Course list for Cross-institutional Course/Subject Enrolment Scheme for Research Postgraduate Students
(2022-23, Term 2)
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
ANTH6020	Seminars in Research Methods	3	This seminar will introduce you to a range of techniques for collecting and analyzing data. The course will also seek to help you prepare for your own research and field work. Being a seminar, the course will require extensive reading; classes will be discussions rather than lectures, and you are expected to ask questions and volunteer answers. Other teachers and advanced graduate students will be invited to participate in the course.	-	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 selected advanced topics associated with the behavioral research process. In particular, students will learn how to apply various types of research design and statistical methods, and how to interpret the results. Sample topics include among others experimental design, measurement theory, cross-cultural research, significance tests and statistical power, interaction and moderating effects, multi-level analysis, confirmatory factor analysis, and structural equation modeling. Even though mathematical proofs and statistical derivations will be reduced to a minimum, having the knowledge of basic statistics and matrix manipulations will be helpful.	BASA6001 or with the instructor's permission	A-F	English	Quota for visiting students: 3
CENG5270	EDA for Physical Design of Digital Systems	3	This course aims to present the fundamental concepts and algorithms applied in Design Automation (CAD) of VLSI circuits. The scope will include various areas in Physical Design of digital systems, including circuit partitioning, FPGA technology mapping, floorplanning, placement, routing, compaction and interconnect optimization.	-	A-F	English	-
CHLL6261	Special Topics in Classical Chinese Texts II	3	Critical study of topics that pertain to compilation, transcription, transmission, commentaries, and annotations of ancient Chinese texts. Students are required to conduct research on a chosen topic under guidance.	-	A-F	Cantonese & Putonghua	Quota for visiting students: 10
CHLL6331	Special Topics in Classical Chinese Poetry I	3	Critical study of classical Chinese poetry, with emphasis on particular authors, works or schools.	-	A-F	Cantonese & Putonghua	Quota for visiting students: 10
COMM6320	Digital Research	3	How has the rise of digital media, new data landscape, and computational tools transformed the process of knowledge generation and academic production? In preparing students to engage with this digital social and research environment, this course has three interrelated foci: (1) To introduce epistemological and ontological perspectives on the concepts of data, analytics, and knowledge production; (2) To discuss emerging theoretical approaches to studying digital media-rich phenomenon; (3) To provide basic training on selecting digital data analytic tools and techniques, with an aim to incorporate these skills in research projects.	-	A-F	English	Quota for visiting students: 4
CSCI5030	Machine Learning Theory	3	This course first introduces fundamentals of machine learning with a large size of samples, including basic principles (maximum likelihood vs least redundancy) and typical structures (linear systems of hidden factors, mixture of local structures, and Markov temporal models), The second part of the course covers learning theories towards small sample size challenge, including major topics (model selection, learning regularization, two stage implementation, sparse learning, and automatic model selection) and three streams of efforts, namely generalization error estimation (CV, AIC, VC theory), shortest coding length (MML vs MDL) or similarly various Bayes (BIC, MAP, Laplace, marginal, and variational), and BYY learning (BYY system, best harmony theory, Ying-Yang alternation updating, and five action circling implementation).	-	A-F	English	-
CSCI5640	Natural Language Processing	3	Natural language processing (NLP) is a crucial part of artificial intelligence (AI), which aims to endow computers with the ability to process human language. This course gives an overview of modern deep learning techniques for natural language processing. The course starts with basic linguistic concepts in NLP and moves from shallow bag-of-words representations to richer structural embeddings, which is the foundation for the successful use of deep learning in NLP. Then the course will guide you through three fundamental tasks of NLP: language modeling (LM), natural language understanding (NLU), and natural language generation (NLG), followed by some recent advances such as BERT and adversarial learning. Along the way we will introduce cutting-edge computational models together with insights from a linguistic perspective.	-	A-F	English	-
