



Official TCC Course Syllabus

Discipline Prefix: EGR	Course Number: 120	Course Title: Introduction to Engineering	
	Course Section: D01B		
Credit Hours: 2	Lecture Hours: 1	Clinical Hours:	Lab Hours: 2
Contact Hours: 3	Studio Hours:	Semester: Summer 2017	
Meeting Days/Time/Location: Mondays and Wednesdays 1:00 –4:15 pm, Room H-151, Advanced Technology Center, Virginia Beach Campus Note that this is a special 6-week session: Meets Wednesday, May 27 – Monday, July 6. The final exam will be given on July 6.			

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

Moaveni. Engineering Fundamentals – An Introduction to Engineering, 5th Edition. Cengage Learning, 2014. (ISBN: 978-1-305-08476-6)

General Education Core Competencies Supported by this Course

After completion of this course, students will be able to:

- **Critical Thinking**
A competent critical thinker evaluates evidence carefully and applies reasoning to decide what to believe and how to act.
- **Information Literacy**
A person who is competent in information literacy recognizes when information is needed and has the ability to locate, evaluate, and use it effectively.

- **Written Communication**

A competent written communicator can use writing to communicate with others, resulting in understanding and being understood.

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 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 microprocessor including servos and sensors (such as infrared optical sensors, ultrasonic rangefinders, and temperature sensors.)
- Develop and implement algorithms for programming the Arduino-based robot.
- Participate in team-based robotic experiments.
- Demonstrate the ability to evaluate information and scholarly literature
- Demonstrate effective search strategies with library databases

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 Arduino-BOT
- 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
- The Design Process
- Information literacy: evaluation of information and scholarly literature
- Library databases: effective search strategies

Description of Assignments/Assessments

- Blackboard Quizzes – online quizzes for various sections of the course.
- Homework Assignments – Individual assignments based on textbook and lecture topics.
- 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 or online.
- In-Class Exercises – Individual and/or group assignments to be completed during class. No credit will be received if a student is absent during an in-class exercise.
- Test #1 – Written test based on Homework Assignments, Media Assignments, related textbook sections, 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, Homework #6-8)	15%
Blackboard Quizzes (5)	15%
Homework Assignments (10)	27%
Media Assignments (4)	4%
In-Class Exercises (3-5)	4%
Team Assignments (6)	20%

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.

Date	Topic(s)	Reading Assignment	Homework Assignment and Quizzes – Due in one week (unless otherwise noted). Also see Due Dates Table.
T, 5-23	<ul style="list-style-type: none"> • TCC Engineering curriculum, <u>TCC Student Handbook for Engineering</u>, common traits of good engineers • Engineering disciplines, specialization, engineering vs engineering technology • Significant Digits and Systems of Units (bring calculator to class) 	<ul style="list-style-type: none"> • Ch. 1 • Ch. 6 • Lecture #1 • Lecture: Sig Digits & Units 	<ul style="list-style-type: none"> • <u>HW #1</u> - (graduation plan) • <u>Media Assignment #1B</u> – (“The 787 Dreamliner”)
R, 5-25	<ul style="list-style-type: none"> • Engineering employment, engineering salaries, advanced degrees, engineering societies • Systems of Units (bring calculator to class) 	<ul style="list-style-type: none"> • Ch. 1-2 • Ch. 6 • Lecture #2 • Lecture: Sig Digits & Units 	<ul style="list-style-type: none"> • <u>HW #2</u> - (EGR Handbook, transfer) • <u>Media #2</u> – (“To Engineer is Human”)

