COURSE OUTLINE: MCH103 - STRENGTH OF MATERIAL

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

Course Code: Title	MCH103: STRENGTH OF MATERIALS
Program Number: Name	4039: MECH. ENG. TN-MANUFA
Department:	MECHANICAL TECHNIQUES PS
Semesters/Terms:	20W
Course Description:	Basic concepts, stress and strain, Hooke`s law, Young`s modulus, temperature stresses, thin walled cylinders, factor of safety, structural shapes, riveted and bolted connections, first and second moment of areas, and shear and bending diagrams are studied.
Total Credits:	3
Hours/Week:	3
Total Hours:	45
Prerequisites:	MCH110
Corequisites:	There are no co-requisites for this course.
This course is a pre-requisite for:	MCH608, MCH609
Course Evaluation:	Passing Grade: 50%, D
Other Course Evaluation & Assessment Requirements:	Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 - 59% 1.00 F (Fail) 49% and below 0.00 CR (Credit) Credit for diploma requirements has been awarded. S Satisfactory achievement in field /clinical placement or non-graded subject area. U Unsatisfactory achievement in field/clinical placement or non-graded subject area. X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. NR Grade not reported to Registrar`s office. W Student has withdrawn from the course without academic penalty.
Books and Required Resources:	Static and Strength of Materials, Foundation for Structural Design by Onouye Publisher: Pearson Prentice Hall Edition: 1st ISBN: 0-13-111837-4

Course Outcomes and Learning Objectives:	**Course Outcome 1**	**Learning Objectives for Course Outcome 1**
	1. Upon successful completion of this course,	1.1 Define the terms mass, weight, force, pressure, energy and work.

the student will gain an Introduction to Statics and Equilibrium Reactions	1.2 Carry out units analysis in equations. 1.3 State Newtons three laws and explain their significance to the design of structures. 1.4 Determine how loads applied to structures are distributed to supporting members. 1.5 Construct free-body diagrams for particles and rigid bodies.	
Course Outcome 2	**Learning Objectives for Course Outcome 2**	
2. Upon successful completion of this course, the student will understand Reactions of Materials Under Load - Stress, Strain, And Deformation	2.1 Identify and define the various elements of a stress/strain diagram (elastic range, plastic range, proportional limit, elastic limit, yield point, ultimate strength, rupture strength, elongation). 2.2 Define and explain the difference between ductile and brittle materials. 2.3 Explain the concept of toughness for statically and dynamically loaded materials. 2.4 Explain the relationship between safety factor and allowable or working stress. 2.5 Differentiate tensile, compressive and shear stresses and to know which one to use in particular cases. 2.6 Explain Hooke`s law and Young`s modulus, how they relate and their importance to structures. 2.7 To explain the concept of stress concentration and when it should be taken into consideration. 2.8 Calculate allowance for thermal effects in structures.	
Course Outcome 3	**Learning Objectives for Course Outcome 3**	
3. Upon successful completion of this course, the student will be able to Define Centroids and Cross-Sectional Properties of Structural Members	3.1 Explain the difference between centroid and center of gravity. 3.2 Calculate the center of gravity for masses with compound shapes. 3.3 Explain the concept of moment of inertia and to calculate the moment of inertia for compound members. 3.4 Define the term radius of gyration. 3.5 Calculate a columns resistance to buckling under axial load.	
Course Outcome 4	**Learning Objectives for Course Outcome 4**	
4. Upon successful completion of this course, the student will be able to Determine Shear and Bending Moments in Beams	4.1 Construct load, shear and moment diagrams for beams with various support and loading configurations. 4.2 Determine the maximum shear and moment locations for beams with various support and loading configurations.	
Course Outcome 5	**Learning Objectives for Course Outcome 5**	
5. Upon successful completion of this course, the student will be able to Calculate Bending and Shear Stresses In Beams	5.1 Calculate the bending stresses, shear stresses and deflection in beams with various cross-sectional shapes and various support and loading configurations. 5.2 Describe methods to resist lateral buckling in beams.	
Course Outcome 6	**Learning Objectives for Course Outcome 6**	
6. Upon successful completion of this course, the student will demonstrate	6.1 Describe the various parameters that have to be evaluated to prevent failure in columns under axial and eccentric loading.	

	the ability to Describe and Calculate Column Analysis and Design	6.2 Describe methods to prevent buckling in columns. 6.3 To calculate the load carrying ability of columns with various shapes, support and loading configurations.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments and Quizzes	40%
Final Exam	30%
Mid Term	30%

Date: August 27, 2019

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.