New Jersey Institute of Technology
Department of Engineering Technology
MET 302 Analysis & Design of Machine Elements II

COURSE NUMBER	MET 302
COURSE NAME	Analysis & Design of Machine Elements II
COURSE STRUCTURE	(2-2-3) (lecture hr/wk - lab hr/wk – course credits)
COURSE COORDINATOR/INSTRUCTOR	Dr. J. Sodhi/ Dr. Sahidur Rahman
COURSE DESCRIPTION	A continuation of MET 301, including analysis and design of power screws, brakes, clutches, belts, chain drives, gears, gear trains, bearings, and other machine elements.
PREREQUISITE(S) COREQUISITE(S)	MET 301
REQUIRED, ELECTIVE OR SELECTED ELECTIVE	Required
REQUIRED TEXTBOOK	Shigley: Mechanical Engineering Design. McGraw Hill. (Open Access through NJIT Library) Jiang, Wei: Analysis and Design of Machine Elements. Wiley (Open Access through NJIT Library)
REFERENCE TEXTBOOKS	Spotts, Shoup & Hornberger: Design of Machine Elements, Prentice-Hall, 8th edition. ISBN 9780130489890 Beer, Johnston, DeWolf, and Mazurek Mechanics of Materials, Eighth Edition, McGraw-Hill, ISBN: 9781260113273
COURSE LEARNING OUTCOMES (CO)	By the end of the course students should be able to: 1. Design a helical spring for a given static load and deflection. 2. Analyze a helical spring subjected to a fluctuating load. 3. Examine the requirements and performance of a cone clutch at a given speed. 4. Examine the requirements and performance of a band brake under specified conditions. 5. Evaluate the load-carrying capacities of journal bearings. 6. Evaluate the requirements and performance of a ball bearing under both steady and variable loading conditions. 7. Evaluate the requirements and performance of a helical and spur gears under specified conditions. 8. Evaluate press fit requirements to ensure proper load transmission. 9. Experimentally evaluate the stress and strain of a shaft loaded in torsion and bending. 10. Experimentally evaluate the speed of rotating machinery components.

11. Apply written and graphical communication in engineering reports to accepted professional engineering standards.

CLASS TOPICS

Springs, Belts, Clutches, Brakes and Chains, Lubrication, Ball Bearings, Spur Gears, Helical, Bevel and Worm Gears, Shrink fit, Machine Elements Laboratories.

STUDENT OUTCOMES

The Course Outcomes support the achievement of the following MET Student Outcomes-

Student outcome (1) - an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline
Course Outcome – 1 - 8

Student Outcome (2) - an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
Course Outcome – 1, 3 - 8

Student outcome (3) - an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
Related CO – 11

Student outcome (4) - an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes;
Related CO – 9 & 10

Student outcome (5) - an ability to function effectively as a member as well as a leader on technical teams.
Related CO – 11

GRADING POLICY

Homework/Quizzes	15 %
Lab Reports	10 %
Tests (3)	30 %
Final Exam	30 %
Final Project	15 %

Note: Cannot pass course if you having failing grades on tests and final exam.
There are three tests during the semester. The lowest grade will be dropped. However, if you achieve an A for all three tests, you will not be excused from the final. There will be no makeup tests – if you miss one test, then that is the test you will drop.

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ACADEMIC INTEGRITY

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.

GENERATIVE AI

Student use of artificial intelligence (AI) is permitted in this course for certain assignments and activities. It is not permitted to be used in the assignments noted by the instructor, as doing so would undermine student learning and achievement of course learning outcomes. Additionally, if and when students use AI in this course, the AI must be cited as is shown within the NJIT Library AI citation page for AI. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

STUDENT BEHAVIOR

- No eating or drinking is allowed at the lectures, recitations, workshops, and laboratories.
- Cellular phones must be turned off during the class hours – if you are expecting an emergency call, leave it on vibrate.
- No headphones can be worn in class.
- Unless the professor allows the use during lecture, laptops should be closed during lecture.
- During laboratory, if you are finished earlier, you must show the professor your work before you leave class
- Class time should be participative. You should try to be part of a discussion

MODIFICATION TO COURSE

The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course outline.

PREPARED BY

Dr. Sahidur Rahman / Dr. J. Sodhi

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COURSE COORDINATED BY Dr. J. Sodhi

CLASS HOURS

Monday	6:00 PM – 7:55 PM	GITC 2315A
Monday	8:05 – 10 PM	ME 214

OFFICE HOURS:

In Person in FENS205 or Zoom
Monday: 4-5:30 PM, Tuesday 9 -11 AM and 2:30 – 5 PM
Wednesday, Thursday and Friday: 10 AM – 4 PM (by appointment only)

HOMEWORK - IMPORTANT

Homework is due the week following the date they are assigned.

GRADING LEGEND

GRADE	NUMERIC RANGE
A	90 to 100
B+	85 to 89
B	80 to 84
C+	75 to 79
C	70 to 74
D	60 to 69
F	0 to 59

NJIT ONLINE INFORMATION

The instructor will discuss these requirements on the first day of the course and/or post on their Learning Management System (LMS). Please become familiar

- Canvas: https://canvas.njit.edu/
- Zoom: https://njit-edu.zoom.us/
- Online Proctoring: https://ist.njit.edu/online-course-exam-proctoring

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COURSE OUTLINE

WEEK	DATE	TOPICS
1	9/2	Springs
2	9/9	Screws
3	9/16	Belts, Clutches, Brakes, and Chains
4	9/23	Belts, Clutches, Brakes, and Chains (Cont.) **Test 1**
5	9/30	Welded Connections
6	10/7	Riveted Connections
7	10/14	Lubrication **Test 2**
8	10/21	Lubrication (Cont.) Lab 1 – Oscilloscope
9	10/28	Ball and Roller Bearings
10	11/4	Spur Gears
11	11/11	Spur Gears (Cont.) Helical, Bevel and Worm Gears
12	11/18	**Test 3** Lab 2 – Speed Measurements
13	12/2 (No class on 11/25)	Impact Stress Curved Beams
14	12/9	Shrink & Press Fits Gaskets & Seals
15	TBD	**FINAL EXAM**