ENTC 4350 Capstone Projects
Mechanical Engineering Technology, Department of Engineering
Spring 2019

A. COURSE INFORMATION

Course number/section: ENTC 4350.001/4370.201
Class meeting time: Lec: W 1:00-1:50 p.m.; Lab: MF 1:00-1:50 p.m., F 2:00-4:50 p.m.
Class location: Lecture CI 107; Labs: EN 108
Course Website: bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Dr. Ruby Mehrubeoglu
Office location: EN 222D
Office hours: MWF 10:50 a.m. -12:30 p.m. + by appointment
Telephone: 361-825-3378
e-mail: Ruby.Mehrubeoglu@tamucc.edu
Appointments: E-mail or call to make an appointment

C. COURSE DESCRIPTION

Catalog Course Description
This course allows students to employ the knowledge attained in other courses to implement (including building, testing, and documenting) the project approved in ENTC 4415 Project Justification and Management, within budget and on schedule. Course requirements include a written report and oral presentations. Normally taken in the student’s last semester.

Extended Course Description
This course is about the realization of an engineering design through developing experiments to test, improve, and validate a final working prototype. The students work in teams and are expected to demonstrate individual contribution to the project, both technical and non-technical.

D. PREREQUISITES AND COREQUISITES

Prerequisites
ENTC 4415 – Project Justification and Management

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
None

Optional Textbook(s) or Other References

**Supplies**
To be determined individually for each team based on Bill of Materials

**F. STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:

1. Keep real-time documentation of project’s progress and results (including research, testing, troubleshooting, analysis results, charts, diagrams, design sketches, etc.) in a notebook
2. Create and present capstone project status reports
3. Analyze/justify/demonstrate the project design, performance and needed improvements, using modern engineering/technology tools, software, and theoretical formulas
4. Design, develop and create a prototype of proposed capstone project (through integration of knowledge, concepts, and skills in engineering technology)
5. Practice professional skills (team, time, budget management, leadership, conflict resolution, etc.), to complete the capstone project
6. Create and apply testing schemes to validate the product performance, and troubleshoot technical problems
7. Analyze the social and global impacts and ethical implications of the project
8. Develop a patent application for the proposed product
9. Develop a Business Plan based on the Capstone Project Prototype

**G. INSTRUCTIONAL METHODS AND ACTIVITIES**

Methods and activities for instruction include the following: lectures, meetings, invited speakers, group discussions, webinars, homework assignments, team assignments, quizzes, reports, oral presentation, and a technical notebook
H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Advisor Meeting (summaries and in-class updates)</td>
<td>10</td>
</tr>
<tr>
<td>Project Notebooks</td>
<td>5</td>
</tr>
<tr>
<td>Peer/Team and Mentor Assessment</td>
<td>5</td>
</tr>
<tr>
<td>Homework + Pop Quizzes</td>
<td>15</td>
</tr>
<tr>
<td>Capstone Project Proposal and Oral Presentation</td>
<td>10</td>
</tr>
<tr>
<td>CP Progress Report and Oral Presentation</td>
<td>20</td>
</tr>
<tr>
<td>Final Project Defense and Report</td>
<td>35</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
</tr>
</tbody>
</table>

