

Machining process

Syllabus Number

1F203

Basic Major Subjects

Elective Requisites 2
credit

ONO, Takenori

1. Course Description

Main topics are as follows:

- Definition and significance of conventional machining processes.
 - Classification of the conventional machining such as casting, forging, molding, cutting, abrasive process, energy beam process, etc.
 - Principle of the conventional machining processes.
 - Machine tools and their elements for conventional machining processes.
 - Contemporary manufacturing systems and its environmental issues.
 - Principle of the measurement systems for machining processes.
 - Recent topics about machining processes.
- etc.

It is required that students have knowledge about typical material properties and fundamentals of the mechanics of materials, before lesson starts.

2. Course Objectives

An introduction of the principle of the typical machining processes for mechanical products such as, casting, forging, molding, cutting, abrasive process, energy beam process, etc. Topics include machine tool, measurement systems, contemporary factories and their environmental issues and recent progresses of this field.

3. Grading Policy

Final grade will be calculated according to following, presentation of the group discussion (50%) and final examination (50%). To pass, students must earn at least 60 points out of 100.

4. Textbook and Reference

Textbook

材料加工プロセス (Machining process in Japanese), First volume

K. YAMAGUCHI, K. OKIMOTO ,

Kyoritsu shuppan.

Reference

Other references will be introduced in the class.

5. Requirements(Assignments)

English information will be announced on LMS (*internal use).

And the detail will be introduced in the class.

6. Note

This course will be taught in Japanese.

7. Schedule

- [1] Classification of the conventional machining
- [2] Casting #1: its principle and characteristics
- [3] Casting #2: its structure and defects
- [4] Plastic working #1: its principle and classification
- [5] Plastic working #1: its practical applications, forging, bending, shearing and tube forming
- [6] Molding: its principle and newly applications
- [7] Cutting: its principle, machine tools, and newly applications
- [8] Abrasive process: grinding, polishing, and newly their applications
- [9] Energy beam processes: electro-discharging process, laser process, electron beam process, and ion beam processes include the Focused Ion Beam
- [10] Micro machining: its principle and problems include the lithography, epitaxy and plasma processes
- [11] Joining: Mechanical joints, adhesive glues
- [12] Welding: its principle and applications, include solid state welding (Ex. FSW) and soldering.
- [13] Manufacturing systems
- [14] Measurement systems
- [15] Summarize, Final test