For entrants in AY 2024

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	エネルギー変換プログラム
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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			
							Spring		Fall		Spring		Fall		Spring		Fall	
							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)	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													
		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													
			2	Introduction to Information and Data Sciencies	2	Required												
	Health and Sports Courses		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	1													
				Experimental Methods and Laboratory Work in Physics II Note	1													
				General Chemistry	2									○				
			2	Experimental Methods and Laboratory Work in Chemistry I(Note 4)	1	Compulsory elective			○									
				Experimental Methods and Laboratory Work in Chemistry II(Note 4)	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 or

Note 3

Note 4

Cluster 1　Basic Specialized Subjects

Required subject
Compulsory elective subject
Free elective subject

	Class Subjects	Credits	Type of course registration: Mechanical Systems Engineering	Transportation Systems	Materials Processing	Energy Transffn	Class Hours/Week: 1st grade Spring 1T	2T	Fall 3T	4T	2nd grade Spring 1T	2T	Fall 3T	4T	3rd grade Spring 1T	2T	Fall 3T	4T	4th grade Spring 1T	2T	Fall 3T	4T	Note
1st group	Applied Mathematics I	2							4														
	Applied Mathematics II	2									4												
	Applied Mathematics III	2											4										
	Engineering Mathematics A	2													4								
	Engineering Mathematics C	2															4						
	Probability and Statistics	2									4												
	Synthesis of Applied Mathematics	2																4					
	Practice of Mechanics	1							4														
	Introduction of Mechanical and Transportation Engineering	2							4														
	Technical English	1									2	2											
	Basic Engineering Computer Programming	2										4											
2nd group	Mechanics of Material I	2									4												
	Thermodynamics I	2									4												
	Fluid Dynamics I	2										4											
	Control Engineering I	2										4											
	An Introduction to Engineering Materials	2									4												
	Fundamentals of Materials Processing	2										4											
	Machine Design and Drawing	1							3	3													
	Computer Aided Design	1									3	3											
	Machine Shop Training (a)	1							3	3													
	Machine Shop Training (b)	1									3	3											

Students can select either Machine Shop Training (a) or Machine Shop Training (b)

Required subject
Compulsory elective sul
Free elective subject

			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					
Elementary Electromagnetism	2								4										
Introduction to Quantum Physics	2									4									
Fluid Dynamics II	2									4									
Compressible Fluid Dynamics	2										4								
Fluid Machinery	2													4					
Thermodynamics II	2									4									
Statistical and Thermal Physics	2												4						
Heat Transfer I	2								4										
Heat Transfer II	2										4								
Combustion Engineering Fundamentals	2										4								
Internal Combustion Engines	2												4						
Plasma Engineering	2											4							
Data Processing and Numerical Analysis	2	◎								4									
Computer Programming	2	○										4							
Radiation Engineering	2	△										4							※1
Nuclear Engineering	2													4					
Theory of Elasticity and Plasticity	2										4								
Computational Solid Mechanics	2											4							
Electrical and Electronic Engineering	2										4								
Measurement and Signal Processing	2													4					
Optical Measurement Techniques	2													4					
Machine Elements Design	2								4										
Natural-Energy Utilization Engineering	2													4					
Internship	1												3	3					
Mechanism and Kinematics	2									4									
Systems Engineering	2									4									
Mechanics of Materials II	2								4										
Transportation	2	○							4										
Control Engineering II	2								4										
Materials Science	2									4									
Mechanical Materials I	2											4							
Dynamics of Vibrations II	2										4								
Machining	2											4							
Manufacturing System	2											4							
Fusion and Solidification Processings I	2											4							
Plastic Working and Powder Metallurgy II	2												4						
Mechanical System Control	2										4								
Machine Design	2												4						
Mechanical Materials II	2													4					
Fracture Mechanics	2													4					
Mechatronics	2												4						
Graduation Thesis	5																		

