MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
ENGS 302 – ENGINEERING DYNAMICS II

Created by: Dr. Lucas Craig
Updated by: Dr. Lucas Craig

Canino School of Engineering Technology

Department: MKTX

Semester/Year: Fall 2021
A. **TITLE:** Engineering Dynamics II

B. **COURSE NUMBER:** ENGS 302

C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

   # Credit Hours: 3
   # Lecture Hours: 3 per week
   # Lab Hours: per week
   Other: per week

   Course Length: 15 Weeks

D. **WRITING INTENSIVE COURSE:** Yes ☐ No ☒

E. **GER CATEGORY:** None: ☒ Yes: GER

   *If course satisfies more than one:* GER

F. **SEMESTER(S) OFFERED:** Fall ☒ Spring ☐ Fall & Spring ☐

G. **COURSE DESCRIPTION:**

   In this second dynamics course, students learn about planar two-dimensional rigid body kinematics, kinetics of rigid bodies—force and acceleration, work and energy, and impulse, momentum, and three-dimensional motion. An introduction to vibrations is also provided.

H. **PRE-REQUISITES:** None ☒ Yes ☒ If yes, list below:

   ENGS 202 or MECH 301

   **CO-REQUISITES:** None ☒ Yes ☐ If yes, list below:
### I. STUDENT LEARNING OUTCOMES: *(see key below)*

By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
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<tbody>
<tr>
<td>Solve two-dimensional kinematic motion of rigid bodies.</td>
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<td>2-Crit Think ISLO ISLO</td>
<td>PS Subsets Subsets Subsets</td>
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<tr>
<td>Solve force and acceleration for two-dimensional rigid bodies.</td>
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<td>2-Crit Think ISLO ISLO</td>
<td>PS Subsets Subsets Subsets</td>
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<tr>
<td>Solve kinetic and potential energy problems through conservation of energy for two-dimensional rigid bodies.</td>
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<td>2-Crit Think ISLO ISLO</td>
<td>PS Subsets Subsets Subsets</td>
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<tr>
<td>Solve impulse and momentum for two-dimensional rigid bodies.</td>
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<td>2-Crit Think ISLO ISLO</td>
<td>PS Subsets Subsets Subsets</td>
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<td>Analyze kinematics and kinetics for three-dimensional rigid bodies.</td>
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<td>Institutional Student Learning Outcomes [ISLO 1 – 5]</td>
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<td>Communication Skills</td>
<td>Oral [O], Written [W]</td>
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<td>2</td>
<td>Critical Thinking</td>
<td>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
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<td>3</td>
<td>Foundational Skills</td>
<td>Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
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<td>Social Responsibility</td>
<td>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</td>
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<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
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*Include program objectives if applicable. Please consult with Program Coordinator
J. **APPLIED LEARNING COMPONENT:** Yes ☒  No ☐

If YES, select one or more of the following categories:

- Classroom/Lab
- Internship
- Clinical Placement
- Practicum
- Service Learning
- Community Service
- Civic Engagement
- Creative Works/Senior Project
- Research
- Entrepreneurship (program, class, project)

K. **TEXTS:**


L. **REFERENCES:**

N/A

M. **EQUIPMENT:** None ☒ Needed:

N. **GRADING METHOD:** A-F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

- Homework 25%
- Exams (3) 60%
- Final Exam / Project 15%

P. **DETAILED COURSE OUTLINE:**

I. Planar Kinematics of Rigid Bodies
   A. Planar rigid body motion

II. Planar Kinetics of Rigid Bodies: Force, Mass, and Acceleration
   A. Mass Moment of Inertia
   B. Kinetic Equations of Motion: Translation, Rotation about a Fixed Axis, General Planar Motion

III. Planar Kinetics of Rigid Bodies: Work and Energy
   A. Kinetic Energy
   B. Principle of Work and Energy
   C. Conservation of Energy

IV. Three-Dimensional Kinematics and Kinetics of Rigid Bodies
   A. Rotation about a Fixed Point
   B. Angular Momentum
   C. Kinetic Energy
V. Introduction to Vibrations
   A. Undamped Natural Frequency
   B. Energy Methods

Q. LABORATORY OUTLINE: None ☒ Yes ☐