REGULATIONS FOR THE DEGREES OF
MASTER OF SCIENCE (MSc) AND MASTER OF SCIENCE IN ENVIRONMENTAL MANAGEMENT (MSc[EnvMan])

For students admitted in 2024-25 and thereafter

(See also General Regulations and Regulations for Taught Postgraduate Curricula)

Any publication based on work approved for a higher degree should contain a reference to the effect that the work was submitted to the University of Hong Kong for the award of the degree.

The degree of Master of Science is a postgraduate degree awarded for the satisfactory completion of a prescribed course of study in one of the following six fields: Applied Geosciences, Chemical Technologies for Health and Materials, Food Industry: Management and Marketing, Food Safety and Toxicology, Physics and Space Science.

The degree of Master of Science in Environmental Management is a postgraduate degree awarded for the satisfactory completion of a prescribed course of study in Environmental Management.

Admission requirements

Sc21

(a) To be eligible for admission to the courses leading to the degree of Master of Science or Master of Science in Environmental Management, a candidate

(i) shall comply with the General Regulations and the Regulations for Taught Postgraduate Curricula;

(ii) shall hold a Bachelor's degree of this University; or another qualification of equivalent standard of this University or another University or comparable institution accepted for this purpose;

(iii) in respect of the courses of study leading to the degree of Master of Science in the field of Space Science, shall hold a Bachelor's degree in a relevant science or engineering discipline, and prior knowledge expected in basic college-level physics, mathematics, statistics, and computer programming;

(iv) in respect of the courses of study leading to the degree of Master of Science in the field of Physics, a Bachelor's degree in a relevant science (e.g. physics, astronomy, earth science, mathematics) or engineering discipline, and prior knowledge expected in university-level electromagnetism, quantum mechanics and thermodynamics, university-level linear algebra and multi-variable calculus, basic statistics, and some computer programming experience (e.g. coding in C++, Mathematica, Matlab or Python);

(v) in respect of the courses of study leading to the degree of Master of Science in the field of Chemical Technologies for Health and Materials, a Bachelor's degree in a relevant science (e.g. chemistry, biochemistry, biotechnology, health science, material science, medical or food analysis) or engineering (e.g. chemical engineering, environmental engineering, materials or mechanical engineering) discipline is preferred; and

(vi) shall satisfy the examiners in a qualifying examination if required.

(b) A candidate who does not hold a Bachelor's degree of this University or another qualification of equivalent standard may in exceptional circumstances be permitted to register if the candidate demonstrates adequate preparation for studies at this level and satisfies the examiners in a qualifying examination.

Qualifying examination

Sc22

(a) A qualifying examination may be set to test the candidate's academic ability to follow the course of study prescribed. It shall consist of one or more written papers or equivalent and may include a project proposal.

(b) A candidate who is required to satisfy the examiners in a qualifying examination shall not be permitted to register until he/she has satisfied the examiners in the examination.

Award of degree

Sc23 To be eligible for the award of the degree of Master of Science or Master of Science in Environmental Management, a candidate

(i) shall comply with the General Regulations and the Regulations for Taught Postgraduate Curricula; and

(ii) shall complete the curriculum and satisfy the examiners in accordance with these regulations and syllabuses.

Advanced standing

Sc24 In recognition of studies completed successfully before admission to the Master of Science in Environmental Management, Master of Science in the field of Applied Geosciences and Master of Science in the field of Space Science, and Master of Science in the field of Chemical Technologies for Health and Materials, advanced standing of up to 12 credits may be granted to a candidate with appropriate qualification and professional experiences, on production of appropriate certification, subject to the approval of the Board of the Faculty. Credits gained for advanced standing shall not be included in the calculation of the GPA but will be recorded on the transcript of the candidate. The candidate should apply before commencement of first year of study via the Department and provide all the supporting documents.

Period of study

Sc25

(a) The curriculum of the Master of Science (except Master of Science in the field of Food Industry: Management and Marketing, and Master of Science in the field of Chemical Technologies for Health and Materials) or the Master of Science in Environmental Management shall normally extend over one academic year of full-time study or two academic years of part-time study. Candidates in either degree shall not be permitted to extend their studies beyond the maximum period of registration of two academic years of full-time study or three academic years of part-time study, unless otherwise permitted or required by the Board of the Faculty.

(b) The curriculum of the Master of Science in the field of Food Industry: Management and Marketing shall normally extend over one academic year of full-time study. Candidates shall not be permitted to extend their studies beyond the maximum period of registration of two academic years of full-time study, unless otherwise permitted or required by the Board of the Faculty.

(c) The curriculum of the Master of Science in the field of Chemical Technologies for Health and

Materials shall normally extend over one and a half academic years of full-time study. Candidates shall not be permitted to extend their studies beyond the maximum period of registration of three academic years of full-time study, unless otherwise permitted or required by the Board of the Faculty.

Completion of curriculum

Sc26 To complete the curriculum of the Master of Science or Master of Science in Environmental Management, a candidate

(a) shall satisfy the requirements prescribed in TPG 6 of the Regulations for Taught Postgraduate Curricula;

(b) shall follow courses of instruction and complete satisfactorily all prescribed written, practical and field work;

(c) shall complete and present a satisfactory dissertation or project on an approved subject or complete courses with equivalent credits as a replacement; and

(d) shall satisfy the examiners in all courses prescribed in the respective syllabuses.

Dissertation or Project

Sc27 The title of the dissertation or project shall

(a) for the full-time mode of Master of Science in the field of Applied Geosciences, Master of Science in the field of Food Safety and Toxicology and Master of Science in the field of Space Science, be submitted for approval by October 15 and the dissertation or project report shall be submitted not later than August 15 in the subsequent year;

(b) for the full-time curriculum of MSc in the field of Food Industry: Management and Marketing, be submitted by April 30 and the dissertation or project report shall be submitted not later than August 15 of the first year of study, unless otherwise permitted or required by the course coordinator(s);

(c) for the full-time curriculum of MSc in Environmental Management, be submitted by October 30 and the dissertation or project report shall be submitted not later than the last Friday in June of the first year of study, unless otherwise permitted or required by the course coordinator(s);

(d) for the part-time curriculum (except Master of Science in the field of Applied Geosciences, Master of Science in the field of Physics and MSc in Environmental Management), be submitted for approval by March 15 of the first year of study and the dissertation or project report shall be submitted not later than July 1 of the second year of study;

(e) for the part-time curriculum of MSc in the field of Applied Geoscience, be submitted for approval by November 15 of the first academic year and the dissertation shall be submitted not later than August 15 of the second year of study;

(f) for the part-time curriculum of MSc in Environmental Management, be submitted by June 30 of the first academic year, unless otherwise permitted or required by the course coordinator(s). The dissertation shall be submitted not later than the last Friday in May of the second year of study and the project report shall be submitted not later than the last Friday in June of the second year of study, unless otherwise permitted or required by the course coordinator(s);

(g) for the full-time curriculum of Master of Science in the field of Physics, be submitted by November 30 and the dissertation or project report shall be submitted not later than the first Friday in June of the first year of study;

(h) for the part-time curriculum of Master of Science in the field of Physics, be submitted by November 30 of the first academic year and the dissertation or project report shall be submitted not later than the first Friday in June of the second year of study.

(i) for the full-time curriculum of Master of Science in the field of Chemical Technologies for Health and Materials, be submitted by March 30 of the first academic year and the dissertation or project report shall be submitted by November 30 of the second year of study.

Sc 28 A candidate shall submit a statement that the dissertation or project represents his/her own work (or in the case of co-joint work, a statement countersigned by his/her co-worker, which shows his/her share of the work) undertaken after registration as a candidate for either degree.

Assessments

Sc29 The assessment in any course shall consist of elements prescribed by the course teachers, and will normally comprise either written coursework alone, or coursework combined with formal examinations; in either case participation in field work or practical work may form part of the assessment.

Sc30 A candidate who has failed to satisfy the examiners

(a) at his/her first attempt in any course in the examination held during any of the academic years of study may be permitted to present himself/herself for re-examination in the course or courses at a specified subsequent examination, with or without repeating any part of the curriculum;

(b) at his/her first submission of dissertation or project report may be permitted to submit a new or revised dissertation or project report within a specified period;

(c) in any prescribed fieldwork or practical work may be permitted to present himself/herself for re-examination in fieldwork or practical work within a specified period.

Sc31 Failure to take the examination as scheduled, normally results in automatic course failure. A candidate who is unable because of illness to be present at any examination of a course, may apply for permission to be present at some other time. Any such application shall be made on the form prescribed within seven calendar days of the examination concerned.

Discontinuation

Sc32 A candidate who

(a) has failed to satisfy the examiners in more than half the number of credits of courses during any of the academic years or in any course at a repeated attempt, or

(b) is not permitted or fails to submit a new or revised dissertation or project report, or

(c) has failed to satisfy the examiners in their dissertation or project report at a second attempt,

may be recommended for discontinuation of studies.

Assessment results

Sc33 On successful completion of the curriculum, candidates who have shown exceptional merit may be awarded a mark of distinction, and this mark shall be recorded in the candidates' degree diploma.