DSME5121	Econometric Theory and Applications	3	This course is designed for business Ph.D. students who need to apply econometrics in their research. The major contents of this course will focus on two parts. The first part will cover fundamental econometrics topics such as ordinary least squares, instrumental variable estimation, panel data models, and generalized linear model. The second part will cover topics about business causal inference by either randomized field/lab experiments or natural experiments such as matching, difference-in-differences, and regression discontinuity design. This course is a graduate econometrics course that emphasizes application in practice. Knowledge of multivariate calculus, linear algebra, statistics, and econometrics at the undergraduate level is	-	A-F	English	-
DSME6612	Advanced BE Research Seminar	3	This seminar course provides students with a broad exposure to research in Business Economics (BE). It will cover the development of current research topics such as game theory, information economics, firm and contract theory, industrial organization, and other topics related to microeconomics. Students are expected to read assigned papers thoroughly prior to classes and be able to discuss the paper's key assumptions and how those assumptions influence the paper's key findings. The contribution of the papers to the literature will also be discussed.	-	A-F	English	-
DSME6632	Research Sem in Operations & SCM	3	This seminar is designed to provide students with the latest knowledge on research issues, theories and methodologies in the areas of Operations and Supply Chain Management. Students will be required to read research papers, critique and synthesize other people's research work, and identify areas for future research. They are also required to present and discuss other people's research and their own research proposals. The instructor and scholars from different universities will also be invited to present their latest research. Topical areas will include Operations Supply Chain Strategy, Total Quality Management, Service Operations Management, Innovation and New Product Development, Lean Thinking, Business Process Improvement/Innovation Relationship Management and Supply Chain Integration, Supply Chain/Logistics Network Design and other topics.	-	A-F	English	-

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EASC5020	Soil Mechanics and Its Applications	3	A survey of basic concepts of soil mechanics: Classification and physical properties of soil; stress and strain; pore pressure, seepage theory and effective stress; elastic solutions; shear strength and Mohr-Coulomb theory; failure mode and criteria; soil consolidation; lateral earth pressure; slope stability; bearing capacity and foundation designs; pile analyses and designs; soil improvement and soil nailing. Geotechnical applications: shallow and deep foundations; retaining structures; slope instability.	-	A-F	English	Subject to teacher's approval on individual application.
EASC5101	Advanced Topics in Geophysics	3	Recent advances in theoretical and applied geophysics, with focus on geodesy, seismology, geoelectricity, geomagnetism and gravity, and their applications in natural hazard reduction, energy resources and environmental issues.	-	A-F	English	Subject to teacher's approval on individual application.
EASC5180	Earthquake Source Physics	3	This course focuses on the concepts and theory of earthquake source physics. The topics covered include seismic instrumentation, geophysical observations of earthquake source processes, kinematic source representation of earthquakes, dynamic rupture propagation of earthquakes, frictional properties of fault zones, and entire earthquake cycle. Methods and field practice of seismological survey will also be introduced.	-	A-F	English	Subject to teacher's approval on individual application.
EASC5220	Tropical Meteorology	3	This course introduces the phenomena and motions in the tropical atmosphere. The topics covered include the role of the tropics in the global energy and momentum balance, ITCZ, subtropical high, upper-level anticyclones, weather and climate phenomena including meso-scale convective systems, tropical waves, the Hadley and the Walker circulation, air-sea interaction and coupled climate modes such as El Nino-Southern Oscillation and Indian Ocean Dipole, tropical cyclones, Madden Julian Oscillation, and monsoons.	-	A-F	English	Subject to teacher's approval on individual application.
EASC5510	Statistical Methods and Data Analysis for Earth and Atmospheric Sciences	3	This course covers the theoretical basis and practical applications of data analysis relevant for earth system science. This course aims to introduce students to Earth and environmental data manipulation, from sampling, reading and writing, to statistical analysis and parameter estimation, to time series analysis, to plotting and visualization. Topics include: digital signal processing, sampling techniques; probability distributions; hypothesis testing; correlation analysis; linear and nonlinear regression; statistical forecasting, harmonic analysis and spectral analysis; principle component analysis; and geostatistics. Tutorials will be based on real geophysical examples including remote sensing and in situ observations, as well as model data. Previous elementary coding experience in Python 3 is recommended.	-	A-F	English	Subject to teacher's approval on individual application.
