBOT, calculating	Class notes	Team Assignment #4 (navigating)