Grading systems

Sc34 Individual courses shall be graded according to one of the following grading systems as determined by the Board of Examiners:

(a) Letter grades, their standard and the grade points for assessments as follows:

Grade	Standard	Grade Point
A+	Excellent	4.3
A		4.0
A-		3.7
B+	Good	3.3
B		3.0
B-		2.7
C+	Satisfactory	2.3
C		2.0
C-		1.7
D+	Pass	1.3
D		1.0
F	Fail	0

or

*(b) 'Pass' or 'Fail'

#(c) 'Distinction', 'Pass' or 'Fail'

Courses which are graded according to (b) or (c) above will not be included in the calculation of the GPA.

*Only applies to certain courses in MSc in the field of Applied Geosciences and MSc in the field of Physics

#Only applies to certain courses in MSc in the field of Chemical Technologies for Health and Materials

SYLLABUSES FOR THE DEGREE OF
MASTER OF SCIENCE IN THE FIELD OF CHEMICAL TECHNOLOGIES FOR HEALTH AND MATERIALS
(for students admitted in 2024-25 and thereafter)

The Department of Chemistry offers a postgraduate curriculum leading to the degree of Master of Science in the field of Chemical Technologies for Health and Materials in one and a half years full time mode. This MSc programme endeavours to equip students with in-depth knowledge in relevant subject areas, advanced transferable skills and innovative mindset, enabling them to achieve breakthroughs in workplace and research. The MSc programme focuses on the two most prominent scientific frontiers in chemical technologies: health science and material technologies. The contents cover a wide range of subjects from drug design and synthesis, quality assurance, modern analysis techniques to energy harvesting, conversion and storage, as well as technology transfer. Along with core and elective lecture modules, the programme also offers laboratory and project-based practical courses, offering extensive hands-on experience. The qualification is a valuable asset for individuals seeking careers in industry, start-up business, education, or pursuing further postgraduate studies.

STRUCTURE AND EVALUATION

Each student must complete 72 credits of courses. If a student selects a course whose contents are similar to a course (or courses) which he/she has taken in his/her previous study, the Department may not approve the selection in question.

A. COURSE STRUCTURE

The list of courses, and their contents set out thereafter, will be changed from time to time.

Programme Structure of the Full-time Mode		
Compulsory Courses (30 credits)		
CTHM7101	Advanced Chemical Instrumentation and Data Analysis	(6 Credits)
CTHM7104	Frontiers in Modern Materials	(6 Credits)
CTHM7105	Innovation, Technology Transfer and Entrepreneurship	(6 Credits)
CTHM7106	Bioanalytical methods: principles and diagnostic applications	(6 Credits)
CTHM8101	Research and Development Seminar	(6 Credits)
Elective Courses (18 credits)		
CTHM7102	Synthesis for Drugs and Advanced Materials	(6 Credits)
CTHM7103	New Technologies and Applications in Chemical Biology	(6 Credits)
CTHM7107	Green and Sustainable Chemistry	(6 Credits)
CTHM7108	Quality Assurance and Regulatory Compliance	(6 Credits)
CTHM7109 #	Big Data Analysis in Analytical Science	(6 Credits)
CTHM7110	Advanced Materials	(6 Credits)
CTHM7111	Medicinal Chemistry	(6 Credits)
COMP7404 #	Computational Intelligence and machine learning	(6 Credits)
STAT8017 #	Data Mining Techniques	(6 Credits)
Capstone Course (24 credits)		
CTHM8102	Research Project and Dissertation	(24 Credits)

Students have the option of taking either CTHM7109, COMP7404 or STAT8017 as one elective. However, they cannot take more than one among these three courses.

B. COURSE CONTENTS

Compulsory Courses

CTHM7101 Advanced chemical instrumentation and data analysis

The aim of this course is to provide students with an understanding of advanced modern chemical instrumentation, covering both fundamental principles and practical aspects of instrument design for qualitative and quantitative chemical analysis. The course emphasizes bridging theory and practice to address real-life problems. The frontiers in electrochemical technologies, mass spectrometry analysis and machine learning for chemical analysis will be discussed.

Assessment: Course work (50%); Examination (50%)

CTHM7104 Frontiers in modern materials

This course provides an in-depth exploration of modern materials chemistry, with a focus on bridging fundamentals and practical applications. The topics include functional materials and nanodevices for energy conversion and storage, environmental issues, biomedicine, and optoelectronics. The course also covers the fundamentals of materials chemistry, design strategies, synthesis, device preparation, and characterization. Throughout the course, students will learn about the latest techniques used in materials chemistry and gain hands-on experience.

Assessment: Course work (50%); Examination (50%)

CTHM7105 Innovation, technology transfer and entrepreneurship

This course provides students exposure into how science/technology startup is conceived and established. From laboratory scientific research results to successful technology concepts and products, the students who are interested in technology transfer and entrepreneurship need to build up a spectrum of knowledge and practical experiences from technology analyses, product ideation, value evaluation, business plan, IP preparation, all the way to team building, funding raising, and go-to-market strategy. Students in this course will obtain essential understanding of how tech startup is built and triumphed, which is a key introductive step in becoming future technology transfer professionals and entrepreneurs.

Assessment: Course work (100%)

CTHM7106 Bioanalytical methods: principles and diagnostic applications

This course provides an overview of bioanalytical methods for disease diagnostics and sensing applications. Course contents cover the principles and applications of modern bioanalytical techniques. Selected topics include chemistry of MRI and contrast agents, point-of-care testing, microfluidics, mass spectrometry, next-generation DNA sequencing and other nucleic-acid-based analysis, and separation science. Other emerging technologies and the latest development in bioanalytical chemistry will also be discussed.

Assessment: Course work (50%); Examination (50%)

CTHM8101 Research and development seminar

The course consists of a series of seminars, which are designed to acquaint students with the latest advancements and developments in chemical technologies that are relevant to health, well-being, materials synthesis, and analysis. The seminar series will cover topics such as the latest advancements in chemical technologies, new materials and their applications, synthesis and analysis techniques, biochemical processes involved in drug discovery and development, and other related topics. Students will present their literature research and findings in class and receive feedback from their peers and instructors.

Assessment: Course work (100%)

Elective Courses

CTHM7102 Synthesis for drugs and advanced materials

This course provides a comprehensive training on synthetic methods that are applicable to the preparation of pharmaceuticals and organic materials. Current organic transformations, including oxidations/reductions, substitutions, enolate chemistry, and transition metal-catalyzed transformations will be covered. A focus of this course is the application of these methods in the synthesis of drugs and materials, with discussions on multiple examples in both academia studies and industrial manufacturing.

Assessment: Course work (50%); Examination (50%)

CTHM7103 New technologies and applications in chemical biology

This course covers state-of-the-art advancements in technologies to probe chemistry in cells, with a primary focus on the latest development and application of technologies for examining cellular processes, molecular interactions, and their implications in biology and medicine. The novel technologies probing cellular chemistry using chemical biology, synthetic biology, and genome engineering methodologies, as well as techniques for single-cell analysis, microscopy, and mass spectrometry analysis, will be discussed. Extensions of these application to disease treatments will be introduced.

Assessment: Course work (50%); Examination (50%)

CTHM7107 Green and sustainable chemistry

The principles and practices of green chemistry, focusing on renewable energy, green catalysis, and carbon neutrality will be discussed. The course covers the chemistry underlying renewable energy technologies; green catalysis in the synthesis of important chemicals, such as pharmaceuticals and polymers; and investigates the concept of carbon neutrality such as carbon capture and storage. Through a combination of lectures, readings, and case studies, students will learn about the principles and applications of green chemistry, as well as the environmental and economic benefits of this approach.

Assessment: Course work (50%); Examination (50%)

CTHM7108 Quality assurance and regulatory compliance

A good grasp of effective practices to maintain service quality and adhere to government legislations and regulatory guidelines is vital for entering into the industry. Building upon basic metrology concepts and techniques used in quality control, this course aims to provide a thorough understanding of the principles and requirements for both management and technical aspects of the international standard ISO/IEC 17025:2017, along with other management standards such as Good Laboratory Practice (GLP) and Good Manufacturing Practice (GMP). Practical guidelines for establishing, implementing and maintaining a quality management system for laboratory operation are given. Requirements of internal and external audits as stipulated in ISO/IEC 17025:2017, and criteria from accreditation bodies such as Hong Kong Accreditation Service (HKAS) and China National Laboratory Accreditation Committee (CNAS) are also addressed. Extensions of these concepts in clinical trials will be introduced. Emphasis is also given to technical requirements for different disciplines.

Assessment: Course work (100%)

CTHM7109 Big data analysis in analytical science

This course focuses on the application of big data analytics in analytical chemistry, health and materials sciences. It introduces students to the principles of big data analytics, current challenges, most recent development, and opportunities presented in the field. Case studies on big data analytics in chemistry, including the use of advanced analytics in the areas of drug discovery, diagnosis, materials development and environmental analysis will also be discussed.

