Appended Form 1

Specifications for Major Program

Name of School (Program)〔School of Engineering Cluster 1(Mechanical Systems, Transportation, Material and Energy)〕

Program name (Japanese)	材料加工プログラム
(English)	Program of Material Processing

1.Academic degree to be Acquired :

2.Overview

The Program of Material Processing in Cluster 1 helps students acquire basic knowledge as mechanical engineers through the learning of basic mechanical subjects, drafting and design, and machine shop training at the Phoenix Workshop. Also, this program offers such materials-related specialized subjects as machine materials and materials science; specialized subjects related to the deformation and destruction of materials, such as material strength and elastic-plastic engineering; and specialized subjects that deal with the technology of forming processes, such as forming processes and machine processes. The program provides students with highly specialized education in the design, development, and use of functional materials, and in the principles of production and processing. Through such education, this program aims at nurturing engineers and researchers who, having a broader perspective on human-machine relations, energy, and environmental issues, are able to assume cutting-edge design and development roles in production engineering. In order for students to develop their perspectives in other related fields, while also gaining in-depth expertise, the program will be run not only by specialists from the closely-related Materials and Processing Program, but also by specialists from the other three programs in Cluster 1, as well as by highly-skilled technical personnel from the Phoenix Workshop.

Students are assigned to this program in the second semester of the second year. Then, in the first semester of the fourth year, students are assigned to their respective research laboratories, choose their research topics, and write up their graduation theses. Around sixty percent of graduates from this program will advance to graduate school. Graduates are employed in the general machinery and automotive fields, as well as in electronics, information & communications, heavy industry, the chemical industry, and a broad range of other industries. Centering on manufacturers in the fields of heavy industry, transportation equipment, machinery, and materials, they work actively in the fields of R&D, design, production engineering, and engineering marketing.

The Program of Material Processing offers not only machine-related basic education, but also specialized education concerning the design and development of new functional materials and utilization technology, as well as the principles of production and processing, and their the application.
To ensure that students are able to achieve the goals of the program, the program develops and puts into practice a curriculum based on the following policy:
・In the first year, the students take Liberal Arts Education subjects such as Peace Science Courses, Basic Courses in University Education, common subjects, and Foundation Courses, as well as specialized basic subjects and specialized practical education, such as machine shop training.
・In the first semester of the second year, specialized basic subjects suc Ⅰ and Fluid Dynamics Ⅰ become major subjects. In the second semester of the second year, the students are assigned to this program. As a result, specialized subjects in accordance with the program become major subjects to be taken.
・In the third year, specialized subjects tailored to the program continue to become major subjects to be taken.
・In the fourth year, the students are assigned to their respective research laboratories, choose their research topics, and write their graduation theses.

5. Program Timing/Acceptance Conditions

the Second semester of the second year

By the first semester of the second year, students must have acquired the Liberal Arts Education subjects and specialized basic subjects that are commonly specified in Cluster 1. Acceptance conditions for the program are not particularly specified.

6.Qualifications to be Acquired

Type-1 High School Teaching License (Industry)

(Students must acquire the required number of credits for the Type-1 High School Teaching License (Industry), in addition to the required number of credits for this program.)

7. Class subjects and course content

* For class subjects, see the Course List table on the attached sheet.
* For course content, see the syllabus for each academic year.

8. Academic Achievements

At the end of each semester, the evaluation criteria are applied to each academic achievement evaluation item so that the level of attainment is

* For the relationship between evaluation items and evaluation criteria, see the attached Sheet 2 .	Good	1.00～1.99

* For the relationship between evaluation items and class subjects, see the attached Sheet 3.
* For the curriculum map, see the attached Sheet 4.

9. Graduation Thesis (Graduation Research) (Positioning, When and how it is assigned, etc.)

The graduation thesis is positioned as one of the major subjects to achieve the following learning/educational goals:

(E) Developing communication skills and the ability to globally collect and dispatch information.

When it is assigned: At the start of the fourth year (only to those who meet the conditions for embarking on a graduation thesis)
Conditions for embarking on a graduation thesis
(1) Students must gain 43 credits or more out of 46 credits, the required number for graduation in Liberal Arts Education subjects.
(2)Students must gain 10 credits or more in the first group of specialized basic subjects
(3) Students must gain all of the required credits in Machine Design and Drawing, CAD, Mechanical Engineering Design and Production, Machine Shop Training, Experiments in Mechanical Engineering Ⅰ, and Experiments in Mechanical Engineering Ⅱ.
(4) Students must gain 18 credits or more out of 22 credits, the required number in the second group of specialized basic subjects.
(5) Students must gain a total of 68 units or more in specialized basic subjects and specialized subjects.

The research details of each laboratory to which the students can be assigned are explained by giving out handouts at a briefing held in February, in the second semester of the third year. After the number of students acceptable to each laboratory is given at the start of the fourth year, students who can begin their graduation theses are assigned as requested. In the case that the number of students exceeds the acceptable limit for a laboratory, adjustments may be made.

10. Responsibility-taking System
(1) PDCA Responsibility-
The cluster leader and program leader are responsible for executing this program. Faculty committee members responsible for this program make plans, while self-check/evaluation committee members responsible for this program make evaluations. The cluster and program teachers committee scrutinize the plans and evaluations from time to time for further improvement. When major issues arise, a working group may be established at the discretion of cluster leader and program leader.
(2) Program assessment

・Whether or not each class subject is properly allocated in light of the goals of the program, and whether course content is appropriate
・Whether or not, on average, students taking the course have achieved or exceeded the goals
・Whether or not the system runs in proper cycles that enable the continuous improvement of the program

・Conducting self-assessment for each subject based on class improvement questionnaires from students who have taken course, and based on performance rating results
・Conducting questionnaires (obtained at graduation) in suitable cycles, to evaluate the validity of the goals

questionnaires obtained from students, subject teachers draw up class improvement plans that reflect the questionnaire results.

