



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 4050 Mechanical Design II
- 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: MECT2230, MECT3050
- 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 covers design and application of mechanical components and machine elements including shafts, gears, gear drives, belt drives, chain drives, fasteners, power screws, clutches, brakes and machine frames.
- 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. Demonstrate an ability to understand the functions and design requirements of several kinds of keys and flexible couplings and to recognize commercially available designs and apply them properly.	Problem based quizzes and exams.
2. Specify suitable seals for shafts and other types of machine elements and be able to describe several alternate methods of fastening machine elements to shafts.	Problem based quizzes and exams.
3. Develop a systematic approach to shaft design analysis, be able to perform calculations of the forces exerted on shafts by gears, belt sheaves, chain sprockets, and torque distribution.	Problem based quizzes and exams.
4. Apply the shaft design procedure to determine the required diameter of shafts at any section to resist the combination of torsional shear stress and bending stress.	Problem based quizzes and exams.
5. Identify the types of rolling bearings that are commercially available and analyze for selection as well as complete the basic design analysis required to ensure satisfactory operation.	Problem based quizzes and exams.
6. Demonstrate an ability to use appropriate tables and charts to determine and specify suitable sizes for power screws, and ball screw drives for a given application.	Problem based quizzes and exams.
7. Develop skills in designing and analyzing springs of the helical compression, helical tension, and torsional types.	Problem based quizzes and exams.
8. Analyze the performance of fasteners and select suitable types and sizes.	Problem based quizzes and exams.
9. Perform the design and analysis of plate-type, caliper disc, cone, drum shoe, and band, brakes, and clutches.	Problem based quizzes and exams.

ABET Outcomes:

- *Outcome a.* Application of principles of geometric dimensioning and tolerancing;
- *Outcome b.* Use of computer aided drafting and design software;
- *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 system design;
- *Outcome j.* Electrical circuits (ac and dc) and electronic controls;
- *Outcome k.* Application of industry codes, specifications and standards.

M. Topical Timeline (Subject to Change):

- Keys, Couplings, and Seals
- Shaft Design

- Rolling Contact Bearings
- Plain Surface Bearings
- Fasteners
- Motion Control: Clutches and Brakes
- Machine Frames, Bolted Connections, and Welded Joints
- Design details

N. Course Assignments:

- Quizzes
- Exams
- Projects

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:

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S. Classroom Expectations:

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T. College Procedures/Policies:

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