Impermissible Combination: Students should not be taking or have taken STAT8017 Data mining techniques or COMP7404 Computational intelligence and machine learning

Assessment: Course work (100%)

CTHM7110 Advanced materials

This course gives a comprehensive overview on materials chemistry. It focuses on the application of materials in advanced technology for renewable energy, catalytic devices, sustainable resourcification, wearable biosensors, nanoelectronics, membrane technology, and other specialty applications. The most recent development, synthesis, and characterization in materials chemistry will also be discussed.

Assessment: Course work (50%); Examination (50%)

CTHM7111 Medicinal chemistry

This course covers the chemical principles of drug design and drug action. It discusses the drug discovery, design, and development; as well as drug metabolism; prodrugs and drug delivery. It serves as an introduction to the current development of bioorganic/inorganic chemistry, pharmaceutical chemistry, and biotechnology.

Assessment: Course work (50%); Examination (50%)

COMP7404 Computational intelligence and machine learning

This course will teach a broad set of principles and tools that will provide the mathematical, algorithmic and philosophical framework for tackling problems using Artificial Intelligence (AI) and Machine Learning (ML). AI and ML are highly interdisciplinary fields with impact in different applications, such as, biology, robotics, language, economics, and computer science. AI is the science and engineering of making intelligent machines, especially intelligent computer programs, while ML refers to the changes in systems that perform tasks associated with AI. Ethical issues in advanced AI and how to prevent learning algorithms from acquiring morally undesirable biases will be covered.

Topics may include a subset of the following: problem solving by search, heuristic (informed) search, constraint satisfaction, games, knowledge-based agents, supervised learning, unsupervised learning; learning theory, reinforcement learning and adaptive control and ethical challenges of AI and ML.

Impermissible combination: Students should not be taking or have taken CTHM7109 Big data analysis in analytical science or STAT8017 Data mining techniques

Assessment: Course work (50%); Examination (50%)

STAT8017 Data mining techniques

With the rapid developments in computer and data storage technologies, the fundamental paradigms of classical data analysis are mature for change. Data mining techniques aim at helping people to work smarter by revealing underlying structure and relationships in large amounts of data. This course takes a practical approach to introduce the new generation of data mining techniques and show how to use them to make better decisions. Topics include data preparation, feature selection, association rules, decision trees, bagging, random forests and gradient boosting, cluster analysis, neural networks, introduction to text mining.

Impermissible Combination: Students should not be taking or have taken CTHM7109 Big data analysis in analytical science or COMP7404 Computational intelligence and machine learning

Assessment: Course work (100%)

Capstone Course

CTHM8102 Research project and dissertation

The Research Project and Dissertation provides students with the opportunity to conduct original research and development project in the field of chemistry and related areas. Students will work with experienced faculty members to conduct advanced independent research projects in areas such as biomaterials, drug delivery, biocatalysis, green synthesis and analytical chemistry; which will be the basis of their thesis.

The course provides comprehensive training in design and conduct experiments, data analysis, and critical thinking. Students will learn how to design and conduct experiments, analyze experimental data, and write a high-quality research thesis. This course includes lectures, seminars, laboratory work, and independent research; which provides students with advanced knowledge of chemical regulations and safety. This course also enables students to apply scientific principles, data analysis, and other transferrable skills in real-world scenarios.

Prerequisite: CTHM8101 Research and Development Seminar

Assessment: Course work (100%)

SYLLABUSES FOR THE DEGREE OF
MASTER OF SCIENCE IN THE FIELD OF APPLIED GEOSCIENCES
(for students admitted in 2024-25 and thereafter)

A. COURSE STRUCTURE

To be eligible for the award of the MSc in the field of Applied Geosciences a student shall complete all core courses and total credits prescribed in a selected theme and elective courses, if any, totalling 66 or 69 credits.

ENGINEERING GEOLOGY THEME (66 credits)

Core Courses

GEOS7010 OR GEOS7011	^Geology principles and practice (6 credits) OR *Advanced geology of Hong Kong (6 credits)
GEOS7012	Site investigation and engineering geological techniques (6 credits)
GEOS7015	Rock mechanics (3 credits)
GEOS7016	Soil mechanics (3 credits)
GEOS7020	Project Part I (6 credits)
GEOS7021 OR GEOS8021	^Geological fieldwork I (3 credits) OR *Geological fieldwork II (3 credits)
GEOS7033	^Geology of Hong Kong (6 credits)
GEOS8001	Hydrogeology (3 credits)
GEOS8002	Professional practice in applied geosciences (3 credits)
GEOS8003	Seminars on unforeseen ground conditions, geotechnical and environmental failures (3 credits)
GEOS8020	Project Part II (12 credits)
GEOS8101	Engineering geology and geotechnical design (6 credits)
GEOS8102	Rock engineering and applications (6 credits)
GEOS8104	*Natural hillside landslide and hazard studies (3 credits)
GEOS8204	*Basic structural mechanics and behaviour (3 credits)

Other courses

GEOS7022	#Course of directed studies (3 credits)
GEOS7036	#Innovative Technology and Environmental Sustainability (3 credits)

^ For students whose first degree is not in Geology or a related subject
* For students with a first degree in Geology or a related subject
# As directed by the programme director

Core Course Replacement

Students with a first degree in Geology or a related subject may be directed by the programme director as shown below:	
Replace ...	**With**
GEOS8204 Basic structural mechanics and behaviour (3 credits)	GEOS7022 Course of directed studies (3 credits)

ENGINEERING GEOLOGY WITH HKIE APPROVED COURSES THEME (69 credits)

Core Courses

GEOS7012	Site investigation and engineering geological techniques (6 credits)
GEOS7015	Rock mechanics (3 credits)
GEOS7016	Soil mechanics (3 credits)
GEOS7020	Project Part I (6 credits)
GEOS7024	Management (3 credits)
GEOS8001	Hydrogeology (3 credits)
GEOS8002	Professional practice in applied geosciences (3 credits)
GEOS8003	Seminars on unforeseen ground conditions, geotechnical and environmental failures (3 credits)
GEOS8020	Project Part II (12 credits)
GEOS8101	Engineering geology and geotechnical design (6 credits)
GEOS8102	Rock engineering and applications (6 credits)
GEOS8204	Basic structural mechanics and behaviour (3 credits)
GEOS8205	Mathematics I (6 credits)
GEOS8206	Mathematics II (6 credits)

Other courses

GEOS7036	[#]Innovative Technology and Environmental Sustainability (3 credits)

[#] As directed by the programme director

GENERAL APPLIED GEOSCIENCES THEME (66 CREDITS)
For full-time students (non-geologists)

Core Courses

GEOS7010	Geology principles and practice (6 credits)
GEOS7012	Site investigation and engineering geological techniques (6 credits)
GEOS7015	Rock mechanics (3 credits)
GEOS7016	Soil mechanics (3 credits)
GEOS7020	Project Part I (6 credits)
GEOS7021	Geological fieldwork I (3 credits)
GEOS7024	Management (3 credits)
GEOS7033	Geology of Hong Kong (6 credits)
GEOS7035	Intermediate geology (6 credits)
GEOS7036	Innovative Technology and Environmental Sustainability (3 credits)

GEOS8001	Hydrogeology (3 credits)
GEOS8002	Professional practice in applied geosciences (3 credits)
GEOS8003	Seminars on unforeseen ground conditions, geotechnical and environmental failures (3 credits)
GEOS8020	Project Part II (12 credits)

Certain courses not included above may be accepted as electives at the discretion of the programme director.

Teaching will take place mainly on weekday evenings but students are expected to undertake field and laboratory work during weekends. Normally there are two evening classes each week but in some semesters there are three. Full-time students attend the same evening classes as part-time students, most of whom have day-time employment. Concentrated teaching may be held at weekends.

B. COURSE CONTENTS

GEOS7010 Geology principles and practice (6 credits)

This course provides a comprehensive review of fundamental concepts in geoscience, including earth and geological processes, surface processes, minerals and rocks, geological structures, and geological map interpretation. It aims to enhance students' practical skills in identifying minerals and rocks, which will be developed through dedicated practical sessions aimed at refining their analytical and observational abilities.

Assessment: Course work (30%) and written examination (70%)

GEOS7011 Advanced geology of Hong Kong (6 credits)

This advanced course explores the specialised aspects of the rocks and geological formations and structures in Hong Kong and their importance in geotechnical engineering, natural hazard management and resource development. Topics include volcanic systems, volcanic-plutonic connections, marble formations and complex geology, metamorphic rocks, tectonic history and geological structures, Quaternary stratigraphy and processes, and geological aspects of landslides.

Assessment: Course work (50%) and written examination (50%)

GEOS7012 Site investigation and engineering geological techniques (6 credits)

A professional course on the concepts and skills used in geotechnical site investigation. Topics include the design of site investigations, desk study and walkover survey, aerial photographic interpretation, soil and rock description and classification, ground investigation technology and soil and rock laboratory testing.

Assessment: Course work (30%) and written examination (70%)

GEOS7015 Rock mechanics (3 credits)

The course introduces the basic concepts of rock mechanics used in geotechnical practice. Topics include index properties, strength and deformability of intact rock; distribution and measurement of in-situ stresses; and shear strength of discontinuities in rock masses.

