Proposal Form For Addition And Revision Of Courses

1. Proposing College / School: College of Engineering
   Department: Mechanical Engineering

2. Course Prefix and Number: MECH 5230  
   3. Effective Term: Fall 2012

4. Course Title: Friction, Wear and Lubrication
   Abbreviated Title (30 characters or less):

5. Requested Action:
   - [ ] Renumber a Course
     Current Course Number:
   - [ ] Add a Course
     Proposed Course Number:
   - [ ] Revise a Course
     Type of Revision:
     Prereq.

6. Course Credit:
<table>
<thead>
<tr>
<th>Contact/Group Hours</th>
<th>Scheduled Type (e.g.: Lab, Lecture, Practicum, Directed Study)</th>
<th>Weekly or Per Term?</th>
<th>Credit Hours</th>
<th>Anticipated Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Hours (Repeatability): 3</td>
<td>3</td>
<td>Lecture</td>
<td>weekly</td>
<td>3</td>
</tr>
</tbody>
</table>
   Total Credit Hours: 3

7. Grading Type:
   - [ ] Regular (ABCDF)
   - [ ] Satisfactory/Unsatisfactory (S/U)
   - [ ] Audit

8. Prerequisites/Corequisites:
   Use “P:” to indicate a prerequisite, “C:” to indicate a corequisite, and “P/C:” to indicate a prerequisite with concurrency.
   MECH 3030, MECH 3230, or INSY 3800, or Departmental Approval.

9. Restrictions: List specific restriction in space above.
   - [ ] College
   - [ ] Major
   - [ ] Standing
   - [ ] Degree

10. Course Description:
    (20 Words or Less; exactly as it should appear in the Bulletin)
    Theory and techniques for considering friction, wear and lubrication, in the design of machine components, and other surface interactions.

11. May Count Either: _______ or _______  (Indicate if this particular course cannot be counted for credit in addition to another)
    Program Type | Program Title | Requirement or Elective?
    (e.g.: minor, major, etc.) | (e.g.: MS in Chemistry, Performance Option, Minor in Art) | (required or optional?)
    Major | Mechanical Engineering | Elective
    Minor | Tribology | Elective

12. Affected Program(s):
    (Respond “N/A” if not included in any program; attach memorandum if more space is required)
    Major | Mechanical Engineering | Elective
    Minor | Tribology | Elective

13. Overlapping or Duplication of Other Units’ Offerings:
    (If course is included in any other degree program, is used as an elective frequently by other unit(s), or is in an area similar to that covered by another college/school, attach correspondence with relevant unit)
    - [ ] Applicable
    - [ ] Not Applicable
14. Justification: The prerequisites are changed so that tribology minor students outside of mechanical engineering can take the course with approval.

(Include a concise, yet adequate rationale for the addition/revision of the course, citing accreditation, assessments (faculty, graduate, and/or external) where applicable)

15. Resources: No existing resources will need to be reallocated since this is already an existing course.

(Indicate whether existing resources such as library materials, classroom/laboratory space, and faculty appointments are adequate to support the proposed addition/revision; if additional resources are required, indicate how such needs will be met, referencing the appropriate level of authorization -- i.e.: Dean -- where necessary; if no additional resources or shifting of resources will be necessary, respond "Not Applicable")

16. Student Learning Outcomes: Upon completion of the course students will be able to:
1. Identify critical parameters in a tribological system.
2. Make predictions of the performance and behavior of a tribological system based on these critical parameters.
3. Design or choose efficient and robust tribological systems such as rolling element bearings, hydrodynamic bearings, and dry sliding bearings, for the needs of a specific application.
4. Improve the tribological properties of a machine component surface to improve reliability.
5. Optimize existing and new systems to improve performance.