EASC5602	Selected Topics in Earth and Atmospheric Sciences	2	Recent research methods, experimental, and computational techniques applied in selected, advanced topics in Earth and Atmospheric Sciences.	-	A-F	English	Subject to teacher's approval on individual application.
ECON5150	Applied Econometrics	3	Please visit: https://www.econ.cuhk.edu.hk/econ/en-gb/programs/curriculum/course-offered/postg	Graduate Econometrics or Mathematical Statistics	A-F	English	-
ECON5180	Economics and Data Science	3	Please visit: https://www.econ.cuhk.edu.hk/econ/en-gb/programs/curriculum/course-offered/postg	Graduate Microeconomics and Macroeconomics	A-F	English	-
ECON5480	Industrial Organization	3	Please visit: https://www.econ.cuhk.edu.hk/econ/en-gb/programs/curriculum/course-offered/postg	Graduate Microeconomics and Econometrics	A-F	English	-
ECON6810	Special Topics in Economics I: Economics of Social Networks	3	Please visit: https://www.econ.cuhk.edu.hk/econ/en-gb/programs/curriculum/course-offered/postg	Graduate Microeconomics and Econometrics	A-F	English	-
ELEG5060	Functional Analysis and Approximation Theory	3	This course will provide graduate students with a panorama of functional analysis and approximation theory in multiple dimensions, adopting a systematic dual point of view (functions defined through a collection of measurements, weak formulations). The emphasis will be laid on the simplest, albeit modern mathematical concepts and mechanisms, with a view to avoid extraneous formalism and more abstract (e.g., topological) considerations. This knowledge will be used to modelise engineering problems (e.g., data acquisition, sampling), to devise methods for solving exactly or approximately the inverse problems that are related (e.g., resulting from partial differential equations), and to analyse the error resulting from the approximations.	-	A-F	English	Quota for visiting students: 5
ELEG5491	Introduction to Deep Learning	3	http://dl.ee.cuhk.edu.hk/	-	A-F	English	Quota for visiting students: 5
ENGE5230	Major Author(s): Shakespeare	3	An intensive study of the life, the imaginative character, and the works of a single author or authors who have played major roles in the development of Western literature. Authors studied may vary from year to year.	-	A-F	English	-
ENGE5240	Creative Writing	3	The course acquaints students with the art of creative writing at an advanced level. Depending on the specialization(s) of the instructor, creative works will be explored and produced in such genres as poetry, short stories, film-scripts, and/or plays. Students will engage in intensive critique of each other's works as well as study the generic conventions of the disciplines which focus the course each year. There will also be some emphasis on exploring local and international publishing or performance avenues.	-	A-F	English	-
ENGE5340	Distant Readings	3	In the context of a world that was beginning to understand the power of "big data," Franco Moretti introduced the notion of "distant reading" to the field of literary studies. A method of literary scholarship that embraced the technological explosion at the end of the twentieth century, Moretti's distant reading looked to transcend a literary studies that he thought of as dominated by the "theological exercise" of close reading – which is to say the "very solemn treatment of very few texts taken very seriously." Distant reading attempted (attempts) to make sense of thousands of texts at the same time. It asks questions that only a survey of tens of thousands of texts can answer – how does the thematic concern of western literature change over the decades… or over the centuries? And not just the thematic concern of the canonical literature we all know, but all western literature (or as much of it as we can recover today!) Such questions cannot be answered by the individual scholar but, as Moretti understood, they can be answered with the aid of computation. This course introduces you to the debates provoked by Moretti's ideas and then moves on to show you how distant reading is practiced today. By way of workshop and project-based learning, you will be introduced to the statistical analysis platforms that computational literary studies scholars use today. You will then learn how to use this software in order to generate your own distant readings of a corpus of texts.	-	A-F	English	-

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ENGE5410	Psycholinguistics	3	Psycholinguistics is the study of the interrelation between linguistic and psychological aspects. This course thus explores diverse topics at the intersection of language and mind with the aim of understanding the cognitive, psychological, and linguistic processes that underlie language comprehension and production. Specifically, the course will focus on discussing (a) how human beings process language in real-time comprehension and production and (b) what cognitive and psycho-linguistic mechanisms are operative in language processing. The course also offers diverse hands-on activities to explore classic and recent research methods in Psycholinguistics. In addition, students will learn to design a psycholinguistic experiment and analyze real data obtained from previous research. Topics to be covered in the course include: (a) speech perception, (b) word recognition, (c) sentence comprehension, (d) predictive processing, and (e) sentence production.	-	A-F	English	-
