Prepared: Sal Ienco Approved: Corey Meunier

Course Code: Title	MCH212: MECHANICS OF MATERIALS
Program Number: Name	4080: CIVIL ENG TECHNICIAN
Department:	CIVIL/CONSTRUCTION
Semester/Term:	18W
Course Description:	You are surrounded by a wide variety of structures such as buildings, bridges, and dams. These structures play such an important role in our lives that we cannot ignore them. As a technician, you will need to know this subject well enough to intelligently facilitate communication between designers and construction personnel. This Mechanics of Materials course explores mathematical expressions which have been developed to describe how various elements of structures work. But at the same time every effort is made to link the mathematical expression to structural function. To that end you are encouraged to visually appreciate various structures in your community while understanding the mathematical relationships found in structures. This course is a continuation of MCH100 and leads to CIV225.
Total Credits:	4
Hours/Week:	4
Total Hours:	60
Prerequisites:	MCH100
Substitutes:	ARC200, ARC235, MCH103, MCH220
This course is a pre-requisite for:	CIV225
Vocational Learning Outcomes (VLO's): **Please refer to program web page for a complete listing of program outcomes where applicable.**	#5. collaborate with the project team and communicate effectively with project stakeholders to support civil engineering projects. #6. collect, process and interpret technical data to produce written and graphical project-related documents. #7. use industry-specific electronic and digital technologies to support civil engineering projects. #8. participate in the design and modeling phase of civil engineering projects by applying engineering concepts, basic technical mathematics and principles of science to the review and

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	production of project plans. #11. apply teamwork, leadership and interpersonal skills when working individually or within multidisciplinary teams to complete civil engineering projects.
Essential Employability Skills (EES):	#1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. #2. Respond to written, spoken, or visual messages in a manner that ensures effective communication. #3. Execute mathematical operations accurately. #4. Apply a systematic approach to solve problems. #5. Use a variety of thinking skills to anticipate and solve problems. #8. Show respect for the diverse opinions, values, belief systems, and contributions of others. #9. Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. #10. Manage the use of time and other resources to complete projects. #11. Take responsibility for ones own actions, decisions, and consequences.
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.
Evaluation Process and Grading System:	

Evaluation Type	Evaluation Weight
Final Test	30%
Mid-Term Test	30%

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	Quizzes/Assignemtns/Laboratories | 40%
Books and Required Resources:	Statics and Strength of Materials by Barry Onouye Publisher: Pearson Edition: Fourth ISBN: 0-13-111837-4
Course Outcomes and Learning Objectives:	**Course Outcome 1.** Upon successful completion, the student will be able to: 1. Recall and apply basic statics principles including the equilibrium equation and the free body diagram to the study of strength of materials. **Learning Objectives 1.** 1.1 Define the terms mass, weight, force, pressure 1.2 Carry out units' analysis in equations. 1.3 State Newton's 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.** Upon successful completion, the student will be able to: 2. Solve technical problems based on internal changes occurring in structural members as a result of the application of a force that produces stress, strain and deformation. **Learning Objectives 2.** 2.1 Discover real life example of structural members that are under various load conditions 2.2 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, and elongation). 2.3 Define and explain the difference between ductile and brittle materials. 2.4 Explain the concept of toughness for statically and dynamically loaded materials. 2.5 Explain the relationship between safety factor and allowable or working stress. 2.6 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 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.

Upon successful completion, the student will be able to:

3. Determine the cross-sectional properties of structural members beams so that the critical bending, shear stresses and deflection are kept within allowable safe limits.

Learning Objectives 3.

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

Course Outcome 4.

Upon successful completion, the student will be able to:
4. Define and illustrate the relationship between load, shear forces and bending moments in beams.

Learning Objectives 4.

4.1 Construct load, shear and moment diagrams for beams with point
loads
4.2 Determine the maximum shear and moment locations for beams with various support and loading
configurations.
4.3 Construct load, shear and moment diagrams for beams with distributed loads
4.4 Construct load, shear and moment diagrams for beams with combination loads

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4.5 Construct load, shear and moment diagrams for overhanging beams
4.6 Construct load, shear and moment diagrams for cantilevered beams

Course Outcome 5.

Upon successful completion, the student will be able to:
5. Apply teamwork, leadership and interpersonal skills when working individually or within a team to complete the survey field camp projects.

Learning Objectives 5.

5.1 Take initiative while working with your team to complete in class assignments and laboratories
5.2 Assume accountability for self in managing the use of time and resources to meet established deadline
5.3 Work as an effective team player to complete in class assignments and laboratories while promoting a positive work environment
5.4 Use effective time-management and organizational techniques to prioritize project tasks and to accomplish goals set by the team
5.5 Use conflict resolution skills in the field including cooperation and compromise

Course Outcome 6.

Upon successful completion, the student will be able to:
6. Use industry-specific electronic technologies to support the calculations for typical strength of materials problems

Learning Objectives 6.

6.1 calculate and graph the results of stress strain activities using an Excel spreadsheet
6.2 calculate the centroid and moment of inertia of structural members using AutoCAD

Date:	Friday, September 1, 2017

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