※1 Biannual opening

Academic Achievement in Educational Program for Energy Transform Engineer

The Relationship between Evaluation Items and Evaluation Criteria

Academic Achievements			Evaluation Criteria		
Evaluation Items			Excellent	Very Good	Good
Knowledge and Understanding	(1)	To develop the ability to work positively and independently on the development of local societies, international society, and business and industries.	To be able to be sufficiently engaged in the development of local societies, international society, and business and industry.	To be able to be engaged in the development of local societies, international society, and business and industry at the standard level.	To be able to be engaged in the development of local societies, international society, and business and industry at the minimum level.
	(2)	Acquiring necessary basic knowledge for an engineer and developing the ability to consider logically.	Acquiring necessary basic knowledge for an engineer and being able to sufficiently and logically consider it.	Acquiring necessary basic knowledge for an engineer and being able to logically consider it at the standard level.	Acquiring necessary basic knowledge for an engineer and being able to logically consider it at the minimum level.
Abilities and Skills	(1)	Acquring basis of mechanical system engineering steadily and developing the applied skill.	Acquring basis of mechanical system engineering steadily, and being able to apply it sufficiently.	Acquring basis of mechanical system engineering steadily, and being able to apply it at the standard level.	Acquring basis of mechanical system engineering steadily, and being able to apply it at the minimum level.
	(2)	Developing the ability of solving the technological issues with flexible ideas and creativity.	Based on flexible ideas and creativity, to be able to sufficiently solve problems related to engineering.	Based on flexible ideas and creativity, to be able to independently solve problems related to engineering to the standard level.	Based on flexible ideas and creativity, to be able to independently solve problems related to engineering at the minimum level.
Overall Abilities	(1)	Cultivating abilities of communication and of internationally collecting information and releasing it	To be able to communicate sufficiently with others, collect and release information internationally.	To be able to communicate with others, collect and release information internationally at the standard level	To be able to communicate with others, collect and release information internationally at the minimum level.

Placement of the Liberal Arts Education in the Major Program

We aim to cultivate a well-rounded character, backed up by a broad range of basic knowledge and an understanding of global environmental issues and problems in the social environment. Furthermore, we aim to cultivate the ability to consider ways to solve problems in the context of the multifaceted relations between people and society, and between nature and engineering. To that end, the following are offered: (1) The acquisition of the necessary abilities and attitudes to see various social issues multilaterally and to understand the complete picture (2) The acquisition of a broader perspective after being exposed to fields outside of one's area of expertise (3) Through sports, the acquisition of knowledge of health and physical strength that form basis of human living (4) The cultivation of the ability to

Relationships between the evaluation items and class subjects

						Weighted values of evaluation items in the subject	Weightsed values of evaluation items	Weighted values of evaluation items in the subject	Weightsed values of evaluation items	Weighted values of evaluation items in the subject	Weightsed values of evaluation items	Weighted values of evaluation items in the subject	Weightsed values of evaluation items	Weighted values of evaluation items in the subject	Weightsed values of evaluation items	
Liberal Arts Education	Introduction to University Education	2	Required	1semsester-1T		100	1									100
Liberal Arts Education	Introductory Seminar for First-Year Students	2	Required	1semsester								50	1	50	1	100
Liberal Arts Education	Peace Science Courses	2	Elective	1semsester-2T		100	1									100
Liberal Arts Education	Basic English UsageI	1	Required	1semsester										100	1	100
Liberal Arts Education	Basic English UsageII	1	Required	2semsester										100	1	100
Liberal Arts Education	CommunicationIA	1	Required	1semsester										100	1	100
Liberal Arts Education	Communication IB	1	Required	1semsester										100	1	100
Liberal Arts Education	Communication IIA	1	Required	2semsester										100	1	100
Liberal Arts Education	Communication IIB	1	Required	2semsester										100	1	100
Liberal Arts Education	Basic language I	1	Elective	1semsester-1T										100	1	100
Liberal Arts Education	Basic language II	1	Elective	1semsester-2T										100	1	100
Liberal Arts Education	Area Courses(Courses in Arts and HumanitiesSocial Sc)	4	Elective	1,2,3,4semsester		100	1									100
Liberal Arts Education	Area Courses (Courses in Natural Sciences)	4	Elective	1,2,3,4semsester		100	1									100
Liberal Arts Education	Health and Sports Courses	2	Elective	1,2semsester		100	1									100
Liberal Arts Education	Information and Data Science Courses	2	Required	1semsester				100	1							100
Liberal Arts Education	CalculusI	2	Required	1semsester				100	1							100
Liberal Arts Education	CalculusII	2	Required	2semsester				100	1							100
Liberal Arts Education	Linear AlgebraI	2	Required	1semsester				100	1							100
Liberal Arts Education	Linear AlgebraII	2	Required	2semsester				100	1							100
Liberal Arts Education	Seminar in Basic Mathematics I	1	Required	1semsester				100	1							100
Liberal Arts Education	Seminar in Basic Mathematics II	1	Required	2semsester				100	1							100
Liberal Arts Education	General Mechanics I	2	Required	1semsester				100	1							100
Liberal Arts Education	General Mechanics II	2	Required	2semsester				100	1							100
Liberal Arts Education	Basic Electromagnetism	2	Required	3semsester				100	1							100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics I- II	2	Required	2semsester				100	1							100
Liberal Arts Education	General Chemistry	2	Elective	3semsester				100	1							100
Liberal Arts Education	Experimental Methods and Laboratory Work in Chemistry I- II	2	Elective	2semsester				100	1							100
Specialized Education	Applied Mathematics I	2	Required	2semsester						100	1					100
Specialized Education	Applied Mathematics II	2	Required	3semsester						100	1					100
Specialized Education	Applied Mathematics III	2	Required	4semsester						100	1					100
Specialized Education	Engineering Mathematics A	2	Elective	5semsester						100	1					100
Specialized Education	Engineering Mathematics C	2	Elective	4semsester						100	1					100
Specialized Education	Probability and Statistics	2	Required	3semsester						100	1					100
Specialized Education	Synthesis of Applied Mathematics	2	Elective	6semsester						100	1					100
Specialized Education	Practice of Mechanics	1	Elective	2semsester						100	1					100
Specialized Education	Introduction of Mechanical and Transportation Engineering	2	Required	2semsester						100	1					100
Specialized Education	Technical English	1	Required	3semester						100	1					100
Specialized Education	Basic Engineering Computer Programming	2	Required	3semsester				100	1							100
Specialized Education	Experiments in Mechanical Engineering	1	Required	5semsester								80	1	20	1	100
Specialized Education	Fundamentals of Materials Processing	2	Required	3semsester						100	1					100
Specialized Education	An Introduction to Engineering Materials															

