Course list for Cross-institutional Course/Subject Enrolment Scheme for Research Postgraduate Students
(2025-26, Term 1)
Institution: The Chinese University of Hong Kong

Course Code	Course Title	Units	Keyword Syllabus or Brief Subject Description	Pre-requisites (if any)	Result Grade	Medium of Instruction	Remarks, if any
AIST5020	Trustworthy Artificial Intelligence	3	This course introduces the principles and techniques of Trustworthy Artificial Intelligence (Trustworthy AI), which aims to mitigate the potential adverse effects of AI on people and society. The course focuses on four main aspects of trustworthy AI: privacy & security, robustness, explainability, and fairness. It covers the state-of-the-art research progress in these areas, including federated learning and adversarial attacks. Algorithms, models, and systems will be covered. Moreover, the course discusses the ethical and social implications of trustworthy AI, to foster social awareness among students who would use or develop AI techniques in the future. This course is suitable for students who have some background in machine learning, probability, and linear algebra.	-	A-F	English	-
ANTH6010	Seminars in Anthropological Theory	3	The course provides an advanced review of major theoretical approaches in anthropology, from classic theories of Morgan, Tyler, Weber, and Durkheim, through the influential theories of Boas, Radcliffe-Brown, Levi-Strauss, Geertz and Douglas, to more recent theories.	-	A-F	English	Subject to teacher's approval on individual application.
BASA6002	Research Methodology in Behavioural Studies II	3	This course is the continuation of BASA6001. The course covers concepts and techniques related to behavioral experiment. In particular, students will learn how to apply various types of behavioral research design and statistical methods, and how to analyze and interpret the results. Sample topics include among others experimental design, significance tests , statistical power, interaction and moderating effects, testing of psychological mechanism. This course does not involve mathematical proofs or statistical derivations. Good knowledge of basic statistics is essential.	BASA6001	A-F	English	Quota for visiting students: 3
BMEG5610	Research Methods in Biomedical Engineering	3	This course presents research methods in biomedical engineering, and primarily aims at preparing postgraduate students for basic research or employment in the clinic and biomedical industries. Students will learn relevant concepts and tools for analyzing data arising from quantitative and qualitative research in molecular, physiological, and clinical systems. This course focuses on developing students' ability to analyze research data and critique the scientific literature.	-	A-F	English	Quota for visiting students: 5
CHEM5642	Supramolecular Chemistry	2	This course provides an overview of fundamental concepts and essential applications of supramolecular chemistry. This course covers two parts. The first part focuses on the fundamental concepts, including a brief history of supramolecular chemistry, characterization of supramolecular systems, noncovalent interactions and ion binding, templated synthesis and self-assembly as well as inclusion complexes. The second part focuses on the application of supramolecular chemistry, discussing selected supramolecular systems and introducing important examples of applying supramolecular chemistry in materials sciences and biology.	Having taken at least one undergraduate organic chemistry course.	A-F	English	-
CHLL6381	Special Topics in Classical Chinese Literature II	3	Critical study of special topics in classical Chinese literature, with emphasis on particular authors, works or schools.	-	A-F	Cantonese, Putonghua	-
CHLL6451	Special Topics in Modern Chinese Literature I	3	Critical study of issues, other than genres and authors, in modern Chinese literature. Topics may focus on research methodologies, literary thoughts, literary schools, regional literature, comparative literature, etc.	-	A-F	Putonghua	
COMM5220	Communication Theories I	3	This course provides an overview of the current theories and concepts in media, technology, human, and global communication studies. It serves as an introduction to the current literature, main epistemologies, key theories, representative scholars and their works, and key sources of reference.	-	A-F	English	Quota for visiting students: 2
COMM5310	Statistical Analysis in Communication	3	This course aims at introducing graduate students to the study of the scientific discipline of communication. The course covers analyses of data using the general linear model. Topics include simple and multiple regression, analysis of variance and covariance, tests of significance, the interpretation of model parameters and other topics like path analysis and structural equation modeling as time allows. Students are expected to conduct a complete quantitative research and analysis at the end of the course.	-	A-F	English	Quota for visiting students: 2
CSCI5120	Advanced Topics in Database Systems	3	This course will introduce to students advanced topics in database systems including advanced data structures, concurrency control, deadlock resolutions, recovery schemes, distributed database systems, multimedia database indexing techniques, and data mining, data on the web and network data analysis.	-	A-F	English	-
CSCI5150	Machine Learning Algorithms and Applications	3	This course introduces a dozen of machine learning algorithms and typical applications in business intelligence, natural language processing, computer vision, and sensor-based data analyses, including four topics that consist of (1) supervised learning algorithms induced by structural risk minimization for classification and regression problems (decision trees, logistic regression, support vector machines, regularized linear regression, kernel machines, etc.), and their applications in sensor-based indoor localization, business intelligence; (2) supervised learning algorithms based on deep learning (CNN, RNN, etc.), and their applications to natural language processing and computer vision; (3) unsupervised learning algorithms for clustering and representation learning (K-means, spectral clustering, autoencoder, etc.); (4) introductions of other learning algorithms and applications, such as transfer learning, recommender systems, sensor-based activity recognition, etc.	-	A-F	English	-
CSCI5550	Advanced File and Storage Systems	3	This course aims to introduce important systems-level research topics in the design and implementation of practical file and storage systems. Topics include: (i) storage device organization (e.g., disk drives, disk arrays, RAID, solid state drives), (ii) file system design (e.g., log-structured file systems, distributed file systems), (iii) data availability (e.g., erasure coding techniques, data integrity protection), (iv) data consistency (e.g., journaling techniques), (v) data compression (e.g., deduplication), (vi) benchmarking (e.g., I/O metrics, benchmarking tools), etc. Depending on the current research trends, the course also discusses the latest applied storage topics, especially related to scalable and dependable big data management. Advisory: Students are expected to have taken CSCI3150 or ESTR3102 or equivalent.	-	A-F	English	-
CSCI5600	Advanced Topics in Distributed Systems	3	This course aims to cover research topics on distributed systems. Topics including distributed time and global states, distributed coordination and consensus, P2P systems, distributed transactions and concurrency control, distributed replications and synchronization. Case studies about latest distributed systems such as Chord, Paxos and Spanner and research papers from top conferences will be discussed. Advisory: Students are expected to have solid foundations on operating systems and database systems.	-	A-F	English	-
CULS6001	The Making of Contemporary Culture	3	This MPhil/PhD seminar is an introduction to methods in Cultural Studies. The course looks at how culture as an object of knowledge is produced through disciplinary programs and academic journals. It explores how Cultural Studies borrows approaches from other fields such as cultural history and anthropology. It acquaints students with the textual and visual analysis of different cultural forms including literature, film, visual art, and digital media.	-	A-F	English	-

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CULS6110	Thing Theories	3	This course examines a theoretical turn to the non-human that has emerged in the new materialism discussion in the past decade. It involves a range of contemporary perspectives in the arts, humanities and social sciences that have inverted the longstanding study of how people make things into asking how things make people. This field of studies explores how things can be understood as having a form of subjectivity, being, and agency of their own. Non-human examples could include virus, guns, robots, animals and plants, pollution etc. The course joins this interdisciplinary endeavour to survey major theories and literature to enrich pre-existing conjunctions across philosophy, history, politics, ecocriticism, cultural geography, cultural anthropology, and literary critics among others.	-	A-F	English	-
DOTE5001	Microeconomic Theory	3	This course is on advanced microeconomic theory. Topics include individual decision theory (consumer theory, production theory, choice under uncertainty), game theory (static and dynamic games under complete and incomplete information), and equilibrium and market failure (general equilibrium, principal-agent problems, economics of information, auctions, bargaining, and market design).	-	A-F	English	-
DOTE6622	MIS Seminar	3	This course provides students with a broad-based exposure to research in MIS and its research methodologies, including survey, case study, experimental design, and field work. Various theories used in MIS research will also be discussed to provide students with background on approaches to theory building and theory testing. Seminal MIS articles will be reviewed to orient students to the emergence of MIS discipline and its research tradition and trend.	-	A-F	English	-
ECON5440	International Trade	3	This course offers theoretical, empirical and current topics in international trade. It covers studies of positive issues, such as: Why do countries trade? What goods do countries trade? How does openness to trade shape countries' industrial structure and global production sharing? The course also concerns the normative issues, such as: Is trade beneficial to everyone, or are there winners and losers? What is the impact of trade on economic growth, wage inequality and poverty? All these issues will be discussed both from theories and empirics, as well as at country, industry and firm level. In particular, we will also discuss the ongoing US-China trade war.	Graduate Microeconomics.	A-F	English	-
EESC5001	Research Frontiers in Earth & Atmospheric Sciences I	3	Recent research methods, experimental, and computational techniques applied in Earth & Environmental Sciences. Topics extend over a diversity of research areas in Earth & Environmental Sciences, with a consistent theme that many of the operative processes are intertwined and advances in elucidating them hinge on the adoption of an interdisciplinary framework.	-	A-F	English	Subject to teacher's approval on individual application.
EESC5103	Aerosol Physics and Chemistry	3	Knowledge of aerosol physics and chemistry such as condensation and evaporation; thermodynamics; radiative, hygroscopic properties, and cloud formation potential of aerosols; Recent advances in aerosol physics and chemistry researches; Roles of atmospheric aerosols on the critical environmental issues such as air quality, tropospheric smog, and climate change, with focus on observations, laboratory measurements and modelling.	-	A-F	English	Subject to teacher's approval on individual application.
EESC5110	Applied Geophysics	3	This course introduces concepts, principles, and applications of geophysical methods in environmental and engineering studies. It offers an overall survey of various geophysical methods for exploring the shallow subsurface. It provides the technical foundation needed to understand the use and limitations of gravity, seismic, ground penetrating radar, and electromagnetic methods. Demonstration of commonly used methods will be provided in the field along with tutorials of preliminary data analysis techniques. Technical papers published in leading applied geophysics journals will be discussed in reading groups.	-	A-F	English	Subject to teacher's approval on individual application.
EESC5210	Land-Atmosphere Interactions and Boundary-Layer Meteorology	3	This course introduces the physical, chemical and biological processes governing the exchange of energy, momentum, water and other chemical materials between the atmosphere and land surface, including a formal introduction into boundary-layer meteorology. Topics covered include the basic equations and concepts of heat, momentum and mass conservation and transfer at the land-atmosphere interface; soil physics and hydrometeorology; temperature, humidity and wind distribution in the atmospheric boundary layer; theories and observations of turbulence; stability and boundary-layer dynamics; biometeorology and ecophysiology of land plants; canopy and ecosystem exchange; and land use change and urbanization. Applications to weather phenomena, air pollution, forestry, agriculture and ecosystem management will be emphasized throughout.	-	A-F	English	Subject to teacher's approval on individual application.
EESC5310	Chemistry of Aquatic and Terrestrial Organic Matter	3	This course explores the analysis of the chemical composition, properties, and reactivity of organic matter found in aquatic and terrestrial environments. Students will learn about the sources, transformation, and fate of organic matter in natural systems, as well as the impact of human activities on organic matter cycling. Topics may include the structure and function of organic molecules, biogeochemical processes involving organic matter, analytical techniques for studying organic matter, and the role of organic matter in ecosystem functioning. This course may also explore the implications of organic matter chemistry for environmental quality, carbon cycling, and nutrient dynamics in natural systems.	-	A-F	English	Subject to teacher's approval on individual application.
ELEG5301	Photonic Integrated Circuits	3	The course covers the design of planar optical waveguides and introduce numerical methods such as Fourier transform beam Propagation Method, and Finite Difference Time Domain methods. We shall introduce the principles and design methodology of passive integrated optic functional elements (Multimode Interferometer, directional couplers, waveguide grating couplers, microring resonators, arrayed waveguide gratings), and the use of subwavelength gratings in engineering different optical properties. We shall also introduce pulse propagation in dispersive and nonlinear media and nonlinear optical effects in waveguides. Examples of waveguide based photonic devices covered in the course include waveguide photodetectors, laser diodes and optical modulators.	Vector calculus, semiconductor physics, Fourier transforms, Introductory electromagnetism.	A-F	English	Quota for visiting students: 3
ELEG5421	Audio Signal Processing	3	This course is an in-depth exploration of audio processing using neural networks. Starting with an introduction to audio problems, the course covers a range of topics including audio features and human labels, filtering and digital signal processing for audio processing, audio and music tagging with convolutional neural networks, audio and music transcription with recurrent neural networks, audio compression, bridging audio and language with sequence-to-sequence models, symbolic music generation, audio and music generation with pipelines, vocoder, and autoregressive models, audio and music generation with VAEs and diffusion models, controllable audio and music generation from texts and multiple modalities, and open problems and future directions in the field.	Students should have knowledge of Linear Algebra, Probability, C/C++/Python, pattern recognition or machine learning.	A-F	English	Quota for visiting students: 3

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ENGE5850	Special Topic(s) in Literary History	3	Specific area(s) of investigation will be defined every year to cover one or more of the following aspects in the critical and comparative studies of literary history: influence andreception; period and movement; literary ideas and intellectual history; historicism;neohistoricism; classicism; neo-classicism; romanticism; symbolism; realism; modernism; postmodernism; functions and theories of literary history; perspectives of historicalcriticism; concepts of literary tradition; concepts of literary system; literary history andliterary reception; feminist perspectives; materialist perspectives; problems of textualityand intertextuality. The chosen area(s) of investigation will use texts from all three major genres of poetry, drama, and fiction. Subject to the approval of the Division Head, students are allowed to take the above course more than once and gain the units each time they pass the course. However, students cannot take courses with the same course code more than once in a single term.	-	A-F	English	-
ENGE5010	Theoretical Linguistics	3	This course provides a broad introduction to general linguistics and the fundamental properties of human language shared by all language systems. It includes a survey of phonological, morphological, syntactic, and semantic structures of language, thus enabling students to investigate established theoretical premise for the linguistic description of natural languages and describe general grammatical properties of language universals in the light of the theory established. This course also equips students with some analytical tools and techniques for linguistic analysis and provides practice in using these scientific ways to discover the organizing principles underlying a language.	-	A-F	English	-

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ENGE5320	American Literature	3	This course is an introduction to American Literature of the twentieth century. We will study a representative selection of novels, drama, film, and poetry, and discuss concepts such as nationalism/national identity, the frontier, the American Dream, democracy, gender and sexuality, race and ethnicity, and immigration. As we discover significant historical moments, artistic movements, and geographical locations in these texts, we will also trace the social, political, and cultural conditions from which they emerge. Figures studied will include (but are not limited to): F. Scott Fitzgerald, Langston Hughes, William Carlos Williams, Arthur Miller, Tennessee Williams, Lorraine Hansberry, Alfred Hitchcock, John Ford, Amiri Baraka, Allen Ginsberg, Toni Morrison, Tony Kushner, and Jhumpa Lahiri.	-	A-F	English	-
ENGE5420	Sociolinguistics	3	This course provides a survey of the relationship between social variables (e.g., age, gender, ethnicity, attitude, style, location, time, social status, power, politics, and network membership) and variations in language in use. Some key areas covered include language attitudes and choice, language maintenance and shift, code alternation, contact languages, standard and vernacular languages, language planning and policy, regional land social dialects, influences of age and gender on language in use, politeness theory, linguistic stereotyping, as well as culture and language. Sociolinguistic research methods are also introduced.	-	A-F	English	-
ENGE5540	Research Methods in Applied Linguistics	3	This course introduces students to major research methods in applied linguistics (e.g. qualitative, quantitative, mixed-method) and guide students through the basics of preparing their research proposals. Major topics of the course include the identification of research problems; the formulation of research questions; a critical review of relevant research literature; and the selection of appropriate research methods.	-	A-F	English	-
ENGE5630	Cognitive Linguistics and Its Applications in Language Teaching	3	This course provides an overview of the discipline of cognitive linguistics and its application in second language teaching. Cognitive linguists understand the language that we encounter every day as input from which we draw inferences about form-meaning relationships, typical patterns, and schemata. The course addresses core concepts in this area of study including: prototype, perspective, categorization, image schema, figure and ground, metaphor, metonymy, entrenchment, embodied cognition, gesture, construction grammar, attention and salience, and contingency learning. The course discusses how cognitive linguists design pedagogical methods and stimulate learners to explore the deeper meanings of grammatical forms.	-	A-F	English	-
ENGE5670	Language Policy and Planning (LPP)	3	Language Policy and Planning (LPP) studies the linguistic, sociocultural, economic, educational, and socio-political dimensions of decisions about the use, role, and status of languages across spaces. As an interdisciplinary field, LPP investigates how and why institutions, communities, and individuals create, negotiate, and implement language policies. This course aims to engage students in understanding and analysing the theories, research practices, impacts, and implications of LPP across spaces such as school/university, family, workplace, and public places. The course engages students in critical analyses of how language policies shapes language learning, socialization, identities (e.g., race, ethnicity, and social class), ideologies and inequalities. The major topics to be covered in the course are: language ideology, language education policy(including English as a medium of instruction and multilingual education), family language policy (FLP), agency in language policy, and linguistic landscape. Students will read research-based texts and participate in discussions to examine language policies from diverse world contexts, including minority language contexts.	-	A-F	English	-
ENGE5710	Critical Approaches in Literary Studies	3	The course aims at providing the students with an orientation of critical and interpretive approaches required of graduate studies in literature in a cross-cultural context. Various literary and critical paradigms from Western and Chinese traditions will be reviewed with a discussion of the basic issues in interpretation theory and criticism. The course will also focus on the implications of recent orientations in social sciences and philosophy for literary studies. Students will be required to identify their own research interests and pursue text- based case studies on problems or topics in criticism and interpretive theory that are involved in the interdisciplinary studies of literature.	-	A-F	English	-
ENGG5105	Computer and Network Security	3	This course aims to introduce important topics in computer and network security from an applied perspective. Topics include: (i) applied cryptography (e.g., cryptographic primitives, programming with OpenSSL), (ii) network security (e.g., unauthorized accesses, large-scale network attacks, firewall & intrusion detection systems), (iii) web security (e.g., HTTP session management and web attacks), and (iv) system security (e.g., buffer overflow, passwords, file system security). The course also discusses latest applied security topics depending on the current research trends. Advisory: Students are expected to have taken CSCI3150 or ESTR3102, and CSCI4430 or CENG4430 or IERG3310	-	A-F	English	-
ENGG5108	Big Data Analytics	3	This course aims at teaching students the state-of-the-art big data analytics, including techniques, software, applications, and perspectives with massive data. The class will cover, but not be limited to, the following topics: advanced techniques in distributed file systems such as Google File System, Hadoop Distributed File System, CloudStore, and map-reduce technology; similarity search techniques for big data such as minhash, locality-sensitive hashing; specialized processing and algorithms for data streams; big data search and query technology; managing advertising and recommendation systems for Web applications. The applications may involve business applications such as online marketing, computational advertising, location-based services, social networks, recommender systems, healthcare services, or other scientific applications.	-	A-F	English	-
ENGG5301	Information Theory	3	Introduction. Shannon's information measures. Entropy rate of a stationary process. The source coding theorem. Kraft inequality. Huffman code. Redundancy of a prefix code. The channel coding theorem. Rate-distortion theory. Universal data compression.	-	A-F	English	-
ENGG5303	Advanced Wireless Communications	3	This course provides an extensive introduction to basic principles and advanced techniques in the physical layer of wireless communications. Topics to be covered include channel coding, MIMO and space-time processing, OFDM and multicarrier systems, spread spectrum and CDMA, channel capacity, opportunistic scheduling and diversity schemes. Advisory: A prior undergraduate level course in wireless communication is highly recommended.	-	A-F	English	-

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ENGG5501	Foundations of Optimization	3	In this course we will develop the basic machineries needed for formulating and analyzing various optimization problems. Topics include convex analysis, linear and conic linear programming, nonlinear programming, optimality conditions, Lagrangian duality theory, and basics of optimization algorithms. Applications from different fields, such as computational economics and finance, combinatorial optimization, and signal and image processing, will be used to complement the theoretical developments. No prior optimization background is required for this class. However, students should have a workable knowledge in multivariable calculus, basic concepts of analysis, linear algebra and matrix theory.	-	A-F	English	-
ENGG5781	Matrix Analysis and Computations	3	Matrix analysis and computations are widely used in engineering fields—such as machine learning, computer vision, systems and control, signal and image processing, optimization, communications and networks, and many more—and are considered key fundamental tools. This course covers matrix analysis and computations at an advanced or research level. It consists of several parts. The first part focuses on various matrix factorizations, such as eigendecomposition, singular value decomposition, Schur decomposition, QZ decomposition and nonnegative factorization. The second part considers important matrix operations and solutions such as matrix inversion lemmas, linear system of equations, least squares, subspace projections, Kronecker product, Hadamard product and the vectorization operator. Sensitivity and computational aspects are also studied. The third part explores presently frontier or further advanced topics, such as matrix calculus and its various applications, tensor decomposition, and compressive sensing (or managing undetermined systems of equations via sparsity). In every part, relevance to engineering is emphasized and applications are showcased.	-	A-F	English	Quota for visiting students: 3
GDRS5011	Introduction to Gender Studies	3	This course introduces students to the main streams of the current academic discourse on gender theory and feminism. It will explore various schools of thought in feminism and relate theoretical frameworks to issues of current interest such as the ability of women to earn an independent income, social security, occupational segregation, women sexuality, body politics and discrimination against women in different fields of society. It also introduces students to some basic methodology in gender and feminist research.	-	A-F	English	Quota for visiting students: 5
GDRS5087	Feminist Methodology	3	The purpose of this course is to acquaint students with the intellectual debate between feminist epistemology and scientific knowledge production as well as to equip them with the abilities of critical thinking about their methodologies and conducting research with proper methods. Topics include: 1) critically questioning the validity of knowledge production, the power relations between the researcher and his or her research subjects, and the representation of the research and the researcher; 2) cautiously examining the influence of globalization on feminist research and the intersectionality among race, class and gender; and 3) innovatively connecting theory with praxis through participatory action and writing. We will begin with a brief introduction to the history and development of feminist research, followed by discussions on feminist methodologies by exemplary researchers. In the final weeks, we will shift our focus to the application of theory and groundbreaking feminist writing through collaboration.	-	A-F	English	Quota for visiting students: 2
GPAD5050	Qualitative Methods of Political Research	3	This course serves to introduce postgraduate students to the fundamental principles of scientific inquiry and major qualitative research methods. Topics to be covered include: conceptual foundation of research in social science, design and structure of political research, and methods for collecting and analyzing qualitative data.	-	A-F	English	-
GPAD5055	Quantitative Methods of Political Research	3	This course serves to help postgraduate students develop working knowledge of a number of statistical methods that are widely used in political and social studies. Topics to be covered include major principles of data collection and analysis and a variety of statistical models.	-	A-F	English	-
GRMD5110	Statistical Applications in Geography	3	This course is an introduction to statistical methods in geographic research. The goal of this course is to provide a practical understanding of the application of statistical analysis to geographic problem solving. Emphasis is placed on the application of appropriate methods to analyse geographic data, the appropriate procedures for research design, and the interpretation of research results. Topics include: geographical data and data manipulation, spatial autocorrelation, multiple linear regression, logistic regression, principal components analysis, factor analysis, cluster analysis and discriminant analysis.	-	A-F	English	Quota for visiting students: 5
IERG5050	AI Foundation Models, Systems and Applications	3	Foundation Models in Artificial Intelligence (AI), such as GPT, BERT, Claude and DALL-E, are large-scale neural networks that serve as a base for building a wide range of AI / Deep Learning applications. These models are pre-trained on massive amounts of data using distributed / parallel computing infrastructure. They are called foundation models because of their adaptability for many specific downstream tasks after fine-tuning or refinement. This graduate-level course explores the latest developments in AI foundation models, systems, and applications, providing students with a comprehensive understanding of how to design, implement, and deploy AI solutions in different domains by leveraging foundation models. The course is designed for students who already have a background in deep learning and builds upon the knowledge gained in related introductory courses. It begins with a comprehensive coverage of the Transformer model, which has emerged as a universal and flexible learning architecture. Students will learn how state-of-the-art foundation models are constructed for different application domains using the Transformer as the basic building block. The course also covers how to leverage distributed / parallel computing infrastructure and methodologies to enable the training, serving, and deployment of foundation models in a scalable manner. Key aspects of foundation models including their emergent behavior, scaling laws, in-context learning ability, adaptation and augmentation are covered. The role of foundation models in the low-code, rapid development and adoption of new AI applications, as well as their societal considerations will also be discussed. Throughout the course, students will gain hands-on experience through assignments, case studies, and a project, allowing them to develop a comprehensive understanding of AI foundation models and their applications in different domains. Advisory note: A first course in Deep Learning or with equivalent background, or with instructor's written approval.	-	A-F	English	-
IERG5200	Channel Coding and Modulation	3	This course covers classic and new channel coding, and related modulation schemes. Topics include Reed-Solomon codes, convolutional codes, concatenated codes, low-density parity-check (LDPC) codes, and optionally, OFDM, MIMO, and network coding.	-	A-F	English	-

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IERG6200	Advanced Topics in Computer Networks (Algorithms and Systems for Embedded AI)	3	This is a systems course that will enable students to have in-depth understanding of key AI algorithms and their implementation for embedded and Internet of Things (IoT) systems. The topics cover 1) overview of basic signal processing algorithms such as FFT and digital filters; 2) advanced AI algorithms such as acoustic and visual signal processing, spatial sensing, machine learning etc.; 3) their implementation on cutting-edge IoT platforms and key system issues such as energy efficiency and real-time in the contexts of a set of representative IoT applications such as smart health, environmental monitoring, smart homes/buildings, smart cities etc. Students will work on an individual or team project to build an end-to-end system. The project should have a significant AI algorithm components and include implementation on real embedded IoT platforms. In addition to course project assignments, students will also read and discuss latest publications in the areas of embedded AI, Internet of Things, Cyber-Physical Systems, mobile systems, and ubiquitous computing. Advisory: IERG4230 or an equivalent course approved by the instructor. Students are expected to have basic understanding on signals and systems, signal processing or imaging processing and Internet of Things System.	-	A-F	English	-
LING6903	Syntactic Theory	3	This course provides students with a concise and critical introduction to the central issues and perennial problems in syntactic theory, with special focus on the Government and Binding Theory and the Minimalist Program. Through exercises, class discussions, and presentations, students will gain a solid understanding of the concepts and principles which have been of central significance in the recent development of syntactic theory. Whenever relevant, data from Mandarin and other languages will be used to motivate and instantiate the analyses that pertain to the central issues in syntactic theory.	-	A-F	English	-
LING6904	Topics in Phonetics	3	This course introduces major theories and research topics in phonetics. Issues in both speech production and perception will be introduced. Both segmental and suprasegmental aspects of speech sounds will be investigated. Emphasis will be placed on the acoustic nature of speech sounds. Phonetic interfaces with other sub-branches of linguistics will also be discussed. Students will gain a good understanding of the complex nature of speech communication.	-	A-F	English	-
LING6920	Topics in Language Acquisition	3	This course focuses on current issues in language acquisition with a strong emphasis on the interface of theoretical analysis of linguistics phenomena and central research questions in studies of language acquisition. Selected topics from first language acquisition, bilingual acquisition, second language acquisition, and sign language acquisition will be covered. Data from different languages will be used for illustration. Empirical coverage that extends beyond one language is essential. Topics vary from year to year.	-	A-F	English	-
LING6940	Linguistics Research Seminars	1	This course aims to engage students in the Department's Linguistics Research Seminars and in-house research activities. These activities will deepen students' knowledge of various fields of specialization, and help prepare them for their future academic and professional careers.	-	A-F	English	-
LING6971	Special Topics in Experimental Methods	3	This course is a continuation of LING 6980 (Research Methodology). Selected experimental methods will be discussed in depth. Students will learn about the mechanics of the methods as well as how they can be used to address theoretical issues in linguistics. Topics may include EEG, fMRI, eye-tracking, advanced behavioral methods and data analytics and computational mathematics. Students will learn hands-on techniques and will complete a research project using the methods introduced.	-	A-F	English	-
LING6984	Quantitative Methods in Language Research	3	This course presents an introduction to research designs and data analyses that are commonly used in experimental linguistic research. The course will emphasize on practical skills in data handling and analyses, in particularly using R. The course first introduces students to experimental designs as a prerequisite to statistics. Then it progresses from data distribution and descriptive statistics to gradually more complicated statistical techniques that are commonly used to analyze linguistic data (e.g., correlation, t-test, non-parametric tests, ANOVA, regression). With a focus on both conceptual understanding and practical skills in statistics, the course offers both lectures and also practical sessions where students have hands-on experience using R to analyze actual language data.	-	A-F	English	-
MKTG6153	Advanced Seminar in Marketing - Behavioral Studies II	3	This seminar covers major behavioral decision making related issues in behavioral marketing. It is focused on the selected current theory and research in areas of contemporary importance and relevance to behavioral decision making. Topics will vary over course offerings but may include heuristics and biases, prospect theory, mental accounting, preference construction, etc.	-	A-F	English	-
PHYS5330	Instrumentation I	3	This course provides an introduction to the working principles and operation techniques of instruments commonly used in experimental physics. Topics covered include: transducers and sensors; signal conditioning, propagation and conversion; noise, signal recovery techniques, computer interface, vacuum techniques, and integrated-circuit instrumentation. This course also includes laboratory experiments for practice and illustration of the subject matter.	-	A-F	English	Quota for visiting students: 3
PHYS5410	Advanced Quantum Mechanics	3	This course will discuss various theoretical topics of non-relativistic quantum mechanics at the graduate level. The quantum mechanics of many-body systems will also be introduced. Topics covered include: operator methods in quantum mechanics, addition of angular momenta, variational method, stationary perturbation theory, time-dependent perturbation theory, scattering theory, and introduction to the quantum theory of many-body systems.	-	A-F	English	-
PHYS5510	Topics in Theoretical Physics (Advanced Statistical Mechanics)	3	This course provides an introduction to the major ideas and methods in equilibrium statistical mechanics as well as in nonequilibrium statistical physics. Topics will be selected from the statistical mechanics of magnetic systems; interacting fluids and soft matter; theory of critical phenomena and the renormalization group; stochastic dynamics and nonequilibrium processes; introduction to quantum statistical mechanics; and other topics of current interest in statistical physics.	-	A-F	English	-

Course Code	Course Title	Units	Keyword Syllabus or Brief Subject Description	Pre-requisites (if any)	Result Grade	Medium of Instruction	Remarks, if any
