

ME 454/654 - Design of Machine Elements

1998 Catalog Data: **ME 454/654: Design of Machine Elements. 3(3,0).** Design of common machine elements including clutches, brakes, bearings, springs, and gears. Optimization techniques and numerical methods are employed as appropriate. *Preq:* ME 306 or consent of instructor.

Textbook: R. C. Juvinall and K. M. Marshek, Fundamentals of Machine Component Design, 2nd Ed., Wiley, 1991.

Reference: None

Coordinator: M. W. Dixon, Professor of Mechanical Engineering

Objectives¹:

1. To introduce students to the design and theory of common machine elements and to give students experience in solving design problems involving machine elements. [B,D,H,I]
2. To require the student to prepare professional quality solutions and presentations to effectively communicate the results of analysis and design. [F,I]

Prerequisites by Topic:

1. Fundamentals of Machine Design. (ME 306)

Topical Outline:

1. Design of Bolted and Welded Joints. (9 hours)
2. Design of Springs. (6 hours)
3. Selection of Bearings. (8 hours)
4. Design and Selection of Gears and Gear Trains. (8 hours)
5. Design of Clutches and Brakes. (4 hours)
6. Shafts and Associated Parts. (4 hours)
7. Tests. (4 hours)

Projects and Computer Usage:

1. Design problems are assigned throughout the semester. Some are open-ended problems where the student must design or select a component for a particular application. Computer techniques may be used as appropriate.

Evaluation Methods:

1. Homework and Projects = 15%
2. Design Project = 20%
3. Tests = 45%
4. Final Exam = 20%
5. Laboratory Reports = 0%

¹ Letters in brackets refer to the ME Program Educational Objectives.

Student Learning Outcomes²:

Course Objective 1

1. Students will be able to design machine elements and systems of machine elements to successfully satisfy the function of the machine. The elements addressed are listed under Topics above. [1,2,3]

Course Objective 2

1. Students will be able use a written format to communicate engineering designs in a professional manner. [1]

Engineering Topics:

Engineering Science: 1 credit
Engineering Design: 2 credits

Prepared by: M. W. Dixon

Date: August 20, 1998

² Numbers in brackets refer to evaluation methods used to assess student performance.