ENGE5420	Sociolinguistics	3	This course is a graduate-level introduction to the field of sociolinguistics. It presents and elucidates the interconnectedness between language, culture and society. It places special emphasis on sociolinguistic variation in the context of language contact and multilingualism. An introduction to basic theoretical concepts, practical insights, and research methods in sociolinguistics will be given. We will consider multiple dimensions along which language use may vary and discuss the implications of language variation for diverse contexts ranging from micro-level interactional practices to national level language policies. We will investigate the link between language practices and social factors such as ethnicity, gender, social class, and culture. Topics covered in this course include code-switching, styles, identity, language attitudes, language shift/maintenance as well as language policy. Examples are drawn from a wide range of social contexts, with a focus on the English language. As the course will touch on quantitative and qualitative approaches to sociolinguistic research, students will come out of the course equipped with the basic skills necessary to empirically analyze the relationship between social variables and linguistic practice.	-	A-F	English	-
ENGE5440	Language and Intercultural Communication	3	This course examines the relationship between language and intercultural communication theory, research, and practice to better understand communication between people who have a different linguistic and cultural background. Core concepts in this course include: conceptions of culture and interculturality; the relationship between language, culture, communication, and power; language, culture, and identity; race and ethnicity; generalizations and stereotypes; second language (L2) socialization; L2/intercultural transition and adaptation; intercultural relationship development; intercultural communicative competence; English as the primary language of intercultural/international communication; the role of culture in English language teaching and learning; intercultural pedagogy and assessment. This course will consist of lectures, readings, discussions, a reading-summary presentation, and a major project (individually	-	A-F	English	-
ENGE5560	Second Language Teaching	3	This course is designed to help students develop robust understanding about how instruction can facilitate second language acquisition. It begins with theories underlying concepts and theories on second language acquisition (SLA) that should be firmly established before discussing how to translate such theories into teaching practices. Then, various pedagogical approaches to second language (L2) teaching are introduced, highlighting the differences between implicit vs explicit and input-based vs output-based instruction. In addition, this course reviews empirical findings on the effects of various pedagogical interventions on second language learning so that students can understand the importance of solid theoretical background in SLA in desining, implementing, and evaluating L2 instructions.	-	A-F	English	-
ENGE5620	Acquisition and Teaching of L2 Pronunciation	3	This course focuses on both the acquisition of a second language (L2) sound system and the teaching of L2 pronunciation. The first part of the course focuses on the acquisition of L2 phonology, and covers child first language (L1) acquisition, theories of L2 phonological acquisition, and linguistic and social factors affecting the acquisition and use of a L2 sound system. In the second part of the course, the foci is on the application of theory into practice, and examines models for English pronunciation teaching; goals, models, and issues in the development of a pronunciation curriculum; and practical guidelines for the teaching of vowels, consonants, and suprasegmentals.	-	A-F	English	-
