San José State University
Department of Civil and Environmental Engineering
CE 95, Theory and Application of Statics
Section 1, Fall 2014

Instructor: Steven Vukazich
Office Location: ENG 165
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Email: Steven.Vukazich@sjsu.edu
Office Hours: M 0920-1020
TR 0820-0850
or during advising hours (if no advisees are waiting)
Class Days/Time: TR 0900 – 1015
Classroom: ENG 341
Prerequisites: MATH 31, PHYS 50

Course Description
Detailed study of bodies in equilibrium to provide background for advanced study of engineering mechanics. Applications to general three-dimensional bodies and structural systems. Topics include free body diagrams, centroids, internal forces, distributed loads, moments of inertia and friction.

Course Objectives and Student Learning Outcomes
The objectives of the course are to:
1. Introduce the student to the fundamentals of analysis of bodies and structures in static equilibrium;
2. Introduce the student to the concepts of centroid and center of gravity and the mathematical calculations involved in finding the centroid of a two-dimensional area;
3. Introduce the student to the concept of moment of inertia and the mathematical calculations involved in finding moments of inertia of two-dimensional areas.

Course Content Student Learning Outcomes
The learning outcomes listed support course objectives 1 through 3. The course objective and ABET outcome that each learning outcome supports is shown in parenthesis.

Upon successful completion of this course, students will be able to:
a. Express a vector in terms of components (Objective 1, ABET Outcome A);

b. Find the vector and scalar product of vectors (Objective 1, ABET Outcome A).

c. Draw Free Body diagrams (F.B.D.) of two and three-dimensional structures, or their components, with all loads and reactions correctly applied (Objective 1, ABET Outcome A);

d. Express forces on two- and three-dimensional bodies in terms of an equivalent force and couple system (Objective 1, ABET Outcome A);

e. Analyze truss structures using the method of joints and method of sections; (Objective 1, ABET Outcome A);

f. Analyze frames and machines (Objective 1, ABET Outcome A);

g. Find shear and bending moment forces in beams (Objective 1, ABET Outcome A);

h. Analyze simple structures acted on by friction (Objective 1, ABET Outcome A);

i. Find centroids and centers of gravity of two-dimensional bodies by integration (Objective 2, ABET Outcomes A);

j. Find centroids and centers of gravity of two-dimensional composite bodies (Objective 2, ABET Outcome A);

k. Calculate moments of inertia of various shapes by integration (Objective 3, ABET Outcome A);

l. Calculate moments of inertia of composite shapes using the parallel axis theorem (Objective 3, ABET Outcome A);

Required Texts/Readings

Textbook

Classroom Protocol

Please arrive to class on time: turn off and put away cell phones, laptop computers, and other electronic devices during class. Instructor permission is required for use of laptop computers and other electronic devices during class.

If you do happen to arrive to class late, please enter and take your seat quietly.

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of forty-five hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to; internships, labs, clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.
Office Hours

Phone and email communication is most appropriate for administrative matters (notification of illness, scheduling appointments, clarification of homework problems, etc.).

Because of the extensive use of Free Body Diagrams and figures, detailed solution strategy to homework problems or other course material is best discussed in person during scheduled office hours and not via phone or email.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic calendar web page at http://www.sjsu.edu/provost/Academic_Calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Assignments and Grading Policy

Final Exam:

- The final exam will be Open-Book, Closed-Notes. One standard 3 inch by 5 inch index card (front and back) is allowed for the final exam.
- Bring a calculator, pencil, and eraser for the final exam. Please do not use pens on the final exam.
- No phones or electronic devices will be allowed to be used during the final exam. All phones and electronic devices should be switched off and put away during the final exam.
- Instructor permission is required to leave the classroom for bathroom visits or other reasons during the final exam.
- The Final Exam must be completed in order to complete the course.

Quizzes:

- Five 20-minute Closed-Book and Closed-Notes quizzes will be held at the end of the class period on the dates indicated.
- Bring a calculator, pencil, and eraser for quizzes. Please do not use pens on quizzes.
- The best 4 out of 5 quizzes will be used toward the course grade.
- No make-up quizzes will be given: a missed quiz will be excused for valid reasons per SJSU policy (reported in advance if possible). If more than one quiz is missed for valid reasons, the course grade will be based on the remaining course work.
Homework:

A list of homework problems for the material covered in each chapter is given on the last page of this syllabus. **Homework will not be collected and graded but its timely completion and understanding is essential for learning the material and performing well on the quizzes and exams.** In order to guide the timely completion of homework, the problems that are appropriate for the material covered will be designated in class and the date that each homework set should be completed will be given in class. Note that homework problems might be added or deleted from the list as the semester progresses.

