

Synthetic Mechanical Engineering 1

Syllabus Number

1J303

Special Subjects

Elective 2 credit

TANUMA, Tadashi

1. Course Description

Students will study recent accomplishments, issues and design technology in mechanical engineering. Students will solve some typical design problems that mechanical engineers typically have to solve in actual daily operations. Students should find the guidance and data for solving the design problems in the textbook to present their own grounds to solve the problems. Furthermore, students will solve equations which they have introduced by themselves using their calculators, and will double-check their results using alternative solutions just like in the actual design processes. Through this series of lectures, students will acquire abilities to find, to analyze and to solve problems and technical communication skills. These technical abilities and skills are essential for students who wish to become expert engineers or researchers in this field. Students will be able to acquire the knowledge, skills, abilities and attitudes described in the diploma policy DP2 and DP3. Students will also study with an actual specific design project proactively using Project-based learning methodology (PBL).

2. Course Objectives

The goal of this course is to acquire the applicable skills necessary for you as a mechanical engineer in years to come. You will learn how to solve technical problems in research, development, design, manufacturing, operation, maintenance and other technical jobs of productions in mechanical engineering fields, using dynamics, mathematics and all mechanical engineering related sciences. At the same time, students will understand how mechanical engineering answers to the engineering demands on site of productions through actual examples. Students will also acquire the basic design skills they will need in their future jobs.

3. Grading Policy

Exercises will be graded and sample answers will be presented.

Grade points are evaluated using equally weighted exercise total point and final exam point.

4. Textbook and Reference

Textbook

Japan Society of Mechanical Engineers Practical handbook of Mechanical Engineering 7th edition
ISBN978-4-88898-209-2 C3053

Japan Society of Mechanical Engineers

5. Requirements(Assignments)

Students are preparing each lecture in advance and need to review each lecture and exercise. Every preparation needs at least one hour and every review needs at least one hour.

Students need to bring own text book and calculator for each exercise and final exam.

6. Note

Students need to use their own calculator for exercises of every class and final exam.

Students can see the text book and own handwritten note books during each exercise and final exam.

7. Schedule

- [1] The goal of Engineering, Mechanical Engineering and Design
- [2] Minimum requirement Mathematics, Mechanics and Units for Mechanical Engineering
- [3] Lecture and exercise of strength of material for steam turbine design
- [4] Lecture and exercise of fluid dynamics and hydro turbine design
- [5] Lecture and exercise of vibration mechanics and generator rotor design
- [6] Introduction of design methodology
- [7] Applications of design methodology
- [8] Lecture and exercise of Thermodynamics and aero and automotive engine designs
- [9] Lecture and exercise of aerodynamic designs for airplanes and automobiles
- [10] Introduction of design project methodology and management
- [11] Exercise of design project methodology and management
- [12] Aerodynamic similarity rules and model tests for ship design
- [13] Lecture and exercise of home electric appliances: vacuum cleaner design
- [14] Exercise result evaluations and an overview of design methodology
- [15] Final exam and review