For entrants in AY 2024

Appended Form 1

Specifications for Major Program

Name of School (Program) School of Engineering Cluster 2 (Electrical, Electronic and Systems Engineering)

Program name	
(Japanese)	
(English)	Program of Electrical, Systems and Information Engineering

- 1 Academic degree to be acquired: Bachelor's degree in engineering
- 2. Overview
- (1) Overview of "English-based Bachelor's Degree Program"

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.

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.

Students enrolled in the program will begin the curriculum from the first semester of their first year. 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).

(2) Program overview of "Program of Electrical, Systems and Information Engineering".

In the fields of electricity, electronics, systems, information, and in other related fields, technological innovation has been advancing rapidly. We are now in a situation where technological innovation, ideas, and theories are being produced not only by deepening expert knowledge in a specific area, but by combining expert knowledge from multiple fields. As the impact of such technology on society is getting greater, it is always necessary to keep in mind the relationship between humankind, society, and nature.

On the basis of these social trends, Cluster 2 in the School of Engineering (Electrical, Electronic and Systems Engineering) has prepared the following programs with the aim of developing professionals who have a wide range of perspectives and insights, a sense of responsibility, and an ethical outlook, as well as specialized technological, problem-analyzing, and problem-solving abilities.

The Program of Electrical, Systems and Information Engineering

The Program of Electronic Devices and Systems

Except for in exceptional circumstances, students who are enrolled in Cluster 2 in the School of Engineering (Electrical, Electronic and Systems Engineering) can choose one of the above two options for this program at the start of the second year, after going through liberal arts education and specialized education for one year after enrollment.

The Program of Electrical, Systems and Information Engineering develops professionals who have acquired a broad basic knowledge and the technical expertise related to electrical and electronic circuits, electric energy, measurement control, system planning management, and information processing required for system construction, as well as the ability to solve complicated problems in a highly informatized society, and to take the lead in future technological innovation on their own initiative.

To that end, this program offers a curriculum in which students can learn, comprehensively and systematically, the specialized subjects related to electricity, systems, and information, from the basics to practical application. In concrete terms, students study mathematics, electric circuits, technical English, programming that is commonly used in all fields related to electricity, systems and information, experimentation, practicum, and introductory subjects such as "specialized basic subjects". These are studied mainly in the first and second years, and enable students to acquire a broad range of knowledge and a wide field of vision. From the second year to the fourth year, students can systematically acquire the knowledge and applied skills required in each field by taking combined "specialized subjects" classified into the six fields of physical engineering, electric circuits and energy, measurement

control, system planning management, computing, and mathematical information. Specialized basic subjects and specialized subjects are designed for students to be able to acquire specialization and a broad range of knowledge. Consideration is given to ensuring that students have a degree of freedom in choosing their future career path.

This program has prepared a curriculum through which students can acquire the qualifications below. If students complete the designated subjects, they are exempted, wholly or in part, from the applicable national examination for the acquisition of these qualifications.

Type-1 High School Teaching License (Industry) (mastery of teaching related subjects is required)

Electrical Chief Engineer (some years' work experience after graduation is required)

Engineer for Architectural Equipment (Qualification of candidacy for an exam is given to those who gain two or more years' experience after graduation.)

3. Academic Awards Policy (Goals of the Program and Policy for Awarding Degrees)

The Program of Electrical, Systems and Information Engineering develops professionals who have a broad perspective, insight, a sense of responsibility, and an ethical outlook, as well as expertise, technical knowledge, and the ability to analyze and solve problems.

To that end, this program covers the fields of electricity, systems, and information, and offers an education that deals with "electricity" in a comprehensive way, from the two perspectives of electricity as a thing in itself, and of the abstract concept of electricity, systems, and information. By providing everything, from the basic concepts to cutting-edge knowledge, in each field and, furthermore, identifying the mutual relationships between the fields in a systematic manner, this program aims at developing professionals who can take the lead in engineering development in these fields, and who have the ability to develop innovative technology by synthesizing the different fields, which is of growing importance for the future.

