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)	
(English)	Program of Mechanical Systems Engineering
1. Academic Degree to be Acquired	Bachelor’s degree in Engineering

2. Overview

(1)

system and the principles of the design and processing of mechanical systems based on new concepts, computer-aided design (CAE and CAD), measurement and control technology, mechatronics technology, the principles of the design and production of new mechanical systems through intelligent numerical simulation and information processing, as well as basic fields such as the mechanics of materials, the dynamics of vibrations, system controls, and other fields.

The ability to assume roles in the design and development of cutting-edge production technology, while having a broader perspective about human-machine relations and environmental issues.

4. Curriculum Policy (Policy for Preparing & Implementing Curriculum)

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:

. The Program offers not only basic mechanical education but also specialized education in the structure and function of mechanical systems and the principles of the design and processing of mechanical systems based on new concepts, computer-aided design (CAE and CAD), measurement and control technology, mechatronics technology, and the principles of the design and production of new mechanical systems through intelligent numerical simulation and information processing.

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, the students take the specialized basic subjects that are important, together with subjects common to Cluster 1 such as “Mechanics of Materials Ⅰ” and “Fluid Dynamics Ⅰ”. Then, from the second semester, the students take specialized subjects, such as highly professional subjects related to advanced technology that reflect the characteristics of this program, and subjects related to integrated systems technology.

In the third year, specialized subjects become major subjects, and the students take subjects required for this program. The program tries, as far as possible, not to allocate multiple specialized subjects to the same time-slot, allowing students to take specialized subjects provided by other programs in Cluster 1 according to their personal interests.

In the fourth year, the students are assigned to their respective research laboratories, choose their research topics, and write their graduation theses.

In the curriculum described above, teaching and learning will be implemented by utilizing active learning and online classes, depending on the delivery methods of the program, such as lectures and seminars.

In addition to strict grading using the standards clearly outlined in the syllabus, learning outcomes are evaluated based on the degree to which the goals set by the educational program are achieved.

5. Program Timing/Acceptance Conditions

○ When to start the program

The English-based Bachelor’s Degree programs begin in the first semester of the first year. Enrollment in Program of Mechanical Systems Engineering occurs in the second semester of the second year.

○Additional Requirements

To determine acceptance into the English-based Bachelor’s Degree program, all applicants are required to have an individual consultation with the faculty committee members.

○ Credit Requirements

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.

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 fiscal year.
* All class subjects are taught in Japanese. Course materials will be written in both Japanese and English or only English.

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 clearly demonstrated. Students' grade calculation for each subject, from admission to the current semester, is given in one of three levels: "Excellent," "Very Good," and "Good," based on evaluation criteria calculated by adding the weighted values to the numerically-converted values of their academic achievement in each subject being evaluated (S = 4, A = 3, B = 2, and C= 1).

Evaluation of academic achievement	Converted values
S(Excellent: 90 points or higher)	4
A(Superior:80-89 points)	3
B(Good: 70-79 points)	2
C(Fair: 60-69 points)	1

Academic achievement	Evaluation criteria
Excellent	3.00 4.00
Very Good	2.00 2.99
Good	1.00 1.99

* For the relationship between evaluation items and evaluation criteria, see the attached Sheet 2 .
* 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 Work) (Positioning, When and how it is assigned, etc.)

○ Positioning

The graduation thesis is designed to be one component of the overall evaluation of academic achievement.

It is positioned as one of the major subjects to evaluate the following:

Ability/Skills (2) Developing the ability to solve engineering issues on one's own initiative with flexible thinking and creativity

Collective capacity (1) Developing communication skills and the ability to globally collect and dispatch information.

○ When and how it is assigned

○When it is assigned: At the start of the fourth year. (Only those who satisfy the conditions for embarking on a graduation thesis will be assigned a 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, Machine Shop Training, Experiments in Mechanical Engineering, and Mechanical Engineering Design and Production.

(4)Students must gain 11 credits or more out of 15 credits, the required number in Liberal Arts Education subjects, in the second group of specialized basic subjects.

(5) Students must gain a total of 68 credits or more in specialized basic subjects and specialized subjects.

○ How it is assigned

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.

The graduation thesis must be written in English in "English-based Bachelor's Degree Program".

