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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)	機械システムプログラム
(English)	Program of Mechanical Systems Engineering
1. Academic Degree to be Acquired : Bachelor's degree in Engineering	
<p>2. Overview</p> <p>(1) Overview of "English-based Bachelor's Degree Program"</p> <p>This program aims to foster and produce future members of a global society who have the knowledge to be innovative, creative, take leadership, and possess language abilities that will help them play an important role in the international world.</p> <p>This program focuses specifically on producing individuals who are capable of addressing various global issues from an engineering perspective and contribute to the creation of new and valuable solutions that are significant to both the industrial and academic societies.</p> <p>Students enrolled in the program will begin the curriculum from the first semester of their first year.</p> <p>In the second year, students will set off on their major programs and take the designated courses which are offered at each cluster. Major program overview is as (2).</p> <p>(2) Overview of "Program of Mechanical Systems Engineering"</p> <p>This program offers education in the fundamentals of mechanical system engineering, 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, 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. By offering such education, it aims to develop engineers who, having a broader perspective on human-machine relations and environmental issues, are able to assume cutting-edge design and development roles in production engineering. In order to provide an efficient and integrated education, the teachers belonging to the academic society (Science and Engineering Field, Machine Engineering/Science and Technology Unit) are in charge of education for this program. 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.</p> <p>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.</p>	
<p>3. Academic Awards Policy (Goals of the Program and Policy for Awarding Degrees)</p> <p>The Program of Mechanical Systems Engineering develops professionals capable of taking action and displaying great humanity and rationality, who can contribute to the peace, development, and survival of humankind, and to the realization of happiness while striving for co-existence with nature.</p> <p>Based upon the above, this program awards a bachelor's degree in engineering to students who have acquired the following abilities in a balanced manner, as well as the number of credits necessary to meet the standard of the course.</p> <ul style="list-style-type: none"> Acquisition of the fundamentals of mechanical system engineering, the structure and function of mechanical 	

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 ” and “Fluid Dynamics ”. 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.

5. Program Timing/Acceptance Conditions

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.

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
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of cluster leader and program leader.

(2) Program assessment

Criteria for program assessment

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content is appropriate

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- 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 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	Spring	Fall	Spring	Fall	Spring	Fall				
								1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T		
Liberal Arts Education Subjects	Peace Science Courses			2		2	Required		○																
	Basic Courses in University Education	Introduction to University Education		2	Introduction to University Education	2	Compulsory elective	◎																	
		Introductory Seminar for First-Year Students		2	Introductory Seminar for First-Year Students	2	Compulsory elective		◎																
	Common Subjects	Area Courses		4	Courses in Arts and Humanities/Social Science	2	Compulsory elective	○		○															
				4	Courses in Natural Sciences	2	Compulsory elective		○		○														
		Foreign Languages	English (Note 2・3)	Basic English Usage	2	Basic English UsageI	1	Required	◎	◎															
						Basic English UsageII	1				◎	◎													
			Communication I	2	CommunicationIA	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			○															
		Information and Data Science Courses			2	Elements of Information Literacy or Exercise in Information Literacy	2	Compulsory elective	○	○															
		Health and Sports Courses			2		1or2	Compulsory elective	○	○	○	○													
		Basic Subjects				18	CalculusI	2	Required		◎														
							CalculusII	2					◎												
							Linear AlgebraI	2		◎															
	Linear AlgebraII						2				◎														
	Seminar in Basic Mathematics						1			◎															
	Seminar in Basic Mathematics						1					◎													
	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					◎													
	2					General Chemistry	2	Compulsory elective					○												
						Experimental Methods and Laboratory Work in Chemistry I (Note 4)	1				○														
						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

Note 2: The credit obtained by mastery of "English-speaking Countries Field Research" or 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 if application is made in advance. For more details, please refer to the article on English in Liberal Arts Education in the student handbook.

Note 3: We have a recognition of credit system for foreign language proficiency tests. For more details, please refer to the article on English in Liberal Arts Education in the student handbook.

Note 4: Students must take both「Experimental Methods and Laboratory WorkI(1credit)」and「Experimental Methods and Laboratory WorkII(1credit)」.