Subject type	Class subjects	credits	Type of course registration	Period	Evaluation items										Total weighted values of evaluation items in the subject
					Knowledge and Understanding				Abilities and Skills				Comprehensive Abilities		
					(1)		(2)		(1)		(2)		(1)		
					Weighted values of evaluation items in the subject	Weightsed values of evaluation items	Weighted values of evaluation items in the subject	Weightsed values of evaluation items	Weighted values of evaluation items in the subject	Weightsed values of evaluation items	Weighted values of evaluation items in the subject	Weightsed values of evaluation items	Weighted values of evaluation items in the subject	Weightsed values of evaluation items	
Specialized Education	Mechanical Engineering Design and Production	1	Required	6semsester							100	1			100
Specialized Education	Computer Programming	2	Elective	5semsester			100	1							100
Specialized Education	Machine Shop Training (a)	1	Required	2semsester							100	1			100
Specialized Education	Machine Shop Training (b)	1	Required	3semsester							100	1			100
Specialized Education	Mechanical Materials I	2	Elective	5semsester					100	1					100
Specialized Education	Mechanical Materials II	2	Elective	6semsester					100	1					100
Specialized Education	Fracture Mechanics	2	Elective	6semsester					100	1					100
Specialized Education	Fusion and Solidification Processings I	2	Elective	5semsester					100	1					100
Specialized Education	Plastic Working and Powder Metallurgy II	2	Elective	6semsester					100	1					100
Specialized Education	Materials Science	2	Elective	4semsester					100	1					100
Specialized Education	Machining	2	Elective	5semsester					100	1					100
Specialized Education	Fluid Dynamics II	2	Required	4semsester-4T					100	1					100
Specialized Education	Heat Transfer I	2	Required	4semsester-3T					100	1					100
Specialized Education	Combustion Engineering Fundamentals	2	Elective	5semsester					100	1					100
Specialized Education	Internal Combustion Engines	2	Elective	6semsester					100	1					100
Specialized Education	Data Processing and Numerical Analysis	2	Required	4semsester					100	1					100
Specialized Education	Theory of Elasticity and Plasticity	2	Elective	5semsester					100	1					100
Specialized Education	Computational Solid Mechanics	2	Elective	5semsester					100	1					100
Specialized Education	Mechanics of Materials II	2	Elective	4semsester					100	1					100
Specialized Education	Mechanism and Kinematics	2	Elective	4semsester					100	1					100
Specialized Education	Dynamics of Vibrations II	2	Elective	5semsester					100	1					100
Specialized Education	Control Engineering II	2	Elective	4semsester					100	1					100
Specialized Education	Electrical and Electronic Engineering	2	Elective	5semsester					100	1					100
Specialized Education	Mechatronics	2	Elective	6semsester					100	1					100
Specialized Education	Measurement and Signal Processing	2	Required	6semsester					100	1					100
Specialized Education	Mechanical System Control	2	Elective	5semsester					100	1					100
Specialized Education	Manufacturing System	2	Elective	5semsester					100	1					100
Specialized Education	Machine Design	2	Elective	6semsester					100	1					100
Specialized Education	Systems Engineering	2	Elective	4semsester					50	1	50	1			100
Specialized Education	Machine Elements Design	2	Elective	4semsester					100	1					100
Specialized Education	Internship	1	Elective	6semsester	40	1					30	1	30	1	100
Specialized Education	Elementary Electromagnetism	2	Required	4semsester					100	1					100
Specialized Education	Introduction to Quantum Physics	2	Required	4semsester					100	1					100
Specialized Education	Compressible Fluid Dynamics	2	Elective	5semsester					100	1					100
Specialized Education	Fluid Machinery	2	Elective	semsester					100	1					100
Specialized Education	Thermodynamics II	2	Elective	semsester-4T					100	1					100
Specialized Education	Statistical and Thermal Physics	2	Elective	semsester					100	1					100
Specialized Education	Heat Transfer II	2	Elective	5semsester					100	1					100
Specialized Education	Plasma Engineering	2	Elective	5semsester					100	1					100
Specialized Education	Radiation Engineering	2	Elective	5semsester					100	1					100
Specialized Education	Nuclear Engineering	2	Elective	6semsester					100	1					100
Specialized Education	Optical Measurement Techniques	2	Elective	6semsester					100	1					100
Specialized Education	Natural-Energy Utilization Engineering	2	Elective	6semsester					100	1					100
Specialized Education	Transportation	2	Elective	semsester-4T					100	1					100
Specialized Education	Graduation Thesis	5	Required	7,8semsester							55	1	45	1	100