Assessment: Course work (30%) and written examination (70%)

GEOS7016 Soil mechanics (3 credits)

An examination of the basic soil mechanics theory used in geotechnical practice. The course reviews phase relationships, elasticity and plasticity, soil classification, compaction, seepage and effective stress concepts; and provides a more detailed analysis of lateral earth pressures, shear strength and consolidation.

Assessment: Course work (30%) and written examination (70%)

GEOS7020 Project Part I (6 credits)

The first phase of an independent study of a problem in applied geosciences. It involves literature review, data collection and data analysis. Students are required to write an inception report and give a presentation on their proposed study. Professional geologists are expected to undertake a field mapping task as part of their project. This course provides a capstone experience.

Assessment: Course work (100%)

GEOS7021 Geological fieldwork I (3 credits)

Self-directed study in the field over a 6-month period leading to the production of maps, field sheets, narrative accounts and other geological records for assessment. The fieldwork may be undertaken in association with the excursions of the Department of Earth Sciences, the local learned societies or independently. (Marked on a pass/fail basis.)

Assessment: Course work (100%)

GEOS7022 Course of directed studies (3 credits)

Studies to assist learning in the core courses, involving some of the following activities: professional activities, field work, laboratory work, internship, class exercises, tutorials and reading.

Assessment: Course work (80%) and oral examination (20%)

GEOS7024 Management (3 credits)

This course introduces the basic knowledge of project management practice. It will cover the following topics: engineering processes, programming and procurement strategies; contract management; construction site safety, health and environmental aspects; quality control and quality assurance.

Assessment: Course work (30%) and written examination (70%)

GEOS7033 Geology of Hong Kong (6 credits)

To provide an understanding of the principal components of the geology of Hong Kong and its regional setting, including the distribution and interpretation of the main rock types, age relationships; and superficial deposits; and the locations and orientations of the main regional and local structures.

Pre-requisite course: Pass in GEOS7010
Assessment: Course work (50%) and written examination (50%)

GEOS7035 Intermediate geology (6 credits)

The course is designed for students without geology background. It introduces mineralogy, petrology, structural geology, and further geological topics for non-geologists who have passed the prerequisite course GEOS7010.

Pre-requisite course: Pass in GEOS7010
Assessment: Course work (30%) and written examination (70%)

GEOS7036 Innovative Technology and Environmental Sustainability (3 credits)

The course introduces the government policy on the adoption of digital technology and sustainability assessment in public works projects, and provides an understanding of the role of innovative technology and environmental sustainability in engineering practice through case histories and examples.

Assessment: Course work (60%) and written examination (40%)

GEOS8001 Hydrogeology (3 credits)

To study the role of sub-surface water in engineering and environmental applications. Topics include the hydrologic cycle, properties of aquifers controlling the transmissivity storage and quality of groundwater, quantification of groundwater flow, the field investigation of groundwater and assessment of field parameters and applications of hydrogeology in engineering and environmental studies.

Assessment: Course work (30%) and written examination (70%)

GEOS8002 Professional practice in applied geosciences (3 credits)

An examination of issues in professional practice in applied geoscience, including regulation of practice, professional ethics and law, contracts and risk management.

Assessment: Course work (30%) and written examination (70%)

GEOS8003 Seminars on unforeseen ground conditions, geotechnical and environmental failures (3 credits)

A series of student-led seminars on case histories of landslides, collapses of engineering structures, excessive ground settlement and environmental disasters. Presentations of facts and opinions are given by students based on suggested reading material. This course provides a capstone experience.

Pre-requisite course: Pass in GEOS8002
Assessment: Course work (100%)

GEOS8020 Project Part II (12 credits)

The second phase of an independent study of a problem in applied geosciences culminating in the preparation of a project report of about 10,000 words. Students will be required to make a presentation of their preliminary results. This course provides a capstone experience.

Assessment: Course work (100%)

GEOS8021 Geological fieldwork II (3 credits)

Self-directed study in the field over a 6-month period leading to the production of maps, field sheets, narrative accounts and other geological records for assessment. The fieldwork may be undertaken in association with the excursions of the Department of Earth Sciences, the local learned societies or independently. (Marked on pass/fail basis.)

Assessment: Course work (100%)

GEOS8101 Engineering geology and geotechnical design (6 credits)

An examination of civil engineering design methodology and the application of soil mechanics theory and empiricism in geotechnical design. Emphasis is given to soil slopes and embankments, earth pressure and retaining structures and shallow and deep foundations.

Pre-requisite course: Pass in or concurrently enrolled in GEOS7016
Assessment: Course work (30%) and written examination (70%)

GEOS8102 Rock engineering and applications (6 credits)

This course starts with a brief introduction to the design methodology and the systems approach in rock engineering, and is mainly focused on the collection and analyses of engineering geological data for the design of rock structures. Uses of rock mechanics input and empirical classifications in analysis and design of rock slopes, tunnel excavation and support systems, and rock foundations are demonstrated through case histories.

Pre-requisite course: Pass in GEOS7015

Assessment: Course work (30%) and written examination (70%)

GEOS8104 Natural hillside landslide and hazard studies (3 credits)

The contents of this course will include most of the following topics: classification of landslides; Hong Kong terminology, examples of natural terrain landslides and documentary sources of information; hillslope evolution, geomorphological principles (including the evolutionary landform models of Dalrymple and Hansen) and Quaternary geology of Hong Kong; hillslope hydrology, modes of groundwater flow, runoff and infiltration, piping; hydrological and morphological conditions for initiation of shallow landslides in regolith; engineering geological and geomorphological mapping; landform processes; regolith mapping, boulder identification; landslide hazard assessment; landslide susceptibility assessment for risk quantification; design event approach; landslide mobility modelling.

Assessment: Course work (30%) and written examination (70%)

GEOS8204 Basic structural mechanics and behaviour (3 credits)

The subject will cover most of the following:

Behaviour of structural members subjected to tension, compression, bending, shear and torsion. Buckling of compression members. Statically determinate and indeterminate structures; including the concept of redundancy of structural members. Load transfer mechanisms of structural systems including foundations and shoring systems. General behaviour and basic concepts in design of reinforced concrete members. Structural design of foundations and retaining walls.

Assessment: Course work (30%) and written examination (70%)

GEOS8205 Mathematics I (6 credits)

This course (together with GEOS8206 Mathematics II) strives to provide a comprehensive introduction to the fundamental mathematics that all earth scientists need. Topics include the language of sets, the concept of matrices and its applications, functions, limits, first order differentiation, applications of derivatives, first order Taylor's expansion, properties of exponential and logarithmic functions, the notation of integration, integration techniques, volume of revolution, higher order differentiation and Taylor's expansion, Hessian test for functions of two variables, the concept of multiple integration, and volume using triple integration.

Assessment: Course work (30%) and written examination (70%)

GEOS8206 Mathematics II (6 credits)

This course is a continuation of GEOS8205 (Mathematics I). The first part of the course aims to teach students different solution methods to first order differential equations (separable, linear, Bernoulli, exact/non-exact types), second order linear differential equations with constant coefficients using characteristic equation, method of variation of parameters, method of educated guess. The second part introduces the concept of probability and statistics, topics include counting, probability (using the language of sets), random variables (including Binomial, Poisson, Exponential, Normal), probability density/distribution functions, cumulative distribution functions, joint distributions, independence, mean, variance, covariance, moment generating functions, sampling and confidence intervals (using Normal/t- distributions).

Assessment: Course work (30%) and written examination (70%)

C. PROGRAMME LEARNING OUTCOMES

1. Can apply geological and related engineering knowledge and skills in the solution of problems in the student's discipline.
2. Can explain, use and critically assess the use of science related to the student's discipline.
3. Insists on knowing the facts before making a judgement; exhibits judicial habits of mind.
4. Effective in defining and solving problems from first principles, without reliance on solutions from memory; can satisfactorily complete a self-directed study.
5. Effective in oral, written and graphical communication.
6. Works well in a team.
7. Knows the standards of conduct required by law, by the student's professional qualifying body and by the university and why it is important to uphold a high standard of professional ethics. Knows the specific malpractices that may be encountered in the student's profession and how to guard against malpractice.
8. Able to recognise, articulate and advocate the societal benefits of the application of best practice in engineering geology in the construction industry, in the use of earth resources and in the mitigation of geological risk.[1.]

[1.] for those taking the Engineering Geology Theme or the Engineering Geology with HKIE Approved Courses Theme of the MSc in the field of Applied Geosciences

---

D. ACADEMIC ASSESSMENT

The following Grade Descriptors will be used in academic assessment:

Grade A	Is very good or excellent in using basic principles and essential skills in practice. Requires very limited supervision. Is creative, work is virtually error free and writes well. Can apply learning in unfamiliar situations.
Grade B	Is good in using the basic principles and the essential skills in practice but requires some supervision.
Grade C	Is able to state most of the basic principles but is poor at using them, and the essential skills, in practice without direction.
Grade D	Marginal Pass and any Pass in a supplementary examination.
Fail	Does not know most of the basic principles and has not mastered the essential skills used in practice.