This program awards a bachelor's degree in engineering to students who, in addition to the number of credits necessary to meet the standard of the course, have acquired the following knowledge and abilities:

Goal A Acquisition of the ability to recognize the relationship between science and technology, and humankind, society, and the natural environment, from various perspectives, and the ability to understand the responsibilities engineers have for society.

Goal B Acquisition of the basic knowledge commonly required in the field of electronic systems and information, and the abilities applicable to the field.

Goal C Acquisition of the ability to analyze given challenges by using expertise, and draw solutions that meet the requirements of society.

Goal D Acquisition of the ability to draw up plans and measures to resolve challenges, and the will to carry these measures out.

Goal E Acquisition of the ability to gather information and to communicate in Japanese and English. Acquisition of the ability to sum up one's thoughts and accomplishments, to write logically, and to give a presentation.

4. Curriculum Policy (Policy for Preparing & Implementing Cu

Basic knowledge of mathematics, such as differential and integral calculus, and linear algebra, required by scientists and engineers (Goal B). This is obtained through mastery of such fundamental subjects as "Calculus" to be offered in the first year.

students must acquire a total of 34 or more credits in liberal arts education subjects and specialized education subjects by the end of the first year.

6. Qualifications to be Acquired

By mastering the predetermined courses, students can obtain Type-1 High School Teaching License (Industry) Students qualify as electrical chief engineers and engineers for architectural equipment after having hands-on experience for some years after graduation. The details are given in student handbook.

- 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.
- * All courses are taught in Japanese. Course materials may 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 evaluation item of academic achievement to clearly demonstrate the level of attainment. 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 achievements (S = 4, A = 3, B = 2, and C = 1) in each subject being evaluated.

Evaluation of academic	Converted
achievement	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	Evaluation						
achievement	criteria						
Excellent	3.00 4.00						
Very Good	2.00 2.99						
Good	1.00 1.99						

* See

relationship between evaluation items and evaluation criteria in the attached sheet 2.

9. Graduation Thesis (Graduation Research) (Positioning, When and how to be assigned, etc.)

Graduation work aims at imparting general research skills by conducting research in line with the research agenda established for each student. The following are more concrete goals:

- (1) The acquisition of the ability to make a research plan based on the research agenda and execute the research in accordance with the plan
- (2) The acquisition of the ability to collect materials related to the research agenda, demonstrate a deep understanding of the research agenda, and identify problems
- (3) The acquisition of the ability to analyze the problems in the research agenda and reach solutions in accordance with the requirements of society
- (4) The acquisition of the ability to read, write, converse, and retrieve information in the English language necessary for conducting research
- (5) The acquisition of the ability to organize research results and write in coherent sentences the significance and validity of the obtained outcomes
- (6) The acquisition of the ability to present the research outcomes and discuss them verbally in an easy-to-understand manner

The requirements for embarking on a graduation thesis are as described in student handbook. Students in the fourth year or over, who satisfy the requirements for embarking on a graduation thesis, are to be assigned as requested. How adjustments are made in relation to assignment is explained to the applicable students at a briefing

^{*} See the relationship between evaluation items and class subjects in the attached sheet 3.

^{*} See the curriculum map in the attached sheet 4.

held in advance. A briefing session about research topics or an open laboratory is held around the time from February to April for students who are to be assigned to the research laboratory and to the program.

10. Responsibility System

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

This Program is operated by teachers who support the Program of Electrical, Systems and Information Engineering, however, the program targets students who belong to Cluster 2 and, therefore, the person responsible for executing the program is the Cluster 2 leader. Planning, implementing, evaluation, and handling are discussed mainly in the Cluster 2 Education Program committee and in the Cluster 2 committee (held, in principle, on the first Wednesday of every month) in an appropriate manner. Depending on the situation or content, a working group is established at the instruction of the Cluster leader to focus in the issues at hand.