I. COURSE CONTENT/SCHEDULE

COURSE OUTLINE: Weekly Schedule*

<table>
<thead>
<tr>
<th>WEEK</th>
<th>Date</th>
<th>Lecture Topics*</th>
<th>Laboratory Topics and Assignments* (*Subject to change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/14</td>
<td>Review of syllabus; Review of safety and security procedures; Lab notebooks</td>
<td>Lab Safety; Workshop Tour Assignment: Set up weekly appointments with capstone project advisor Assignment: Set up weekly meeting schedule with Dr. M</td>
</tr>
<tr>
<td></td>
<td>1/16</td>
<td>MLK Holiday: 01/21/18 Student updates on projects, EVA resource allocation schedule budget Bill of Materials Identifying vendors for materials purchase DESIGN PROCESS – revisited</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/18</td>
<td>Social and economic impact of the project;</td>
<td>Assignment: Coastal Bend Business Plan (business plan*) Assignment: Measuring Performance with Earned Value Analysis (SLO 3) WEEKLY ASSIGNMENT: a) Weekly advisor-approved advisor meeting summaries (SLO 2) b) Notebook reviews by instructor (SLO 1) Project Phase: Planning/Implementation - Updated CAD/circuit drawings (detailed blue print), and theoretical analysis of performance (Review of Ch 12: MS OP)</td>
</tr>
<tr>
<td>2</td>
<td>1/23</td>
<td>Modeling and Simulation in Engineering</td>
<td>Managing Risks, Issues and documentation WEEKLY ASSIGNMENT: (see above)</td>
</tr>
<tr>
<td></td>
<td>1/25</td>
<td>1/28 1/30 2/1</td>
<td>Final DESIGN, RESOURCES and BUDGET due Bill of Materials due WEEKLY ASSIGNMENT: (see above)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2/4 2/6 2/8</td>
<td>Capstone Project Proposal – Complete the acquisition of materials for the CP Capstone Project Proposal – Oral Presentation and Report (video recording) (SLO 2,3,6,7)</td>
</tr>
<tr>
<td>WEEK</td>
<td>Date</td>
<td>Lecture Topics</td>
<td>Lab Topics and Assignments</td>
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| 5    | 2/11       | Engineering Economics; Planned Value, Earned Value, Actual Cost review / project updates | • Tracking work and updating capstone project plan  
• Project Phase: Implementation – Build prototype  
• WEEKLY ASSIGNMENT: (see above) |
|      | 2/13       |                                                                      |                                                                                        |
|      | 2/15       |                                                                      |                                                                                        |
| 6    | 2/18       | Engineering Economics; Patent Application                               | • Project Phase: Implementation – Build Prototype  
• HW Assignment: Provisional Patent Application (SLO 8)  
• WEEKLY ASSIGNMENT: (see above) |
|      | 2/20       |                                                                      |                                                                                        |
|      | 2/22       |                                                                      |                                                                                        |
| 7    | 2/25       | Engineering Economics; Review of Video Recordings, and presentation skills | • Project Phase: Implementation  
• WEEKLY ASSIGNMENT: (see above)  
• Review of video recordings (SLO 2) |
|      | 2/27       |                                                                      |                                                                                        |
|      | 3/1        |                                                                      |                                                                                        |
| 8    | 3/4        | Engineering Ethics and Ethics Writing                                   | • Project Phase: Implementation |
|      | 3/6        |                                                                      |                                                                                        |
|      | 3/8        |                                                                      |                                                                                        |
| 9    | 3/11 - 3/15| S P R I N G       B R E A K                                                                                     |                                                                                           |
| 10   | 3/18       | Guest Lecturer (Engineer/Project Manager)*                           | • Project Phase: Implementation - Testing and Troubleshooting  
• WEEKLY ASSIGNMENT: (see above)  
• Review of video recording (SLO 2)  
• CP Progress Report – Oral Presentation and Report (video recording) (SLO 2,3,4,6,7) |
|      | 3/20       |                                                                      |                                                                                        |
|      | 3/22       |                                                                      |                                                                                        |
| 11   | 3/25       | Social and economic impact of the project;                               | • Project Phase: Implementation - Testing and Troubleshooting  
• WEEKLY ASSIGNMENT: (see above) |
|      | 3/27       |                                                                      |                                                                                        |
|      | 3/29       |                                                                      |                                                                                        |
| 12   | 4/1        | Guest Lecturer*: Standards                                              | • Project Phase: Implementation - Evaluation and Improvements |
|      | 4/3        |                                                                      |                                                                                        |
|      | 4/5        |                                                                      |                                                                                        |
| 13   | 4/8        | Intellectual Property and Patenting: Guest Lecturer                   | • Project Phase: Implementation - (Troubleshooting/modifications) Testing and Validation (SLO 6)  
• WEEKLY ASSIGNMENT: (see above) + updated patent application (SLO 8) |
|      | 4/10       |                                                                      |                                                                                        |
|      | 4/12       |                                                                      |                                                                                        |
| 14   | 4/15       | Lifelong learning: Webinar; current issues in engineering             | • Project Phase: Implementation/Termination: Final Evaluation  
• WEEKLY ASSIGNMENT: (see above) |
|      | 4/17       |                                                                      |                                                                                        |
|      | 4/19       |                                                                      |                                                                                        |
| 15   | 4/22       | Webinar: current issues in engineering                                  | Final Project Presentations - Dry Run; (SLO 2, 4, 7) (oral presentations (PP)); Notebooks due 3 copies of bound Final CP Reports due |
|      | 4/24       |                                                                      |                                                                                        |
|      | 4/26       |                                                                      |                                                                                        |
| 16   | 4/29       | Final Formal Presentation Prep                                          |                                                                                        |
|      | 5/1        |                                                                      |                                                                                        |
| FINAL EXAM DATE | 05/03§      | Friday 1:45 p.m. – 4:15 p.m.§                                          | FORMAL FINAL PROJECT ORAL PRESENTATIONS (SLO 2,3,4,6,7) |