(State in measurable terms (reflective of course level) what students should be able to do when they have completed this course)

17. Course Content Outline:

1. Background and Motivation [2 Lectures]
2. Fluid and Material Properties [2 Lectures]
3. Surface Characterization [3 Lectures]
4. Normal Single Asperity Contact [2 Lectures]
5. Contact Between Rough Surfaces [3 Lectures]
6. Asperity Sliding Contact [2 Lectures]
7. Abrasive Wear [2 Lectures]
8. Adhesive Wear [3 Lectures]
9. Metal Working [2 Lectures]
10. Rolling Element Bearing Design [3 Lectures]
11. Hydrodynamic Lubrication Theory [3 Lectures]
12. Thrust Bearing Design and Modeling [3 Lectures]
14. Gas Bearing Design [3 Lectures]
16. Boundary Lubrication [2 Lectures]
17. Exams [3 Lectures]

(Provide a comprehensive, week-by-week breakdown of course content, including assignment due dates)

18. Assignments / Projects: Homework: Homework will be checked for satisfactory completion on a ten point scale. Late homework will be deducted three points. Students may work in groups, but are strongly encouraged to work individual problems themselves.
Exams: All exams will be open book and notes. Exams and final will be open to all material covered in class and homework up to that point. The projects will be presented during the regularly scheduled final exam period.
Project: A project will be assigned to the entire class. The project will use techniques in the course to design and optimize a tribological system. The projects will also be presented at the end of the semester using a 10 minute presentation format during the final exam period, while the graduate
19. Rubric and Grading Scale:

<table>
<thead>
<tr>
<th>Grading</th>
<th>MECH 5230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>15%</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>
</tr>
<tr>
<td>Project</td>
<td>25%</td>
</tr>
</tbody>
</table>

Grading Scale:

- A: 100-90%
- B: 90-80%
- C: 80-70%
- D: 70-60%
- F: <60%

(List all components of the course grade -- including attendance and/or participation if relevant -- with point totals for each; indicate point totals and ranges or percentages for grading scale; for S/U grading, detail performance expectations for a passing grade)

20. Justification for Graduate Credit:

(List all quizzes, projects, reports, activities and other components of the course grade -- including a brief description of each assignment that clarifies its contribution to the course's learning objectives)

POLICY STATEMENTS

**Attendance:** Although attendance is not required, students are expected to attend all classes, and will be held responsible for any content covered in the event of an absence.

**Excused Absences:** Students are granted excused absences from class for the following reasons: illness of the student or serious illness of a member of the student's immediate family, the death of a member of the student's immediate family, trips for student organizations sponsored by an academic unit, trips for university classes, trips for participation in intercollegiate athletic events, subpoena for a court appearance, and religious holidays. Students who wish to have an excused absence from class for any other reason must contact the instructor in advance of the absence to request permission. The instructor will weigh the merits of the request, and render a decision. When feasible, the student must notify the instructor prior to the occurrence of any excused absences, but in no case shall such notification occur more than one week after the absence. Appropriate documentation for all excused absences is required. Please see the Tiger Cub for more information on excused absences.

**Make-Up Policy:** Arrangement to make up a missed major examination (e.g., hour exams, mid-term exams) due to properly authorized excused absences must be initiated by the student within one week of the end of the period of the excused absence(s). Except in unusual circumstances, such as the continued absence of the student or the advent of university holidays, a make-up exam will take place within two weeks of the date that the student initiates arrangements for it. Except in extraordinary circumstances, no make-up exams will be arranged during the last three days before the final exam period begins.

**Academic Honesty Policy:** All portions of the Auburn University student academic honesty code (Title XII) found in the Tiger Cub will apply to university courses. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

**Disability Accommodations:** Students who need special accommodations in class, as provided for by the Americans With Disabilities Act, should arrange for a confidential meeting with the instructor during office hours in the first week of classes (or as soon as possible if accommodations are needed immediately). The student must bring a copy of their Accommodation Letter and an Instructor Verification Form to the meeting. If the student does not have these forms, they should make an appointment with the Program for Students with Disabilities, 128B Haley Center, 844-2096 (V/TT).