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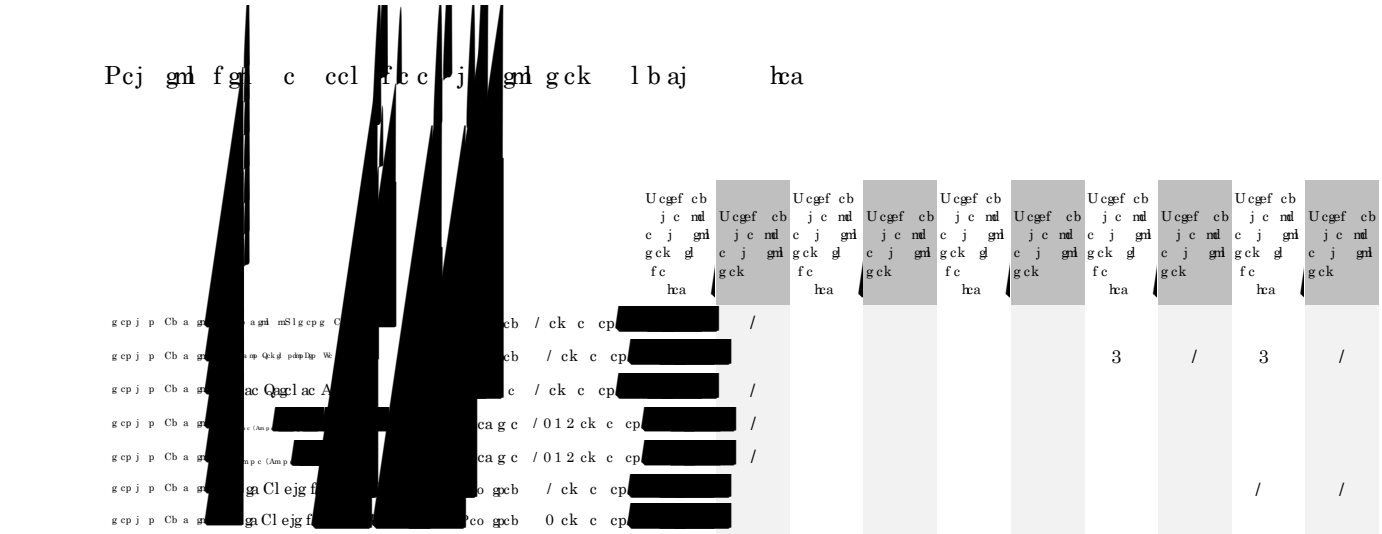

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Curriculum Map of Materials Processing

Sheet

Academic achievements	1st grade		2nd grade		3rd grade		4th grade	
Evaluation Items	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Knowledge and Understanding To develop the ability to work positively and independently on the development of	Introduction to University Education Peace Science Courses Area Courses Health and Sports Courses Exercise in Information Literacy Elements of Information Literacy CalculusI Linear AlgebraI Seminar in Basic Mathematics I General Mechanics I	Area Courses Health and Sports Courses CalculusII Linear AlgebraII Seminar in Basic Mathematics II General Mechanics II Experimental Methods and Laboratory Work in Physics I ( ) Experimental Methods and Laboratory Work in Chemistry I ( )	Area Courses Basic Electromagnetism General Chemistry Basic Engineering Computer Programming Applied Mathematics II Probability and Statistics Mechanics of Material I Thermodynamics I Fluid Dynamics I Control Engineering I An Introduction to Engineering Materials Fundamentals of Materials Processing	Area Courses Applied Mathematics III Engineering Mathematics C Dynamics of Vibrations I Materials Science Elementary Electromagnetism Introduction to Quantum Physics Fluid Dynamics II Thermodynamics II Heat Transfer I Data Processing and Numerical Analysis Mechanics of Materials II Mechanism and Kinematics Control Engineering II Instrumentation Engineering Machine Elements Design I Systems Engineering Transportation	Reliability Engineering Computer Programming Engineering Mathematics A Mechanical Materials I Fusion and Solidification Processings I Machining Introduction to chemical physics Heat Transfer II Combustion Engineering Fundamentals Plasma Engineering Theory of Elasticity and Plasticity Dynamics of Vibrations II Electrical and Electronic Engineering Mechanical System Control Manufacturing System Machine Elements Design II Reliability Engineering Remote sensing	Internship Synthesis of Applied Mathematics Mechanical Materials II Fracture Mechanics Plastic Working and Powder Metallurgy II Statistical and Thermal Physics Internal Combustion Engines Computational Solid Mechanics Mechatronics Optical Measurement Techniques Data Structure and Algorithm Machine Design		
Comprehensive Abilities Cultivating abilities of communication and of internationally collecting information and releasing it	Introductory Seminar for First-Year Students Basic English UsageI CommunicationI Communication I Basic language I Basic language II	Introductory Seminar for First-Year Students Basic English UsageII Communication II Communication II	Technical English		Experiments in Mechanical Engineering I	Experiments in Mechanical Engineering II Internship	Graduation Thesis	Graduation Thesis
	Introductory Seminar for First-Year Students	Machine Shop Training (a)	Machine Shop Training (b) Computer Aided Design	Systems Engineering	Experiments in Mechanical Engineering I	Experiments in Mechanical Engineering II Mechanical Engineering Design and Production Internship	Graduation Thesis	Graduation Thesis

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Common subjects	Foundation Courses	Basic Specialized Subjects The first group	Basic Specialized Subjects The second group	Specialized Subjects
Required subject	Compulsory elective subject	Free elective subject		