*subject to change  
§ based on published final exam schedule
J. COURSE POLICIES

Attendance/Tardiness
You are advised to attend all lectures and laboratories. If you miss a class period, you are responsible for whatever is covered or announced during your absence. There will be no make-ups for oral presentations or quizzes. The students are expected to display responsible conduct in the classroom and laboratory, including but not limited to adhering to the rules and regulations, and respecting the instructor and fellow classmates.

Late Work and Make-up Exams
No makeup work will be allowed except in the case of a documented extreme emergency, or University-accepted excuse. Team presentations must be given by all team members. There are no makeups for missed presentations.

All assignments, both individual and team, must be uploaded by each student to Black Board online system as well as hard copies handed to the course professor in class by the due dates. Late assignments will only be accepted with penalty and with prior notification. There will be a 20-point deduction per late day from the total score of maximum 100 up to 5 days, after which a late assignment will not be accepted. Late assignments will not be accepted after the graded assignments are returned to class.

Extra Credit
Extra credit may be assigned at the discretion of the instructor.

Food in Class
Eating or drinking is strictly prohibited in the laboratories, and not permitted in the lecture rooms. Students with food or drink in visible sight will be asked to discard them, or leave the room. All signage regarding health and safety must be followed in the lecture rooms and laboratories.

Missed Exam
No makeup examinations will be given. For this course, the final exam is a final presentation during exam week to internal and external technical evaluators and must be completed as a team.

Participation
Students are expected to participate in the in-class and online exercises, discussions, and team work. Members not contributing to team assignments will not receive full credit for that team assignment.

Use of Electronic Devices
The use of cell phones, electronic devices, or computers for purposes other than those of the course objectives of the day is not permitted. Restricted activities include but are not limited to text messaging, twittering, talking on the phone, instgramming, browsing on the internet,
and disrupting the classroom activities. Anyone displaying unsuitable classroom behavior will be asked to leave the classroom or the laboratory. Recording of part or all of the lecture or lab instruction and materials requires approval of the course instructor.

**Safety**
The safety of students, faculty, staff and visitors to the engineering laboratories is of paramount importance to the Engineering and Engineering Technology programs. You must follow all safety procedures and use personal protective equipment as required in each laboratory and workshop. Any student who attempts to use equipment without authorization or violates any safety policy or regulation will be immediately removed from the laboratory.

**K. COLLEGE AND UNIVERSITY POLICIES**

- **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high-quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events
can sometimes occur that make dropping a course necessary or wise. *Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.* Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition,
the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

I. OTHER INFORMATION

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

- **Teamwork**
  Students are expected to work in teams and contribute to teamwork equally. Peer assessment scores will be considered when computing individual grades in team assignments.

**GENERAL DISCLAIMER**

The instructor reserves the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. The instructor will announce such changes in a timely manner during regularly scheduled lecture periods.