When there is a need to consider the response on a program basis, research laboratory groups responsible for the applicable program take the necessary measures. In that case, the responsible person is appointed by the Cluster 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 students taking the course have one average achieved the goal or above

Whether or not the system runs in proper cycles that enable the program to continually improve in an upward spiral

Conducting self-assessment for each subject based on the results of class evaluations carried out by students who have taken the course, and also based on grade calculation results

Regarding the upward spiral of the program, obtaining the questionnaire from graduates in suitable cycles and also collecting the needs from business corporations

Position on giving feedback to students and how it is approached

For individual courses, the teacher in charge gives comments on course evaluation results and academic achievement results.

For re-examining the program structure, the reasons for and the purposes of re-examination are given on the website.

$Cluster~2~(Electrical,~Electronic~and~Systems~Engineering)\\ @~Required~subject~(period~of~registration~specified)$

					T		△ F	ree e	lecti	ve subje	ct (any	of th	nese s	ubjec	ts shall	be reg	istere	
S	Subject Type	Require d No. of credits	Class subjects, etc.	No. of credits	registra tion	Spi	st g	grad Fa	e all	2nd Sprin	l grac g Fa	le all	Spri	rd g ing	rade Fall	4t Spr	th gi ing	rade
P	eace science curse	2		2	ory		0											
irses rsity ion	Introduction to University Education	2	Introduction to University Education	2	Required	0												
Basic Courses in University Education	Introductory Seminar for First-Year	2	Introductory Seminar for First-Year Students	2	Required	0												
Ba in	Advanced Seminar	0		1	Free elective			\triangle	\triangle									
	Area Courses	4	Courses in Arts and Humanities/Social Sciences	2	Compuls ory	0		0										
		4	Courses in Natural Sciences	2	elective		0		0									
	Basic English	2	Basic English UsageI	1	Required	0	0											
	Usage		Basic English UsageII	1	•			0	0									
S	Communic	2	CommunicationIA	1	Required	0	0											
Common Subjects	ation I	۵	Communication IB	1	Required	0	0											
non S	Communic		Communication IIA	1				0	0									
Comr	ation II		Communication IIB	1				0	0									
	Initial Foreign Languages (Select one language from German, French, Spanish,	2	1 subjects from Basic language I	1	Compuls ory	0												
	Russian, Chinese, Korean and Arabic)	2	1 subjects from Basic language II	1	elective													
	Information and Data Science Courses	2	Introduction to Information and Data Sciencies	2	Required		0											
	Health and Sports Cou	. 2		1or2	Compuls ory elective	0	0	0	0									
			CalculusI	2			0											
			CalculusII	2					0									
			Linear AlgebraI	2		0												
			Linear AlgebraII	2				0										
			Seminar in Basic Mathematics I	1	Required		0											
			Seminar in Basic Mathematics II	1					0									
			General Mechanics I	2		0												
			General Mechanics II	2				0										
			Experimental Methods and Laboratory Work in Physics I (Note 4)	1				0										
			Experimental Methods and Laboratory Work in Physics $\Pi(\text{Note 4})$	1					0									
Fre	ee elective subjects	6	From all Subject Type (Note 5)		Free elective	\triangle	\triangle	\triangle	Δ									

- Note 1: When students fail to acquire the credit during the term or semester marked with \bigcirc , \bigcirc , \triangle 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. Please be sure to check the time schedule for Liberal Arts
- 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 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 Foreign Language in Liberal Arts Education in the student handbook.
- Note 4: Students must take both \lceil Experimental Methods and Laboratory Work I (1 credit) \rfloor and \lceil Experimental Methods and Laboratory Work II (1 credit) \rfloor .
- Note 5: You should take subjects from the Area courses in Natural Sciences and Basic subjects.