T, 5-30	<ul style="list-style-type: none"> Engineering accreditation (ABET), Professional Engineering registration, engineering societies Systems of Units (bring calculator to class) In-Class Exercise (individual): Perform various unit conversions using dimension analysis 	<ul style="list-style-type: none"> Ch. 1-2 Ch. 6 Lecture #3-4 Lecture: Sig Digits & Units 	<ul style="list-style-type: none"> HW #3 - (EGR Licensing, societies, and accreditation) HW #5 - (Significant Digits and Systems of Units) Media #3 ("Get Licensed, Get Ahead") Bb Quiz #1 - (Engr Profession: Ch 1-2 and related material)
R, 6-1	<ul style="list-style-type: none"> Engineering Ethics - NSPE Code of Ethics Engineering Ethics - the "Ethics Challenge" game (counts as an In-Class Assignment) Excel Lecture A - Engineering Problem-Solving using Excel (basics): Overview of spreadsheet features, formulas, functions, absolute and relative cell addresses, tables, formatting, adding diagrams (Microsoft Draw) and equations (Microsoft Equation Editor) to spreadsheets 	<ul style="list-style-type: none"> Ch. 5 Ch. 14 Lecture #5-6 (Ethics) Lecture Excel A 	<ul style="list-style-type: none"> HW #6 - (Excel A) Bb Quiz #2 - (Systems of Units: Ch 6 and related material)
T, 6-6	<ul style="list-style-type: none"> Introduction to the Arduino-BOT – Why study robots? Robot applications, overview of hardware & software (compiler), overview of sensors and applications, C++ programming using the Arduino environment, emphasis on the importance of teamwork on labs. Divide class into teams for the remainder of the semester. Team Assignment #1: Intro to the Arduino-BOT – Team assignment to write several small programs for the Arduino-BOT to control LEDs and to gain familiarity with the Arduino. 	<ul style="list-style-type: none"> Arduino-BOT Lecture #1 	<ul style="list-style-type: none"> Team Assignment #1 (Report) - Communicating with the ARDUINO-BOT Bb Quiz #3 - (Arduino-BOT and related material)
R, 6-8	<ul style="list-style-type: none"> Engineering Ethics – Ethics Case Studies In-Class Exercise (team): Discuss assigned engineering case studies and decide as a group which NSPE Code sections apply and how to respond. Excel Lecture B - Engineering Problem-Solving using Excel (graphing): x-y (scatter) graphs; linear, exponential, power, and polynomial regression; correlation coefficient; use of log scales 	<ul style="list-style-type: none"> Ch. 5 Ch. 14 Lecture Excel B Lecture #7 (Ethics) 	<ul style="list-style-type: none"> HW #4 - (Ethics Case Studies) HW #7 - (Excel B) Bb Quiz #4 - (Ethics: Ch 5 and related material)
T, 6-13	<ul style="list-style-type: none"> Engineering Communication – reports, oral communication, PowerPoint presentations Team Assignment #2: Servos and the Arduino-BOT – servos (unmodified and modified), applications of servos, Arduino commands to control servos, calibrating servos 	<ul style="list-style-type: none"> Ch. 4 PowerPoint 2013 Lecture Arduino-BOT Lecture #2 	<ul style="list-style-type: none"> HW #9 - (PowerPoint) Team Assignment #2 (Report) - Calibrating servos Bb Quiz #5 - (Excel: Ch 14 and related material)
R, 6-15	<ul style="list-style-type: none"> Information Literacy - Evaluation of information and scholarly literature. Guidelines for evaluating information. Applying information literacy to projects. In-Class Exercise (individual): Tables of calculations using Excel formulas, formatting, etc. Excel Lecture C - Engineering Problem-Solving using Excel: Graphing curves with multiple x and or y values, histograms, lookup tables and functions, statistical functions 	<ul style="list-style-type: none"> Ch. 5 Ch. 14 Excel 2013 Lecture C Lecture: Information Literacy 	<ul style="list-style-type: none"> HW #8 - (Excel C) HW #10 – Information Literacy Media #4A – ("Incident at Morales")
T, 6-20	<ul style="list-style-type: none"> Team Assignment #3: Navigating the Arduino-BOT using Dead Reckoning – controlling the ARDUINO-BOT, calculating distances using wheel revolutions (dead reckoning), turning, navigating a course 	<ul style="list-style-type: none"> Arduino-BOT Lecture #3 	<ul style="list-style-type: none"> Team Assignment #3 (Report) - Navigating a track using dead reckoning
R, 6-27	<ul style="list-style-type: none"> Test #1: Written test based on HW #1-5, Media #1-4, & related topics) – 75 minutes for the test Engineering Design – the Design Process, teamwork, standards, scheduling, ASEE Model Design Competition Team Assignment #6: - ASEE Robotics Competition – begin working in class with your team: brainstorming and preparing presentation for next week 	<ul style="list-style-type: none"> Team Assign. #6 (Lecture) Lecture for Team #6 	<ul style="list-style-type: none"> Team Assessment Team #6 (Presentation) – Give team presentation on the last day of class
T, 6-27	<ul style="list-style-type: none"> Team Assignment #5: Navigation using IR Sensors – controlling the ARDUINO-BOT using infrared sensors to follow a line on a track, navigating a course Team Assignment #6: (continued) Extra Credit: Team Assignment #4: Navigation using Tactile Sensors (whiskers) – controlling the ARDUINO-BOT using tactile sensors (whiskers), navigating a course, using functions in C++ 	<ul style="list-style-type: none"> Ch. 4 Arduino-BOT Lecture #5 Arduino-BOT Lecture #4 	<ul style="list-style-type: none"> Team Assignment #5 (Report) - Navigating a track using infrared sensors – Due on the last day of class Extra Credit: Team Assignment #4 (Report) - Navigating a track using whiskers – Due on the last day of class

R, 6-29	<ul style="list-style-type: none"> • Test #2: Practical test on Excel. during Final Exams week (computer test – open-book, open-notes) • Team Presentations (10-minute presentation by your team on a potential design for the ASEE Model Design Competition) • Complete any other team assignments if necessary 		
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Blackboard and Course Communication

Students should check Blackboard and their VCCS student email accounts regularly at least every 72 hours. The best way to reach the instructor is by email. The instructor will respond within 72 hours, although generally much sooner.

