

MFG 565 Machine Tool Engineering

Fall 2020-2021

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Course Description

Detailed analysis of machine tool components, configurations and peripherals will be covered. Basics of CNC machine operation, velocity and position control, comparative analysis of different drives, spindles, axis configurations and tool holding systems; accuracy of machine tools; static and thermal deformations; machine tool selection and testing; dynamic rigidity of machine tools and modal analysis; safety and maintenance.

Course Outline

- Overview of machine tools, types, components etc.
- Design and analysis of machine tool components
- Drive systems for machine tools and CNC architecture.
- Velocity and position control
- Machine tool accuracy and testing
- Static, dynamic and thermal deformations
- Special applications

References

1. Altintas, Y. Manufacturing Automation, Cambridge University Press, 2000.
2. Tlusty, J. Manufacturing Processes and Equipment, Prentice Hall, 2000.

Grading

Assignments	30 %
Term Project	30 %
Participation	10 %
Reading assignments	15 %
Labs	15 %

Assignments: You will be given several assignments throughout the term. Please complete them in allowed due time. You will need to use software such as Matlab to do some of them. We will offer support for Matlab if you do not have much experience.

Term project: The details of the project will be described in another document and will be uploaded in SuCourse. The projects will be executed as groups and the objective will be design of a machine tool.

Labs: There will not be physical labs in this term due to COVID-19. However, the topics related to the labs will be covered online through live or video sessions. The detailed expectations for each lab report will be described.

Reading Assignments: You are asked to write a short summary (less than a page) of the Reading Assignments uploaded in SuCourse. The summary should be composed of your own words, i.e. not to be directly taken from the document.

Participation: Attendance to the lecture and lab hours are very important. You should also participate the discussions during the lecture and lab hours.