North Central State College

MASTER SYLLABUS
2019-2020

A. Academic Division: Business, Industry and Technology

B. Discipline: Mechanical Engineering Technology

C. Course Number and Title: MECT 3050 Mechanical Design I

D. Course Coordinator: Daniel Wagner
Assistant Dean: Toni Johnson, PhD

Instructor Information:
- Name: Click here to enter text.
- Office Location: Click here to enter text.
- Office Hours: Click here to enter text.
- Phone Number: Click here to enter text.
- E-Mail Address Click here to enter text.

E. Credit Hours: 3

F. Prerequisites: MECT3010, MECT2440

G. Syllabus Effective Date: Fall, 2019

H. Textbook(s) Title:

Machine Elements in Mechanical Design
- Authors: Mott, Vavrek, Wang
- Copyright Year: 2017
- Edition: 6th Edition
- ISBN: 9780134441184

I. Workbook(s) and/or Lab Manual:

J. Course Description: This course introduces the student to the engineering design process. Analysis of stress, strain, deflection and fatigue in mechanical design will be examined. Design of beams, columns, springs and machine elements will also be discussed.

K. College-Wide Learning Outcomes:

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Communication – Written	
Communication – Speech	
Intercultural Knowledge and Competence	
Critical Thinking	
Information Literacy	
Quantitative Literacy	

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Determination of stresses and how to apply them to mechanical elements and systems.	Problem based quizzes and exams
2. Evaluate the design of machine elements to avoid fatigue failure.	Problem based quizzes and exams
3. Evaluate the design of machine elements to avoid failure due to stress concentrations.	Problem based quizzes and exams
4. Evaluate the relationship between mating machine elements.	Problem based quizzes and exams

ABET Outcomes:

- *Outcome e.* Manufacturing processes;
- *Outcome f.* Material science and selection;
- *Outcome g.* Solid mechanics (such as statics, dynamics, strength of materials, etc.);
- *Outcome h.* Mechanical systems design;
- *Outcome k.* Application of industry codes, specifications and standards.

M. Topical Timeline (Subject to Change):

- The nature of mechanical design
- Stress and deformation analysis
- Combined stresses and Mohr's circle
- Design for different types of loading
- Design and analysis of columns
- Belt drives and chains drives
- Kinematics of gears
- Spur gear design
- Helical, bevel, and worm gear design
- Design of gear trains

Week	Date	Topic	Chapter/section	Homework
1		Nature of Mechanical Design, Material Properties, Carbon/Alloy Steels	1.1-10, 2.1-5	
2		Heat Treatment, Ferrous and Non-Ferrous Materials, Plastics/Composites, Stresses Analysis (Axial, Shear, Torsional)	2.6-18, 3.1-12	
3		Stresses Analysis (Bending), Beam Deflection, Stress Concentration, Combined Stress, Stress Transformation	3.13-23, 4.1-3	
4		Mohr's Circle, Complex Loading	4.4-7	
5		**Review and Exam I**	**1 through 4**	
6		Failure, Endurance Limit, Cyclic Loading	5.1-11	
7		Sample Design Exercises, Statistical Approach, Finite Life	5.12-14	

8		Columns	6.1-12	
9		**Review and Exam II**	**5 and 6**	
10		Belt/Chain Drives, Wire Rope	7.1-7	
11		Kinematics of Gears	8.1-14	
12		Spur Gear Design	9.1-15	
13		Helical and Bevel Gears	10.1-13	
14		**Review and Exam III**	**7 through 10**	
15		Course review and final exam review	1 through 10	
16		**Final Exam**	**1 through 10**	

N. Course Assignments:

- Quizzes
- Exams

O. Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70-72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
00--59	F	0.00	Failure

P. Grading and Testing Guidelines:

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Q. Examination Policy:

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R. Class Attendance and Homework Make-Up Policy:

Click here to enter text.

S. Classroom Expectations:

Click here to enter text.

T. College Procedures/Policies:

Important information regarding College Procedures and Policies can be found on the syllabus supplement located at https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf

The information can also be found Choose an item.