Course Policies

1. **Attendance Policy:** All students are expected to be present and on time at all scheduled class and laboratory meetings. Instructors are not required to admit a student who arrives late to the classroom. A student who adds a class or registers after the first day of classes is counted absent from all class meetings missed.

If a student is absent more than 15 percent of scheduled instructional time, attendance may be defined as unsatisfactory. This calculation includes absences occurring during the add/drop period. See also the Withdrawal Policy in this syllabus for more information. Per the college's attendance policy, faculty has the right to develop a more stringent policy as well. Students who do not attend or participate in class by the deadline to drop for tuition refund may be deleted from the course.

2. **Late Work/Make-up Exam Policy:**

- Homework, Media Assignments, and Team Assignments will be accepted late up to two weeks late with a 10 point penalty. However, no late assignments will be accepted after the last class meeting.
- Students will receive a grade of 0 on In-Class Exercises if they are absent.
- Students will not receive any credit for Team Assignments if they are absent when the team assignment was performed.
- No make-up tests are allowed. Missing a test will result in a grade of 0 for the test unless the student gets approval before the tests or notifies the instructor within 24 hours of the test in case of emergency.

3. **Statement on Classroom Behavior:** TCC is committed to maintaining a social and physical environment conducive to carrying out its education mission. Therefore, all members of the TCC community are expected to demonstrate standards for civility.

- Be moderate in speaking. Loud, obscene, argumentative, or threatening speech is disruptive to teaching and learning and is offensive to others. It has no place in an academic setting.
- Resolve any disagreements in a positive, non-combative manner. Request the assistance of college authorities if needed.
- Show respect for the comfort of others in an educational setting by observing acceptable standards for personal cleanliness and dress.

4. **Electronic Devices Policy:** Cell phones, pagers, and other communication devices are prohibited from use in classrooms, laboratories, and libraries, unless authorized by the appropriate faculty or staff. Although soundless communication devices such as cell phones and pagers are permissible in classrooms, college offices, and/or meeting rooms, they must not be answered during class.]

5. Disposition of Classes for Emergency Shutdown of the College:

In the event of an emergency shutdown of the college, the president and her executive staff may elect to conclude the term in session if eighty-five percent or more of that term has been completed. If the term in session is concluded, faculty shall compute final grades of students based on coursework completed at that point.

Academic Policies

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

Withdrawal Policy

Students who wish to withdraw without academic penalty should contact a counselor to determine the appropriate procedure. Withdrawals through completion of 60 percent of a session will result in a **W** grade. After 60 percent of a session is completed, a withdrawal will result in a grade of **F** in a credit course or a grade of **U** in a developmental course, except under mitigating circumstances that must be documented by the instructor and approved by the academic dean. Dynamic session classes have unique refund and withdrawal dates. Contact a campus Enrollment Services Office for more information, or visit <http://www.tcc.edu/students/calendar/academic/Dynamic.htm>.

A student who drops after the last day to withdraw does not receive a "W." He/she receives an "F," in which case there is both an academic and financial penalty. A student who withdraws by the deadline faces a financial penalty, but not an academic penalty.

5-30-17	Deadline to drop for tuition refund
6-16-17	Deadline to withdraw without academic penalty and to receive a grade of W for the course

Academic Integrity

TCC will expect students to demonstrate personal and academic integrity, to be open to new ideas, and to share in a community where individuals from diverse backgrounds and cultures help one another grow intellectually, socially, and personally.

TCC expects students to achieve, not just to get by. And while many caring and talented faculty and staff are here to help, students must take responsibility for their own learning. Students should strive for a high level of academic performance and to be responsible, contributing citizens within the college and in outside communities. Above all, TCC wants students to develop a love of learning that will last a lifetime, along with a life-long interest in maintaining emotional and physical wellness.

Student Outcomes Assessment Requirement

Work products submitted by students to fulfill course requirements may be used by the college to evaluate its academic programs and general education requirements.

