General Course Information

Instructor

Prof. Vipin Kumar
MEB 312
vkumar@u.washington.edu
206-543-5535

Office hours
MWF 9 to 10.30 or by appointment

Lecture
MWF 11:30 – 12:20, Loew Hall 201

Lab / Recitation
Conducted by TA, Th. 9:30 – 12:20, MEB 238

TA
Nick Silverman
nls2@u.washington.edu

TA Office Hours
M F 1 – 2; Tu 1-3 in MEB 236

Text

Homework
Assigned weekly on Wednesdays.

Grading
Homework 15%
Lab activities 15%
Midterm 1 20%
Midterm 2 20%
Final Exam 30%

Lab/Recitation
The lab time will be used in a flexible manner. Activities will include working on design examples more involved than can be covered in the lecture. Some hand-on exercises are planned, and some short projects may be undertaken. The lab activity will often involve students working as a team. The lab grade will primarily depend on student participation, so attendance is essential.

Examinations
Midterm 1 Friday, Oct. 19
Midterm 2 Friday, Nov. 9
Final Exam Thursday, Dec. 13, 9:30 – 11:20, in MEB 238

Course Objectives
This course will introduce the student to the design process as applied to the design of mechanical elements and systems. The course attempts to bring together a large amount of knowledge and information from previous courses. The first half of the course can be thought of as ‘theory’: we will briefly review aspects of strength of materials, material properties, stress concentration factors, then look at how to prevent failure in design for static loads and finally for fatigue loads. In the second half of the course we will apply these analytical tools to the design of a variety of machine components such as bolts, power screws, welds, springs, gears, etc.

Tentative course outline (Any changes will be announced in class.)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Review of principles of mechanics</td>
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<tr>
<td>2</td>
<td>Design to prevent failure: static loads</td>
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<tr>
<td>3</td>
<td>Design to prevent failure: static loads, cont’d.</td>
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<td>4</td>
<td>Design to prevent failure: time-varying loads</td>
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<tr>
<td>5</td>
<td>Design to prevent failure: time-varying loads, cont’d</td>
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<td>6</td>
<td>Design of Mechanical Elements: power screws</td>
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<td>7</td>
<td>Design of Mechanical Elements: bolts, bolted joints</td>
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<td>8</td>
<td>Design of Mechanical Elements: welded joints</td>
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<tr>
<td>9</td>
<td>Design of Mechanical Elements: helical springs</td>
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<td>10</td>
<td>Design of Mechanical Elements: bearings and gears</td>
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<tr>
<td>11</td>
<td>Course review and final exam.</td>
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