10. Responsibility-taking System

(1) PDCA Responsibility-taking System ("Plan," "Do," "Check," and "Act")

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

○ Criteria for 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

○ How the program is assessed

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

○ Position on feedback to students and how it should be conducted

Search records of each student's learning status, prepared by tutors, are kept.

Based on these records, study guidance is given to each student. At the same time, requests from students are discussed at teachers' meetings as needed. Furthermore, based on the results of the course improvement questionnaires obtained from students, subject teachers draw up class improvement plans that reflect the questionnaire results.

Cluster 1 (Mechanical Systems, Transportation, Material and Energy)

◎ Required subject (period of registration specified)

○ Compulsory elective subject (any of these subjects shall be registered)

△ Free elective subject (any of these subjects shall be registered)

Subject type			Required No. of credits	Class subjects, etc.	No. of credits	Type of course registration	Year in which the subject is taken (*The lower figure means semester) (Note 1)													
							1st grade				2nd grade				3rd grade				4th grade	
							Spring		Fall		Spring		Fall		Spring		Fall		Spring	Fall
							1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T 2T	3T 4T
Peace Science Courses			2		2	Compulsory elective		○												
Basic Courses in University Education	Introduction to University Education		2	Introduction to University Education	2	Required	◎													
	Introductory Seminar for First-Year Students		2	Introductory Seminar for First-Year Students	2	Required	◎													
	Advanced Seminar		0		1	Free elective			△	△										
Common Subjects	Area Courses		4	Courses in Arts and Humanities/Social Sc	2	Compulsory elective	○		○											
			4	Courses in Natural Sciences	2	Compulsory elective		○		○										
	Foreign Languages (Note 3)	English (Note 2) Basic English Usage	2	Basic English Usage I	1		◎	◎												
				Basic English Usage II	1				◎	◎										
		English (Note 2) Communication I	2	Communication IA	1	Required	◎	◎												
				Communication IB	1		◎	◎												
		English (Note 2) Communication II	2	Communication IIA	1	Required			◎	◎										
				Communication IIB	1				◎	◎										
		Initial Foreign Languages (Select one language from German, French, Spanish, Russian, Chinese, Korean, and Arabic)	2	1 subjects from Basic language I	1	Compulsory elective	○													
				1 subjects from Basic language II	1			○												
	Health and Sports Courses		2	Introduction to Information and Data Sciencies	2	Required		◎												
			2		1or2	Compulsory elective	○	○	○	○										
	Basic Subjects		18	Calculus I	2			◎												
				Calculus II	2					◎										
				Linear Algebra I	2		◎													
				Linear Algebra II	2				◎											
				Seminar in Basic Mathematics I	1			◎												
				Seminar in Basic Mathematics II	1	Required				◎										
				General Mechanics I	2		◎													
				General Mechanics II	2				◎											
				Basic Electromagnetism	2													◎		
				Experimental Methods and Laboratory Work in Physics I (Note 4)	1				◎											
				Experimental Methods and Laboratory Work in Physics II (Note 4)	1					◎										
				General Chemistry	2															
			2		1	Compulsory elective														
					1															
No. of credits required for graduation			46																	

Note 1: When students fail to acquire the credit during the term or semester marked with ◎, ○, △ in the boxes for the year in which the course is taken, they can take the course in subsequent terms or semesters. Depending on class subject, courses may be offered in semesters or terms different from those scheduled.

Note 2: The credit obtained by mastery of self-directed study of "Online Seminar in English A･B" cannot be counted towards the credit necessary for graduation. The credit obtained by Overseas Language Training can be recognized as Communication Ⅰ or Ⅱ og 0 Tw026

Note 3:

Note 4:

Cluster 1 Specialized Subjects

HProgram of Mechanical Systems EngineeringH

E, Required subject
E•Compulsory elective subje
EgFree elective subject

Class Subjects	Credits	Type of course registration	Class Hours/Week																Note
			1st grade				2nd grade				3rd grade				4th grade				
			Spring		Fall		Spring		Fall		Spring		Fall		Spring		Fall		
			1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	
Dynamics of Vibrations I	2	E,							4										
Experiments in Mechanical Engineering	1	E,									3	3							
Mechanical Engineering Design and Production	1	E,											3	3					
Mechanical Materials I	2	E•										4							
Mechanical Materials II	2	E•												4					
Fracture Mechanics	2	E•												4					
Fusion and Solidification Processings I	2	Eg										4							
Plastic Working and Powder Metallurgy II	2	Eg											4						
Materials Science	2	E£								4									
Machining	2	E,										4							
Fluid Dynamics II	2	E£								4									
Heat Transfer I	2	E£							4										
Combustion Engineering Fundamentals	2	Eg									4								
Internal Combustion Engines	2	Eg											4						
Data Processing and Numerical Analysis	2	E,								4									
Theory of Elasticity and Plasticity	2	E•									4								
Computational Solid Mechanics	2	E£										4							
Mechanics of Materials II	2	E•							4										
Mechanism and Kinematics	2	E•								4									
Dynamics of Vibrations II	2	E•									4								
Control Engineering II	2	E•							4										
Electrical and Electronic Engineering	2	E•									4								
Mechatronics	2	E£											4						
Measurement and Signal Processing	2	E,												4					
Mechanical System Control	2	E£									4								
Data Structure and Algorithm	2	E£												4					
Manufacturing System	2	E£										4							
Machine Elements Design	2	E,							4										
Machine Design	2	E•											4						
Systems Engineering	2	E,								4									
Computer Programming	2	E•										4							
Transportation	2	Eg							4										
Internship	1	E•											3	3					
Graduation Thesis	5	E,																	

Cluster 1 Specialized Subjects
(Program of Mechanical Systems Engineering)

◎ Required subject
○Compulsory elective subjec
△Free elective subject

Class Subjects	Credits	Type of course registration	Class Hours/Week																Note
			1st grade				2nd grade				3rd grade				4th grade				
			Spring		Fall		Spring		Fall		Spring		Fall		Spring		Fall		
			1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	
Dynamics of Vibrations I	2	◎							4										
Experiments in Mechanical Engineering	1	◎									3	3							
Mechanical Engineering Design and Production	1	◎											3	3					
Mechanical Materials I	2	○										4							
Mechanical Materials II	2	○												4					
Fracture Mechanics	2	○												4					
Fusion and Solidification Processings I	2	△										4							
Plastic Working and Powder Metallurgy II	2	△											4						
Materials Science	2	○								4									
Machining	2	◎										4							
Fluid Dynamics II	2	○								4									
Heat Transfer I	2	○							4										
Combustion Engineering Fundamentals	2	△									4								
Internal Combustion Engines	2	△											4						
Data Processing and Numerical Analysis	2	◎								4									
Theory of Elasticity and Plasticity	2	○									4								
Computational Solid Mechanics	2	○										4							
Mechanics of Materials II	2	○							4										
Mechanism and Kinematics	2	○								4									
Dynamics of Vibrations II	2	○									4								
Control Engineering II	2	○							4										
Electrical and Electronic Engineering	2	○									4								
Mechatronics	2	○											4						
Measurement and Signal Processing	2	◎												4					
Mechanical System Control	2	○									4								
Data Structure and Algorithm	2	○												4					
Manufacturing System	2	○										4							
Machine Elements Design	2	◎							4										
Machine Design	2	○											4						
Systems Engineering	2	◎								4									
Computer Programming	2	○										4							
Transportation	2	△							4										
Internship	1	○											3	3					
Graduation Thesis	5	◎																	

Academic Achievements in Educational Program for Mechanical Systems

The Relationship between Evaluation Items and Evaluation Criteria

	Excellent	Very Good	Good	Good
(1)	To develop the ability to participate in the activities of local societies, international societies, business and industry at the standard level			