It is the responsibility of the individual student to verify, in detail, the correctness of the final results, calculations, diagrams, and solution methodology for each homework problem. For this purpose, homework solutions will be available on the course website:


Grading:

Grades are assigned based on class performance on the quizzes and the final exam with the weights listed below:

- **Best 4 of 5 Quizzes (15% each)** 60%
- **Final Exam** 40%

Course grades are assigned based on a total of 100 points possible for the course with standard decimal rounding (i.e. 0.5 and greater rounded up). If the median score on any individual quiz is less than 70%, all scores will be adjusted to bring the median score on that particular quiz to 70%. For example, if the class median score on quiz 1 is 67/100, 3 points will be added to the score of each quiz to bring the median to 70/100. The final course grades will be assigned according to the following grading scale:

- 98 A+
- 91-97 A
- 88-90 A-
- 85-87 B+
- 75-84 B
- 72-74 B-
- 69-71 C+
- 59-68 C
- 56-58 C-
- 53-55 D+
- 43-52 D
- 40-41 D-
- ≤ 39 F
CEE Policy Statement on Enforcement of Prerequisites/Co-requisites for Undergraduate Courses

All undergraduate students must hand in the following documents (as appropriate) to the class instructor at the beginning of the third class meeting:

1. A transcript (unofficial) showing that the student has the prerequisites and co-requisites for the course with the required grade.
2. A copy of the assist.org document showing the equivalency for any prerequisite or co-requisite if the course was taken at another university or a community college.
3. A signed equivalency form, if the prerequisite or co-requisite was taken at a college for which an assist.org document is not available.
4. A copy of the student’s official schedule for the current semester indicating enrollment in a co-requisite course if the student is concurrently enrolled in a co-requisite.
5. For courses that require junior and/or senior standing, the instructor will check the class roster to verify the required standing.

Students who do not meet the prerequisites or co-requisites will be dropped from the course. Students who are enrolled in the class at the beginning of the semester and fail to produce the appropriate documents by the beginning of the third class meeting will be dropped from the course.

Students who were not enrolled in the class at the beginning of the semester will produce the required document(s) by the beginning of the third class meeting after enrolling in the course. Such students, who fail to produce the appropriate document(s) by the beginning of the third class meeting after enrolling in the course, will be dropped from the course.

The package you will need to turn in for CE 95 on or before the third class meeting (September 2, 2014) is:

Math 31
• Taken at SJSU – SJSU unofficial transcript;
• Taken at California Community College – Assist.org printout(s) and unofficial transcript(s) showing course equivalency to Math 31;
• Taken at other colleges - Signed Equivalency form and unofficial transcript.

Phys 50
• Taken at SJSU – SJSU unofficial transcript;
• Taken at California Community College – Assist.org printout(s) and unofficial transcript(s) showing course equivalency to Phys 50;
• Taken at other colleges - Signed Equivalency form and unofficial transcript.

University Policies

Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University’s Academic Integrity policy, located at http://www.sjsu.edu/senate/S07-2.htm, requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of
Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Integrity Policy S07-2 requires approval of instructors.

**Campus Policy in Compliance with the American Disabilities Act**

If you need course adaptations or accommodations because of a disability, 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. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Disability Resource Center (DRC) at http://www.drc.sjsu.edu/ to establish a record of their disability.
CE 95, Theory and Application of Statics, Fall 2014
Lecture, Exam, and Quiz Schedule

