Advanced Production Technology

2 units (selection)

Tohru Ishida · Professor / Institute of Technology and Science, Yoshihiro Tada · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduce electrical discharge machining and plasticity theory for powder processings that can be used for advanced manufacturing and novel material fabrication.

Outline〉 In the former half of the class, the principles and fundamentals of electrical discharge machining and related machine tools are discussed. In the latter half of the class, powder forming processing and plasticity theories for compressive metals (porous metals) are discussed.

Style〉 Lecture

Keyword〉 ***electrical discharge machining, electrical discharge machine, powder metallurgy, plasticity theory***

Requirement〉 Students are required to have a good understanding on fundamentals of machining and forming technologies, machine tools, physics, chemistry, and mathmatics.

Goal〉

1. To understand non-traditional machining technologies based on electrical discharge machining and related machine tools.
2. To undrstand powder forming processings and plasticity theory for compressive metals.

Schedule〉

1. Fundamentals of electrical discharge machining and its machining characteristics 1
2. Fundamentals of electrical discharge machining and its machining characteristics 2
3. Electrical discharge machine 1
4. Electrical discharge machine 2
5. Micromachining and surface treatment based on electrical discharge machining
6. Electrical discharge machining for less- and non-conductive materials
7. Electrical discharge machining of holes with curved axis and holes with changing cross sections
8. Exercise
9. Introduction to powder forming processings
10. Consolidation characteristics of powder and forming charactreistics of sintered preform
11. Yield criterion of porous metal
12. Plasticity theory for porous metal
13. Consolidation criterion of powder
14. Variational principle for porous metal
15. Upper bound theorem for porous metal
16. Examination

Evaluation Criteria〉 Assignments count 70%, exercises and examinations count 30%.

Textbook〉 Printed synopsises are used.

Reference〉

- ◇ For the first half: To be introduced in the class
- ◇ For the latter half: Advances in Powder Forming Processes and Related Technologies, Corona Publ.Co.,ISBN4-339-04367-2

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216727

Student〉 Able to be taken by only specified class(es)

Contact〉

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Note〉 Students are required preparation (2 hours) and review (2 hours) for every two hours class work.