Cluster 1 Basic Specialized Subjects

◎ Required subject

○ Compulsory elective subject

△ Free elective subject

	Class Subjects	Credits	Type of course registration				Class Hours/Week																Note	
			Mechanical Systems Engineering	Transportation Systems	Materials Processing	Energy Transform Engineering	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		
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															
	Engineering Mechanics	2	○	△	○	○				4														
	Introduction of Mechanical and Transportation Engineering	2	⊙	⊙	⊙	⊙			4															
	Technical English	1	⊙	⊙	⊙	⊙				4														
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													
	Computer Programming	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)

Cluster 1 Specialized Subjects

(Program of Mechanical Systems Engineering)

© Required subject

○Compulsory elective subject

Δ 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 I	1	☉									3	3							
Experiments in Mechanical Engineering II	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					
Mathematical Optimization	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							
Instrumentation Engineering	2	☉							4										
Mechanical System Control	2	○									4								
Data Structure and Algorithm	2	○												4					
Manufacturing System	2	☉										4							
Machine Elements Design I	2	☉							4										
Machine Elements Design II	2	○									4								
Machine Design	2	○										4							
Reliability Engineering	2	△									4								
Systems Engineering	2	○								4									
Internship	1	○											3	3					
Graduation Thesis	5	☉																	

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 knowlth

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	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Liberal Arts Education	Introduction to University Education	2	Required	1semester-1T	100	1									100
Liberal Arts Education	Introductory Seminar for First Year Students	2	Required	1semester							50	1	50	1	100
Liberal Arts Education	Peace Science Courses	2	Elective	1semester-2T	100	1									100
Liberal Arts Education	Basic English UsageI	1	Required	1semester									100	1	100
Liberal Arts Education	Basic English UsageII	1	Required	2semester									100	1	100
Liberal Arts Education	CommunicationI	1	Required	1semester									100	1	100
Liberal Arts Education	Communication I	1	Required	1semester									100	1	100
Liberal Arts Education	Communication II	1	Required	2semester									100	1	100
Liberal Arts Education	Communication II	1	Required	2semester									100	1	100
Liberal Arts Education	Basic language I	1	Elective	1semester-1T									100	1	100
Liberal Arts Education	Basic language II	1	Elective	1semester-2T									100	1	100
Liberal Arts Education	Area Courses Courses in Arts and Humanities/Social Sci	4	Elective	1,2,3,4semester	100	1									100
Liberal Arts Education	Area Courses Courses in Natural Sciences	4	Elective	1,2,3,4semester	100	1									100
Liberal Arts Education	Health and Sports Courses	2	Elective	1,2semester	100	1									100
Liberal Arts Education	Reviews of Information Library or Exercise in Information Library	2	Required	1semester			100	1							100
Liberal Arts Education	CalculusI	2	Required	1semester			100	1							100
Liberal Arts Education	CalculusII	2	Required	2semester			100	1							100
Liberal Arts Education	Linear AlgebraI	2	Required	1semester			100	1							100
Liberal Arts Education	Linear AlgebraII	2	Required	2semester			100	1							100
Liberal Arts Education	Seminar in Basic Mathematics I	1	Required	1semester			100	1							100
Liberal Arts Education	Seminar in Basic Mathematics II	1	Required	2semester			100	1							100
Liberal Arts Education	General Mechanics I	2	Required	1semester			100	1							100
Liberal Arts Education	General Mechanics II	2	Required	2semester			100	1							100
Liberal Arts Education	Basic Electromagnetism	2	Required	3semester			100	1							100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics I	2	Required	2semester			100	1							100
Liberal Arts Education	General Chemistry	2	Elective	3semester			100	1							100
Liberal Arts Education	Experimental Methods and Laboratory Work in Chemistry I	2	Elective	2semester			100	1							100
Specialized Education	Applied Mathematics I	2	Required	2semester					100	1					100
Specialized Education	Applied Mathematics II	2	Required	3semester					100	1					100
Specialized Education	Applied Mathematics III	2	Required	4semester					100	1					100
Specialized Education	Engineering Mathematics A	2	Elective	5semester					100	1					100
Specialized Education	Engineering Mathematics C	2	Elective	4semester					100	1					100
Specialized Education	Probability and Statistics	2	Required	3semester					100	1					100
Specialized Education	Synthesis of Applied Mathematics	2	Elective	6semester					100	1					100
Specialized Education	Practice of Mechanics	1	Elective	2semester					100	1					100
Specialized Education	Engineering Mechanics	2	Elective	2semester					100	1					100
Specialized Education	Introduction of Mechanical and Transportation Engineering	2	Required	2semester					100	1					100
Specialized Education	Technical English	1	Required	3semester					100	1					100
Specialized Education	Basic Engineering Computer Programming	2	Required	3semester			100	1							100
Specialized Education	Experiments in Mechanical Engineering I	1	Required	5semester							80	1	20	1	100
Specialized Education	Experiments in Mechanical Engineering II	1	Required	6semester							80	1	20	1	100
Specialized Education	Fundamentals of Materials Processing	2	Required	3semester					100	1					100
Specialized Education	An Introduction to Engineering Materials	2	Required	3semester					100	1					100
Specialized Education	Mechanics of Material I	2	Required	3semester					100	1					100
Specialized Education	Dynamics of Vibrations I	2	Required	4semester					100	1					100
Specialized Education	Control Engineering I	2	Required	3semester					100	1					100
Specialized Education	Fluid Dynamics I	2	Required	3semester					100	1					100
Specialized Education	Thermodynamics I	2	Required	3semester-1T					100	1					100
Specialized Education	Machine Design and Drawing	1	Required	2semester					100	1					100
Specialized Education	Computer Aided Design	1	Required	3semester							100	1			100
Specialized Education	Mechanical Engineering Design and Production	1	Required	6semester							100	1			100
Specialized Education	Computer Programming	2	Required	5semester			100	1							100