Note that the schedule below is subject to change with advance notice given in class.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Topics [Text Reading]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/26</td>
<td>Introduction, Vector Operations, Force Vectors [2.1-2.3]</td>
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<tr>
<td></td>
<td>8/28</td>
<td>Force Systems, Vector Addition, Scalar Components [2.4-2.8]</td>
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<tr>
<td>2</td>
<td>9/2</td>
<td>2-D Equil. of a Particle, Free Body Diagram (F.B.D.) [2.9-2.11]</td>
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<td></td>
<td>9/4</td>
<td>Prerequisite documents due</td>
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<td></td>
<td>2-D Equil. of a Particle, Free Body Diagram (F.B.D.) [2.9-2.11]</td>
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<tr>
<td>3</td>
<td>9/9</td>
<td>Forces in 3-D space, Scalar Components [2.12-2.14]</td>
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<tr>
<td></td>
<td>9/11</td>
<td>Equil. of a Particle in Space, Forces on Rigid Bodies [2.15, 3.1-3.3]</td>
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<tr>
<td>4</td>
<td>9/16</td>
<td>Forces on Rigid Bodies, Vector (Cross) Product [3.3-3.5]</td>
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<td>9/18</td>
<td>Moment of a Force about a Point [3.6-3.8], Quiz 1</td>
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<tr>
<td>5</td>
<td>9/23</td>
<td>Scalar (Dot) Product, Moment of a Force about an axis [3.9, 3.11]</td>
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<td>6</td>
<td>9/30</td>
<td>Equivalent Force Systems, F.B.D., [3.17-3.18, 4.1-4.2],</td>
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<td></td>
<td>10/2</td>
<td>2-D Supports, F.B.D., 2-D Equilibrium [4.1-4.4]</td>
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<td>7</td>
<td>10/7</td>
<td>Solution of Equations of Equilibrium for 2-D Rigid Bodies [4.4]</td>
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<td>10/9</td>
<td>Equilibrium of 2 and 3 Force Bodies [4.6-4.7], Quiz 2</td>
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<td>8</td>
<td>10/14</td>
<td>Trusses - Method of Joints [6.1-6.5]</td>
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<td></td>
<td>10/16</td>
<td>Trusses - Method of Joints [6.1-6.5]</td>
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<td>9</td>
<td>10/21</td>
<td>Trusses - Method of Sections [6.6]</td>
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<td>10/23</td>
<td>Frames [6.8-6.10], Quiz 3</td>
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<td>10</td>
<td>10/28</td>
<td>Machines [6.11]</td>
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<td>10/30</td>
<td>Dry Friction [4.10-4.12]</td>
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<td>11</td>
<td>11/4</td>
<td>Dry Friction Problems [4.13]</td>
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<td>11/6</td>
<td>Centroids, Center of Gravity of a 2-D Body [5.1-5.3],</td>
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<td>12</td>
<td>11/11</td>
<td>Veterans Day Holiday</td>
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<tr>
<td></td>
<td>11/13</td>
<td>Centroids of Composite Bodies, Integration [5.4-5.6], Quiz 4</td>
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<tr>
<td>13</td>
<td>11/18</td>
<td>Distributed Loads [5.8]</td>
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<td>11/20</td>
<td>Moment of Inertia (MOI), Radius of Gyration [7.1-7.5]</td>
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<td>14</td>
<td>11/25</td>
<td>Parallel-Axis Theorem, MOI of Composite Areas [7.6-7.7]</td>
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<td>11/27</td>
<td>Thanksgiving Holiday</td>
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<tr>
<td>15</td>
<td>12/2</td>
<td>MOI of Composite Areas, Internal Forces [7.6-7.7, 12.1-12.2]</td>
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<td></td>
<td>12/4</td>
<td>Internal Forces [12.1-12.2], Quiz 5</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Lecture Topics [Text Reading]</td>
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<tr>
<td>16</td>
<td>12/9</td>
<td>3-D Equilibrium [4.8-4.9], Review</td>
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<tr>
<td>Final</td>
<td></td>
<td>Final exam time and date per SJSU Fall 2014 Final Exam Schedule</td>
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Homework Problem Sets

1.) 2.24, 2.26, 2.29, 2.34, 2.39, 2.47, 2.63, 2.69, 2.73, 2.83, 2.87
2.) 3.1, 3.4, 3.8, 3.11, 3.13, 3.16, 3.22, 3.25, 3.29, 3.50, 3.51, 3.61, 3.64, 3.73
3.) 4.2, 4.7, 4.11, 4.12, 4.17, 4.27, 4.30, 4.44
4.) 6.2, 6.7, 6.10, 6.25, 6.27, 6.33, 6.49, 6.52, 6.60, 6.85
5.) 4.75, 4.79, 4.91, 4.95, 5.26
6.) 5.1, 5.3, 5.6, 5.51, 5.54, 5.55
7.) 7.9, 7.13, 7.26, 7.27, 7.30, 7.31
8.) 4.59, 12.1, 12.2, 12.6