Relationshipsbetweentheevaluationitemsandclasssubjects

Sheet3

Subjecttype	Classsubjects	credits	Typeof course registration	Period	Evaluationitems										Total weighted values of evaluation items inthe subject
					KnowledgeandUnderstanding				AbilitiesandSkills				ComprehensiveAbilities		
					(1)		(2)		(1)		(2)		(1)		
					Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	
LiberalArtsEducation	IntroductiontoUniversityEducation	2	Required	1semsester-1T	100	1									100
LiberalArtsEducation	IntroductorySeminarforFirst-YearStudents	2	Required	1semsester							50	1	50	1	100
LiberalArtsEducation	PeaceScienceCourses	2	Elective	1semsester-2T	100	1									100
LiberalArtsEducation	BasicEnglishUsageI	1	Required	1semsester									100	1	100
LiberalArtsEducation	BasicEnglishUsageII	1	Required	2semsester									100	1	100
LiberalArtsEducation	CommunicationIH	1	Required	1semsester									100	1	100
LiberalArtsEducation	CommunicationI H	1	Required	1semsester									100	1	100
LiberalArtsEducation	CommunicationIIH	1	Required	2semsester									100	1	100
LiberalArtsEducation	CommunicationIIH	1	Required	2semsester									100	1	100
LiberalArtsEducation	BasiclanguageI	1	Elective	1semsester-1T									100	1	100
LiberalArtsEducation	BasiclanguageII	1	Elective	1semsester-2T									100	1	100
LiberalArtsEducation	AreaCourses HCourseinArtsandHumanitiesSocialSc H	4	Elective	1,2,3,4semseste	100	1									100
LiberalArtsEducation	AreaCourses HCoursesinNaturalSciences H	4	Elective	1,2,3,4semseste	100	1									100
LiberalArtsEducation	HealthandSportsCourses	2	Elective	1,2semsester	100	1									100
LiberalArtsEducation	IntroductiontoInformationandDataSciencies	2	Required	1semsester			100	1							100
LiberalArtsEducation	CalculusI	2	Required	1semsester			100	1							100
LiberalArtsEducation	CalculusII	2	Required	2semsester			100	1							100
LiberalArtsEducation	LinearAlgebraI	2	Required	1semsester			100	1							100
LiberalArtsEducation	LinearAlgebraII	2	Required	2semsester			100	1							100
LiberalArtsEducation	SeminarinBasicMathematicsI	1	Required	1semsester			100	1							100
LiberalArtsEducation	SeminarinBasicMathematicsII	1	Required	2semsester			100	1							100
LiberalArtsEducation	GeneralMechanicsI	2	Required	1semsester			100	1							100
LiberalArtsEducation	GeneralFMechanicsII	2	Required	2semsester			100	1							100
LiberalArtsEducation	BasicElectromagnetism	2	Required	3semsester			100	1							100
LiberalArtsEducation	ExperimentalMethodsandLaboratoryWorkinPhysicsI GNuBi	2	Required	2semsester			100	1							100
LiberalArtsEducation	GeneralChemistry	2	Elective	3semsester			100	1							100
LiberalArtsEducation	ExperimentalMethodsandLaboratoryWorkinChemistryI GNuBi	2	Elective	2semsester			100	1							100
SpecializedEducation	AppliedMathematicsI	2	Required	2semsester					100	1					100
SpecializedEducation	AppliedMathematicsII	2	Required	3semsester					100	1					100
SpecializedEducation	AppliedMathematicsIII	2	Required	4semsester					100	1					100
SpecializedEducation	EngineeringMathematicsA	2	Elective	5semsester					100	1					100
SpecializedEducation	EngineeringMathematicsC	2	Elective	4semsester					100	1					100
SpecializedEducation	ProbabilityandStatistics	2	Required	3semsester					100	1					100
SpecializedEducation	SynthesisofAppliedMathematics	2	Elective	6semsester					100	1					100
SpecializedEducation	PracticeofMechanics	1	Elective	2semsester					100	1					100
SpecializedEducation	IntroductionofMechanicalandTransportationEngineering	2	Required	2semsester					100	1					100
SpecializedEducation	TechnicalEnglish	1	Required	3semsester					100	1					100
SpecializedEducation	BasicEngineeringComputerProgramming	2	Required	3semsester			100	1							100
SpecializedEducation	ExperimentsinMechanicalEngineering	1	Required	5semsester							80	1	20	1	100
SpecializedEducation	FundamentalsofMaterialsProcessing	2	Required	3semsester					100	1					100
SpecializedEducation	AnIntroductiontoEngineeringMaterials	2	Required	3semsester					100	1					100
SpecializedEducation	MechanicsofMaterialI	2	Required	3semsester					100	1					100
SpecializedEducation	DynamicsofVibrationsI	2	Required	4semsester					100	1					100
SpecializedEducation	ControlEngineeringI	2	Required	3semsester					100	1					100
SpecializedEducation	FluidDynamicsI	2	Required	3semsester					100	1					100
SpecializedEducation	ThermodynamicsI	2	Required	3semsester-1T					100	1					100
SpecializedEducation	MachineDesignandDrawing	1	Required	2semsester					100	1					100
SpecializedEducation	ComputerAidedDesign	1	Required	3semsester							100	1			100
SpecializedEducation	MechanicalEngineeringDesignandProduction	1	Required	6semsester							100	1			100
SpecializedEducation	ComputerProgramming	2	Elective	5semsester			100	1							100
SpecializedEducation	MachineShopTraining(a)	1	Required	2semsester							100	1			100
SpecializedEducation	MachineShopTraining(b)	1	Required	3semsester							100	1			100