ENGE5720	Comparative Approaches in Literary Studies	3	The course serves as an introduction to the advanced study of literature from comparative perspectives. With a view to enhancing their ability in identifying problems and topics for research, students will be familiarized, through team-work instruction, with the basic techniques and methods of bibliographical research and textual criticism. This will involve the use of specific primary texts. Emphasis will be put on giving the students an overview of historical as well as current research in the field. The concept of comparative literature will be investigated along with the various cultural as well as literary issues particularly involved in the studies of literature in the Chinese-Western context. Traditional areas of research, such as influence and reception, themes and motifs, genres and forms, and interrelations of literature and art, will be reviewed in the light of recent literary and cultural theories. In this course students will have to read major literary and critical texts with regard to the various perspectives on comparative literature.	-	A-F	English	-
ENGE5950	Special Topic(s) in Critical Studies: The Gothic in the Romantic Era	3	This course is designed to investigate areas of specialisation normally not covered under generic studies or literary history. It may involve any one of the following areas in the comparative and interdisciplinary studies of literature: thematology, textual criticism and reader response, aesthetics, Western critical theories and Chinese literary studies, problems in the histories of literary criticism; twentieth-century critical theories; literature and the other arts; literature and sociology; literature and philosophy; literature and history; literature and language; literature and culture. 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	-
ENGG5101	Advanced Computer Architecture	3	This course is designed to present an overview of some advanced computer architectures and their underlying design principles. Issues discussed will include scalability and performance evaluation. The underlying technologies such as processor and memory hierarchy, cache and shared memory, and advanced pipelining techniques will be presented. Examples of high performance vector processors, multicomputers and massive parallel processors will be compared. Some novel architectures such as VLIW, fault tolerant systems and data flow machines will also be elaborated. Advisory: Students are expected to have taken CENG3420 or having background knowledge in computer organization.	-	A-F	English	-

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ENGG5104	Image Processing and Computer Vision	3	This course will cover fundamental knowledge and advanced topics in image processing and computer vision, including feature detection, segmentation, motion estimation, panorama construction, 3D reconstruction, scene detection and classification, color image processing and restoration. Applications in computer graphics will also be introduced, including image transformation, and camera calibration. Basic concepts of related algorithms and mathematic background will be discussed.	-	A-F	English	Students who took CMSC5711 or CSCI5280 before are not allowed to take ENGG5104.
ENGG5282	Nanoelectronics	3	Review of semiconductor physics. Electrons in nanostructures: density of states, quantum confinement, transport properties, nanocontacts, Coulomb blockade. Nanoscale fabrication and synthesis: lithography, nanopatternning, epitaxy and heterostructure, self-assembly, other techniques. Nanoscale characterization: scanning probe microscopy and other microscopic techniques, nanoscale electrical measurements. Nanoscale devices: nano-MOSFETs; carbon nanotube devices, nanowire- and nanoparticle-based devices, organic thin film devices, molecular electronic devices, applications, and commercialization.	ELEG2510 or equivalent	A-F	English	Quota for visiting students: 5
ENGG5601	Principles of Biomechanics and Biomaterials	3	This course focuses on biomechanics (biostatics, biodynamics, mechanics of biological solids), biomaterials (metals, ceramics, synthetic polymers, natural polymers, composites; characterization of biomaterials; biomaterial scaffolds for regenerative medicine) & clinical applications in the musculoskeletal system (including, sports, traumatology, and rehabilitation), cardiovascular system, and dentistry.	-	A-F	English	Quota for visiting students: 5
GDRS5040	Advanced Topics in Gender Studies II	1.5	This course is the Wednesday Gender Seminar Series co-presented by the Gender Studies Programme and the Gender Research Centre. We will invite speakers from different disciplines to give talks on various gender-related topics and present their research findings. The interaction part following the talk will help the audience to engage themselves in a direct dialogue with the research traditions and gain insights on gender, sexualities and society.	-	A-F	English	Quota for visiting students: 5
HIST6100HY	Reading Seminar: Historical Materials in the Middle Periods of China (7th-13th centuries) 史學著作研討會：中古史料學	3	中國古代史之中，最重要之一大階段，為七至十四世紀南北地域政治、社會、思想之分際離合。這一在現代中古史學界一般被通稱為「中古中國」(The Middle Periods of China)的時間段，覆蓋了傳統朝代史視野中唐、五代、十國、宋、遼、金、西夏、元各朝。相關史料較之晚期帝制中國，雖曰相對有限，卻錯雜紛紜，故有「治中古史者大不易」之嘆。本課程以相關時段核心史料為綱領，從史源學、史學史角度出發，帶領學生精讀包括官修正史、私人通史、文集、經籍、法律條文、筆記小說、詩詞、題跋等在內的多種史料。希望通過師生之間的相互討論，教學相長，在中古史研究園地上開闢出新的研究問題與視野。 Details: https://www.history.cuhk.edu.hk/course/2022232_hist6100hy/	-	A-F	English & Putonghua	Quota for visiting students: 3