SYLLABUSES FOR THE DEGREE OF
MASTER OF SCIENCE IN THE FIELD OF
FOOD INDUSTRY: MANAGEMENT AND MARKETING

For students admitted in 2024-2025 and thereafter

A. COURSE STRUCTURE

The list of courses, and their contents set out thereafter, may be changed from time to time.

Programme Structure of the Full-time Mode:

Compulsory Courses (39 credits)

FOOD7001 Quality assurance and management I (6 credits)
FOOD7006 Future food (9 credits)
FOOD7007 Marketing management (6 credits)
FOOD7008 Organisational behaviour (6 credits)
FOOD8010 Quality assurance and management II (6 credits)
FOOD8013 Business and financial strategies (6 credits)

Elective Courses (12 credits)

Select any two elective courses from the following list:
FOOD7003 Advance food technology (6 credits)
FOOD7004 Food studies: exploring economics, culture, and environmental implications (6 credits)
FOOD8011 Food innovation & product development (6 credits)
FOOD8012 Food marketing strategies (6 credits)

Capstone Course (12 credits)

FOOD8009 Project (12 credits) *[Capstone experience]*

Total: 63 credits

Note: If students wish to focus in the area of Food Marketing/Management, he/she should take FOOD7004 and FOOD8012. If students wish to focus in the area of Food Product/Technology, he/she should take FOOD7003 and FOOD8011.

B. COURSE CONTENTS

Compulsory Courses

FOOD7001 Quality assurance and management I (6 credits)

This course includes an overview on the practical aspects of quality management not only from consumer's, but also on all stakeholders' perspectives in managing a cost effective quality department in a multinational corporations. The application of different quality management systems by international food corporations will be discussed. The management of food laboratory as well as international lab accreditation requirements will be introduced in this course. Students will learn the different phases of crisis management supplemented with case studies for discussion and practice. Issue management, crisis handling, product recall, post-crisis recovery will be discussed. Students will learn the skills in risk management. Troubleshooting techniques for

root cause analysis during product failure including microbiological troubleshooting will be discussed. Quality / process improvement tools will be introduced.

Assessment: Course work (85%); Examination (15%)

FOOD7006 Future food (9 credits)

Due to social and consumer's demands, practical modifications in food industries are inevitable globally. Notwithstanding, the use of advanced technology, AI and urban farming has become essential worldwide. Students will learn up-to-date approaches in sustaining food retail such as resources, digital business and the use of big data, and the application of modern farming in the city. Guest lectures from local and international experts will be invited to exchange real-life experience in the current food industry.

Assessment: Course work (100%)

FOOD7007 Marketing management (6 credits)

The course is designed to provide an understanding of the role of marketing multinational business organization and its contribution to business success. Students will be introduced to different international marketing concepts, marketing programs, planning and execution of marketing strategies. On completion of the course, students will be able to analyze customer requirements, competitive environment and to formulate effective marketing program. Sharing sessions with international industry practitioners will be arranged to deliver the topics on marketing in food industry (F&B operations & marketing, food labelling tracking system, food safety management and accreditation of ISO 22000 standard to create/deliver customer value) and field work will be arranged to visit food industry settings in Hong Kong. In addition, field work will be arranged for the students to visit the real-life food industry settings (e.g. restaurants of international management, shared kitchen, food factory plus online delivery) and they are required to apply the marketing concepts to formulate a marketing plan for these companies as part of their assessment in the course.

Assessment: Course work (60%); Examination (40%)

FOOD7008 Organisational behaviour (6 credits)

The course aims to equip students with a better understanding of the complex array of behaviours in organisational life in global entity. It will analyse the determinants of human behaviour in an organisation at the individual, group and organisational levels. Topics covered will include motivation, performance management, group dynamics, leadership, organisational culture, management of conflict, management of ethics, and the leading changes of these topics.

Assessment: Course work (70%); Examination (30%)

FOOD8009 Project (12 credits) *[Capstone experience]*

This is an individual or group research project to be carried out under the supervision of one or more faculty members in local or overseas institutions. Students may propose their own topics and approach potential supervisors, or they may consider those suggested by the faculty members. The proposed project title must be submitted for approval before starting the study. The candidate shall make a formal presentation on the subject of his/her project during the final semester of the teaching programme.

Assessment: Course work (100%)

FOOD8010 Quality assurance and management II (6 credits)

This course includes an overview on quality management focused on global food safety and risk management. Students will learn food quality and safety management, and crisis and management in food industry. Core components in GMP and other international safety standards and religious related standards (GSFI, ISO, BRC, Halal, Kosher) will be introduced in this course. Through these foundations and exercises of problem solving, students will be able to apply the knowledge in decision making of crisis and the use of modern communications for intervention.

Assessment: Course work (70%); Examination (30%)

FOOD8013 Business and financial strategies (6 credits)

The course aims to equip non-accounting professionals with the skills required to analyse and interpret the major financial reports prepared by international corporations. The focus of the course is on providing a user perspective of the financial statements and aim as how to use financial information in daily business life. In addition, the course addresses principles of basic financial management and explains the need for internal control procedures. Particular emphasis is given to develop an understanding of the balance sheet, profit and loss statement, and cash flow statement. The relationship between the statements will be explained and illustrated in detail. Study detail on different types of costing and how they impact business decision will be taught. A framework for making business decisions in an international corporations by analysing a set of financial statements using simple techniques will also be developed.

Assessment: Course work (60%); Examination (40%)

Elective Courses

FOOD7003 Advance food technology (6 credits)

The effects of processing and packaging on the shelf lives and changes in physical and chemical characteristics of food products will be discussed. Emphasis will be placed on the food preservation methods to extend product shelf lives as applicable to popular food products. Methods for sensitive nutrients and techniques to preserve the characteristic aroma and taste of a product in processing and modification will be reviewed. Issues related to nutrient enrichment and fortification will be discussed. Global case studies will be used to dispel the many misplaced information on food preservations and alternatives to extending shelf life of foods without the use of the traditional food preservatives. In addition, understanding of various newly world-visionic food ingredients for health is will be introduced; reformulation to reduce sugar and fat as well as reinforcement of fibres to foods are to be discussed.

Assessment: Course work (70%); Examination (30%)

FOOD7004 Food studies: exploring economics, culture, and environmental implications (6 credits)

The course will explore a range of themes related to food from various disciplines including but not limited to economics, social sciences, cultural studies, environmental studies, and food sciences. The course will have two distinct parts. In part one, the traditional approaches of food studies from the economics and agri-business perspectives will be examined. Various historical and contemporary social issues across the globe that intervene our daily food consumption with an interdisciplinary perspective will also be discussed. In part two, current applications and limitations of food waste treatment technologies will be addressed. The handling and management of food waste is an important part of the green circular economy strategy which focuses on food waste minimization, conversion and valorization. These components will be further explored, by including the social, economic, and environmental implications associated with food waste.

Assessment: Course work (60%); Examination (40%)

FOOD8011 Food innovation & product development (6 credits)

The role of research from management perspective in global corporations, the R & D process and the impact of technological innovation on the development of new products will be discussed. The impact of global issues in the direction of research and development for food corporations. The risks and opportunities of new product development for international markets. Interrelationship between product recipes, processing and food packaging in the food product development process will be discussed together with the effects of product formulations on food safety, sustainability, fair trade and business ethics will be highlighted.

Cultural aspects will be emphasized as an important consideration in developing new market frontiers. Differences between basic research and application research as applied in food product development will be deliberated along with career prospects. The difference in the product development process among food companies as compared to more established FMCG global food companies will also be discussed with case studies, together with illustrations in actual product formulations. Consumer survey and data analysis will be covered. The application of information technology in food manufacturing and catering, and the concepts of logistics in supply chain and new regulations in cold chain and food delivery will be discussed.

Assessment: Course work (70%); Examination (30%)

FOOD8012 Food marketing strategies (6 credits)

Marketing approaches and techniques applied for food products include topics such as test marketing, segmentation, positioning, branding, targeting, consumer research, and market strategy including product choice, pricing, promotion and distribution in relation to food industry. In this course, advanced knowledge of the factors specific to food effecting the global sustainability of food production and the role that innovation can play in the sector will be addressed. Appreciation of the complex and global environment in which the food business currently operates and the uncertainties and risks attached to food production will be discussed. The course cover issues and tasks that marketing managers face in dynamic marketplaces and the concepts that can be used for decision making and understand consumer behaviours towards food products sold in domestic and international market will be discussed.

Assessment: Course work (70%); Examination (30%)

SYLLABUSES FOR THE DEGREE OF
MASTER OF SCIENCE IN THE FIELD OF
FOOD SAFETY AND TOXICOLOGY

For students admitted in 2024-2025 and thereafter

All courses in this programme are compulsory. A candidate shall be examined shortly after the completion of each course.

