

(3) School of Science and Engineering Bachelor's Program in Interdisciplinary Engineering

Foundation Subjects for Major (Required)

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
FJ20004	Linear Algebra I	4	3.0	1	Fall/ABC	Wed4, 5	3A213	Xiao-Min Tong	This course introduces the basic ideas of vector, matrix and their operations and how to solve linear equations using matrices and vectors. The primary goal of this course is to understand the systems of linear equations, classifications of matrices and their applications. Although most of the problems can be solved without Mathematica, you are encouraged to solve the homework using the software once you know how to solve the problems. The course is a prerequisite for "Linear Algebra II"	Lectures are conducted in English.
FJ20014	Linear Algebra II	4	3.0	1	Spr/ABC	Wed4, 5		Sonia Sharmin	Following "Linear Algebra I", "Linear Algebra II" will also concentrate on the basics of linear algebra. Emphasis will be given to topics that will be useful in other disciplines, such as determinants, eigenvalues, positive definite matrices, Fourier series and the Fast Fourier Transform. Some homework problems may require you to use a program such as MATLAB or Mathematica, an important tool for numerical linear algebra. No previous programming experience is required.	Lectures are conducted in English.
FJ20104	Calculus I	4	4.0	1	Fall/AB	Tue1, 2 Thu5, 6	3A311	Nobuyuki Sano	This course along with the subsequent course "Calculus II" introduces the basic tools of calculus and develops their technical competence. The primary goal of this course is to understand the concept and to build up a working ability of various mathematical manipulations such as derivatives, integrals, differential equations, parametric representations, polar coordinates, etc. This is efficiently achieved by visualization, numerical and graphical experimentations and, thus, students are required to be acquainted with Mathematica (or similar ones) during the course as working exercises and homework problems. This course as well as "Calculus II" provides a core and practical knowledge required for many scientific courses you shall take hereafter in the IDE program.	Lectures are conducted in English.
FJ20114	Calculus II	4	4.0	1	Spr/AB	Tue5, 6 Thu4, 5	3A311	Nobuyuki Sano	Following the "Calculus I", this course also introduces the basic tools of calculus and develops their technical competence, namely, differential equation, infinite series, vector calculus, spherical coordinate system, and partial derivatives etc. This is achieved again by visualization, numerical and graphical experimentations and, thus, students are required to be acquainted with Mathematica (or similar ones) during the course as working exercises and homework problems. This course as well as "Calculus I" provides a core and practical knowledge required for many scientific courses you shall take hereafter in the IDE program.	Lectures are conducted in English.
FJ20201	Probability and Statistics	1	2.0	1	Fall/C	Tue/Thu 1, 2	3A213	Monirul Muhammad Islam	This course introduces basics of probability theory and statistics. This course will be mainly oriented to interpret physical problems in engineering and natural sciences through application of probability theory and statistics. Evaluation will be done through class quiz, homework on regular basis, and final examinations.	Lectures are conducted in English.
FJ22004	Electromagnetism I	4	3.0	2	Fall/ABC	Wed2, 3	3A214	Toshiaki Hattori	This course introduces the basic ideas of electromagnetism. The course is a prerequisite for "Electromagnetism II".	Lectures are conducted in English.
FJ22014	Electromagnetism II	4	3.0	-						Lectures are conducted in English. Not open in 2020.

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FJ25101	Electrical Circuit	1	2.0	2	FallAB	Tue5, 6	3A212	Toru Takahashi, Hirotaka Osawa	A lecture is given on basic knowledge and analysis methods of electrical and electronic circuits, including linear passive elements, sinusoidal alternating current and complex number, impedance and admittance, resonant circuits, mutual induction circuits, bridge circuits, filters, general circuit theorems, and AC power.	Lectures are conducted in English.
FJ26004	Mechanics I	4	2.0	1	FallAB	Mon5, 6	3A213	Akihiro Matsuda	Primary goals of Mechanics I is to develop students' ability to (i) analyze problems in a simple and logical manner and (ii) apply basic principles to find their solutions. This course reviews such fundamental concepts as coordinate, time, mass, force and energy for a particle. The students are required to solve exercises and work on homework assignments.	Lectures are conducted in English.
FJ26014	Mechanics II	4	2.0	1	SprAB	Mon5, 6		Masamichi Kawai, Gaku Shoji	Following "Mechanics I", "Mechanics II" will also concentrate on the basics of mechanics. Emphasis will be given to topics that will be useful in other disciplines, such as systems of particles, statistics and dynamics of rigid body and principles about analytical vector mechanics.	Lectures are conducted in English.
FJ26104	Thermodynamics I	4	2.0	2	FallAB	Tue3, 4	3A213	Akiko Kaneko	Thermodynamics is one of the essential physics to discuss energy conservation for engineer in various fields. The aim of this lecture is to master the basics of the first and second laws of thermodynamics. The specific goal is to be able to appropriately express the first law of thermodynamics for the system, to be able to discuss changes in entropy based on the second law of thermodynamics, and to combine these basic matters. The heat efficiency of the heat engine can be derived.	Lectures are conducted in English.
FJ26114	Thermodynamics II	4	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ27004	Programming I	4	2.0	1	SprAB	Fri1, 2		Takehito Utsuro	This course, introduction to programming, is focused on the first steps in C language. Topics that will be covered include fundamentals of programming languages applicable to general engineering systems.	Lectures are conducted in English. Only for IDE students
FJ27014	Programming II	4	1.0	1	SprC	Fri1, 2		Itaru Kitahara	[Overview] Learn the basics of programming in C-language. [Objective] Develop the ability to process information well using computers.	Lectures are conducted in English. Only for IDE students
FJ27024	Programming III	4	2.0	2	FallAB	Tue1, 2	3L202, 3L504	Tsutomu Maruyama	Introduction to algorithm, data structure and computational complexity; Writing C program: Programming techniques	Lectures are conducted in English. Only for IDE students
FJ27034	Programming IV	4	1.0	2	FallC	Tue1, 2	3L202, 3L504	Yoshinari Kameda	After Programming I - III, Learn C programming skill by coding basic computer graphics programs.	Lectures are conducted in English. Only for IDE students
FJ28003	Fundamental Labs I	3	2.0	2	FallABC	Mon3-5	3L103, 3L203, 3L204, 3L205	Yasushi Nakauchi	Fundamental labs for the basics of Engineering Systems. The labs consist of 6 themes. Each theme be concluded in 2 weeks.	Lectures are conducted in English. Only for IDE students