Subjecttype	Classsubjects	credits	Typeof course registration	Period	Evaluationitems										Total weighted values of evaluation items inthe subject
					KnowledgeandUnderstanding				AbilitiesandSkills				ComprehensiveAbilities		
					(1)		(2)		(1)		(2)		(1)		
					Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	Weighted valuesof evaluation itemsin the subject	Weightsed valuesof evaluation items	
SpecializedEducation	MechanicalMaterialsI	2	Elective	5semsester					100	1					100
SpecializedEducation	MechanicalMaterialsII	2	Elective	6semsester					100	1					100
SpecializedEducation	FractureMechanics	2	Elective	6semsester					100	1					100
SpecializedEducation	FusionandSolidificationProcessingsI	2	Elective	5semsester					100	1					100
SpecializedEducation	PlasticWorkingandPowderMetallurgyII	2	Elective	6semsester					100	1					100
SpecializedEducation	MaterialsScience	2	Elective	4semsester					100	1					100
SpecializedEducation	Machining	2	Required	5semsester					100	1					100
SpecializedEducation	FluidDynamicsII	2	Elective	4semsester-4T					100	1					100
SpecializedEducation	HeatTransferI	2	Elective	4semsester-3T					100	1					100
SpecializedEducation	CombustionEngineeringFundamentals	2	Elective	5semsester					100	1					100
SpecializedEducation	InternalCombustionEngines	2	Elective	6semsester					100	1					100
SpecializedEducation	DataProcessingandNumericalAnalysis	2	Required	4semsester					100	1					100
SpecializedEducation	TheoryofElasticityandPlasticity	2	Elective	5semsester					100	1					100
SpecializedEducation	ComputationalSolidMechanics	2	Elective	5semsester					100	1					100
SpecializedEducation	MechanicsofMaterialsII	2	Elective	4semsester					100	1					100
SpecializedEducation	MechanismandKinematics	2	Elective	4semsester					100	1					100
SpecializedEducation	DynamicsofVibrationsII	2	Elective	5semsester					100	1					100
SpecializedEducation	ControlEngineeringII	2	Elective	4semsester					100	1					100
SpecializedEducation	ElectricalandElectronicEngineering	2	Elective	5semsester					100	1					100
SpecializedEducation	Mechatronics	2	Elective	6semsester					100	1					100
SpecializedEducation	MeasurementandSignalProcessing	2	Required	6semsester					100	1					100
SpecializedEducation	MechanicalSystemControl	2	Elective	5semsester					100	1					100
SpecializedEducation	DataStructureandAlgorithm	2	Elective	6semsester					100	1					100
SpecializedEducation	ManufacturingSystems	2	Elective	5semsester					100	1					100
SpecializedEducation	MachineElementsDesign	2	Elective	5semsester					100	1					100
SpecializedEducation	MachineDesign	2	Elective	4semsester					50	1	50	1			100
SpecializedEducation	SystemsEngineering	2	Required	4semsester					100	1					100
SpecializedEducation	Transportation	2	Elective	4semsester					100	1					100
SpecializedEducation	Internship	1	Elective	6semsester	40	1					30	1	30	1	100
SpecializedEducation	GraduationThesis	5	Required	7,8semsester							55	1	45	1	100

CurriculumMapofMechanicalSystemsEngineering

Sheet H