Course Title: Kinematics (ME317)

CRN: 10420

Credit: 3

Term: Fall 2015

Meeting Place: BU217

Meeting Times: T TH 11:00 –12:15 p.m.

Prerequisites: ME 112, 121, 202

Instructor: Dr. James Aflaki, Ph. D.

Office: N109

Office Hours:

<table>
<thead>
<tr>
<th>Days</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW</td>
<td>8:15 - 12:00</td>
</tr>
<tr>
<td>T TH</td>
<td>8:15 - 9:30</td>
</tr>
</tbody>
</table>

Or: by appointment

Office Phone: (901) 321-3559
Email: jaflaki@cbu.edu

Course Description:

A study of relative motion and geometry of machine parts and mechanisms without reference to force or mass. Graphical and analytical solutions for the displacement, velocity, and acceleration of planar mechanisms. General case of acceleration including Coriolis component. Computer programming and numerical techniques applied to velocity and acceleration analysis of cycles.
Course Objectives

1. Deepen understanding of kinematic analysis as an essential element of the design process
2. Develop mastery of analytical, graphical, and numerical methods for calculating kinematics of machine elements

Instructor's Educational Philosophy:

Education is helping students achieve their goals. Through education, students recognize and improve their learning skills and strengthen their capabilities to accomplish their life dreams.

Each student must be treated uniquely and a mutual respect must be developed between a student and an instructor. This is paramount in creating a suitable and pleasant learning environment.

Methods of Instruction:

The concepts covered in this course will be presented in a traditional lecture environment as well as using Power Point slides in combination with videos. Sample problems will be solved to demonstrate applications of the theories and concepts covered in the course.


Publisher: McGraw-Hill

ISBN: 9780077421717

Grading Policies

Your final grade will be determined based on the following table and your class participation. Feedback to students is provided through test scores administered in class as well as consultation with the instructor if that is required.

Examinations

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Pop quiz</td>
<td>5%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 3</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
</tbody>
</table>

(No makeup quiz) (Final exam is comprehensive)

Exam dates:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>September 24, 2015</td>
</tr>
<tr>
<td>Exam 2</td>
<td>October 22, 2015</td>
</tr>
<tr>
<td>Exam 3</td>
<td>November 24, 2015</td>
</tr>
<tr>
<td>Final Exam</td>
<td>TBA</td>
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</tbody>
</table>
No makeup exam will be given. In case you have to miss an exam, you must inform the instructor prior to the exam time. If it is determined that you have a legitimate excuse, the average grade of the first exam that you have taken and the final exam will be substituted for your exam grade. Missing the final exam will result in failing the course.

Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100</td>
</tr>
<tr>
<td>B</td>
<td>80-89</td>
</tr>
<tr>
<td>C</td>
<td>70-79</td>
</tr>
<tr>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>0-59</td>
</tr>
</tbody>
</table>

Bathroom Break:

Students cannot leave the classroom for using bathrooms during exams. If there is a justified medical case, student must discuss it with the instructor prior to exam.

Homework:

Homework is assigned regularly.

Students must try to solve all problems and submit them on the due date.

Late homework submission will result in 30% penalty for each class session after the due date

Class Participation:

Students are expected to be called to front of the class to discuss assigned problems, quiz problems or exam problems.

Attendance:

Students are expected to attend all classes and actively participate in class discussions.

Any student who misses a total of eight hours of class time will be given an F grade for the course.

Some of the topics presented in class may not be in your textbook. You are responsible for knowing these topics.
Cheating and Plagiarism

Students must always do their own work. Cheating of any kind will result in a reduction of student’s final grade by one letter grade. Cheating on an exam will result in an "F" grade for the course.

Computer Usage

During class time, students can only use computers to do the assigned in-class or homework projects. Students cannot use the computer for any other purposes. This includes, but is not limited to checking email, browsing the Internet, playing games or printing lecture notes or using the CBU intranet, etc. A student who violates this policy will be asked to leave the classroom. A repeat of a similar situation will reduce the student’s final grade by a letter grade.

Computer Account

A computer account on the CBU Server is necessary. Make sure you have obtained your account name and password and that you can log in successfully.

Students must check their campus e-mail regularly and are responsible for announcements or memos sent by the instructor via campus e-mail.

Electronic Devices:

- All electronic devices must be turned off during the entire class period.
- The one and only electronic device allowed to be used in classroom is a calculator.
- Any other portable electronic devices must be turned off prior to the start of each class.

Academic Misconduct

Academic misconduct is a violation of the principles of the academic community and will not be tolerated at Christian Brothers University. The procedures outlined in Students’ Handbook under Academic Misconduct will be enforced.

Academic misconduct is any conduct which distracts from the teaching and learning process of faculty members and students. This includes, but is not limited to: inappropriate or abusive language, distracting or disorderly conduct, misuse of or damage to property, or conduct dangerous to others.

American Disability Act:  It is the policy of Christian Brothers University to provide reasonable accommodations to qualified students with disabilities. Please see your instructor for proper procedures and arrangements.
Topics:

1. Overview: links, joints, degrees of freedom, mechanisms, structures
2. Spatial and planar mechanisms
3. Planar mechanisms: slider-crank, four-bar linkage, quick return, toggle mechanisms, pantographic mechanisms, etc.
4. Computer programming / modeling software
5. Displacement analysis: graphical methods, analytical solutions, numerical methods; complex variable methods; software and programming
6. Velocity analysis: graphical methods, analytical solutions, numerical methods; complex variable methods; software and programming
7. Acceleration analysis: as above, plus: accelerating reference frames, equivalent linkages