A. Course Structure

Programme Structure of the Full-time Mode:		
Year 1 (69 credits)		
FSTX7001	Principles of toxicology I	(9 credits)
FSTX7002	Principles of toxicology II	(9 credits)
FSTX7003	Toxicity tests and hazards evaluation methods	(9 credits)
FSTX7004	Regulatory toxicology: risk assessment, risk management and communication	(12 credits)
FSTX8005	Chemical and microbial hazards in food	(9 credits)
FSTX8006	Food safety management	(9 credits)
FSTX8007	Project *[Capstone experience]*	(12 credits)

Programme Structure of the Part-time Mode:		
Year 1 (39 credits)		
FSTX7001	Principles of toxicology I	(9 credits)
FSTX7002	Principles of toxicology II	(9 credits)
FSTX7003	Toxicity tests and hazards evaluation methods	(9 credits)
FSTX7004	Regulatory toxicology: risk assessment, risk management and communication	(12 credits)
Year 2 (30 credits)		
FSTX8005	Chemical and microbial hazards in food	(9 credits)
FSTX8006	Food safety management	(9 credits)
FSTX8007	Project *[Capstone experience]*	(12 credits)

B. Course Content

FSTX7001 Principles of toxicology I (9 credits)

This module introduces students to the general principles and practice of toxicology. The major focus of the course is on basic principles, mechanisms and common methods underpinning the science of toxicology. Selected target organ systems (e.g. respiratory, nervous and immune systems) are studied with respect to understanding how representative chemicals damage and impair their ability to function. Students will

develop a fundamental understanding of how chemicals may exert toxic effects and gain insight into the importance of organ-specific toxicity.

Assessment: Course work (30%); Examination (70%)

FSTX7002 Principles of toxicology II (9 credits)

This module continues to introduce students to the general principles and practice of toxicology. The course continues to focus on basic principles, mechanisms and common methods underpinning the science of toxicology. Selected toxicants are studied with respect to their source of exposure and mechanisms of effects. Selected disease processes (e.g., mutagenesis, carcinogenesis, reproductive toxicity, teratogenesis and developmental toxicity) are studied with respect to understanding their basic pathways and common mechanisms. Selected fields are presented to give students insight into the applications of toxicology and its relationship with other fields.

Assessment: Course work (20%); Examination (80%)

FSTX7003 Toxicity tests and hazards evaluation methods (9 credits)

This module will provide students with the current state-of-the-art methodology employed to investigate the effect of chemical and microbial toxins and environmental pollutants on living systems. Topics include exposure estimate, animal tests for acute toxicity, short-term and long-term toxicity, for mutagenicity, genotoxicity and carcinogenicity, for reproductive toxicity, teratogenicity, developmental toxicity and delayed neurotoxicity. Major focus is on the basic principles underpinning each test method including the test rationale, protocol design, limitations and data interpretation. Students will also be introduced to the basic concepts of toxicological evaluation and criteria for setting guidance values for dietary and non-dietary exposure to chemicals. The role of biochemical, metabolic and toxicokinetic studies in toxicological evaluation is also considered.

Assessment: Course work (20%); Examination (80%)

FSTX7004 Regulatory toxicology: risk assessment, risk management and communication (12 credits)

In order to fully appreciate risks that arise from human exposure to chemicals in our living environment, it is essential to quantify levels of chemical contamination in environmental media and foods, and estimate total chemical exposure from dietary and non-dietary sources. This module will provide students with intensive training to develop the necessary practical skills to measure and model the extent to which human populations come into contact with toxic agents in the environment and foods, to conduct qualitative and quantitative risk assessments, to set safe levels of chemical exposure in foods (based on local food consumption patterns), and to implement effective risk management in protecting human health and the environment. The roles of international food safety authorities such as WHO, FAO, Codex Alimentarius Commission, JECFA, IARC and OECD will be described. Introduction to local and international food laws will be provided.

Assessment: Course work (20%); Examination (80%)

FSTX8005 Chemical and microbial hazards in food (9 credits)

This module will introduce students to the chemical and microbial hazards in food and their effects on human health. Special reference is made to heavy metals, pesticides, food additives, persistent organic pollutants and natural food contaminants of current public concern. An emphasis will also be placed on developing the

understanding of the actual impact of food and waterborne pathogens, their epidemiology and factors contributing to the increase in their incidence. Determination of exposure pathways and linking food hazards to human health is the primary focus. Topics include: contamination monitoring, quantification of exposure at the individual level, interactive effects of exposure to multiple risk factors, perceptions of risk and integration of laboratory science with population-based studies.

Assessment: Course work (20%); Examination (80%)

FSTX8006 Food safety management (9 credits)

Good manufacturing practice has a significant impact on the daily operation of a food processing facility. Quality products and a safe work place are important components of a good company. This course will focus on issues arising from GMP and aspects of the physical design of a food processing facility which impact the safety of workers and products. In food supply chain, traceability is the ability to follow the movement of a food product through the stages of production, processing, and distribution, and is an important component of the food safety management system. As a core quality management tool in the food industry, the relevance, impact and use of ISO 22000 and HACCP in manufacturing and catering will be discussed. Topics covered will include the international/national HACCP standards, and designing safety into food products and processes as well as the practical development and implementation of a HACCP Plan using local and Asian case studies.

Assessment: Course work (20%); Examination (80%)

FSTX8007 Project (12 credits) *[Capstone experience]*

All students are required to undertake to attend training (up to maximum 6 months) in one of the following areas:

- Academic institutions, to carry out basic research project using the most advanced techniques in molecular biology, analytical chemistry and biomedical sciences.
- Food, chemical and pharmaceutical industries, to overlook industry procedures on ensuring that the emerging/newly developed food and chemical products meet regulatory standards and requirements and are safe for consumers; their potential health implications, and
- Government agencies, to gain knowledge on the procedures implemented by the local/national authorities in formulating science-based policies, laws and regulations to ensure the safe production and use of food and chemicals.
- Students will have the opportunity to conduct their research component (own cost) at collaborative overseas universities (e.g., Finland, Sweden and Canada).

The candidate shall make a formal presentation on the subject of his training during the final semester of the teaching programme.

Assessment: Course work (100%)

SYLLABUSES FOR THE DEGREE OF
MASTER OF SCIENCE IN ENVIRONMENTAL MANAGEMENT
MSc(EnvMan)

For students admitted in 2024-2025 and thereafter

A candidate shall follow and be examined in at least 60 credits of courses including core courses (42 - 51 credits) and elective courses (9 -18 credits). For Part-time candidates, they will normally take 30 credits in their first year of study and 30 credits in their second year of study. A 3-credit course will normally consist of 18-24 hours of lectures, seminars, workshops and/or field trips.

A. COURSE STRUCTURE

The list of courses, and their contents set out thereafter, will be changed from time to time.

Programme Structure of the <u>Part-time</u> Mode (from 2024-2025 onwards):	
The list of courses and their contents may be changed from time to time.	
<u>Year 1:</u>	
Core courses (30 – 33 credits):	
ENVM7003	Introduction to ecology (3 credits)
ENVM7012	Environmental economics and analysis (3 credits)
ENVM7013	Sustainability, society and environmental management (3 credits)
ENVM7014	Environmental quality management (6 credits)
ENVM7015	Research methods and report writing in environmental management (6 credits)
ENVM7016	Environmental policy (3 credits)
ENVM7017	Environmental law in Hong Kong (3 credits)
Select at least one field study course:	
ENVM7018	Environmental field studies (3 credits)
ENVM7019	Ecological field studies (3 credits)
<u>Year 2:</u>	
Core courses (12 – 18 credits):	
ENVM8006	Environmental impact assessment (3 credits)
Select either one of the two capstone experience courses, i.e. ENVM8004 or ENVM8021	

ENVM8004 #	Dissertation (15 credits) ***[Capstone experience]***
ENVM8021	Project (9 credits) ***[Capstone experience]***

Elective courses (9 – 18 credits):
(Depending on the core courses taken):

[Indicative only: courses' availability will vary from year to year]

ENVM8003	Conservation biology and management (3 credits)
ENVM8011*	Environmental auditing and reporting (3 credits)
ENVM8012	Environmental health and risk assessment (3 credits) (May be taken in Year 1 summer semester)
ENVM8013	Air and noise pollution control and management (3 credits)
ENVM8014	Special topics in environmental management (3 credits)
ENVM8015	Directed studies in environmental management (6 credits)
ENVM8016	Conservation and management of freshwater resources (3 credits)
ENVM8017	Conservation and management of marine resources (3 credits)
ENVM8018	Urban planning and environmental management (3 credits)
ENVM8019	Corporate sustainability (3 credits)
ENVM8020	Green building design and management (3 credits)
ENVM8023	Environmental education (3 credits)
ENVM8024	Our planet – an introduction to earth system science (3 credits)
SLGP7115*	Sustainability management systems and assessment tools (6 credits)
SLGP7118	Transparency, accountability and disclosure (6 credits)

Notes: *Alternative courses from all other taught Masters' programmes at HKU might be accepted at the discretion of the Programme Director.*
 # If a part-time student wishes to take ENVM8004 Dissertation, he/she must obtain a Grade B+ or above in ENVM7015 Research methods and report writing in environmental management by May of the first study year. Students must have submitted their dissertation titles and supervisor's names to the School of Biological Sciences by June 30 and are expected to commence work on their dissertation during the summer vacation between their first and second years of study. Students are also required to attend a dissertation research colloquium in their first and second years of study. They have to deliver presentations based on their dissertation project. The presentations will be assessed and this will contribute to the final grade awarded for the dissertation. Part-time students must submit their dissertation to the School of Biological Sciences on or before the last Friday in May in the second academic year of study, unless otherwise permitted or required by the course coordinator(s). On the successful completion of the degree, a copy of the outstanding dissertation may be lodged in the University Library for public access.

