

# Virginia Western Community College

## MEC 131

### Statics for Engineering Technology

#### Prerequisites

Prerequisite: MTH 115 or equivalent. Co-requisite: MTH 116 or equivalent

#### Course Description

Teaches Newton's laws, resultants and equilibrium of force systems, trusses and frames, determination of centroids, and distributed loads and moments of inertia. Introduces dry friction and force systems in space.

**Semester Credits: 3 Lecture Hours: 3 Lab/Recitation: Hours: 0**

#### Required Materials

##### **Textbook:**

Statics and Mechanics Materials, 5th edition, Author: Hibbeler, Publisher: Pearson, ISBN# .9780134301006

##### **Other Required Materials:**

1. Scientific calculator
2. Engineering graph paper for problem solving.

##### **The following supplementary materials are available:**

1. Problem answer guide on reserve for checkout on second floor of LRC



- Digital resources of how to solve specific problems related to Statics are available on BlackBoard.

### **Course Outcomes**

**At the completion of this course, the student should be able to:**

- Construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium.
- Analyze rectangular and triangular shaped distributed loads.
- Knowledge of internal forces and moments in members.
- An ability to calculate centroids and moments of inertia.
- An ability to solve static equilibrium problems involving friction.
- Able to analyze a truss to find the internal loads in each member.
- Analyze simple machines to determine the internal loads and exerted forces of the machines.

### **Topical Description**

| <b>Week</b> | <b>Topic</b>   |
|-------------|--|
| 1           | Chapter 1 Fundamental Concepts and Principles          |
| 2-4         | Chapter 2 Resultant of Coplanar Force Systems          |
| 5-6         | Chapter 3 Equilibrium of Coplanar Force Systems        |
| 7           | Chapter 4 Truss analysis using the Method of Joints    |
| 8           | Chapter 4 Truss analysis using the Methods of Sections |
| 9           | Chapter 4 Frame analysis.                              |
| 10          | Chapter 4: Machines                                    |
| 11          | Chapter 5 Friction: Sections 5-1,2,3, and 6.           |
| 12          | Chapter 6 Concurrent Spatial Force Systems             |
| 13          | Chapter 7 Center of Gravity and Centroids              |
| 14-15       | Chapter 8 Area Moments of Inertia                      |
| 16          | Final Exam   |



**Notes to Instructors**

1. Instructors should use Excel to demonstrate as many problem solutions as appropriate. In addition, online or downloadable software (MDSolids) can be used to supplement solution of problems.
2. The solution guide is available for student use in the reserve area of the LRC.
3. Concepts should be demonstrated as possible through the use of projects. A common type of project is a bridge building and analysis competition.
4. Industry standards and applications of static principles should be stressed. Failures in the analysis of engineering problems can be used to demonstrate the need for proper force determination. The Hyatt Walkway Failure:  
[http://en.wikipedia.org/wiki/Hyatt\\_Regency\\_walkway\\_collapse](http://en.wikipedia.org/wiki/Hyatt_Regency_walkway_collapse)
5. The final exam is worth 15-20% of the final grade.

