Instructor: Dr. Dennis O’Connor

Office Hours (virtual): Tuesday and Thursday, 9-11AM
https://csuchico.zoom.us/j/86993454205?pwd=U2NyVlRoc0dFQnR0ZGw3d1dy3hxzd09
Meeting ID: 869 9345 4205 | Passcode: 661383

Contact: dmoconnor@csuchico.edu

Prerequisites: MECH 100, 100L; MECH 210 and CIVL 311 with C- or higher. Students who have not met the prerequisites will be dis-enrolled from the course unless given permission through the department.


Class: Lecture - MWF Synchronous Zoom; Sect. 01, Noon-12:50PM | Sect. 03: 1-1:50PM
Activity - RF Synchronous Zoom; Sect. 02, R 3-4:50PM | Sect. 04, F 2-3:50PM

Course Grade: Minimum passing grade is C-, letter grades will be assigned as follows.

- Homework 10%
- Technical writing and design activities 40%
- Exams 50%

Zoom Etiquette: Online lectures will be conducted synchronous/live during scheduled class times through Zoom. These will be recorded and made available within the Blackboard class site for up to one month. Students are expected to be courteous and respectful during lecture. The links below should provide direct access to the lecture and activity series.

Lecture 01 – MWF Noon-12:50pm, Meeting ID: 820 5163 3051 | Passcode: 661383
https://csuchico.zoom.us/j/82051633051?pwd=MERSeXo5c2M4dRHR2R0ZnZdFlFzd09

Activity 02 – Thursday 3-4:50pm, Meeting ID: 889 0958 3933 | Passcode: 661383
https://csuchico.zoom.us/j/88909583933?pwd=Q2ZTS09zTHkzLiptSUhpZckE0SEhIzz09

Lecture 03 – MWF 1-1:50pm, Meeting ID: 821 7944 5387 | Passcode: 661383
https://csuchico.zoom.us/j/82179445387?pwd=MEIzZ2Q4aHR4UVNzKhrL3p4bW1aQT09

Activity 04 – Friday 2-3:50pm, Meeting ID: 834 1618 3485 | Passcode: 661383
https://csuchico.zoom.us/j/83416183485?pwd=MkZsd0R2MERjWktYR3Q3Rk9NbzJiQT09
**Academic Integrity:** Plagiarism and copied work, with or without alterations, on exams or individual activity assignments may result in an automatic F in this class for all parties involved. Students are encouraged to help each other, but should never share files. Such incidences will be documented by Student Judicial Affairs and subject to further consequences. Students are expected to be familiar with the University’s Academic Integrity Policy. The policy on academic integrity and other resources related to student conduct can be found at: https://www.csuchico.edu/scr/integrity.shtml

**Homework:** Weekly problem sets will be posted on the Blackboard class site and due as a single pdf file for online submission. Adobe Creative Cloud is a software which can help with this and is available to all Chico State students. The link below provides a detailed description for how to obtain the program. Late submission, illegible handwriting, or unorganized homework will be subject to lost points. https://support.csuchico.edu/TDClient/1984/Portal/KB/ArticleDet?ID=83083.

**Technical Writing and Design Activities:** A sequence of technical writing and paper design activities will be facilitated through the two hour activity time. The paper design activities will give you an opportunity to practice and learn the course material in a manner which requires technical communication, both written and graphical. Early assignments will focus on gaining technical writing skills such as format, display of engineering analysis, equations, figures, and tables. Later assignments will involve considerably more engineering analysis and design work including part and assembly drawings. The final paper design activity will be a group project.

**Exams:** There will be two normal class exams and a two-hour final exam for the semester. All exams will be made available on the Blackboard class site and due as single pdf file for online submission. Each answered question must show relevant equations and sufficient work necessary to calculate the answer. The final answer must have correct units to avoid further lost points. Attendance within Zoom during scheduled time is required for

**Student Learning Center:** The mission of the Student Learning Center (SLC) is to provide services that will assist CSU, Chico students to become independent learners. The SLC prepares and supports students in their college course work by offering a variety of programs and resources to meet student needs. The SLC facilitates the academic transition and retention of students from high schools and community colleges by providing study strategy information, content subject tutoring, and supplemental instruction. The SLC is online at http://www.csuchico.edu/slc.

**Americans with Disabilities Act:** If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations. Accessibility Resource Center (530-898-5959) and Student Services Center (arcdept@csuchico.edu).
Course Schedule: The following table is a tentative course schedule outlining the chapters covered and approximate time for the Tests.