**ENVM8011 and SLGP7115 are mutually exclusive.*

Programme Structure of the <u>Full-time</u> Mode (from 2024-2025 onwards):	
The list of courses and their contents may be changed from time to time.	
Core Courses (42 – 51 credits):	
ENVM7003	Introduction to ecology (3 credits)
ENVM7012	Environmental economics and analysis (3 credits)
ENVM7013	Sustainability, society and environmental management (3 credits)
ENVM7014	Environmental quality management (6 credits)
ENVM7015	Research methods and report writing in environmental management (6 credits)
ENVM7016	Environmental policy (3 credits)
ENVM7017	Environmental law in Hong Kong (3 credits))
ENVM8006	Environmental impact assessment (3 credits)
Select at least one field study course:	
ENVM7018	Environmental field studies (3 credits)
ENVM7019	Ecological field studies (3 credits)
Select either one of the two capstone experience courses, i.e. ENVM8004 or ENVM8021	
ENVM8004 #	Dissertation (15 credits) ***[Capstone experience]***
ENVM8021	Project (9 credits) ***[Capstone experience]***
Elective courses (9 – 18 credits): **(Depending on the core courses taken):** [Indicative only: courses' availability will vary from year to year]	
ENVM8003	Conservation biology and management (3 credits)
ENVM8011*	Environmental auditing and reporting (3 credits)
ENVM8012	Environmental health and risk assessment (3 credits)
ENVM8013	Air and noise pollution control and management (3 credits)
ENVM8014	Special topics in environmental management (3 credits)
ENVM8015	Directed studies in environmental management (6 credits)

ENVM8016	Conservation and management of freshwater resources (3 credits)
ENVM8017	Conservation and management of marine resources (3 credits)
ENVM8018	Urban planning and environmental management (3 credits)
ENVM8019	Corporate sustainability (3 credits)
ENVM8020	Green buildings design and management (3 credits)
ENVM8022	Environmental management internship (6 credits)
ENVM8023	Environmental education (3 credits)
ENVM8024	Our planet – an introduction to earth system science (3 credits)
SLGP7115*	Sustainability management systems and assessment tools (6 credits)
SLGP7118	Transparency, accountability and disclosure (6 credits)

Notes: *Alternative courses from all other taught Masters' programmes at HKU might be accepted at the discretion of the Programme Director.*

[#] *If a full-time student wishes to take ENVM8004 Dissertation, he/she must pass a qualification assessment in September / October of the first study year. Students must have submitted their dissertation titles and supervisor's names to the School of Biological Sciences by October 30. Students are also required to attend a research colloquium at which presentations are made by students based on their dissertation project. The presentations will be assessed and this will contribute to the final grade awarded for the dissertation. Full-time students must submit their dissertation to the School of Biological Sciences on or before the last Friday in June in the first academic year of their study, unless otherwise permitted or required by the course coordinator(s). On the successful completion of the degree, a copy of the outstanding dissertation may be lodged in the University Library for public access.*

**ENVM8011 and SLGP7115 are mutually exclusive.*

B. COURSE CONTENTS

Core Courses

ENVM7003 Introduction to ecology (3 credits)

This course deals with the ecological processes determining the distribution and abundance of organisms, and which in turn govern the structure and function of communities and ecosystems. The focus of the course is on how an understanding of ecology is important for environmental management. Together with lectures and student-centered learning, this course also incorporates a practical fieldwork component.

Assessment: Examination (100%)

ENVM7012 Environmental economics and analysis (3 credits)

The aim of this course is to equip students with the ability to undertake economic analyses of the environment. The course provides an introduction to economic concepts and principles and applies them to the analysis and management of environmental problems. The course covers the economic understanding of environmental problems (e.g. external costs and benefits, public goods, resource scarcity), economic instruments for environmental management (e.g. taxes, subsidies, tradable permits), methods for valuing environmental goods and services (market and non-market approaches), and economic tools for supporting decision-making (e.g. cost-benefit analysis). All topics will be illustrated with current environmental and policy issues to emphasize their relevance and applicability.

Assessment: Course work (100%)

ENVM7013 Sustainability, society and environmental management (3 credits)

This course begins with intellectual debates on the definitions, conceptions and different interpretations of the notion of sustainability. The course then moves on to explore and analyse the implementation of the sustainability principles and concepts at the macro- and the micro- levels, covering a wide range of issues from international agreements and campaigns to local projects and practice. This will be followed by a number of implementation tools and techniques including social innovation, community engagement and sustainability assessment. The course concludes with a series of real-life case investigations on innovative models to achieve sustainability in urban and rural contexts.

Assessment: Course work (100%)

ENVM7014 Environmental quality management (6 credits)

This course introduces students to the types, sources and effects of environmental pollution and some of the key principles and strategies used in combating pollution and managing environmental quality. Topics include water and air quality management, solid waste management and noise pollution control, with an emphasis on the situation in Hong Kong.

Assessment: Course work (20%) and examination (80%)

ENVM7015 Research methods and report writing in environmental management (6 credits)

This course is intended both as preparation for the dissertation or project course and as a general introduction to writing reports on environmental issues. Subjects covered include: research design, research methodology (quantitative and qualitative methods; basic data processing and analysis) and report writing. Other research skills such as avoiding plagiarism, literature search and review and giving oral presentations may also be taught.

Assessment: Course work (100%)

ENVM7016 Environmental policy (3 credits)

This course focuses on key aspects of environmental policy-making and policy-implementation processes, such as how policy agendas emerge and evolve, how environmental discourse shapes policy outputs; and how institutions affect the trajectories and outcomes of environmental policy measures. Making references to local,

national and international cases of successful and not-so-successful policies that pertain to the sustainable development agenda, the course also examines the theories and praxis of policy transfer and policy convergence, as well as the perennial problematics of policy integration, policy learning and policy failure.

Assessment: Course work (100%)

ENVM7017 Environmental law in Hong Kong (3 credits)

This course focuses on the statutory interpretation of the four principal Ordinances and subsidiary legislation dealing with pollution and environmental protection in Hong Kong; namely the Water Pollution Control Ordinance, the Air Pollution Control Ordinance, the Noise Control Ordinance and the Wild Animal Protection Ordinance. Some consideration will also be given to the Environmental Impact Assessment Ordinance, the Protection of Endangered Species of Animals and Plants Ordinance and international conventions effecting the law. Students will study the nature of environmental offences, including the requirement for proving "mens rea" (intent) in order for certain offences to be successfully prosecuted. Students will also be introduced to the principles of judge made law (the Common Law) and will learn to read and interpret relevant case law in order to better understand the current sentencing policies towards environmental offenders, both locally and in other Common Law jurisdictions.

Assessment: Course work (100%)

ENVM7018 Environmental field studies (3 credits)

This is an experiential learning course. This course aims to broaden students' horizon and knowledge base on key aspects of environmental management and nature conservation through a series of field studies and visits to local and/or overseas organizations. Topics include, but not limited to, conservation and biodiversity management, waste and wastewater treatment processes, water treatment processes, and corporate environmental management in practices. Field studies will be conducted in form of guided visits, field work, service learning and invited lectures or forums according to the topics involved. Study trips outside Hong Kong such as Macau, Mainland China and Taiwan may be considered. Students are required to attend at least 6 sessions organized over the study period and may need to pay the participation fee of some local and/or non-local activities.

Assessment: Course work (100%)

ENVM7019 Ecological field studies (3 credits)

This is an experiential learning course. This course aims to teach students with the field survey and study skills in biodiversity assessment through an intensive residential field course and some optional field trips. Rapid biodiversity assessment methods and report writing skills will be taught. Students taking this course have to conduct hands on field surveys of common plant and animal groups in Hong Kong such as vascular plants, mammals, birds, amphibians, reptiles and butterflies. Students completing this course shall be able to take part in ecological assessments.

Assessment: Course work (100%)

ENVM8004 Dissertation (15 credits) *[Capstone experience]*

The dissertation is an individual, independent research project carried out under the supervision of one or more faculty members. Students may propose their own topics and approach possible supervisors, or they may consider those topics suggested by faculty members. Normally, the student develops the research outline in collaboration with his or her Faculty advisor(s) and then collects data, carries out analysis and writes the report prior to the research colloquium where the student will present his/her work. The candidate shall make a formal presentation on the subject of his/her during the second semester of the teaching programme. Substantial work, in particular, data collection and analysis, is required in this course.

Prerequisite: Part-time students must obtain a Grade B+ or above in ENVM7015 Research methods and report writing in environmental management by May of the first study year. Full-time students must pass a qualification assessment in September / October of the first study year.

Assessment: Individual presentation (10%), and a dissertation report of at least 15,000 words, excluding reference list and appendices (90%)

ENVM8006 Environmental impact assessment (3 credits)

Environmental Impact Assessment (EIA) is one of the most important contemporary instruments of environmental management. Used widely around the world to identify the environment impacts of development projects as well as strategic plans and policies, EIA plays a key role in many regulatory systems for the environment. This course reviews the development of different approaches to EIA, basic analytical principles, administrative and legal systems for EIA, assessments at the project and strategic levels (SEA), and case study applications in Hong Kong.

