



South Central College

## **BDET 2120 Statics and Strengths of Materials**

### **Course Outcome Summary**

#### **Course Information**

<b>Description</b>	This course covers an introduction to structural theory and calculation. It includes analysis of forces, vectors, calculations of forces, moments and internal stresses and strains in structural materials. It also includes tracing of load paths through the structure. Prerequisite: Math 125 Trigonometry, BDET 1210 Studio II
<b>Total Credits</b>	3
<b>Total Hours</b>	64

#### **Types of Instruction**

<b>Instruction Type</b>	<b>Credits/Hours</b>
Lecture	
Lab	

#### **Pre/Corequisites**

MATH 125 Trigonometry

BDET 1210 Studio II

#### **Institutional Core Competencies**

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

#### **Course Competencies**

##### **1. Explain the characteristics of vectors**

###### **Learning Objectives**

- Calculate vector component addition
- Calculate vector's rectangular components
- Perform graphical vector addition
- Calculate bearing stress
- Calculate shear stress
- Calculate compression/tension stress

##### **2. Compute the moment of a force**

### **Learning Objectives**

Calculate force's moment  
Calculate multiple forces' moment  
Calculate force and couple moment

## **3. Explain equilibrium equations**

### **Learning Objectives**

Explain force characteristics  
Draw free body diagrams  
Explain structural support end conditions  
Calculate equilibrium problems  
Analyze beam's end support conditions

## **4. Analyze cable structures**

### **Learning Objectives**

Explain cable geometry and characteristics  
Calculate cable stress

## **5. Analyze trusses**

### **Learning Objectives**

Calculate truss section analysis  
Calculate truss joint analysis  
Calculate diagonal tension counter  
Explain arch principles

## **6. Create structural load paths**

### **Learning Objectives**

Calculate load tributary area  
Calculate roof load path  
Calculate foundation load path  
Calculate floor load path  
Calculate wall load path

## **7. Explain stress/strain relationship**

### **Learning Objectives**

Explain deformation/strain relationship  
Calculate material's strain  
Calculate material's stress

## **8. Explain cross-sectional properties**

### **Learning Objectives**

Calculate shape's Radius of Gyration  
Calculate composite shape's Moment of Inertia  
Calculate shape's Centroid

## **9. Examine bending and shear in simple beams**

### **Learning Objectives**

Construct beam load diagram  
Construct beam shear diagram  
Construct beam moment diagram

## **10. Explain beam internal bending stress**

### **Learning Objectives**

Calculate beam internal shear stress  
Explain beam internal shear stress  
Calculate beam internal bending stress  
Select adequate beam size

## **11. Use column design Equations**

### **Learning Objectives**

Explain column bracing

Calculate long column design

Calculate short column design

### **SCC Accessibility Statement**

South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-7222.

Additional information and forms can be found at: [www.southcentral.edu/disability](http://www.southcentral.edu/disability)

This material can be made available in alternative formats by contacting the Academic Support Center at 507-389-7222.