Statement on Plagiarism and Academic Misconduct

Academic misconduct includes, but is not limited to, the following actions: cheating on an examination or quiz—either giving or receiving information; copying information from another person for graded assignments; using unauthorized materials during tests; collaboration during examinations; buying, selling or stealing examinations; arranging a substitute for oneself during examinations; substituting for another

person, or arranging such a substitution; plagiarism—the intentional or accidental presentation of another's words or ideas; collusion with another person or persons in submitting work for credit in class or lab, unless such collaboration is approved in advance by the instructor.

Faculty members who have reliable evidence of academic misconduct will (1) investigate the matter, and (2) review the facts of the matter and the proposed penalty with the appropriate academic dean. They may then take one or more of the following actions:

- Require the work to be accomplished again
- Give no credit for the test, paper, or exercise
- Assign a grade of **F**, **U**, or **W** for the course
- Refer the matter to the campus Dean for Student Services or designee for possible disciplinary sanction through the college's disciplinary procedure

If the faculty member chooses to refer the matter to the campus Dean for Student Services or designee for disposition, the Plenary Disciplinary Procedure shall be followed, and the student's dismissal from the college is a possibility.

Educational Accessibility (Formerly Disability Services)

Students who have documented, diagnosed disabilities, and who need special accommodations for tests, etc., are advised to see the Educational Accessibility Disabilities Services staff in Student Services so that the instructor may be notified of what accommodations are appropriate in each case. Requests for accommodations should be made to the designated campus Educational Accessibility counselor at least 45 days before classes begin. Documentation must be provided to support the need for accommodations.

For assistance with disabilities, contact the campus Educational Accessibility Counselor/Provider or the Coordinator of Educational Accessibility Services: call 822-7752, visit Student Services/Development, or visit the Educational Accessibility webpage at

<http://www.tcc.edu/students/specialized/disabilityservices/index.htm>

Emergency Procedures

In the event of a bomb threat, tornado, or fire, students and staff may be directed to evacuate the building or move to an internal assembly area location within the building. Evacuation routes are posted in each classroom. The map indicates the route to the nearest exit. Students should review the map to make sure that the exit routes for the building are clearly understood. The information regarding locations of the Emergency Assembly Areas and Internal Assembly Areas for all classrooms or spaces used on the various campuses is available at the following link: <http://www.tcc.edu/emergency/cemp.htm>. If you will require assistance during an evacuation, let your instructor know at the end of the first class.

Tidewater Community College uses TCC Alerts to immediately contact and inform faculty, staff and students of a major crisis or emergency. TCC Alerts delivers important emergency alerts, notifications, and updates via:

- Email account (work, home, other)
- Cell phone
- Pager
- Smartphone/PDA (BlackBerry, Treo & other handhelds)

When an incident or emergency occurs, authorized senders will be instantly notified via TCC Alerts. TCC Alerts is a personal connection to real-time updates, instructions on where to go, what to do, or what not to do, who to contact, and other important information. New users may also register by sending a text message to **411912** keyword: **TIDEWATER**. To cancel the service, text **TIDEWATER STOP** to **411911**.

Student Success Resources

The following resources are available to TCC students. See the *Student Handbook* or visit <http://www.tcc.edu/forms/handbook/> for more information about student services and locations.

Library

A library is located at each TCC campus and at the Visual Arts Center. These libraries are intended for research and study, and they contain materials in print and digital format to support the courses, curricula, and mission of the college. The research materials include books, newspapers, magazines, journals, DVDs, streaming media and an extensive collection of indexes, abstracts and full-text databases. Faculty members may place materials on reserve in the libraries for their students. Visit this site for more information: www.tcc.edu/library/

Academic Support Services

Each campus provides various kinds of academic assistance. One-on-one tutoring, math and computer labs, and other forms of individual and group assistance may be available. Students can also find free help for writing, from short questions about commas and comma splices to a comprehensive review of research papers in progress, in the Writing Centers.

Online Help Desk

Visit the following eLearning Resources for Students website for information about computer skills, technical support, library services for online students, and much more: <http://www.tcc.edu/eLearning/>

Important Websites

- College Website: www.tcc.edu
- Blackboard and Student E-mail: <https://tcc.my.vccs.edu/jsp/home.jsp>
- Student Handbook: <http://www.tcc.edu/forms/handbook/>
- TCC *Catalog*: <http://www.tcc.edu/forms/catalog/>
- Class Schedule: <http://www.tcc.edu/schedule/> (or log-in to SIS for current course offerings)
- Academic Calendar: <http://www.tcc.edu/students/calendar/academic/index.htm>
- eLearning Resources: <http://www.tcc.edu/eLearning>
- For current financial aid information and assistance, visit <http://www.tcc.edu/students/finaid/> or <http://studentaid.ed.gov/>.

Revision History: