

(2) School of Life and Environmental Sciences:
Interdisciplinary Program in Life and Environmental Sciences

School of Life and Environmental Sciences

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG00112	Technical English IS	2	1.5	2	SprABC	Wed5	2B507, 2B508	DeMar Taylor, Mayuri Yamaguchi	This course aims to help students develop abilities necessary for science communication in English.	Lectures are conducted in English.
EG00122	Technical English IF	2	1.5	2	FallABC	Wed5	2B507, 2B508	DeMar Taylor, Mayuri Yamaguchi	This course aims to help students develop abilities necessary for science communication in English.	Lectures are conducted in English.
EG00212	Technical English IIS	2	1.5	3	SprABC	Wed4	2B507, 2B508	DeMar Taylor, Louis John Irving, Mayuri Yamaguchi	This course aims to help students develop abilities necessary for science communication in English.	Lectures are conducted in English.
EG00222	Technical English IIF	2	1.5	3	FallABC	Wed4	2B507, 2B508	DeMar Taylor, Louis John Irving, Mayuri Yamaguchi	This course aims to help students develop abilities necessary for science communication in English.	Lectures are conducted in English.
EG02011	Physics	1	1.0	1	FallAB	Thu4	2C407	Marcos Antonio das Neves, Mito Kokawa	Introduction to physics for life and environmental sciences. Basic areas of mechanics, thermodynamics, and waves will be covered.	Lectures are conducted in English.
EG02021	Mathematics	1	1.0	1	FallAB	Fri5	2G205	Ahamed Tofael	Introduction to mathematics for life and environmental sciences covers application of calculus using applied differentiation and integration, logarithmic and exponential functions, first order differential equations, matrix and probability. This course emphasizes to solve problems related to life and environmental sciences using a wide array of mathematical solutions.	Lectures are conducted in English.
EG02023	Field Studies in Life and Environmental Sciences	3	1.0	1	Sum Vac	Intensive		DeMar Taylor, Louis John Irving, Seung Won Kang, Thomas Parkner	A two-day seminar on life in Tsukuba and studying in the International Undergraduate Program in the School of Life and Environmental Sciences.	Lectures are conducted in English. 本年度開講中止
EG02024	Field Studies in Life and Environmental Sciences	4	1.0	1	Sum Vac	Intensive		DeMar Taylor, Louis John Irving, Seung Won Kang, Akio Yamashita, Shigehiro Fujino	A two-day seminar on life in Tsukuba and studying in the International Undergraduate Program in the School of Life and Environmental Sciences.	Lectures are conducted in English.
EG02031	Statistics	1	1.0	2	FallC	Tue2 Thu2	2C102 2D202-203	Louis John Irving	Introduction to statistics for life and environmental sciences.	Lectures are conducted in English.
EG02041	Advanced Mathematics	1	1.0	2	SprAB	Thu6	2G205	Ahamed Tofael	In this course, students will have a short review of applied calculus and introduces with the advanced mathematics sections like geometrical meaning of differential equations, solution of ordinary and partial differential equations, numerical analysis and Laplace transformation. These advanced mathematical skills will be invaluable to them to interpret the concepts of modeling of real world problems related to life and environmental sciences.	Lectures are conducted in English.
EG02111	Introduction to Biology I	1	1.0	1	FallAB	Fri3	2C102	Louis John Irving, DeMar Taylor	Introduction to biochemistry and cytology.	Lectures are conducted in English.
EG02141	Introduction to Biology IV	1	1.0	1	FallC	Thu4 Fri3	2C102	Katsuo Furukubo-Tokunaga	Introduction to Genetics and Heredity	Lectures are conducted in English.
EG02151	Introduction to Biology V	1	2.0	2	SprAB	Wed3 Fri4	2C410	Louis John Irving	Diversity of Life	Lectures are conducted in English.
EG02211	Chemistry I	1	1.0	1	FallA	Tue/Fri6	2D303	Seung Won Kang	Introduction to general chemistry for life and environmental sciences.	Lectures are conducted in English.
EG02221	Chemistry II	1	1.0	1	FallB	Tue/Fri6	2D303	Seung Won Kang	Introduction to general chemistry for life and environmental sciences.	Lectures are conducted in English.
EG02231	Chemistry III	1	1.0	1	FallC	Tue4 Thu5	2D303	Seung Won Kang	Introduction to general chemistry for life and environmental sciences.	Lectures are conducted in English.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG03012	Paper Preparation and Presentation	2	1.0	4	Fall/C	by appointment		DeMar Taylor	Preparation and help in writing the graduation thesis which is required towards the end of your fourth year. Also, preparation for the presentation of your results during the Presentation Meeting of all the graduation theses.	For students who started graduate research in spring semester Lectures are conducted in English.
EG03022	Paper Preparation and Presentation	2	1.0	4	Spr/AB	by appointment		DeMar Taylor	Preparation and help in writing the graduation thesis which is required towards the end of your fourth year. Also, preparation for the presentation of your results during the Presentation Meeting of all the graduation theses.	For students who started graduate research in fall semester Lectures are conducted in English.

College of Biological Sciences

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG10013	Basic Biological Sciences, Laboratory	3	1.0	2	Spr/C	Intensive	2D413, 2B301	Takeshi Nakayama, Louis John Irving, Kazuo Watanabe, Michiyuki Ono, Ayumi Minoda, Katsuo Furukubo-Tokunaga, Ken Honjo, Shinichi Miyamura, Kentaro Nakano, Kazuichi Sakamoto	This course aims to train the ability of the observation and the experimental technique on the various biological phenomena	Limited to G30 students. Introduction to Biology I-V are prerequisite for non-Bio students. Lectures are conducted in English. 7/8-7/12 学研災に加入していること。
EG11882	Biology Seminar	2	1.0	3	Spr/AB	by appointment		Dean and others	Under the instruction of their supervisor, students read papers on topics related to their graduation research and write a mini-review.	for Students in Biology Lectures are conducted in English.
EG11892	Biology Seminar	2	1.0	3	Fall/C, Spr/Vac	by appointment		Dean and others	Under the instruction of their supervisor, students read papers on topics related to their graduation research and write a mini-review.	for Students in Biology Lectures are conducted in English.
EG11912	Research Seminar I	2	1.0	4	Spr/AB	by appointment		Dean and others	Topics in biology will be discussed with laboratory members and supervisor.	
EG11922	Research Seminar II	2	1.0	4	Spr/C, Fall/A	by appointment		Dean and others	Topics in biology will be discussed with laboratory members and supervisor.	
EG11932	Research Seminar III	2	1.0	4	Fall/B/C	by appointment		Dean and others	Topics in biology will be discussed with laboratory members and supervisor.	
EG11968	Graduation Research	8	6.0	3, 4	Annual	by request		Dean and others	Each student engages in research work in laboratory on specific theme under supervisor.	
EG11978	Graduation Research I	8	3.0	4	Fall Semester	by request		Dean and others	指導教員の指導のもとに、テーマを設定して研究を進めることを通して、自ら問題を解決する基礎的な能力を修得させる。	
EG11988	Graduation Research II	8	3.0	4	Spr/ABC	by request		Dean and others	指導教員の指導のもとに、テーマを設定して研究を進めることを通して、卒業研究Iで修得した能力を深化させる。	
EG20014	Programming I	4	1.0	2, 3	Fall/AB	Thu1	2D204	Yukihiko Tokunaga (Toquenaga)	In this lecture, students learn programming techniques for manipulating a variety of data. They will also learn simulation techniques with individual-based models. The programming language used is Ruby.	Identical to EB60014. Lectures are conducted in English. 情報コース JTP
EG20211	Plant Taxonomy I	1	1.0	2, 3	Spr/AB	Fri2	2C404	Ken-ichiro Ishida	Diversity, classification, morphology, ultrastructure, life history and phylogeny of non-green algae - glaucophytes, rhodophytes, cryptophytes, chlorarachniophytes, euglenophytes, dinoflagellates, haptophytes, and stramenopiles.	Identical to EB50211. Lectures are conducted in English. 多様性コース I・II・IIIを通年で履修することが望ましい。 JTP

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG22011	Genome Biology I	1	1.0	2, 3	SprAB	Tue1	2B412	hidekazu kuwayama	Lectures will cover basic knowledge on the structure and function of the genome, as well as technologies for DNA and genome analyses.	Identical to EB62011. Lectures are conducted in English. 情報コース JTP
EG22911	Marine Biology I	1	1.0	2, 3	SprAB	Wed3	2B411	Kazuo Inaba, Sylvain Leonard Georges Agostini	Lecture will give you several topics on physical, chemical and biological properties of ocean to understand the physiology, reproduction, development, biodiversity and ecology of marine invertebrates and fish. This class will especially focus on the following aspects of marine life: life cycle, locomotion, sensory reception, biomineralization, biogeochemical distribution, photosynthesis, respiration, calcification, nitrogen fixation and the impact of climate change. We will give examples of marine organisms under planktonic and benthic conditions and coral reef. The history and present situation of marine biology research will be also included.	Identical to EB72911. Lectures are conducted in English. 分子細胞コース JTP
EG23131	Biotechnology Literacy	1	1.0	2, 3	FallIC	Intensive	2C410	Kazuo Watanabe, Akira Kikuchi, Michiyuki Ono, Taichi Oguchi	Topics covering ethical, legal and social issues in life & environmental sciences.	Identical to EB83161. Lectures are conducted in English. 応用生物コース JTP CDP G-course EB83131修得者の履修は認めない。
EG24111	Plant Physiology I	1	1.0	2, 3	SprAB	Fri1	2B411	Shinobu Satoh, Jun Furukawa, Kenji Miura, Louis John Irving, Michiyuki Ono	In this lecture, the relationship between various physiological phenomena and the environmental factors in the life history of higher plant will be overviewed for the understanding from the viewpoint at whole plant to cell levels with adding the latest molecular biological findings.	Identical to EB74111. Lectures are conducted in English. 分子細胞コース JTP
EG24211	Metabolic and Physiological Chemistry I	1	1.0	2, 3	SprAB	Thu1	2B508	Iwane Suzuki	The main topics for this course will be photosynthetic energy conversion, primary and secondary carbon metabolism including C3, C4 and CAM metabolisms, photorespiration, and mitochondrial respiration.	Identical to EB74211. Lectures are conducted in English. 分子細胞コース JTP
EG30153	Animal Systematics, Laboratory II	3	1.5	2, 3	SprB	Mon4-6 Tue4, 5 by appointment	2B403	Hiroshi Wada, Yoshiaki Morino	In this course you learn about comparative anatomy of echinoderms (sea urchin, starfish and sea cucumber), molluscs (bivalves, gastropods, and cephalopods), and chordates (lamprey, amphioxus and ascidians). You also observe embryogenesis for some species, and learn evolution of larval forms.	Identical to EB50153. Lectures are conducted in English. Approval following the registration arrangement. 多様性コース 学研災に加入していること。 Will be registered by the office.
EG30221	Plant Taxonomy II	1	1.0	2, 3	FallAB	Fri2	2B309	Takeshi Nakayama	Diversity, classification, morphology, ultrastructure, life history and phylogeny of green plants, including chlorophytes and land plants.	Identical to EB50221. Lectures are conducted in English. 多様性コース I・II・IIIを過年で履修することが望ましい。 JTP

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EG30263	Plant Systematics, Laboratory II	3	1.5	2, 3	SprB	Thu4, 5 Fri4-6 by appointment	2D417	Ken-ichiro Ishida, Takeshi Nakayama	Collecting, observing, identifying and culturing unicellular freshwater protists (algae and protozoa). Students will use light and electron microscopes and a few basic molecular techniques.	Prerequisite: Introduction to Biology I-IV, Plant Taxonomy I. Identical to EB50263. Lectures are conducted in English. Approval following the registration arrangement. 多様性コース 学研災に加入していること。 Will be registered by the office.
EG32131	Chemical Ecology	1	1.0	2, 3	FallAB	Fri4	2C107	Yooichi Kainoh, Shigeru Matsuyama, Keiko Yamaji, Tomoyuki Yokoi, Matsuko Kinoshita	This lecture introduces chemical aspects of relationships between individual insects, animals, plants and microorganisms of the same (pheromone) or different (allelochemicals) species.	Identical to EB82131. Lectures are conducted in English. 応用生物コース JTP
EG32921	Marine Biology II	1	1.0	2, 3	FallAB	Wed3	2B508	Kazuo Inaba, Yasunori Sasakura, Shunsuke Yaguchi, Kogiku Shiba, Hiroaki Nakano, Shigeki Wada, Koetsu Kon, Takeo Horie, Sylvain Leonard Georges Agostini	Lecture will provide several topics on marine organisms, including fertilization, cilia and flagella, gene-manipulation, development, self-non-self recognition, evolution, animal behavior, population ecology and marine environment. The teaching staff of Shimoda Marine Research Center will tell you about recent progress of their own research.	Identical to EB72921. Lectures are conducted in English. 分子細胞コース JTP
EG33111	Plant Biotechnology I	1	1.0	2, 3	SprC	Intensive	2C102	Kazuo Watanabe, Akira Kikuchi, Michiyuki Ono	Lectures will cover topics on plant biotechnology including control of flowering time, circadian rhythms, photoperiodic responses, organ size and responses to environmental stresses.	Identical to EB83141. Lectures are conducted in English. 応用生物コース JTP Who has credit of EB83111 is ineligible.
EG34021	Biometry II	1	1.0	2, 3	FallAB	Fri3	2D202	Yukihiko Tokunaga (Toquenaga)	This lecture introduces the dark side of statistics. Starting with randomization techniques, students learn relationships among different domains of statistical ideas: parametric, nonparametric, null hypothesis significance testing, information-theoretic methods, and the Bayesian methods.	Identical to EB64021. Lectures are conducted in English. 情報コース JTP
EG34111	Theoretical Ecology	1	1.0	2, 3	SprAB	Thu1	2D204	Yukihiko Tokunaga (Toquenaga)	This course illustrates theoretical aspects of ecology with examples of laboratory experiments to connect mathematical expressions with ecological phenomena in nature.	Identical to EB64111. Lectures are conducted in English. 情報コース JTP
EG34131	Plant Physiology II	1	1.0	2, 3	FallAB	Fri1	2B411	Hiroaki Iwai, Takuya Suzuki	This lecture introduces several important topics for your further understanding of plant physiology, which includes recent advances in the research of vegetative and reproductive development, and symbiosis with microorganisms in higher plants.	Identical to EB74131. Lectures are conducted in English. 分子細胞コース JTP

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EG34163	Plant Physiology. Laboratory	3	1.5	2, 3	FallA	Mon4-6 Tue4, 5 by appointment	2D413	Hiroaki Iwai, Shinobu Satoh, Jun Furukawa, Louis John Irving	This course aims to provide an understanding of the roles of hormones, proteins, polysaccharides and genes in plant development and functions. It also covers basic laboratory skills for plant physiology and molecular biology.	Including recombinant DNA experiments. Prerequisite: Introduction to Biology I-IV. Plant Physiology I. Training session for the registration of the students engaged in recombinant DNA experiments. Identical to EB74163. Approval following the registration arrangement. 分子細胞コース 遺伝子組換え実験を含む 学研炎に加入していること。 Will be registered by the office.
EG34221	Metabolic and Physiological Chemistry II	1	1.0	2, 3	FallAB	Thu1	2B508	Ayumi Minoda, Louis John Irving	Nitrogen metabolism, sulfur metabolism, metabolic regulatory mechanisms and the function of trace metals in cellular metabolism are main topics. The main topics for this course will be acclimation process of cellular and energy metabolisms response to the changes in intracellular and extracellular environments. It will be discussed about response and regulations of gene expression, enzymatic reaction, transport and signal transduction system.	Identical to EB74221. Lectures are conducted in English. 分子細胞コース JTP Who has credit of EB74231 or EG34231 is ineligible.
EG34273	Metabolic and Physiological Chemistry. Laboratory	3	1.5	2, 3	FallA	Thu4-6 Fri4, 5 by appointment	2D410	Iwane Suzuki, Ayumi Minoda	Experimental measurements of gas metabolism in photosynthesis, photorespiration and respiration, and glycolate metabolism by microalgae. Mechanisms for acclimation to CO2 stress, N-limitation and P-limitation at molecular level in microalgae. Analysis of the function of selenium in marine coccolithophorids using radioactive Se-125.	Prerequisite: Introduction to Biology I-IV. Metabolic and Physiological Chemistry I. Identical to EB74273. Approval following the registration arrangement. 分子細胞コース 学研炎に加入していること。 Will be registered by the office.
EG35031	Molecular Developmental Genetics	1	1.0	2, 3	FallAB	Fri3	2B208	Katsuo Furukubo-Tokunaga	Study of the mechanism of development is one of the most fascinating areas in current biology. This lecture focuses on the genetic programs that are conserved from fly to human beyond apparent morphological diversity. It also introduces fundamental aspects of nervous system development including network and synaptic plasticity that are essential to higher brain functions such as memory.	Identical to EB72131. Lectures are conducted in English. 分子細胞コース 人間生物コース JTP
EG35153	Molecular Biology. Laboratory	3	1.5	2, 3	SprA	Thu4, 5 Fri4-6 by appointment	2D413	Kazuichi Sakamoto, Tomoki Chiba, Fuminori Tsuruta, 伴 佐藤	Feeding RNAi法による線虫の遺伝子発現阻害実験、マウス胎児を使用した発現解析実験、細胞におけるストレス応答など分子細胞生物学の実験手法を習得する。	Identical to EB71153. Lectures are conducted in English. Approval following the registration arrangement. 分子細胞コース 遺伝子組換え実験を含む 学研炎に加入していること。 Will be registered by the office.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG36013	Laboratory and Field Studies in Marine Biology	3	1.5	2, 3	Spr Vac	Intensive	Shimoda	Shunsuke Yaguchi, Hiroaki Nakano, Shigeki Wada, Sylvain Leonard Georges Agostini	This course aims to understand biodiversity through the collection of coastal and planktonic marine organisms and observation of their body plan and development.	Identical to EB16013. Lectures are conducted in English. 3/9-3/13 Approval following the registration arrangement. 学研炎に加入していること。 Will be registered by the office. Prerequisite: Introduction to Biology I-IV, Marine Biology I.
EG39101	Protistology	1	1.0	2, 3	Fall C	Fri 2, 3	2B412	Ken-ichiro Ishida, Yosuke Degawa, Osamu Numata, Hidekazu Kuwayama, Shinichi Miyamura	Topics in protistology. Cellular evolution, cell biology, sex and reproduction, phylogeny and ecology of protists will be the subjects of this lecture.	Identical to EB59101. Lectures are conducted in English. 多様性コース JTP

College of Agro-Biological Resource Sciences

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG41012	Research Seminar I	2	1.5	4	Spr ABC	by request		Dean and others	Topics in agro-biological resource sciences will be discussed with laboratory members and supervisor.	For students who start a graduation research from Spring Semester. Lectures are conducted in English.
EG41022	Research Seminar II	2	1.5	4	Fall ABC	by request		Dean and others	Topics in agro-biological resource sciences will be discussed with laboratory members and supervisor.	For students who passed EG41012 or EG41032. Lectures are conducted in English.
EG41032	Research Seminar I	2	1.5	4	Fall ABC	by request		Dean and others	Topics in agro-biological resource sciences will be discussed with laboratory members and supervisor.	For Students who start a graduation research from Fall Semester. Lectures are conducted in English.
EG41042	Research Seminar II	2	1.5	4	Spr ABC	by request		Dean and others	Topics in agro-biological resource sciences will be discussed with laboratory members and supervisor.	For students who passed EG41012 or EG41032. Lectures are conducted in English.
EG41078	Graduation Research I	8	3.0	4	Spr ABC	by request		Dean and others	Each student engages in research work in laboratory on specific theme under supervisor.	Lectures are conducted in English. For students who start the graduation research from Spring Semester. Required a special permission by the Dean of the college of Agro-Biological Resource Sciences.
EG41088	Graduation Research II	8	3.0	4	Fall ABC	by request		Dean and others	Each student engages in research work in laboratory on specific theme under supervisor.	Lectures are conducted in English. For students who passed EG41098 or EG41078. Required a special permission by the Dean of the college of Agro-Biological Resource Sciences.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG41098	Graduation Research I	8	3.0	4	FallABC	by request		Dean and others	Each student engages in research work in laboratory on specific theme under supervisor.	Lectures are conducted in English. For Students who start the graduation research from Fall Semester.
EG41108	Graduation Research II	8	3.0	4	SprABC	by request		Dean and others	Each student engages in research work in laboratory on specific theme under supervisor.	Lectures are conducted in English. 14条対応 For students who passed EG41098 or EG41078.
EG50011	World Food and Agriculture	1	1.0	1	FallAB	Fri2	2C102	Seung Won Kang	This course introduces crop plants, domestic animals and their production in the world, in relation to economic and environmental issues.	Lectures are conducted in English.
EG50013	Agricultural Internship Abroad I	3	2.0	2, 3	Annual	by appointment		Nakao Nomura, Dean and others	Field study program in Asian foreign countries under 3 objectives: 1) To learn overview on agriculture and related industries 2) To discuss current issues related agriculture through seminars with local students 3) Field survey of the agricultural sites in the local areas	(インターンシップ) 国外 Identical to EC41013. Lectures are conducted in English. CDP
EG50023	Agricultural Internship Abroad III	3	2.0	2, 3	Annual	by appointment		Nakao Nomura, Dean and others	Field study program in European countries under 3 objectives: 1) To learn overview on agriculture and related industries 2) To discuss current issues related agriculture through seminars with local students 3) Field survey of the agricultural sites in the local areas	Lectures are conducted in English. Identical to EC41133. CDP
EG50031	Cell Structure and Function	1	1.0	2, 3	FallAB	Fri5	2B309	DeMar Taylor	Lectures and discussions will concentrate on cell structure and function as related to 1) membranes, 2) mitochondria, 3) chloroplasts, 4) intracellular transport, 5) cell communication, 6) cell cycle and 7) cell communities.	Use English Textbook Identical to EC31251. Lectures are conducted in English. JTP
EG50033	Agricultural Internship Abroad IV	3	2.0	2, 3	Annual	by appointment		Dean and others, DeMar Taylor, Nakao Nomura	Field study program in North America under 3 objectives: 1) To learn overview on agriculture and related industries 2) To discuss current issues related agriculture through seminars with local students 3) Field survey of the agricultural sites in the local areas	Lectures are conducted in English. ユタ州立・スノー大学における短期研修。 Identical to EC41143. CDP
EG50041	Biochemistry	1	2.0	2, 3	SprAB	Thu4, 5	2C407	Keiji Kimura, Miyako Kusano, Daisuke Hagiwara, Yuko Shimada, Hiromi Yanagisawa	Advanced biochemistry covers a wide area including molecular cell biology, molecular genetics, biotechnology, metabolism, and relates all current biological sciences. In this year, experts of three major classes of the organisms (microorganisms, plants, animals) give lectures from the professional points of view. This course provides an introduction to biochemistry for the undergraduates who are able to learn basic to applied knowledge of life and environmental sciences.	Lectures are conducted in English.
EG50091	Disease Vector Biology	1	1.0	3	FallAB	Fri1	2D206	DeMar Taylor	Agricultural production of both animals and plants is greatly affected by the transmission of diseases through arthropod vectors. This course will provide a better understanding of arthropod disease vectors and the diseases they transmit.	Identical to EC31261. Lectures are conducted in English.
EG50163	Fundamental Chemistry Laboratory	3	1.0	2	FallAB	Fri4-6		Kosumi Yamada, Hideyuki Shigemori, Shin-ichi Kashiwabara, Junji Ishida, Kazuyoshi Ogawa, Akiko Nakagawa-Izumi, Nakao Nomura, Yingnan Yang, Yoko Nagumo, 俊介 樹尾	Chemical substances are existed around and within us everyday and everywhere. We will provide the students inorganic, physicochemical, and organic chemical property of them through the experiments. The students should be able to 1) separate, isolate, and identify chemical substances, 2) learn physicochemical property of them by analytical equipment, 3) know how to use labware and analytical equipment	平成24年度までの「化学実験」(EC12113)を履修済みの者は履修できない。10/5は2H101教室に集合すること。 Number of G30 students are limited to 12. Venue for orientation of G30 on 5th Oct.: TBA Identical to EC12163.

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EG50193	Fundamental Biology Laboratory	3	1.0	2	Fall/BC	Fri4-6		Koji Nomura, Seiichi Furukawa, Yosuke Yoshioka, Yasuhiro Ishiga, Ning Wang, Hitoshi Miyazaki, Hiroaki Daitoku, Daisuke Hagiwara, Hidehiko Hirakawa, Norio Takeshita, Shigeru Matsuyama, Yutaka Yawata	生物学の各分野から、生物資源学類に必要な観察・実験の項目を選んで実施し、生命現象の基本について理解させる。	Class enrollment onto TWINS should be done by the end of September. Identical to EC12173.
EG60041	Animal Production	1	1.0	3, 4	Spr/AB	Thu3	2D307	Atsushi Tajima	Animal production and grain production are two of the most important human inventions. In the present lecture, basic concepts of domestic animals production, i.e. animal husbandry, animal reproduction and animal nutrition will be covered.	Same as EC31081 Lectures are conducted in English.
EG60051	Biotechnology in Domestic Animals	1	1.0	3, 4	Fall/AB	Tue4	2C407	Tamas Somfai	The aim of the course is to provide basic information on the current status of biotechnology in domestic animals.	Open in an odd number year. Lectures are conducted in English.
EG60061	Animals and Animal Products in Human Life	1	1.0	3, 4					This course aims to provide an understanding on the basic principles of human-animal relationship. Topics on how animal and animal products contribute to the human life will be discussed.	Open in an even number year. Lectures are conducted in English.
EG60071	Food Functionality	1	1.0	3, 4	Fall/IC	Tue5, 6	2G407	Hiroko Isoda, Myra Orlina Villareal	Lectures will cover the topics in advanced food functionality including anti cancer, anti allergy, anti stress, anti obesity, neuronal regulation, melanogenesis regulation and the bioavailability of functional food factors.	Same as EC31391 Lectures are conducted in English.
EG60101	Soil Science	1	2.0	3, 4	Fall/IB	Intensive	2C310	Maki Asano	Fundamental aspects of soils with regard to their genesis, physicochemical properties, management and the related environmental issues will be lectured, and the discussion on some selected topics will be treated as more advanced understanding of present status of soils in the changing world.	Same as EC32161 Lectures are conducted in English.
EG60111	Environmental Ecological Engineering	1	1.0	3	Fall/AB	Wed3	2C410	Nakao Nomura	Lecture covers eco-engineering technologies to restore deteriorated environments including following major existing issues: 1) Rehabilitation of enclosed water bodies in terms of water and sediment quality improvement, 2) Biomass energy as a renewable energy and its effect on reduction of green house gas emission, 3) Impact of aquacultural industries on coastal environment including mangrove forest.	横断領域科目「環境」 Identical to EC32111. Lectures are conducted in English.
EG60121	Food Process Engineering	1	1.0	3, 4	Spr/AB	Wed3	2G305	Marcos Antonio das Neves, Mito Kokawa	This course introduces basic principles of fluid flow, heat transfer, and mass transfer phenomena, along with the application of these principles to the unit operations most commonly used in food processing, such as thermal processing, cooling, freezing, centrifugation, filtration, drying, size reduction and emulsification.	Same as EC42021 Lectures are conducted in English.
EG60161	Environmental Colloid Engineering	1	1.0	3, 4	Spr/C	Intensive	2K201	Yasuhiro Adachi	Applications of colloid and interface science to environmental issue and its basis are given. Focus will be placed on the flocculation which is important to control water quality.	Class is held in Seino-B201. It is recommended to take EG60421 together with this subject due to complementarity. EG60491 will also be helpful to understand this subject. Lectures are conducted in English.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG60191	Biomass Conversion	1	2.0	3, 4					This course is designed to help you develop and understanding of the complex processes of biomass conversion. Lectures and discussions will focus on biomass sources, biomass conversion technology and process.	Limited to G30 students. 10:00~18:00. Open in an even number year. Lectures are conducted in English.
EG60222	Seminar in Agrobiology and Forestry	2	2.0	3, 4					This seminar focuses on Agrobiological or Environmental sciences, aiming at providing the latest achievement of these science fields. A student studies the method of accessing suitable information, and also will be requested to reflect them for own research through a seminar.	Lectures are conducted in English. Not open in 2019.
EG60232	Seminar in Applied Biological Chemistry	2	2.0	3, 4	SprAB	Fri5, 6	2D403	Nakao Nomura	The purpose of the course is to introduce and discuss the applied life sciences related to biochemistry of plant molecules, molecular and developmental biology, biology for gene regulations, ecological molecular microbiology, biomimetic chemistry, bioreaction engineering.	Open in an odd number year. Lectures are conducted in English.
EG60252	Seminar in Agricultural Economics and Sociology	2	2.0	3, 4	Annual	Intensive		Hisato Shuto	This course aims to introduce the present issues of agricultural and forestry economics, and discuss the roles of rural society, farm management and forestry planning.	Students who are supervised by faculties in the sociology-economics course are eligible to enroll. Lectures are conducted in English.
EG60272	Seminar in Quantitative Food Economics	2	2.0	2, 3	FallAB	Thu3, 4	2D402, 2D403	Hisato Shuto	Exercises in estimation of food production and consumption based on economic theories, and discussions are performed to analyze the factors controlling supply and demand of foods.	Lectures are conducted in English.
EG60282	Seminar in International Agrobiological Resource Sciences	2	2.0	3, 4					This course aims to provide information for resource plants and animals, methods and examples of field survey, and effective use for agriculture and industry.	13:30-21:30 Limited to G30 students. Open in an even number year. Lectures are conducted in English.
EG60361	Microbiology	1	1.0	2, 3	FallC	Thu3, 4	2G205	Shinichi Andrew Utada	This lecture will introduce you basic microbiology including: 1. Diversity of microorganisms 2. Cell-structures 3. Metabolisms 4. Genetics 5. Their use in our life	Lectures are conducted in English.
EG60401	Economics of Resource and Environment	1	2.0	3, 4					Lectures will cover the topics in agricultural economy and resource and environment including forest.	Open in an even number year. Lectures are conducted in English.
EG60411	Biomaterial Science	1	1.0	3, 4	FallAB	Tue2	2G205	Toshiharu Enomae, Akiko Nakagawa-Izumi	Fundamentals and applications of paper science and papermaking engineering will be given and they cover chemical structures of polysaccharides constituting fibers, pulping methods for extracting fibers from wood, papermaking technology such as beating, forming, calendaring and coating, and geometrical, mechanical, optical, water-related properties of paper as well as latest research topics.	Lectures are conducted in English.
EG60421	Soil and Water Bio-Engineering	1	1.0	3	SprC	Intensive		Fan Chihhao	Engineering aspect of soil and water will be given on the basis of the knowledge of colloid and interface science. Emphasis will be placed on the solid-liquid separation technology by membrane and flocculation. A topic of application of microbiology, such as activated sludge method will be included.	It is recommended to take EG60161 together with this subject due to complementarity. EG60491 will also be helpful to understand this subject. Lectures are conducted in English. 7/31, 8/1
EG60431	Special Seminar IV	1	2.0	1 - 3	Annual	by request		Dean and others, Nakao Nomura	Seminar on the Special research related with agri-biological resource sciences for each individual student. For special study students (short-term exchange students) only.	JTP Identical to EC00041. Lectures are conducted in English.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG60441	Polymer and Organic Chemistry I	1	1.0	2, 3	SprAB	Tue1	2G103	Mikio Kajiyama	Most organic materials are classified into the polymer with a high molecular weight. This class is designed to help you develop an understanding of the chemical nature of the polymers based on the organic chemistry. In the "Polymer and Organic Chemistry I", the basic organic chemistry, e.g. radical, electrophilic and nucleophilic reactions and the conformations of the isomers will be discussed.	生物資源学類開講「高分子科学」及び平成24年度までの「Polymer Chemistry」を履修済みのものは履修できない。Credited auditors are NOT accepted. Lectures are conducted in English. Credited auditors are NOT accepted. Students MUST attend 「Chemistry III」 first.
EG60443	Special Seminar V	3	2.0	1 - 3	Annual	by request		Dean and others, Nakao Nomura	Field practice on the special research related with agro-biological resource sciences for each individual student. For special study students (short-term exchange students) only.	JTP Identical to EC00053. Lectures are conducted in English.
EG60451	Polymer and Organic Chemistry II	1	1.0	2, 3	FallAB	Tue1	2D305	Mikio Kajiyama	Most organic materials are classified into the polymer with a high molecular weight. This class is designed to help you develop an understanding of the chemical nature of the polymers based on the organic chemistry. In the "Polymer and Organic Chemistry II", the reactions for the functional groups, the synthetic pathways and the intermolecular interactions will be discussed.	生物資源学類開講「高分子科学」及び平成24年度までの「Polymer Chemistry」を履修済みのものは履修できない。Students MUST attend 「Polymer and Organic Chemistry I」 first. Lectures are conducted in English. Students MUST attend 「Polymer and Organic Chemistry I」 first.
EG60463	Internship in Environmental Engineering	3	2.0	3	SprC, FallABC	by appointment		Motoyoshi Kobayashi and the faculty of the course of Environmental Engineering	Students experience practical training at a work site in the field related to the course of environmental engineering (food, agricultural machinery, bio-fuel, soil, water, etc.), e.g., a research institute, an office of governmental ministry, NPO, a farm, or a food factory.	same as EC33313. The students should attend a briefing session that will be held in Spring A. This course is basically for students in environmental engineering program. Lectures are conducted in English.
EG60473	Environmental and Colloid Engineering Laboratory	3	1.5	2, 3	SprABC	Intensive		Motoyoshi Kobayashi	Students learn the fundamental and applications of colloidal and environmental engineering through the experiments.	It is desirable for participants to take "Introduction of Colloid and Interface Science" or "Environmental Colloid Engineering" beforehand or at the same time. Students need to make a contact with the instructor (kobayashi.moto.fp@u.tsukuba.ac.jp) before registration. (9:00-17:00) Lectures are conducted in English.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG60491	Elementary Applied Thermodynamics	1	1.0	2, 3	SprAB	Mon4	2C107	Yasuhisa Adachi	Thermodynamics is one of most fundamental subject when biological and environmental issues are treated. In this lecture, the elementary thermodynamics will be explained with an orientation toward an application in life and environmental science. Lecture will start the concept of equilibrium system with an example of Brownian motion. It will be followed by the first and the second law of thermodynamics. Thermodynamic function, the concept of Gibbs free energy, chemical potential. Many example will be cited from the field of Colloid and Interface Science. Those, who want to join the lecture of environmental colloid engineering are strongly recommended to join this lecture.	Lectures are conducted in English.
EG60511	Practical Plant Biotechnology	1	1.0	3, 4	SprAB	Thu5	2D303	Chiaki Matsukura, Hiroshi Ezura, Tohru Ariizumi, Satoko Nonaka	Plant cell, tissue and organ cultures for crop improvement will be introduced as conventional biotechnologies. Production and evaluation of genetically modified (GM) crops as well as the current status of GM crops will be introduced.	same as EC31231 and EG60021. A G30-student who had taken EG60021 is not allowed. Lectures are conducted in English.
EG60541	Conservation and utilization of agrobiodiversity	1	2.0	3, 4	FallC	Intensive	2B208, 2B309	Makoto Kawase, Kazuo Watanabe	Explains about domestic, regional and international activities of gene banks and related organizations which are involved in research and conservation of plant genetic resources for food and agriculture. Current international instruments (CBD, ITPGRFA, etc.) and relevant negotiations on the above-mentioned activities are also introduced.	Lectures are conducted in English. From 1st to 6th period in succession.
EG60551	Water Resources Management Engineering	1	1.0	3, 4	SprABC	Intensive	2G103	Atsushi Ishii	This lecture aims to provide a fundamental understandings of water resources by giving introductory hydraulics and hydrology, natures of river flow, water use in various sectors with a special focus on irrigation, water resources development and management, hydrologic statistics, as well as institutional system for water.	Lectures are conducted in English. 10th and 11th July
EG60561	Water Environmental Management Technology	1	1.0	3	SprC	Intensive		Nakao Nomura	Lecture covers ecological technologies to restore water environments in enclosed water bodies with deteriorated sediment and water quality. Lecture also covers a case study of Lake Kasumigaura Water Renovation Project where several research studies was performed to rehabilitate water environment in large scale.	横断領域科目「環境」. 特別聴講学生 (CiCプロジェクト参加学生を含む)のみ履修可. Cross-disciplinary subjects 「Environment」. Limited to Exchange Student (Tokubetsu Chokogakusei) including CiC Project. Lectures are conducted in English.
EG60571	Introduction to Industrial Ecology	1	1.0	3	SprAB	Tue2	2G205	Helmut Friedrich Yabar Mostacero	One of the biggest challenges our societies face is how to decouple economic growth from environmental pressure within the limits of the earth's carrying capacity. The highly inefficient use of natural resources from extraction to final disposal produces wastes and releases to air, water and soil. This course addresses the mechanisms and tools necessary to overcome this challenge through the introduction to Industrial Ecology (IE). Industrial ecology focuses on promoting industrial activities similar to processes in nature. This is achieved by optimizing energy and material resource use while minimizing and/or avoiding waste and pollution release. The course will outline the tools to achieve this goal including resource use optimization through the 3R Initiative proposed by Japan, Life Cycle Assessment, and Material Flow Analysis. The course will also address the technical and management aspects of the concept including Environmental Management Systems, Cleaner Production and Design for Environment. At the end of the course the student will develop analytical skills and learn the tools necessary to design and implement solutions to the current production and consumption patterns.	Lectures are conducted in English.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG60581	Animal Cell Culture Technology	1	1.0	3	SprAB	Fri3	2B508	Nakao Nomura	Lectures cover basic knowledge about animal cell culture (cell cycle, growth factors, extra-cellular matrixes, cancer cells) as well as application of cultured animal cells (hybrid artificial organ, production of monoclonal antibodies, alternative for experimental animals). Lectures also provides basic information about biotechnological approaches for setting up animal cell bioreactors.	Identical to EC32071.
EG60591	Food and Nutritional Chemistry I	1	1.0	3, 4					The aims of this course are to understand i) structure-function relationship of gastrointestinal tract, ii) functions of food constituents such as carbohydrates, lipids, proteins, and vitamins, iii) mechanisms of their digestion and absorption, iv) relation of lifestyle-related disease with nutrition intake, and v) relation of exercise with nutrition intake.	Same as EC32241 G30 Students who had received credits from EG60081 are not allowed. Open in an even number year. Lectures are conducted in English.
EG60601	Food and Nutritional Chemistry II	1	1.0	3, 4	FallAB	Fri5	2C410	Hitoshi Miyazaki	The aims of this course are to understand i) physiological functions of nutrients such as carbohydrates, lipids, and proteins, ii) regulation of their metabolism, iii) relation of metabolic syndrome with exercise, overnutrition, and biological clock.	Same as EC32241 G30 Students who had received credits from EG60081 are not allowed. Open in an odd number year. Lectures are conducted in English.
EG60621	International Agricultural and Forestry Policies II	1	1.0	3, 4	SprC	Intensive			Lectures will cover the topics in policies for agriculture, food, forestry, and environmental management related to agriculture and forestry in the world.	G30 students who had received credits from EG60201 are not allowed. Open in an odd number year. Lectures are conducted in English.
EG60633	Fundamental Environmental Engineering Laboratory	3	1.5	3	SprAB	Fri4-6	2D110-1	Ryozo Noguchi, Motoyoshi Kobayashi, Marcos Antonio das Neves, Takeshi Mizunoya, Helmut Friedrich Yabar Mostacero, Motoo Utsumi, Zhongfang Lei, Hiroshi Ohi, Akiko Nakagawa-Izumi, Toshiharu Enomae, Mikio Kajiyama, Yasuhisa Adachi, Atsushi Ishii, Zhen Ya Zhang, Yingnan Yang	水、土、圃場、森林、大気などの生産環境やバイオマス、食品などの生物資源を対象として、これらの特性を明らかにする諸理論、試験、計測、解析のための基礎的手法を理解・習得する。また実験を通じて、環境工学的なアプローチや科学技術研究における問題の発見とその解決のための実践的能力を養成する。 This course aims to provide basic concepts of environmental engineering necessary to analyze various phenomena present in environments, biomass, or bioresources.	EG60483 is limited to G30 Students. G30 students who obtained credit from EG60503 are not allowed. Identical to EC23113.
EG60641	Precision Agriculture Technology	1	1.0	2, 3	SprAB	Fri5	2D205	Ahamed Tofael	Lectures will cover the topics of precision agricultural technology. Recent advancements in the agricultural field of automation, satellite remote sensing, and GIS. The Bigdata analytics, IoT in agriculture and machine learning systems are used in medium to large scale of agricultural production. The outdoor agricultural mechanization to indoor plant growth monitoring and machinery utilization are the core subjects of this course. Through this course students will get exposure of large satellite remote sensing systems for agriculture, UAV-based crop monitoring and IoT advancements in agriculture.	Lectures are conducted in English.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG65611	Water Environmental Management Technology	1	1.0	3	SprC	Intensive				Lectures are conducted in English. 7/11, 7/12

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Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG70013	Laboratory Work in Basic Geoscience	3	1.0	1	SprAB	Thu4, 5	1D109	Shigehiro Fujino, Akio Yamashita, Sachiko Agematsu, Tsutomu Yamanaka, Hiroshi Tanaka, Atsushi Ikeda, Keisuke Matsui, Kei Ikehata, Atsushi Kyono, Masanori Kurosawa, Teruyuki Maruoka	Relevant tools and methods to study Earth's environment are the main topic of this lecture. Students are asked to participate in and carry out hand-on exercise in various geoscientific analyses.	Lectures are conducted in English.
EG70021	Introduction to Geoenvironmental Science	1	1.0	1	FallAB	Fri2		Masaaki Kureha, Tsuyoshi Hattanji, Takehiro Morimoto, Hiroshi Tanaka, Michiaki Sugita, Norikazu Matsuoka, Hiroaki Kato	Earth's environment is the main topic of this lecture. Emphasis is on the geoscientific aspects and features in the atmosphere, hydrosphere, topography, and human society among others are discussed.	Lectures are conducted in English.
EG70031	Introduction to Earth Evolution Science	1	1.5	1	FallABC	Wed5	2C407	Yoji Arakawa, Kohtaro Ujiie, Yuji Yagi, Ken-ichiro Hisada, Yoshihito Kamata, Toshiaki Tsunogae, Atsushi Kyono, Shigehiro Fujino	This lecture introduces 4.6 billion years evolution of the earth, mainly focusing on the evolution of solid earth, and the birth and evolution of life.	Students, who attended EG70011, are not permitted. Lectures are conducted in English.
EG80032	Freshman Seminar in Geoscience I	2	1.0	1	FallAB	Fri6	1E401, 1E402	Hiroaki Kato, Atsushi Kyono	Recent topics and future subjects on geoscience are discussed through short excursion, reading of related books, etc.	For G30 geoscience students. Identical to EE11512. CDP
EG80042	Freshman Seminar in Geoscience II	2	0.5	1	FallIC	Fri6	1E401, 1E402	Hiroaki Kato, Atsushi Kyono	Recent topics and future subjects on geoscience are discussed through short excursion, reading of related books, etc.	For G30 geoscience students. Identical to EE11532. CDP
EG90211	Natural Hazards	1	1.0	2, 3	FallAB	Fri1	2D304	Norikazu Matsuoka, Yuji Yagi, Shigehiro Fujino, Kei Ikehata, Tsuyoshi Hattanji, Yuichi Onda, Maki Tsujimura, Tomohiro Sekiguchi, Atsushi Ikeda	This lecture overviews various natural hazards and their triggers, reviews historical and recent hazards and explores future prediction and mitigation against possible hazards.	Offered in odd number years. Lectures are conducted in English. G-course

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG91011	Lecture on Geographical Information Systems	1	1.0	2, 3					This course introduces fundamentals of Geographical Information Systems and its application to geography.	Offered in even number years. Lectures are conducted in English. Not open in 2019.
EG91051	Geomorphology	1	1.0	2, 3	SprAB	Thu1	2D205	Thomas Parkner	This course provides an introduction to geomorphology – the study of earth's landforms and the processes which produce and modify them.	Prerequisite: Introduction to Geoenvironmental Science, Laboratory Work in Basic Geoscience. Or permission by teacher. Priority for G30 students. Non-G30 students by permission of instructor. Up to 20 students. Lectures are conducted in English.
EG91101	Meteorology & Climatology	1	1.5	2, 3					Elementary course about the general circulation of the atmosphere and the energy budget, mechanism of climate and climate change, weather forecasting and precipitation, interactions of the atmospheric environment and human activities.	Offered in even number years. Students, who attended EG91031, are not permitted. Lectures are conducted in English. Not open in 2019.
EG91121	Geomorphological Landscapes of the World	1	1.0	2, 3	FallAB	Thu1	2D303	Thomas Parkner	Geomorphological landscapes are fascinating facets of our planet shaped by different processes acting over times scales from seconds to millions of years. In this seminar-like class students present on individual landscapes, followed by discussion.	Offered in odd number years. Prerequisite: Geomorphology. Or permission by teacher. Priority for G30 students. Up to 20 students. Lectures are conducted in English.
EG91141	Human and Regional Geography	1	1.5	2, 3	FallABC	Thu4	2D304	Kenichi Matsui, Keisuke Matsui, Jun Tsutsumi, Chiaki Akiyama, Tomoko Kubo	This course introduces subjects and fundamentals of the human and regional geography by presenting actual examples of Japan and other regions of the world. Following the introduction of basic concepts of human geography, features of various regions will be explained from viewpoints of rural, urban, commercial, political, religious, recreational and ethnic geographies.	Students, who attended EG80011, are not permitted. Lectures are conducted in English.
EG91151	GIS in geomorphology	1	1.0	2, 3					GIS (Geographical Information Systems) are used for storage, retrieval, mapping and analysis of geographic data. This lecture gives an overview on GIS and its application in geomorphology. Application includes visualization of topography, detection and analysis of topographic change, and quantitative morphometric analysis.	Offered in even number years. Lectures are conducted in English. Not open in 2019.
EG91161	Process Geomorphology	1	1.0	2, 3	SprAB	Fri4	2D205	Atsushi Ikeda, Tomohiro Sekiguchi, Tsuyoshi Hattanji	This lecture focuses on physical processes that create and maintain landforms. Glacial, periglacial, fluvial and coastal processes, and weathering as well as mass movements are mainly discussed.	Offered in odd number years. Students, who attended EG91131, are not permitted. Prerequisite: Introduction to Geoenvironmental Science, Laboratory Work in Basic Geoscience. Or permission by teacher. Priority for G30 students. Up to 20 students. Lectures are conducted in English.
EG91171	Basic Analysis of Environmental Dynamics	1	1.5	2, 3					This lecture provides basic knowledge for analyzing environmental dynamics. In addition, the present state of environmental problems and its analysis methods are discussed.	Offered in even number years. Lectures are conducted in English. Not open in 2019.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG91181	Soil Erosion	1	1.0	2, 3					This lecture covers the processes of soil erosion and their environmental controls. Control and prevention measures are also introduced.	Offered in even number years. Students, who attended EG91041, are not permitted. Priority for G30 students. Non-G30 students by permission of instructor. Up to 20 students. Identical to EG91111 (Soil Erosion and Land Management) until 2014. Lectures are conducted in English. Not open in 2019. 平成26年度までの土壌侵食 (EG91111) を履修済のものは履修できない。
EG91203	Field Work in Geoenvironmental Science I	3	1.5	2, 3	Annual	Intensive		Michiaki Sugita, Jun Asanuma, Maki Tsujimura, Tsutomu Yamanaka	The goal of this course is to provide experience and background in a variety of field methods used by researchers in geoenvironmental sciences. The course will focus on hands-on field techniques for data gathering (observation, measurement, and others), mapping, and data analysis.	Prerequisite: EG70013, EG70021 and EG91091. Permission by teachers. Only for those entered after 2016. Lectures are conducted in English.
EG91213	Field Work in Geoenvironmental Science II	3	1.5	2, 3	Fall/B	Intensive		Hiroaki Ueda, Hiroyuki Kusaka, Mio Matsueda, Yoichi Kamae, Mariko Harada	The goal of this course is to provide experience and background in a variety of field methods used by researchers in geoenvironmental sciences. The course will focus on hands-on field techniques for data gathering (observation, measurement, and others), mapping, and data analysis.	Permission by teachers. Only for those entered after 2016. Lectures are conducted in English.
EG91223	Field Work in Geoenvironmental Science III	3	1.5	2, 3					The goal of this course is to provide experience and background in a variety of field methods used by researchers in geoenvironmental sciences. The course will focus on hands-on field techniques for data gathering (observation, measurement, and others), mapping, and data analysis.	Offered in 2020. Permission by teachers. Only for those entered after 2016. Lectures are conducted in English. Not open in 2019.
EG91233	Field Work in Geoenvironmental Science IV	3	1.5	2, 3					The goal of this course is to provide experience and background in a variety of field methods used by researchers in geoenvironmental sciences. The course will focus on hands-on field techniques for data gathering (observation, measurement, and others), mapping, and data analysis.	Offered in 2020. Prerequisite: Geomorphology. Priority for G30 students. Non-G30 students by permission of instructor. Up to 10 students. Lectures are conducted in English. Not open in 2019. 平成28年以降入学者用。
EG91243	Field Work in Geoenvironmental Science V	3	1.5	2, 3					The goal of this course is to provide experience and background in a variety of field methods used by researchers in geoenvironmental sciences. The course will focus on hands-on field techniques for data gathering (observation, measurement, and others), mapping, and data analysis.	Offered in 2021. Prerequisite: Human and Regional Geography. Permission by teachers. Only for those entered after 2016. Lectures are conducted both in English and Japanese. Lectures are conducted in English. Not open in 2019.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG91253	Field Work in Geoenvironmental Science VI	3	1.5	2, 3					The goal of this course is to provide experience and background in a variety of field methods used by researchers in geoenvironmental sciences. The course will focus on hands-on field techniques for data gathering (observation, measurement, and others), mapping, and data analysis.	Offered in 2021. Permission by teachers. Only for those entered after 2016. Lectures are conducted in English. Not open in 2019.
EG92011	Mineralogy & Petrology	1	1.0	2, 3					This lecture provides basic knowledge for various minerals and rocks in the earth's surface and interior. Main purposes are to learn classification, basic principles and processes of the formations of the minerals and rocks (mainly igneous and metamorphic rocks) in the earth.	Offered in even number years. Lectures are conducted in English. Not open in 2019.
EG92021	Inorganic Geochemistry	1	1.0	2, 3	SprAB	Tue2	2D305	Teruyuki Maruoka	This lecture provides basic principles and quantitative methods of geochemistry in order to gain a better understanding of Earth's surface phenomena.	Offered in odd number years. Lectures are conducted in English.
EG92031	Paleontology & Stratigraphy	1	1.0	2, 3					This lecture provides basic knowledge for sedimentology and paleontology and historical geology. Main purposes are to learn interrelationship between life and environment of geological time.	Offered in even number years. Lectures are conducted in English. Not open in 2019.
EG92041	Applied Structural Geology	1	1.0	2, 3	FallAB	Tue4	2D303	Yuji Yagi, Kohtaro Ujiie	Structural geology with emphasis on its application side is the main topics of this lecture.	Offered in odd number years. Lectures are conducted in English.
EG92093	Field Work in Earth Evolution Science E	3	1.5	2, 3					In this field course students acquire basic field methods on geological science such as field description and mapping.	Offered in 2022. Prerequisite: Introduction to Geoenvironmental Science, Introduction to Earth Evolution Science, Laboratory Work in Basic Geoscience. Or permission by teachers. 平成30年より4年おきに開講。平成28年以降入学者用。Lectures are conducted in English. Not open in 2019.
EG92101	Quaternary Environmental Change	1	1.0	3, 4					This lecture focuses on the interaction between climate change and changes in ice sheets, sea level and other landscapes through the Quaternary. Recent changes in surface processes are also introduced.	Offered in even number years. For G30 students. Prerequisite: Geomorphology, Introduction to Geoenvironmental Science, Introduction to Earth Evolution Science. Identical to EE22421. Lectures are conducted in English. Not open in 2019.
EG92103	Field Work in Earth Evolution Science F	3	1.5	2, 3	Annual	Intensive		Masanori Kurosawa, Atsushi Kyono		Prerequisite: Introduction to Geoenvironmental Science, Introduction to Earth Evolution Science, Laboratory Work in Basic Geoscience. Or permission by teachers. 平成31年より4年おきに開講。平成28年以降入学者用。Lectures are conducted in English.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG92113	Field Work in Earth Evolution Science G	3	1.5	2, 3	Sum Vac	Intensive		Thomas Parkner, Ken-ichiro Hisada	In this field course students acquire basic field methods in stratigraphy and geomorphology.	Prerequisite: Introduction to Geoenvironmental Science, Introduction to Earth Evolution Science, Laboratory Work in Basic Geoscience. Permission by teachers. Lectures are conducted in English.
EG90111	Topics on Earth Evolution Science A	1	1.0	2 - 4					This course presents several Geoscience topics, with a special focus on the "Physics of the Earth". We will explore together how the Earth was formed and how it "works": what are the mechanisms that drive the movement of tectonic plates, why do earthquakes and volcanic eruptions occur and so on. The lectures provide, in particular, some basic knowledge in "Seismology" (or "Earthquake Science") and introduce some current research topics in this field.	Offered in 2021. Lectures are conducted in English. Not open in 2019.
EG90121	Topics on Earth Evolution Science B	1	1.0	2 - 4	Annual	Intensive			This course introduces knowledge and recent developments on specific topic(s) in Earth Evolution Science.	Lectures are conducted in English.
EG90131	Topics on Geoenvironmental Science A	1	1.0	2 - 4					This course introduces knowledge and recent developments on specific topic(s) in Geoenvironmental Science.	Offered in 2022. Lectures are conducted in English. Not open in 2019.
EG90141	Topics on Geoenvironmental Science B	1	1.0	2 - 4					This course introduces knowledge and recent developments on specific topic(s) in Geoenvironmental Science.	Offered in 2020. Lectures are conducted in English. Not open in 2019.
EG90151	Topics on Geoscience A	1	1.0	3, 4	SprAB	Intensive		Thomas Parkner	Students get in contact with the scientific community by attending the Japan Geoscience Union Meeting 2019.	Lectures are conducted in English. For geoscience students.
EG90161	Topics on Geoscience B	1	1.0	3, 4					This course introduces knowledge and recent developments on specific topic(s) in Geoscience.	Offered in 2021. Priority for G30 students. Non-G30 students by permission of instructor. Up to 20 students. Lectures are conducted in English. Not open in 2019.
EG90171	Topics on Geoscience C	1	1.0	2 - 4	Annual	Intensive			This course introduces knowledge and recent developments on specific topic(s) in Geoscience.	Priority for G30 students. Non-G30 students by permission of instructor. Up to 20 students. Lectures are conducted in English.
EG90181	Topics on Geoscience D	1	1.0	2 - 4	FallC	Intensive		Norie Oshima, Chiaki Akiyama	This course introduces knowledge and recent developments on specific topic(s) in Geoscience.	Offered in 2022. Priority for G30 students. Non-G30 students by permission of instructor. Up to 20 students. Lectures are conducted in English.
EG90191	Topics on Geoscience E	1	1.0	2 - 4					This course introduces knowledge and recent developments on specific topic(s) in Geoscience.	Offered in 2020. Priority for G30 students. Non-G30 students by permission of instructor. Up to 20 students. Lectures are conducted in English. Not open in 2019.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG90303	Internship Program in Geoscience	3	2.0	2 - 4	Annual	by appointment		Hiroyuki Kusaka, Sachiko Agematsu	Students gain work experience through on-the-job training at a non-university organization such as companies, research institutions, or a nonprofit organizations. The placement is from 5 days to 2 weeks. An agreement between the employer and our college needs to be obtained before starting work. The employer is requested to submit an evaluation of the student after the training.	For G30 Geoscience students. Lectures are conducted in English. CDP
EG92053	Field Work in Earth Evolution Science A	3	2.0	2, 3					In this field course students acquire basic field methods on geological science such as field description and mapping.	Offered in even number years. Students, who attended EG92013, are not permitted. Prerequisite: Introduction to Geoenvironmental Science, Introduction to Earth Evolution Science, Laboratory Work in Basic Geoscience. Or permission by teachers. Lectures are conducted in English. Not open in 2019.
EG92063	Field Work in Earth Evolution Science B	3	2.0	2, 3	Spr Vac	Intensive		Yoshihito Kamata, Shigehiro Fujino	In this field course students acquire basic field methods on geological science such as field description and mapping.	Offered in odd number years. Prerequisite: Introduction to Geoenvironmental Science, Introduction to Earth Evolution Science, Laboratory Work in Basic Geoscience. Or permission by teachers. Lectures are conducted in English.
EG92073	Field Work in Earth Evolution Science C	3	1.5	2, 3					In this field course students acquire basic field methods on geological science such as field description and mapping.	Offered in 2020. Prerequisite: Introduction to Geoenvironmental Science, Introduction to Earth Evolution Science, Laboratory Work in Basic Geoscience. Or permission by teachers. Lectures are conducted in English. Not open in 2019.
EG92083	Field Work in Earth Evolution Science D	3	1.5	2, 3					In this field course students acquire basic field methods on geological science such as field description and mapping.	Offered in 2021. Prerequisite: Introduction to Geoenvironmental Science, Introduction to Earth Evolution Science, Laboratory Work in Basic Geoscience. Or permission by teachers. Lectures are conducted in English. Not open in 2019.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG71002	Seminar on Geoscience A	2	1.5	3	SprC	by appointment		Akio Yamashita, Shigehiro Fujino	This class provides an overview on all laboratories of the College of Geoscience. Topics on all geoscience disciplines are discussed with members of each laboratory. Students identify 3-4 laboratories of their main interest.	For geoscience students who start their Seminar on Geoscience in spring. Lectures are conducted in English.
EG71012	Seminar on Geoscience B	2	1.5	3	FallABC	by appointment		Akio Yamashita, Shigehiro Fujino	In this class further information and discussion is provided on the laboratories identified by students in Seminar of Geoscience A. At the end of this class the laboratory for Graduation Research is identified.	For geoscience students who started their Seminar on Geoscience A in spring. Lectures are conducted in English.
EG71022	Seminar on Geoscience A	2	1.5	3	FallC	by appointment		Akio Yamashita, Shigehiro Fujino	This class provides an overview on all laboratories of the College of Geoscience. Topics on all geoscience disciplines are discussed with members of each laboratory. Students identify 3-4 laboratories of their main interest.	For geoscience students who start their Seminar on Geoscience in fall. Lectures are conducted in English.
EG71032	Seminar on Geoscience B	2	1.5	3	SprABC	by appointment		Akio Yamashita, Shigehiro Fujino	In this class further information and discussion is provided on the laboratories identified by students in Seminar of Geoscience A. At the end of this class the laboratory for Graduation Research is identified.	For geoscience students who started their Seminar on Geoscience A in fall. Lectures are conducted in English.
EG71102	Research Seminar A	2	1.5	4	SprABC	by appointment		Dean and others	Topics on geoscience are discussed with members of a laboratory.	For geoscience students who start their Research Seminar in spring. Lectures are conducted in English.
EG71112	Research Seminar B	2	1.5	4	FallABC	by appointment		Dean and others	Topics on geoscience are discussed with members of a laboratory.	For geoscience students. Prerequisite: Research Seminar A. Lectures are conducted in English.
EG71122	Research Seminar A	2	1.5	4	FallABC	by appointment		Dean and others	Topics on geoscience are discussed with members of a laboratory.	For geoscience students who start their Research Seminar in fall. Lectures are conducted in English.
EG71152	Research Seminar B	2	1.5	4	SprAB	by appointment		Dean and others	Topics on geoscience are discussed with members of a laboratory.	For geoscience students. Prerequisite: Research Seminar A. Lectures are conducted in English.
EG79018	Graduation Research A	8	3.0	4	SprABC	by appointment		Dean and others	Students undertake research in a laboratory where they become familiar with the most advanced research environments and practices.	For geoscience students who start their graduation research in spring. Lectures are conducted in English.
EG79028	Graduation Research B	8	3.0	4	FallABC	by appointment		Dean and others	Students undertake research in a laboratory where they become familiar with the most advanced research environments and practices.	For geoscience students. Prerequisite: Graduation Research A. Lectures are conducted in English.
EG79038	Graduation Research A	8	3.0	4	FallABC	by appointment		Dean and others	Students undertake research in a laboratory where they become familiar with the most advanced research environments and practices.	For geoscience students who start their graduation research in fall. Lectures are conducted in English.

Course Number	Course Name	Course Type	Credits	Standard Academic Year	Course Offering Term	Weekday and Period	Classroom	Instructor	Course Overview	Remarks
EG79068	Graduation Research B	8	3.0	4	SprAB	by appointment		Dean and others	Students undertake research in a laboratory where they become familiar with the most advanced research environments and practices.	For geoscience students. Prerequisite: Graduation Research A. Lectures are conducted in English.