**Course Syllabus and Policies**

**SE 310, Design of Structures and Mechanisms**

**Fall Semester 2024**

Meeting Times: M,W,F 11-11.50

Classroom: 114 Transportation

A zoom link will be available for the class as well (please see end of document)

**Instructor:** Professor Girish Krishnan

**E-mail:** gkrishna@illinois.edu

**Office Hours (TA):** TBD

**Teaching Assistant:** Emre Eraslan (emree2@illinois.edu)

**Course Resource: Canvas**

**SPECIAL INSTRUCTIONS:** SE 310 lecture delivery will be in person this semester. However, we have a standby zoom link for certain days. We meet Mondays, Wednesdays and Fridays of every week. The course will be organized as ‘pages’ in the canvas site. Each week’s content will be posted as a page. Homework will be approximately every two weeks.

**Course Objectives**: To learn the principles of analytical modeling, whereby real-life structural and mechanical systems are represented schematically and described analytically for the purpose of their design, and to apply those principles to the design of structural and mechanical systems and components.

Most engineering artifacts are either structures that bear loads or mechanisms that move. The concepts covered in this course are the underpinnings of how buildings, trusses, automobiles, robots, machines and mechatronic devices are designed.

After completing the course, the student will be able to:

1. determine if a structure is statically determinate or indeterminate
2. analyze and design trusses, beams and frames
3. analyze statically indeterminate structures by the stiffness matrix method
4. **Learn how to computationally implement truss and beam** design using Python
5. Determine the mobility in mechanisms
6. Computationally implement velocity and acceleration analysis for mechanisms
7. design linkage-based mechanisms for a given kinematic application

**Required Text**:

1. Structural Analysis (5th, 6th, or 7th Edition), Russell C. Hibbeler, Prentice Hall.

**Strongly Recommended Text**:

2. Machines and Mechanisms (Any Edition), David H. Myszka, Prentice Hall.

**Prerequisites**: CS 101 or CS 124, TAM 212, and TAM 251.

**Grading:**

The final grade is determined approximately as follows:

Homework .………………………………………….….25%

Computer project I ………………………………………20%

Computer project II ………………………………………10%

Exam 1 …...…………………………………....15%

Exam 2 …...…………………………………....15%

Final examination ……………………………………….15%

**Homework**:At the end of each class, one to two homework problems will be posted on compass. While it is in your best interest to solve them on the same day, the homework will be due during the due date posted. No late homework is accepted. (Special consideration may be given under emergent health related issues.) Homework should be completed neatly and legibly on the front side (only) of a white paper and scanned neatly and uploaded to compass. Your name, the date, and the assignment number should appear in the upper right corner of the front page. For each problem solved, present the problem statement with any associated drawings, a summary of assumptions, a solution presented in a logical and organized sequence, and the answers(s) clearly identified. Neatness and clarity of presentation are taken into account in grading homework problems. Sketches or free body diagrams must be presented when appropriate. Copying solutions from other students, solution manuals, or homework files is unauthorized and may constitute grounds for academic disciplinary procedures.

**Computer Project I**: One major computer project using the finite element code, Python or ANSYS, is planned. A detailed assignment will be made later. Smaller assignments involving computers may be given as part of the weekly homework.

**Project II:** The second project involves kinematic analysis and design of a linkage-based mechanism using either customized software written in MATLAB or Python.

**Examinations** will be conducted online using compass. The exams will be comprehensive. Due to the classroom capacity and the large enrollment, the exams will be held in the evening in a larger room. Exams missed without an accepted written excuse are scored as a zero. Please put these dates in your calendar immediately, and notify Professor Krishnan the first week of class via email if there is a conflict.

Exam 1: **September 23, 2024, 7-9 pm, Location: TBD**

Exam 2: **November 4, 2024, 7-9 pm, Location: online**

Final Exam: During Finals Week, 3 hours, Room TBA

On-time attendance at all class meetings is expected. Please be considerate of your class colleagues and avoid coming in late. Notes from missed lectures should be obtained from a colleague.

**Grading** follows the +/- grade system. Borderline cases are evaluated individually, and course grades are raised solely at the instructor's discretion, using class participation, enthusiasm, and other subjective factors in that judgment.

**Other**: Individual projects are to be the original and independent work of the student. Active participation in class is expected in discussions and in cooperative learning groups that may take place in class. If you have not completed and passed all the prerequisite courses, you should see the Associate Head of the Department of ISE (104 Transportation Building) to drop this course.

Zoom meeting Link

Topic: Fall 2024-SE 310-Dsgn of Structures & Mechanism-Section A

Time: This is a recurring meeting Meet anytime

Join Zoom Meeting

<https://illinois.zoom.us/j/88504730144?pwd=QWdHV0I1bDVlb3dDMlVyMmxoLzU3UT09>

Meeting ID: 885 0473 0144

Password: 449742