HIST7100HY	Reading Seminar: Historical Materials in the Middle Periods of China (7th-13th centuries) 史學著作研討會：中古史料學	3	中國古代史之中，最重要之一大階段，為七至十四世紀南北地域政治、社會、思想之分際離合。這一在現代中古史學界一般被通稱為「中古中國」(The Middle Periods of China)的時間段，覆蓋了傳統朝代史視野中唐、五代、十國、宋、遼、金、西夏、元各朝。相關史料較之晚期帝制中國，雖曰相對有限，卻錯雜紛紜，故有「治中古史者大不易」之嘆。本課程以相關時段核心史料為綱領，從史源學、史學史角度出發，帶領學生精讀包括官修正史、私人通史、文集、經籍、法律條文、筆記小說、詩詞、題跋等在內的多種史料。希望通過師生之間的相互討論，教學相長，在中古史研究園地上開闢出新的研究問題與視野。 Details: https://www.history.cuhk.edu.hk/course/2022232_hist7100hy/	-	A-F	English & Putonghua	Quota for visiting students: 1
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	-
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 at 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	-
LING6970	Special Topics in Linguistics	3	From time to time, a course focusing on a specific area of linguistics or applied linguistic research that is not covered in the regular linguistic programme may be offered. Students are allowed to take this course more than once (but not within the same term), and gain the units each time they pass the course. However, students cannot take the same topic twice.	-	A-F	English	-
LING6980	Research Methodology	3	The course adopts an interactive, problem-based approach, with an aim to training students in conducting linguistics research on a topic of their interest. Focus will be on linguistic analysis and empirical methods in language research. Students may be required to conduct linguistic research through field	-	A-F	English	-
MGNT6022	Advanced Seminar in Organizational Behavior and Human Resource Management	3	This course is an introduction to theories and research pertaining to individuals and teams in organizations. Topics covered include prosocial and deviant behaviors, creativity and motivation, decision making, affect, trust, justice, leadership, diversity, team dynamics and cross-cultural research.	-	A-F	English	-
MGNT6192	Advanced Cultural Psychology for Business Research	3	This course focuses on cultural influences on behaviors in business settings (marketing, management, financial decision making, and business ethics). We will first survey major cultural theories, and then discuss major cross-cultural differences revealed in self, attribution and social inferences, thinking and perceptual styles, emotion, and motivation. The aim is to understand how culture impacts business behaviors and how Asians may differ from individuals from other cultural background. This knowledge will lay a strong foundation for students to formulate business research in an emerging	-	A-F	English	-
MGNT6252	Research Methods in Strategic Management	3	This course is meant for M.Phil and PhD students in the department of management. The purpose of this course is to introduce students to a variety of empirical approaches that are employed to investigate questions of interest in strategic management discipline as well as enable students learn about the relevance of the several methodologies that are widely used in the field. In this regard, the course will mainly discuss about the links between research questions and designs, and will also lay emphasis on how to review empirical research in strategic management.	-	A-F	English	Quota for visiting students: 5

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PHYS5420	Classical Electrodynamics	3	This course is intended to provide an introduction to the theory of classical electrodynamics at the graduate level. The emphasis is on the problems of electromagnetic radiation and the covariant formulation of electrodynamics. Selected topics of current research interest will also be discussed.	-	A-F	English	Quota for visiting students: 3
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	-
PHYS5550	Topics in Theoretical Physics (Quantum Optics)	3	Concept of photons, properties and applications of nonclassical light, photo-detection of optical coherence, photon-atom interaction models, quantum theory of damping, laser theory, atom coherence effects, and an introduction to quantum communication.	-	A-F	English	Quota for visiting students: 3
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.	For students in MPhil-PhD Systems Engineering and Engineering Management; Pre-requisite: ENGG5501	A-F	English	-
SEEM5410	Optimal Control	3	Dynamic continuous-time systems. Examples, modelling, and classification of optimal control problems. Pontryagin's maximum principle: adjoint equation, Hamiltonian system, and sufficient condition of optimality. Bellman's dynamic programming: principle of optimality, Hamilton-Jacobi-Bellman equation, and verification theorem. Linear quadratic control: Riccati equation and linear matrix inequality. Introduction to numerical methods of solving optimal control problems.	For students in MPhil-PhD Systems Engineering and Engineering Management	A-F	English	-