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FJ28013	Fundamental Labs II	3	2.0	-						Lectures are conducted in English. Not open in 2020. Only for IDE students

Major Subjects (Required)

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FJ10001	Complex Analysis	1	3.0	2	Fall/ABC	Tue1,2	3A214	Monirul Muhammad Islam	This course introduces theories for functions of a complex variable. Students will acquire skill to use complex derivatives function, to have knowledge about integration in the complex plane, use of Cauchy integral theorem, power series, to evaluate complicated real integrals via residue calculus etc.	Lectures are conducted in English.
FJ10101	Applied Mathematics	1	3.0	-						Lectures are conducted in English. Not open in 2020.
FJ11001	Engineering Ethics	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ11101	Introduction to Interdisciplinary Engineering I	1	1.0	1	Fall/AB	Tue5	3A214	Tsutomu Maruyama	This course discusses issues relevant to Engineering Systems and aims to help students grasp general concepts involved in this field of study.	Lectures are conducted in English.
FJ11111	Introduction to Interdisciplinary Engineering II	1	1.0	1	Spr/AB	Tue1		Muneaki Hase, Kiyoto Matsuishi	This course discusses issues relevant to Engineering Sciences and aims to help students grasp general concepts involved in this field of study.	Lectures are conducted in English.
FJ12001	Modern Physics	1	3.0	-						Lectures are conducted in English. Not open in 2020.
FJ15001	System Modeling	1	2.0	2, 3	Spr/AB	Wed1,2		Noriyuki Hori	This course introduces fundamental concepts and techniques in building linear, time-invariant, state-space models of typical engineering systems, including translational and rotational mechanical systems, electrical and electronic circuits, thermal systems, fluid systems, and transducers. Analogies are drawn among these systems in different energy domains based on such concept as the across and the through variables, as well as their energy storages and dissipaters. Response characteristics of standard first and second-order systems are explained, as a prelude to control system designs.	Lectures are conducted in English.
FJ15101	Electronic Circuits	1	2.0	-						Lectures are conducted in English. Not open in 2020.
FJ18003	Advanced Labs I	3	2.0	-						Lectures are conducted in English. Not open in 2020. Only for IDE students
FJ18013	Advanced Labs II	3	2.0	-						Lectures are conducted in English. Not open in 2020. Only for IDE students
FJ19003	Interdisciplinary Engineering PBL I	3	6.0	-						Lectures are conducted in English. Not open in 2020. Only for IDE students
FJ19013	Interdisciplinary Engineering PBL II	3	6.0	-						Lectures are conducted in English. Not open in 2020. Only for IDE students

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FJ19023	Interdisciplinary Engineering PBL III	3	6.0	-						Lectures are conducted in English. Not open in 2020. Only for IDE students
FJ19033	Interdisciplinary Engineering PBL IV	3	6.0	-						Lectures are conducted in English. Not open in 2020. Only for IDE students

Major Subjects(Core Electives)

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
FJ12101	Statistical Physics I	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12111	Statistical Physics II	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12121	Statistical Physics III	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12201	Quantum Mechanics I	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12211	Quantum Mechanics II	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12221	Quantum Mechanics III	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12301	Advanced Electromagnetism I	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12311	Advanced Electromagnetism II	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12321	Advanced Electromagnetism III	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12401	Solid State Physics I	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12411	Solid State Physics II	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ12421	Solid State Physics III	1	1.0	-						Lectures are conducted in English. Not open in 2020.
FJ15011	Control Systems I	1	2.0	-						Lectures are conducted in English. Not open in 2020.
FJ15021	Control Systems II	1	2.0	-						Lectures are conducted in English. Not open in 2020.
FJ16001	Fluid Dynamics I	1	3.0	-						Lectures are conducted in English. Not open in 2020.