MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
ENGS 350 – MECHANICS OF MACHINE ELEMENTS

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

Canino School of Engineering Technology
Department: MKTX
Semester/Year: Fall 2022
A. **TITLE:** Mechanics of Machine Elements

B. **COURSE NUMBER:** ENGS 350

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

   - # Credit Hours: 4
   - # Lecture Hours: 2 hr 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:**

   Students in this course develop fundamentals of mechanics of machine design. Students apply their knowledge of statics, strengths, and materials to the designing of machine components.

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

   ENGS 203

   **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><strong>Course Student Learning Outcome [SLO]</strong></th>
<th><strong>Program Student Learning Outcome [PSLO]</strong></th>
<th><strong>GER [If Applicable]</strong></th>
<th><strong>ISLO &amp; SUBSETS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform static load analysis on machine elements.</td>
<td></td>
<td>2-Crit Think ISLO ISLO</td>
<td>PS Subsets Subsets Subsets</td>
</tr>
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<td>Select appropriate material for a mechanical machine element.</td>
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<td>2-Crit Think 3-Found Skills ISLO</td>
<td>PS Subsets Subsets Subsets</td>
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<tr>
<td>Apply statics and strengths to determine stress on shafts, screws, bearings, gears, and other machine elements.</td>
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<td>2-Crit Think ISLO ISLO</td>
<td>PS Subsets Subsets Subsets</td>
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<td>Apply a variety of failure theories to a design analysis.</td>
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<td>2-Crit Think ISLO ISLO</td>
<td>PS Subsets Subsets Subsets</td>
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<td>Design a mechanical drive system using belts, chains drives, or gears.</td>
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<td>2-Crit Think ISLO ISLO</td>
<td>PS Subsets Subsets Subsets</td>
</tr>
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<td>Apply Mohr’s circle for combined stresses.</td>
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<td>2-Crit Think ISLO ISLO</td>
<td>PS Subsets Subsets Subsets</td>
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<td>KEY</td>
<td>Institutional Student Learning Outcomes [ISLO 1 – 5]</td>
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<td>ISLO #</td>
<td>ISLO &amp; Subsets</td>
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</tbody>
</table>
| 1 | Communication Skills  
Oral [O], Written [W] |
| 2 | Critical Thinking  
Critical Analysis [CA], Inquiry & Analysis [IA], Problem Solving [PS] |
| 3 | Foundational Skills  
Information Management [IM], Quantitative Lit./Reasoning [QTR] |
| 4 | Social Responsibility  
Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T] |
| 5 | Industry, Professional, Discipline Specific Knowledge and Skills |

*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:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>25%</td>
</tr>
<tr>
<td>Exams (3)</td>
<td>60%</td>
</tr>
<tr>
<td>Final Exam / Project</td>
<td>15%</td>
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</tbody>
</table>

P. **DETAILED COURSE OUTLINE:**

I. **Introduction to Basic Design**
   a) Materials
   b) Load and Stress Analysis
   c) Deflection and Stiffness

II. **Failure Prevention**
   a) Static Loading
   b) Variable Loading

III. **Design of Mechanical Elements**
   a) Shafts
   b) Screws, Fasteners
   c) Welding, Bonding
   d) Springs
   e) Bearings
   f) Gears
   g) Clutches, Brakes, Couplings, Flywheels
   h) Belts and Chains
i) Keys
k) Selection of Seals

Q. **LABORATORY OUTLINE:*** None ☒ Yes ☐