SEEM5650	Integer Programming	3	The course deals with theory and algorithms for solving integer and combinatorial optimization problems. Theoretical topics include general concepts such as relaxations, bounds, duality, and total unimodularity. Solution methods cover branch-and-bound, cutting planes, branch-and-cut, Lagrangian relaxations, local search, and metaheuristics. Optimization software and programming languages will be used to implement the methods for solving optimization problems.	For students in MPhil-PhD Systems Engineering and Engineering Management	A-F	English	-
SEEM5670	Advanced Models in Financial Engineering	3	This course covers various applications of engineering technicalities in financial modeling. Emphasis will be on two main topics: investment portfolio optimization and financial derivative pricing. We introduce dynamic programming approach, martingale and PDE numerical solutions, Monte Carlo simulation methods for solving these two problems.	For students in MPhil-PhD Systems Engineering and Engineering Management	A-F	English	-
SOCI6003	Advanced Statistical Analysis	3	The core content/syllabus should be covered by all sections of the same course and selected topics may be added by individual course teacher. Core content should comprise not less than 50% of the course This course focuses on the causal modelling on different types of data. A major part of the discussion will be given to OLS regression in order to illustrate the modelling techniques needed for causal analysis. With this foundation, the lecture will move on to discuss the more sophisticated methods that require a deeper understanding of the statistical literature. Discussion will emphasize both the statistical reasoning underlying these methods and their empirical applications. At the end of the course, students should have sufficient exposure to a wide range of analytical methods, helping them to appreciate the quantitative research literature and to conduct their own empirical analyses.	-	A-F	English	-
SOCI6004	Advanced Qualitative Methods	3	The core con+D62:D64tent/syllabus should be covered by all sections of the same course and selected topics may be added by individual course teacher. Core content should comprise not less than 50% of the course This course examines qualitative methods used in social science research. The course focuses on methods rather than methodology. Its emphasis is on equipping participants with the practical skills, such as case and informant selection, field experiences, interview techniques, writing field notes, and analyzing and writing qualitative data. The course is in a seminar format. Lectures will be interwoven with discussions. Students are also required to conduct a small-scale pilot qualitative research project using the skills discussed in the seminar.	-	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
STAT5020	Topics in Multivariate Analysis	3	This is an advanced course on multivariate analysis. Topics may include: Multivariate central theorem, and its applications, factor analysis, structural equation models, and latent variable models.	For students in MPhil, or PhD Statistics or permission of Instructor	A-F	English	Subject to teacher's approval on individual application. Quota for visiting students: 10
STAT5030	Linear Models	3	This course introduces fundamental elements related to linear statistical models. The major substance of this course covers: classical distribution theory; full-rank linear models; non-full-rank linear models; advanced topics related to modern linear models, including penalized regression, variable selection and screening methods, etc.	For students in MPhil, or PhD Statistics or permission of Instructor	A-F	English	Subject to teacher's approval on individual application. Quota for visiting students: 10
STAT5040	Studies on Selected Topics I	3	This course introduces theory and methodology of statistical machine learning. It will help students develop a solid and systematic understanding of statistical machine learning, grasp cutting-edge methodology development, and explore possible applications of machine learning techniques in science and engineering. The covered topics include theory of uniform convergence, generalization analysis of statistical machine learning algorithms for regression and classification, kernel methods, analysis of unsupervised learning methods, probabilistic graphical models.	Course for MPHIL/PHD students or permission of Instructor	A-F	English	Subject to teacher's approval on individual application. Quota for visiting students: 10
STAT6040	Studies on Selected Topics II	3	This is a graduate-level seminar course. Recent topics on computer-intensive statistical method are selected for discussion. For this semester, the topics are on probabilistic modelling and computing through Bioinformatics.	Undergraduate level probability and statistical inference	A-F	English	Quota for visiting students: 10