SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: CIVL 345 Department: Civil Engineering Technology

Course Title: Statics & Strength of Material Semester: Spring Year: 1999

Objectives/Competencies

Course Objective	Competencies
1. To provide the student with a comprehensive foundation and understanding of the Laws of Equilibrium and learn to apply them using both the English and the metric system of measurements.	1. Apply the three laws of equilibrium, as they apply to rigid bodies. 2. Determine the resultant and equilibrant of two or more forces. 3. Draw free body diagrams for force systems. 4. Determine the beam reactions from point loads, uniformly distributed loads and triangular load systems. 5. Determine the support reaction from roller pin and fixed beam connections. 6. Determine the internal and external tensile and compressive loadings on framed structures, including simply supported, overhanging and cantilever beams.
2. To learn how loads are transferred in various types of trusses, utilizing both the method of joints, the method of shears and the method of sections.	1. Apply the method of joints to determine tensile and compressive loads caused in truss systems. 2. Apply the methods of sears and sections to

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	determine the tensile and compressive loads caused in trusses.
3. To learn how to calculate the effect of frictional forces that develop between two rigid bodies.	1. Calculate the frictional forces that develop between two rigid bodies at rest. 2. Determine the angle of inclination necessary for a rigid body to overcome the frictional resistance to remain at rest. 3. Demonstrate the use of applying coefficients of friction to calculate frictional forces as they resist the direction of impending motion.
4. To learn the basic stress and train theories as they apply to rigid bodies.	1. Calculate the stress and strains for variable loads applied to different construction materials. 2. To develop the stress/strain diagrams for variable tensile and compressive loads. 3. Identify the elastic limit, the yield point, the ultimate stress and the rupture point from stress/strain diagrams.
5. To learn how to apply factors of safety under various steady loads, vibrating loads and shock loads and how they relate to present day building codes.	1. Calculate the allowable stresses for various loading conditions. 2. Use allowable stresses to select the required sizes of structural members. 3. Show the relationships between allowable stresses and the elastic limit and yield and

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	ultimate stress points. 4. Utilize standard structural steel and wood design tables to verify safety under various load systems.
6. To learn how to determine the centroid and the moment of inertia for various shaped bodies.	1. Calculate the centroid location for simple shapes and for composite bodies made from standard framing and construction materials. 2. Calculate the moment of inertia for various shaped structural shapes. 3. Utilize the transfer formula to calculate the moment of inertia for composite bodies. 4. Show the difference between the weak axis and the strong axis of standard structural shapes.
7. To learn the effects of thermal stress and strain as they develop in standard building materials.	1. Calculate the changes in compressive and tensile stresses caused by temperature increases and decreases. 2. Determine the changes in length of standard structural materials (concrete, steel) caused by temperature increases and decreases.
8. To instill in students the necessity for neat, concise, orderly, step-by-step problem analysis in keeping with generally accepted engineering standards and practice.	1. Show detailed, neat, labeled free body diagrams for force systems as the first step to problem solving. 2. How applicable formulas, show substitution, perform the required calculations, and label the

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	resulting calculation. 3. Demonstrate the ability to interpret word problems and convert them to a visual representation of force systems (free body diagram).