

MFG 565 Machine Tool Engineering

Fall 2022

Instructor: E. Budak (FENS 1059/ Tel: 9519/ebudak@sabanciuniv.edu)

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
- Feed drive systems for machine tools and CNC architecture
- Velocity and position control
- Spindles: Components, requirements for various applications, design and selection, analysis, simulation and testing etc.
- Machine tool accuracy and testing
- Dynamic rigidity: Modeling 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 %
Reading assignments	20 %
Lab Work	20 %

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 may offer support for Matlab if you do not experience with this software.

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 be several lab sessions during the term. The detailed expectations for each lab and the 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.