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topics</th>
<th>Readings</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 25 - Jan 29</td>
<td>Load and Stress Analysis, Ch.3</td>
<td>3.1 – 3.6</td>
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<tr>
<td>2</td>
<td>Feb 1 - Feb 5</td>
<td>Load and Stress Analysis, Ch.3</td>
<td>3.7 – 3.12</td>
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<tr>
<td>3</td>
<td>Feb 8 - Feb 12</td>
<td>Load and Stress Analysis, Ch.3</td>
<td>3.13 – 3.19</td>
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<tr>
<td>4</td>
<td>Feb 15 - Feb 19</td>
<td>Deflection and Stiffness, Ch.4</td>
<td>4.1 – 4.17</td>
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<td>5</td>
<td>Feb 22 - Feb 26</td>
<td>Review (Exam I: 3,4)</td>
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<td>6</td>
<td>Mar 1 - Mar 5</td>
<td>Static Load Failure Theories, Ch.5</td>
<td>5.1 – 5.13</td>
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<td>7</td>
<td>Mar 8 - Mar 12</td>
<td>Dynamic Load Fatigue Failure, Ch.6</td>
<td>6.1 – 6.10</td>
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<td>8</td>
<td>Mar 15 - Mar 19</td>
<td>Spring Break</td>
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<td>9</td>
<td>Mar 22 - Mar 26</td>
<td>Dynamic Load Fatigue Failure, Ch.6</td>
<td>6.11 – 6.17</td>
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<td>10</td>
<td>Mar 29 - Apr 2</td>
<td>Shaft Components, Ch.7</td>
<td>7.1 – 7.8</td>
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<td>11</td>
<td>Apr 5 - Apr 9</td>
<td>Review (Exam II: 5,6,7)</td>
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<td>12</td>
<td>Apr 12 - Apr 16</td>
<td>Gears-General, Ch.13</td>
<td>13.1 – 13.9</td>
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<tr>
<td>13</td>
<td>Apr 19 - Apr 23</td>
<td>Gears-General, Ch.13</td>
<td>13.10 – 13.17</td>
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<td>14</td>
<td>Apr 26 - Apr 30</td>
<td>Rolling-Contact Bearings, Ch.11</td>
<td>11.1 – 11.6</td>
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<td>15</td>
<td>May 3 - May 7</td>
<td>Rolling-Contact Bearings, Ch.11</td>
<td>11.7 – 11.12</td>
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<td>16</td>
<td>May 10 - May 14</td>
<td>Review (11,13)</td>
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<td>17</td>
<td>May 17 - May 21</td>
<td>Final Exam (Comprehensive)</td>
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MECH 340 Course Objectives: For students to:
1) Learn a process for designing mechanical systems with a balance of the conceptualization and detail design phases of the process.
2) Synthesize and apply concepts from the engineering sciences including statics, dynamics, strength of materials, and materials science.
3) Practice choosing parameters for a mechanical system (e.g., dimensions and material properties) based upon a set of performance specifications.
4) Learn how to determine allowable stresses in a component based upon an appropriate theory of failure and a reasonable set of assumptions including factors of safety where appropriate.
5) Learn how to mathematically model a selection of common mechanical components in order to predict particular performance measures and to utilize equation solving software to streamline the analytical solution process.
6) Have opportunities to be creative, and at the same time, mindful of the constraints imposed by material limitations, manufacturing, standard practices, codes and standards.
7) Be introduced to the concepts of uncertainty and reliability in design, as they pertain to material properties, manufacturing processes, and applied loads.

**MECH 340 Course Outcomes:** Students shall be able to:

1) Apply energy methods to relate the steady-state input/output characteristics of machines to relate quantities such as torque, force, velocity, and angular velocity.
2) Determine stresses in straight, slender bodies caused by combinations of axial, shear, bending, and torsional loads.
3) Determine stresses in curved beams.
4) Determine miscellaneous stresses in machine components such as direct shear, tearout, and bearing stresses that occur commonly with interconnected machine parts.
5) Apply stress concentration factors where appropriate.
6) Determine principal stresses due to combinations of simple stress states.
7) Size components using static failure theory.
8) Size components using fatigue failure theory.
9) Estimate and apply appropriate factors of safety for a given machine environment and loading, and apply them in selecting materials and sizing selected machine components.
10) Determine the appropriate size of a rotating shaft for infinite-life strength.
11) Select components such as bearings, gears, springs, threaded fasteners, clutches and brakes based on accepted practice and theory for particular machine elements.