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Text: Engineering Mechanics: Statics

7th Edition Wiley 2012

By Meriam and Kraige

This is a basic engineering course studying static equilibrium. Vector algebra, free-body diagrams and static equilibrium of moments and forces are used to solve problems in two and three dimensions. Topics include methods of solving frames, trusses and machines, distributed forces and determination of centroids, fluid statics, applications of friction, and virtual work.

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| **Topics** | **Due Date** | **Problems** |
| **Introduction** |  |  |
| **2-D Systems**  2/3 Components  2/4 Moment, Varignon | Jan 14 | 2/11,13,15,25  2/43,51,55,57 |
| 2/5 Couples  2/6 Resultants | Jan 19 | 2/69,75,77  2/83,88,93,97 |
| **3-D Systems**  2/7 Rectangular comp, dot product  2/8 Moment and couple, cross product | Jan 21 | 2/103,107,113,116  2/127,135,137,141 |
| 2/9 Resultants  2/10 Chapter review | Jan 26 | 2/156,157,159,163  2/176,178,183, 192\* |
| **2-D Equilibrium**  3/1 Introduction  3/2 Free-body diagrams  3/3 Equilibrium conditions  **Quiz** over Ch 2 | Jan 28 | 3/7,9,17,20,27,35 |
| More practice | Feb 2 | 3/36,38,39,44,51 |
| **3-D Equilibrium**  3/4 Equilibrium conditions | Feb 4 | 3/62, 63, 71, 74, 75, 83, 87, 89 |
| 3/5 Chapter review | Feb 9 | 3/90, 92, 98,  3/104, 109, 111, 119\* |
| **Test 1** over Ch 2, 3 | Feb 11 |  |

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| **Structures**  4/1 Intro  4/2 Plane Trusses  4/3 Method of Joints | Feb 16 | After test, read 4/1 - 4/3 and do these problems  4/4, 5, 7 |
| More practice | Feb 18 | 15, 16, 23, 28, Lab |
| ---- Study Day ---- | Feb 23 |  |
| 4/4 Method of Sections | Feb 25 | 4/33, 35, 39, 45, 46, 58 |
| 4/5 Space Trusses  4/6 Frames and Machines | Mar 2 | 4/59, 60, 61, 67  4/76, 79, 85 |
| 4/7 Chapter Review  **Quiz** over ch 4 | Mar 4 | 4/106, 114, 121 |
| **Distributed Forces**  5/1 Intro  5/2 Center of Mass  5/3 Centroids | Mar 9 | 5/5,10,12,14, 17, 21, 36 |
| 5/4 Composite Bodies  5/5 Theorem of Pappus | Mar 11 | 5/51, 56, 74,  5/84, 95 |
| ---- Study Day ---- | Mar 16 |  |
| **Special Topics**  5/6 Beams External Effects  5/7 Beams Internal Effects | Mar 18 | 5/102, 106, 109, 111, 114  5/128, 133 |
| More practice  5/8 Flexible Cables | Mar 23 | 5/140, 144, 147  5/156, 161, 165, 173, 177 |
| 5/9 Fluid Statics | Mar 25 | 5/185, 188, 189, 195, 198 |
| 5/10 Chapter Review | Mar 30 | 5/222, 224, 227, 235, 239 |
| **Test 2** over Ch 4, 5 | Apr 1 |  |
| **Friction**  6/1 Intro  6/2 Types of Friction  6/3 Dry Friction | Apr 6 | After test, read 6/1 – 6/3  Do these problems  6/2, 7, 11 |
| **Applications of Friction**  6/4 Wedges  6/5 Screws | Apr 8 | 6/14, 32,  6/56,  6/57, 63, 69, 70 |
| 6/6 Journal Bearings  6/7 Thrust Bearings | Apr 13 | 6/76,  6/77, 88 |
| 6/10 Chapter Review | Apr 15 | 6/129, 131, 134 |
| **Final Exam**  Ch 6 and Comprehensive |  |  |

**Homework**. Due dates are shown. Homework should be written out in a clear fashion so others can easily follow what you have done. This is an important part of this class, you will take turns putting up your solutions while a different student looks at your work and explains your solution. You will need to be able to present your work clearly on paper and to follow and explain other people’s solutions.

By the class period on that day each student should upload a set of pictures of their homework to the Google drive 2021 Statics Class and put it into the folder for that particular homework assignment. The picture file should be named by chapter, problem number, and first name with hyphens like this:

3-62-mary.jpg this is for chapter 3 problem 62 done by Mary

Try to follow this exactly so the files will order themselves properly. Your homework grade will be based on how well you completed these assignments.

**Lab.** There will be a single lab on trusses which you will complete outside of class time. Using the truss and bridge construction sets you will build a structure and measure forces on several members. Then using the methods of the class you will also calculate them and compare the results.

**Quizzes and Tests**. There will be two quizzes of about 2 problems each and two tests of about 4 problems and a final exam of about 6 problems. The quizzes and tests will all be on Thursdays and you should keep your schedule free following this class on those days (about half an hour extra for the quizzes and up to an hour for the tests. This is because the problems you are learning to solve require considerable time to complete even when you understand them.

**Grading**

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| Quiz Ch 2 | 6% |
| Test 1 | 18% |
| Quiz Ch 4 | 6% |
| Test 2 | 18% |
| Homework | 20% |
| Lab | 5% |
| Final Exam | 27% |

Goshen College wants to help all students be as academically successful as possible. If you have a disability and require accommodations, please contact the instructor or the Director of the Academic Support Center, Lois Martin, early in the semester so that your learning needs may be appropriately met. In order to receive accommodations, documentation concerning your disability must be on file with the Academic Support Center, KU004, x7576, [lmartin@goshen.edu](mailto:lmartin@goshen.edu). All information will be held in the strictest confidence. The Academic Support Center offers tutoring and writing assistance for all students. For further information please see [www.goshen.edu/studentlife/asc.php](http://www.goshen.edu/studentlife/asc.php).