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MEC 637 Special Topics in Precision Engineering

Spring 2024

Instructor: Prof. Yang, Min Yang

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Lectures: TuTh 12:30-1:50 pm

Office Hours: TuTh 2:00-4:00 pm (or by appointment)

Course Overview:

This course offers an in-depth exploration into precision engineering, covering the systematic knowledge and principles essential for designing, fabricating, and measuring high-precision machinery. Emphasis is placed on understanding the theoretical aspects of design and manufacturing specific to high-precision machines. The curriculum includes critical evaluation of scholarly articles and technical papers to enhance students' comprehension and application in real-world scenarios.

Assessment Criteria:

- Homework Assignments: 30%
- Term Project: 30%
- Examinations: 30%
- Class Participation and Attendance: 10%

Core Topics:

- Evaluation Methods for High Precision
- Design Theories for High Precision Applications
- Abbe's Principle in Precision Engineering
- Principle of Compliance,
- Principle of Kinematic Design
- Principle of Error Correction
- Advanced Manufacturing Theories for High Precision
- Principle of Upper Limits

- Principle of Machining Units
- Principle of Copying
- Principle of Evolution
- Principle of Anisotropy
- Future of Precision Engineering

Learning Outcomes: Upon successful completion of this course, students will be able to:

1. Apply comprehensive knowledge in the design, manufacturing, and measurement of high precision machines to solve engineering problems.
2. Engage professionally in various aspects of precision engineering, including the design and realization of systems that fulfill specific requirements.
3. Identify, articulate, and address complex precision engineering challenges.
4. Utilize contemporary engineering techniques, skills, and tools essential for professional practice in precision engineering.

Policies:

- Homework assignments will be posted on the Brightspace.
- The time and details about exams will be announced in the class (and also posted on the Brightspace).
- It is the responsibility of students to make sure that they can access the Brightspace and they have a working email registered with it. The Brightspace should be checked frequently for new materials.
- Examination will be closed book and note.