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	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	

Specialized Education	Machine Shop Training (a)	1	Required	2semester							100	1			100
Specialized Education	Machine Shop Training (b)	1	Required	3semester	Specialized Education						100	1			100

Curriculum Map of Mechanical Systems Engineering

Sheet 4

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 local societies, international	Area Courses	Area Courses	Area Courses	Area Courses	Reliability Engineering	Internship		
		Health and Sports Courses	Health and Sports Courses						
		Introduction to University Education							
		Peace Science Courses							
	Acquiring necessary basic knowledge for an engineer and developing the ability to consider logically.	Exercise in Information Literacy	CalculusII	Basic Electromagnetism		Computer Programming			
		Elements of Information Literacy	Seminar in Basic Mathematics II	General Chemistry					
		CalculusI	Linear AlgebraII	Basic Engineering Computer Programming					
		Seminar in Basic Mathematics I	General Mechanics II						
		Linear AlgebraI	Experimental Methods and Laboratory Work in Physics I						
		General Mechanics I	Experimental Methods and Laboratory Work in Chemistry I						
Abilities and Skills	Acquiring basis of mechanical system engineering steadily and developing the applied skill.		Practice of Mechanical Engineering	Applied Mathematics II	Applied Mathematics III	Engineering Mathematics A	Synthesis of Applied Mathematics		
			Introduction of Mechanical and Transportation Engineering	Probability and Statistics	Engineering Mathematics C	Mechanical Materials I	Mechanical Materials II		
			Engineering Mechanics	Mechanics of Material I	Dynamics of Vibrations I	Machining	Fracture Mechanics		
			Applied Mathematics I	Fluid Dynamics I	Fluid Dynamics II	Combustion Engineering Fundamentals	Internal Combustion Engines		
			Machine Design and Drawing	Fundamentals of Materials Processing	Mechanics of Materials II	Manufacturing Systems	Computational Solid Mechanics		
				An Introduction to Engineering Materials	Mechanism and Kinematics	Reliability Engineering	Mechatronics		
				Control Engineering I	Systems Engineering	Electrical and Electronic Engineering	Machine Design		
				Thermodynamics I	Materials Science	Theory of Elasticity and Plasticity	Plastic Working and Powder Metallurgy II		
					Heat Transfer I	Fusion and Solidification Processings I	Data Structure and Algorithm		
					Data Processing and Numerical Analysis	Dynamics of Vibrations II			
					Mathematical Optimization	Mechanical System Control			
					Control Engineering II	Machine Elements Design II			
					Instrumentation Engineering				
					Machine Elements Design I				
	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)	Systems Engineering	Experiments in Mechanical Engineering I	Experiments in Mechanical Engineering II	Graduation Thesis	Graduation Thesis
				Computer Aided Design			Mechanical Engineering Design and Production		
							Internship		
Comprehensive Abilities	Cultivating abilities of communication and of internationally collecting information and releasing it	Introductory Seminar for First-Year Students	Basic English UsageII			Experiments in Mechanical Engineering I	Experiments in Mechanical Engineering II	Graduation Thesis	Graduation Thesis
		Basic English UsageI	Communication II	Technical English			Internship		
		CommunicationI	Communication II						
		Communication I							
		Basic language I (○)							
		Basic language II							

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