Curriculum Map of Energy Transform Engineering

Sheet

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 local societies, international society, and business and industries.	Introduction to University Education (◎) Peace Science Courses (○) Area Courses (○) Health and Sports Courses (○)	Area Courses (○) Health and Sports Courses (○)	Area Courses (○)	Area Courses (○)	Reliability Engineering (△)	Internship (△)		
Acquiring necessary basic knowledge for an engineer and developing the ability to consider logically.	Introduction to Information and Data Sciencies (◎) CalculusI (◎) Linear AlgebraI (◎) Seminar in Basic Mathematics I (◎) General Mechanics I (◎)	CalculusII (◎) Linear AlgebraII (◎) Seminar in Basic Mathematics II (◎) General Mechanics II (◎) Experimental Methods and Laboratory Work in Physics I・II (◎) Experimental Methods and Laboratory Work in Chemistry I・II (○)	Basic Electromagnetism (◎) General Chemistry (○) Basic Engineering Computer Programming (◎)					
Acquring basis of mechanical system engineering and materials processing steadily		Applied Mathematics I (◎) Practice of Mechani Introduction of Mechanical and Transportation Engineering (◎) Machine Design and Drawing (◎)	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 (◎)	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 (△) Machine Elements Design- (○) Systems Engineering (△) Transportation (○)	Engineering Mathematics A (○) Computer Programming (○) Mechanical Materials I (△) Fusion and Solidification Processings I (△) Machining (△) 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 (△) Compressible Fluid Dynamics (○) Computational Solid Mechanics ( )	Synthesis of Applied Mathematics (○) Dynamics of Vibrations II (△) Fracture Mechanics (△) Plastic Working and Powder Metallurgy II (△) Statistical and Thermal Physics (○) Internal Combustion Engines (○) Mechatronics (△) Optical Measurement Techniques (○) Machine Design (△) Fluid Machinery (○) Internal Combustion Engines (○) Radiation Engineering (△) Nuclear Engineering (○) Measurement and Signal Processing (◎) Natural-Energy Utilization Engineering (○)		
Comprehensive Abilities Developing the ability of solving the technological issues with flexible ideas and creativity.	Introductory Seminar for First-Year Students (◎)	Machine Shop Training (a) (◎)	Machine Shop Training (b) (◎) Computer Aided Design (◎)	Systems Engineering (△)	Experiments in Mechanical Engineering (◎)	Mechanical Engineering Design and Production (◎) Internship (△)	Graduation Thesis (◎)	Graduation Thesis (◎)
Cultivating abilities of communication and of internationally collecting information and releasing it	Introductory Seminar for First-Year Students (◎) Basic English UsageI (◎) CommunicationIA (◎) Communication IB (◎) Basic language I Basic language II (○)	Basic English UsageII (◎) Communication IIA (◎) Communication IIB (◎)	Technical English (◎)		Experiments in Mechanical Engineering (◎)	Internship (△)	Graduation Thesis (◎)	Graduation Thesis (◎)

Color-code: Common subjects / Foundation Courses / Basic Specialized Subjects (The first group) / Basic Specialized Subjects (The second group) / Specialized Subjects

Symbol: (◎)Required subject (○)Compulsory elective subject (△)Free elective subject