PHYS5562	Topics in Theoretical Physics (Astrophysics)	3	This is a graduate course which covers various topics in theoretical astrophysics in one of the following areas: (1) Plasma physics and its applications in astrophysical phenomena, (2) Astroparticle Physics. For area (1), basic concepts in plasma physics such as plasma waves, shocks, MHD instabilities and magnetic reconnection are introduced. In addition, illustrations from astrophysics such as solar flares, cosmic rays, interstellar turbulence, and protostellar disks will be discussed. For area (2), current topics in Astroparticle physics including Big Bang nucleosynthesis, content and dynamics of the Universe, Cosmic rays, Neutrino astrophysics, and Dark matter will be discussed, with emphasis on how fundamental processes at the particle level impact astrophysical and cosmological evolution. In both areas, experimental and observational studies will be discussed in parallel with basic theory.	-	A-F	English	-
PHYS5590	Modern Atomic Physics	3	This course will discuss various fundamental topics of modern atomic physics at the postgraduate level. The first part of the course focuses on atomic structures, the semi-classical theory of atom-light interactions and their application to the understanding of laser cooling and related topics. The second part is on atom-atom interactions at ultracold temperatures, including its application to evaporative cooling for reaching quantum degeneracy. An advanced topics section is also included to introduce the most recent developments in this field. Students should have undergraduate level Quantum Mechanics before taking this course.	-	A-F	English	-
PSYC6520	Engagement and Motivation in Organizations	3	This is the first course of a series of two courses in organizational psychology. Topics covered in this course include: job attitudes, work motivation, stress, job enrichment, communication, decision making, and conflict management.	Students must be graduate students (Master's or PhD level); and should already have a basic understanding of organizational behavior and I-O psychology from related courses (e.g., at least one elective I-O/OB course at undergraduate level).	A-F	English	-
SEEM5340	Stochastic Calculus	3	Introduction to continuous time stochastic processes. Brownian motions: explicit constructions, properties, quadratic variation, the Cameron-Martin-Girsanov formula, multidimensional Brownian motions. Stochastic Integration: definition, Ito's formula, martingale representation, time change, Girsanov's Theorem, local time and Tanaka's formula. Stochastic differential equations and diffusion processes: strong and weak solutions, diffusions, the Feynman-Kac formula, backward stochastic differential equations. Levy processes: definition, the Levy-Khinchin representation, the Levy-Ito decomposition, the Esscher transform.	-	A-F	English	-
SEEM5390	Stochastic Optimization and Risk Management	3	Stochastic optimization (SO) has been effective mathematical approach for decision making under uncertainty and risk management. This course introduces main mathematical models and underlying theory in SO. It begins with one-stage stochastic programming (SP) models and then moves on to two-stage recourse models and multistage dynamic SP models. Particular focuses will be given to SP problems with specific structures such as newsvendor problems, network capacity expansion problems and mathematical programs with equilibrium constraints. The course will also introduce various risk measures such as coherent risk measure, convex risk measure and monetary risk and discuss how stochastic optimization can be effectively used in risk management/optimization. Finally, the course will introduce new developments of SO including robust optimization distributionally robust optimization and preference robust optimization.	-	A-F	English	-
SEEM5580	Advanced Stochastic Models	3	Poisson process. Birth-and-death process, Markov chain. Martingale. Brownian motion. Renewal and stationary processes. Stochastic integration and Ito's formula. Applications to queueing models, inventory models, and financial investment/hedging models.	-	A-F	English	-
SOCI6001	Advanced Theory	3	This course is primarily intended to give graduate students a detailed introduction to some foundational theoretical questions and positions in sociology. It is centered on the writings of Max Weber, Emile Durkheim, and Karl Marx, supplemented by other (and more recent) theoretical work. The readings and seminar discussions will cover three mains sets of issues: 1) the relationship between the individual and society; 2) the special challenges and problems confronting a science of society; and 3) theoretical accounts of key modern social structures. Secondarily, students will through a series of exercises leading up to a final paper gain practice in the essential skill of "reading and writing with theories."	-	A-F	English	-
SOCI6002	Advanced Methodology	3	This is an intensive training course on the logic of theory construction and the logic of evidence building in empirical sociology. The theoretical and evidential logics provide the foundation for the effective use of qualitative and quantitative data analysis alike. The course will provide the tools for clarifying the theoretical and evidential logics of an empirical study and introduce various explanatory mechanisms that are relevant to diverse subfields of sociology. Most importantly, the course will develop the competence of students in theory construction and evidence building through learning-by-doing. Much of the course will be devoted to a re-examination of many exemplary works in empirical sociology from each theoretical family. The course will not focus on any philosophical debate or technique of data analysis.	-	A-F	English	-