Mechanical Systems Design ENTC4360
Engineering
Spring 2017

A. COURSE INFORMATION
Course number/section: ENTC-4360.001
Class meeting time: Lec. MW 5:30-6:45PM
Class location: EN106
Course Website: N/A

B. INSTRUCTOR INFORMATION
Instructor: P. A. Simionescu, Ph.D.
Office location: 207 B
Office hours: MW 2:00-4:00 PM; TF 1:00-2:00 PM
Telephone: (361) 825-5899
e-mail: pa.simionescu@tamucc.edu
Appointments: by email

C. COURSE DESCRIPTION
Catalog Course Description:
Analysis, management and cost, optimal design, and computer simulation of mechanical systems and components; machine elements, and stress analysis. Selected course topics are assigned as projects.

Extended Course Description: Project consists of simulating and designing of the main components of a four-bar oil pump jack.

This course prepares you for the Capstone Projects class and for design engineer careers.

D. PREREQUISITES AND COREQUISITES
Prerequisites
MEEN 3330 - Solid Mechanics for Mechanical Engineering

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
Required Textbook(s)
Handouts supplied by the instructor

Optional Textbook(s) or Other References
Supplies
HB or H pencil or 0.7 mm mechanical pencil, eraser, drawing tolls (ruler, triangles, protractor and compass), pocket calculator and flash memory drive.

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:
(c) design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(k) use the techniques, skills, and modern engineering tools necessary for engineering practice.

Mechanical Engineering Specific Outcomes
(l) apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations): to model, analyze, design, and realize physical systems, components or processes
(n) work professionally with mechanical systems

G. INSTRUCTIONAL METHODS AND ACTIVITIES
Lecture, homework assignments, quizzes and semester-long project

H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>15%</td>
</tr>
<tr>
<td>Homework and Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Working Model 2D tutorials</td>
<td>5%</td>
</tr>
<tr>
<td>Project Report 1</td>
<td>15%</td>
</tr>
<tr>
<td>Project Report 2</td>
<td>25%</td>
</tr>
<tr>
<td>Professionalism</td>
<td>5%</td>
</tr>
</tbody>
</table>
I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Structure and mobility of mechanisms</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>2, 3</td>
<td>Vector loop analysis of linkage mechanisms</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>4, 5</td>
<td>Linkage mechanism design</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Cam design</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Mechanism dynamics</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Theory of involute gears</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Gear transmissions</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Flywheel design</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Motors and actuators</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Rolling element bearings</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Belt transmissions</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Power Screws</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Clutches and Brakes</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Final Exam</td>
<td>TBA</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
Attendance counts towards professionalism.

Late Work and Make-up Exams
You must arrange in advance with the instructor and provide official excuse.

Extra Credit
Bonus questions or problems will be occasionally included within exams
Cell Phone Use
Not allowed during class or exams.

Laptop Use
Permitted

Food in Class
No food during class time.

Missed Exam
See Late Work and Make-up Exams

Participation
N/A

Others
Homework Format: Use 8 1/2 x 11” paper only, not torn-out spiral paper. Use pencil, not pen. Be neat and legible. Order problems sequentially and number them vertically down the page. Skip a space between problems. Staple multiple pages together with this cover page first, fold lengthwise, and write your name on the outside. Number pages in the right hand side of the top margin as page number of total pages. Assignments past the deadline will not be accepted, unless you have a proven emergency or you arranged with your instructor in advance. Allow one full week for return of graded materials.

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)**
  The grade of W will be assigned to any student officially dropping a course. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that must submitted. No student is eligible to receive a W without completing the official drop process by this deadline. 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/

- **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.

L. **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.

**GENERAL DISCLAIMER**

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