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Nanchang University
CE362: Machine Design and Practice
(Last Updated in Jan. 2025)

Credit: 4

Contact Hours

This course is composed of 24 lecture sessions, 3 tutorial sessions and 9 office contact hours. Each lecture session takes 2 contact hours in length, each tutorial session takes 3 contact hours in length, There will be a Q-A review session (3 contact hours) and Final Exam (3 contact hours) at the end of this term. This course has 72 contact hours in total.

Course Description

This course will introduce the theoretical and practical knowledge of machine design. To study this course, student must be equipped with a background of Solid Mechanics and Engineering Graphics. The topics mainly cover background of solid mechanics, failure theories, safty factors and reliability, impact, fatigue, threaded fasteners, springs, bearings, and gear. After learning the course, students will be able to:

- Understand the theories and develop their thinking in a contructive perspective to benefit the society in ecological way, and promote efficient and safe productivity;
- Master the concept of failure theory, safty factors and reliability, impact, fatigue, gear, etc. and apply them to solve practical mechanical engineering problems and complete the design of a project;
- Integrate all knowledge and the usage of software tools in the optimization and presentation of the project design.

Note: This Syllabus is subject to change based on the needs of the class.

Required Textbook

Textbook: *Fundamentals of Machine Component Design* by Robert C. Juvinall, Kurt M. Marshek (2020, Wiley).

Grading

•Assignments	5%
•Project	30%
•Midterm Exam	20%
•Final Exam	45%

A+96-100	A 90-95	A-85-89
B+82-84	B 78-81	B-75-77
C+71-74	C 66-70	C-62-65
D 60-61	F < 60	

Course Schedule

The course has 24 class sessions in total. All sessions are 2 contact hours in length. At the end of this term, there will be a Q-A review session(3 contact hours) and Final Exam (3 contact hours).
Note: the course outline and required readings are subject to change.

Class 1:
Course Overview, Introduction to the Project Plan and Software (Fusion 360)

Class 2:
Load Analysis

Class 3:
Materials

Class 4:
Stress Analysis

Class 5:
Strain and Deformation

Class 6:
Failure Theories, Safty Factors and Reliability I

Class 7:
Failure Theories, Safty Factors and Reliability II

Class 8:
Failure Theories, Safty Factors and Reliability III

Class 9:
Project Preparation Discussion

Class 10:
Impact I

Class 11:
Impact II

Class 12:
Review for Midterm

Class 13:
Midterm

Class 14:
Fatigue I

Class 15:
Fatigue II

Class 16:
Project Development Discussion

Class 17:
Threaded Fasteners I

Class 18:
Threaded Fasteners II

Class 19:
Springs

Class 20:
Rolling-Element Bearings

Class 21:
Spur Gears I

Class 22:
Spur Gears II

Class 23:
Detailed Design and Integration Discussion

Class 24:
Final Exam

Project Schedule

1. Project Preparation (Class 6-7):
    1) Operation of Fusion 360
    2) Reviewing Case Studies
2. Project Launch and Core Knowledge Bridging (Class 8-10):
    1) Define Design Requirements
    2) Preliminary Component Selection
    3) Develop Basic Assembly Framework
3. Detailed Design and Integration (Class 12-24):
    1) Optimize the Design
    2) Complete All Component Selection Calculations and Graphs
    3) Submitting the Final Project Report

Attending Policy

Regular and prompt attendance is required. Under ordinary circumstances, you may miss two times without penalty. Each absence over this number will lower your course grade by a third of a letter and missing more than five classes may lead to a failing grade in the course. Arriving late and/or leaving before the end of the class period are equivalent to absences.

Policy on "Late Withdrawals"

In accordance with university policy, appeals for late withdrawal will be approved ONLY in case of medical emergency and similar crises.

Academic Honesty

Nanchang University expects all students to do their own work. Instructors will fail assignments that show evidence of plagiarism or other forms of cheating, and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation, a student reported twice is suspended or expelled.

General Expectations:

Students are expected to:

— Attend all classes and be responsible for all materials covered in class and otherwise assigned,

— Complete the day's required reading and assignments before class,

— Review the previous day's notes before class and make notes about questions you have about the previous class or the day's reading,

— Participate in class discussions and complete required written work on time,

— Refrain from texting, phoning or engaging in computer activities unrelated to class during the class period,

— While class participation is welcome, even required, you are expected to refrain from private conversations during the class period.

Special Needs or Assistance

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.