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Liberal Arts Education Subjects

Required subject Compulsory elective subje Free elective subject

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Cluster 2 Specialized Subjects

(Program of Electrical, Systems and Information Engineering)

Required subject

Compul sorvel ective subject

			1								/*		Fre	e e	el ec	ct i y	ve	sub	<u>i ect</u>
		urse	Class Hours/Week Start grade 2nd grade 3rd grade 4th grade																
Class Subjects	Credits	e of courgistration	1st grade Spring Fall				2nd grade Spring Fall			ll .				4th grade				Note	
	Cr	Type of course registration																	
		Ι (1T	2T	3Т	4T	1T	2T	3Т	4T	1T	2T	3T	4T	1T	2T	3T	4T	
Electromagnetism I	2	\bigcirc					4												
Electromagnetism II	2	Δ							4										
Exercise of Electromagnetism I	1	Δ					4												
Exercise of Electromagnetism II	1	\triangle							2										
High-voltage Engineering	1	\triangle											2						
Introduction to Semiconductor Devices and Circuits*	2	\triangle						(4)				4							
Electric and Electronic Measurements	2	\triangle									4								
Electric Transient Phenomena	2	\bigcirc							4										
Circuit Theory II	2	0						4											
Electronic Circuits	2	0								4									
Exercise of Electric Circuit	1	0						2											
Electric Energy Generation and Conversion	2	0								4									
Fundamentals of Power Systems	2	\bigcirc									4								
Power System Engineering	2	\bigcirc												4					
Power Electronics and Motor Control Application	2	Δ												4					
Nuclear Engineering	2	Δ												4					
Regulations for Electrical Facilities	1	Δ															2		
Control Systems Engineering I	2	0						4											
Control Systems Engineering II	2	0								4									
Signal Processing Engineering	2	0										4							
Exercises in Measurement and Control Engineering	1	0							2										
Bioelectrical Engineering	2	\bigcirc										4							
Robotics	2	\bigcirc										-	4						
Communication Engineering	2	\wedge										4	_						
Mathematical Programming	2	0					4					1							
Fundamentals of Probability Theory	2	0					1			4									(School of Informatics
Simulation Engineering	2	0							4	4									and Data Science)
Exercises in Systems Planning and Control	-	0							4			2							
Decision Making	2	0												1					
Production Control	2												1	4					
		^									4		4						
Social System Engineering	2	\triangle					4				4								(School of Informatics
Logic System Design	2	Δ					4	(4)				4							and Data Science) (School of Informatics
Software Engineering I *	2	\triangle						(4)				4							and Data Science) (School of Informatics
Introduction to Artificial Intelligence	2	\triangle					4												and Data Science)
Computer Network	2	Δ												4					(School of Informatics and Data Science)
Algorithms and Data Structures*	2	Δ							(4)				4						(School of Informatics and Data Science)
Human Computer Interaction	2	Δ											4						(School of Informatics and Data Science)
Theory of Computing	2	Δ									4								(School of Informatics and Data Science)
Stochastic Modeling*	2	Δ								(4)				4					(School of Informatics and Data Science)
Graduation Thesis	5	0																	

^{*)}Students can register 2nd grade or 3rd grade.

Academic Achievements in Electrical, Systems and Information Engineering Program The Relationship between Evaluation Items and Evaluation Criteria

		Excellent	Very Good	Good
(1)	The ethics and understanding about the relations between society and technology considered basically necessary for engineers.	Sufficiently understand relations between society and technology, and be able to behave with a sufficient sense of ethics.	Understand relations between society and technology at the standard level, and be able to behave with a standard sense of ethics.	Marginally understand relations between society and technology, and be able to behave with a minimum sense of ethics.
(2)	Basic knowledge of mathematics such as calculus and linear algebra, which is required for scientists/engineers.	Acquire and be able to utilize sufficient basic knowledge of mathematics such as calculus and linear algebra.	Acquire and be able to utilize standard basic knowledge of mathematics such as calculus and linear algebra.	Acquire and be able to utilize minimum basic knowledge of mathematics such as calculus and linear algebra.
(3)	Basic knowledge of theories and experimental methods of physics, which is required for scientists/engineers.	Acquire and be able to utilize sufficient basic knowledge of theories and experimental methods of physics.	Acquire and be able to utilize standard basic knowledge of theories and experimental methods of physics.	Acquire and be able to utilize minimum basic knowledge of theories and experimental methods of physics.
(4)	Comprehensive understanding and knowledge of technologies in electrical, systems, and information engineering. Also, basic knowledge which is common in these fields.	Sufficiently acquire and be able to utilize general common and basic knowledge of electrical, systems, and information engineering.	Sufficiently acquire and be able to utilize general common and basic knowledge of electrical, systems, and information engineering.	Marginally acquire and be able to utilize general, common and basic knowledge of electrical, systems, and information engineering.
(1)	Mathematical methods required for professionals in electrical, systems, and information engineering.	Sufficiently acquire and be able to utilize mathematical methods which are required for professionals in electrical, systems, and information engineering.	Acquire and be able to utilize mathematical methods which are required for professionals in electrical, systems, and information engineering, at the standard level.	Marginally acquire and be able to utilize mathematical methods which are required for professionals in electrical, systems, and information engineering.
(2)	Concepts, knowledge and methods which are the basis for studies related to electrical, systems, and information engineering.	Sufficiently acquire and be able to utilize concepts, knowledge and methods which are the basis for studies related to electrical, systems, and information engineering.	Aquire and be able to utilize concepts, knowledge and methods of electrical, systems, and information engineering, at the standard level.	Marginally acquire and be able to utilize concepts, knowledge and methods which are the basis for studies related to electrical, systems, and information engineering.
(3)	Ability to apply basic concepts, knowledge, and methods of electrical, systems, and information engineering to concrete/technical problems.		Acquire and be able to utilize standard abilities to apply basic concepts, knowledge, and methods of electrical, systems, and information engineering to concrete/technical nroblems.	Acquire and be able to utilize marginal abilities to apply basic concepts, knowledge, and methods of electrical, systems, and information engineering to concrete/technical problems.
(4)	Ability to solve practical issues and problems by conducting experiments, using numerical computation methods, and collecting relevant materials.	Acquire and be able to utilize sufficient abilities to solve practical issues and problems by conducting experiments, using mathematical methods, and collecting relevant materials.	Acquire and be able to utilize standard abilities to solve practical issues and problems by conducting experiments, using mathematical methods, and collecting relevant materials.	Acquire and be able to utilize marginal abilities to solve practical issues and problems by conducting experiments, using mathematical methods, and collecting relevant materials.
(5)	Ability to solve practical issues and problems by voluntarily making a plan, revising it, and utilizing basic and technical knowledge and methods.	Acquire and be able to utilize sufficient abilities to solve practical issues and problems by voluntarily making a plan, revising it, and utilizing basic and technical knowledge and methods.	Acquire and be able to utilize standard abilities to solve practical issues and problems by voluntarily making a plan, revising it, and utilizing basic and technical knowledge and methods.	Acquire and be able to utilize marginal abilities to solve practical issues and problems by voluntarily making a plan, revising it, and utilizing basic and technical knowledge and methods.

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Relationships between the evaluation items and class subjects Evaluation item: Total Comprehensive Abilities

(2) (3) (4)

Weight sed of sold sed of evaluation on evaluation in the items in the items. Knowledge/Understanding

(2) (3)

Ight verticate Weight ed values sed values of values of values of values for Abilities/Skills

(3)

Ight values sed values of evaluat of evaluat of evaluat of evaluation weighte (4) . values Subject type Class subjects n evaluat ion items in the ceauir Introduction to University Education 2 1semsester-1T 50 1 50 100 kequire Introductory Seminar for First-Y Peace Science Courses 100 Elective 1semsester-2T 4 rea Courses Courses in Arts and Humanities/Social Sc Elective lsemsester-1T 2semsester-3 100 1 100 Area Courses Courses in Natural Sciences Elective 100 1 100 100 1 100 1 100 1 100 100 100 Basic English UsageI Basic English UsageII require require 1semsester Intensive co CommunicationI reguire Communication 1 1semsester 100 1 100 Communication II 2semsester 100 1 100 Communication II Basic language I Basic language II 100 100 100 Elective Elective Require 1semsester-2T 100 1 100 1 1semsester-2T 100 100 100 100 1 2semsester 1semsester-2T Health and Sports Courses CalculusI Elective 100 100 require 100 CalculusII 2semsester-4T 1 кедине Linear AlgebraI 1semsester-1T 100 1 100 redbra Linear AlgebraII 2semsester-3T 100 100 100 100 100 Seminar in Basic Mathematics I Seminar in Basic Mathematics II 1semsester-2T 2semsester-4T 100 require 100 1 General Mechanics I 1semsester-1T Keduire General Mechanics II 2semsester-3T 100 100 Require Require Require 2semsester-3T 2semsester-4T 2semsester-3T 3semsester-1T 100 1 100 100 100 100 50 50 1 Applied Mathematics I 100 1 Applied Mathematics I 1 Applied Mathematics III 3semsester-2T 100 100 Discrete Mathematics I
Synthesis of Applied Mathe Engineering Mathematics A 2 Elective 5semsester-1T 100 1 100 Engineering Mathematics C Probability and Statistics Elective 4semsester-4T 100 100 100 1 100 Technical English 100 Require Electric Circuit Theory I 100 2semsester-3T 3semsester-2T 1 100 100 require Programming l kequire Programming II Programming III 4semsester-3T 50 1 50 1 100 50 50 100 100 50 regune Basic Experiments in Electrical Engineering II 2 4semsester 50 1 50 1 100 Keathire 5semsester 1 50 1 100 Elective Elective 6semsester 50 1 50 1 100 100 100 100 3semsester-1T 4semsester-3T 100 Electromagnetism Electromagnetism I Exercise of Electromagnetism I 50 1 50 1 Elective 3semsester-1T 50 1 50 1 Elective Elective Elective Exercise of Electromagnetism II 4semsester-3T 6semsester-3T 50 1 50 1 100 100 100 High-voltage Engineering
Introduction to Semiconductor Devices and 100 1 3semsester-2T) 5semsester-2 3semsester-2T Electric and Electronic Measurements 100 1 2 Elective 100 Elective kequire kequire 50 50 50 Electric Transient Phenomena 4semsester-3T 50 1 100 3semsester-2T 4semsester-4T 100 100 100 Circuit Theory II 50 50 Electronic Circuits Exercise of Electric Circuit require 3semsester-2T Elective Electric Energy Generation and Conversion Fundamentals of Power Systems 4semsester-4T 100 Elective 5semsester-1T 100 Power System Engineering
Power Electronics and Motor Control Appl 6semsester-4T 6semsester-4T 6semsester-4T 100 100 100 Elective Elective Nuclear Engineering Elective Elective Require Elective Require Regulations for Electrical Facilities 8semsester-3T 100 100 ntrol Systems Engineering I ntrol Systems Engineering II 50 50 100 100 50 50 Signal Processing Engineering 5semsester-2T 50 50 1 100 кедине 4semsester-3T 100 100 Bioelectrical Engineering Elective 5semsester-2T 6semsester-3T 100 100 100 Communication Engineering Mathematical Programming 100 50 1 100 100 2 Elective 5semsester-2T 3semsester-1T Required Required Elective Require Fundamentals of Probability Theory 2 4semsester-4T 50 50 1 100 100 100 Simulation Engineering Elective Decision Making 6semsester-4T 100 100 100 Production Control Elective 6semsester-3T 1 100 Social System Engineering Logic System Design Software Engineering I Introduction to Artificial Intelligence 100 Elective 5semsester-1T 3semsester-1T 100 100 100 100 50 Elective Elective 50 6semsester-3T 100 1 Elective Computer Network Elective 6semsester-4T 100 1 100 ims and Data Structures 100 50 50 Human Computer Interaction Elective 6semsester-3T 50 Theory of Computing 2 Elective 5semsester-1T 1 50 1 100 Elective Stochastic Modeling 50 50 100 4 semsester 4T , fisemsester 7 8 semsester Graduation Thesis 25 1 25 1 25 100