Assessment: Course work (100%)

ENVM8021 Project (9 credits) *[Capstone experience]*

This is a group project (2-3 students per group) to be carried out under the supervision of one or more teachers. The topic and content of the project will be agreed individually between students and the supervisor(s) which have to be endorsed by the respective course coordinators. Students may propose their own topics and approach potential supervisors, or they may consider those suggested by teachers. Apart from research projects, creative projects such as the production of field guides, books, websites, videos, apps about the environment, and action projects such as waste upcycling; biodiversity conservation, environmental education and public campaigns are encouraged.

Assessment: Individual project report (50%) and group presentation (50%)

Elective Courses

ENVM8003 Conservation biology and management (3 credits)

Conservation biology is the essential scientific element in biodiversity conservation. The course will cover the basic principles and methods of conservation biology from a management perspective. In reality, successful biodiversity conservation projects often require an integration of the welfare of local communities. As such, practical examples from Hong Kong and elsewhere will be used as case studies to illustrate the importance of different elements in conserving the world's biodiversity.

Assessment: Course work (100%)

ENVM8011 Environmental auditing and reporting (3 credits)

This course provides an introduction on the concepts of environmental management, auditing and reporting. Detailed explanation of the development, implementation and continuous improvement of an environmental management system (EMS) based on ISO14001:2015 standards will be covered. With the understanding on the key elements of an EMS, audit methodology and skills based on ISO19011:2011 would be introduced with focus on environmental audit. Process of carbon audit which is becoming important in environmental management by acting as an useful greenhouse gases measuring tool will also be explained. The function and importance of environmental reporting will be explained along with the contents of Global Reporting Initiative which is a guide for sustainability reporting.

Mutually exclusive with SLGP7115
Assessment: Course work (100%)

ENVM8012 Environmental health and risk assessment (3 credits)

Environmental Risk Assessments (ERAs) are a tool to determine the likelihood that contaminant releases, either past, current, or future, pose an unacceptable risk to human health or the environment. Currently, ERAs are required under various regulations in many developed countries so as to support decision-makers in risk characterization or the selection of cost-effective remedial clean-up. This course introduces the theory and practice of human and ecological risk assessments. Students completing the course will understand the concepts and principles of ERAs, risk management and risk communication as applied in practice; be able to select and apply the simpler tools to tackle risk issues; and appreciate the interpretations of risk and its role in environmental policy formulation and decision making.

Assessment: Course work (100%)

ENVM8013 Air and noise pollution control and management (3 credits)

This advanced course focuses on various technical aspects related to air and noise pollution control and their management issues. The topics include micrometeorology; air dispersion modelling; advanced air pollution control (e.g. process modification, energy audit and emission trading); case studies on control of emissions

from stationary and mobile source; concept of sound propagation; basic principles of noise control; noise impact assessment and technical mitigation measures for construction, industrial, road traffic, railway and aircraft noise.

Assessment: Course work (30%) and examination (70%)

ENVM8014 Special topics in environmental management (3 credits*)*

The contents of this course will vary from year to year, depending on the availability of teachers and topics, and will be announced before course selection each year. Hot topics in Hong Kong or overseas that are related to environmental management will be selected. Examples of such topics could include urban tree management; slope greening; nature conservation versus development in rural Hong Kong and China, sustainable development movements. With careful consideration of the needs of various stakeholders, different management options are reviewed and evaluated.

Assessment: Course work (100%)

ENVM8015 Directed studies in Environmental Management (6 credits)

This course provides an opportunity for students to study a topic of particular interest under the supervision of a teacher or an experienced environmental practitioner. The contents of this course will be agreed individually between the student and the supervisor, which has to be endorsed by the course coordinator. Directed studies may include traditional research projects generating scientific paper or other study projects with creative outputs in environmental management such as audit reports; booklets; pamphlets; field guides; manuals; teaching modules and so on. The course was designed to allow a flexible approach in fixing the content and output of the directed studies.

Assessment: A written report or other form of output to be agreed by the supervisor (50%); Supervisor's assessment (20%); Oral presentation (30%)

ENVM8016 Conservation and management of freshwater resources (3 credits)

The overall aim of this course is to introduce the global importance of freshwater resources to sustainable development of mankind. This course offers an introduction to the problems associated with human use of water and current patterns of water resource management, and explains how the characteristics of natural systems constrain sustainable use of water. Emphasis will be placed on examples of river and lake management that can indicate the reasons for success and failure of sustainable water resource use, with particular emphasis placed on regional examples. Students taking this course will gain an appreciation of the trade-offs inherent in water resource management, and the practices that can be adopted to conserve freshwater biodiversity in the complex context of maintaining human livelihoods.

Assessment: Course work (100%)

ENVM8017 Conservation and management of marine resources (3 credits)

The marine environment has been an important source of its fortunes but today suffers from a range of perturbations, from pollution and habitat destruction, to community loss and over-exploitation. This course primarily deals with pressing issues of marine resource conservation and management in Hong Kong. An

overview of the current global situation of marine resources will be presented with an emphasis on the local situation. The past and present exploitation of marine resources and human impacts on the marine ecosystem are addressed with a view to identifying problems and providing practical solutions. Real cases are taken from Hong Kong as example to illustrate the crisis and its management options. Various management options are reviewed and evaluated with careful consideration of different needs of various stakeholders. The key topics of this course include marine pollution, habitat destruction, biological invasion, biodiversity conservation, fisheries, mariculture and harmful algal bloom.

Assessment: Course work (50%) and examination (50%)

ENVM8018 Urban planning and environmental management (3 credits)

This course lays down the challenges of achieving sustainability in cities. It highlights the important role of urban planning and its related tools and instruments in managing development pressure, mitigating environmental impacts, conserving ecological sensitive areas and achieving the society's overall resilience. The course begins with an introduction to the fundamental functions and processes of planning. Illustrated with real-life case studies, the course then critically reviews the effectiveness of a series of planning tools, such as land use zonings, conservation trusts, partnership schemes, in resolving climate change and sustainability conflicts in both urban and rural contexts. The course adopts the Problem-based Learning (PBL) approach where students will take lead and debate on selected current environmental affairs such as planning and development on private land with high conservation value, planning for facilities with environmental nuisances, design and planning for inclusive open space and rural revitalisation for sustainable communities.

Assessment: Course work (100%)

ENVM8019 Corporate sustainability (3 credits)

Corporate sustainability focuses on the business sector's role and contribution to achieving sustainability. In recent years, the expectations of business to act sustainably have increased. The scope has extended from contributing to the social welfare of society through philanthropic contributions or avoiding environmental degradation to a new business approach that creates long term value for both the business and society as a whole, by their managing of risks deriving from economic, environmental and social developments, and through the creation of opportunities. The course examines the commonly used tools in corporate sustainability and corporate social responsibility (CSR), including reporting, environmental, health & safety, corporate community investment and clean production. It reviews the business relationships with the environment and society expressed in the concepts of sustainable production and consumption. The course also emphasizes the importance of learning about current practice in the business sector, and therefore case studies will be used.

Assessment: Course work (100%)

ENVM8020 Green building design and management (3 credits)

One of the ways to tackle global climate change is to significantly enhance resource (i.e. energy, water and materials) efficiency especially in buildings. This course will introduce the global trends in the green building movement with focuses on current sustainable design and management in new and existing buildings in Hong Kong, e.g. BEAM Plus. With a focus on practical knowledge and experiences in green building design and management, this course will introduce various attributes of green buildings including integrated design and management, sustainable site, materials and waste, energy use, water use, health and wellbeing, and innovations. Starting from the Academic Year 2020-21, this course is accredited by Hong Kong Green Building Council Limited (HKGBC) and BEAM Society Limited (BSL). Under this accreditation scheme, part of the course contents will be the BEAM Affiliate Training which will be delivered in video format. Also,

there will be a BEAM Affiliate examination organized by BSL and arranged by HKU. The student upon passing the examination of the course and completing the MSc(EnvMan) programme will be eligible to register as a BEAM Affiliate at HKGBC.

Assessment: Course work (50%) and examination (50%)

ENVM8022 Environmental management internship (6 credits)

This course provides an opportunity for students to undertake an internship in environmental management in universities, NGOs or commercial companies under the supervision of an experienced Environmental Practitioner or Faculty member. The student needs to work for at least 160 hours for the internship employer on either the first, second or summer semester. During the internship, the student needs to conduct a desktop study on a topic related to the internship job duties, which should be endorsed by the course coordinator. The written report for the internship shall contain a fully referenced report for the desk top study and some sharing and reflection of the internship experiences.

Prerequisite: For Full-time students only

Assessment: Written report (40%); Supervisor's assessment (30%); Oral presentation (30%)

ENVM8023 Environmental education (3 credits)

The UN Sustainable Development Goal No. 4 Quality Education aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Education for sustainable development has been widely recognized as an integral part of quality education and a key driver for sustainable development. From the 1960s when the first definition of environmental education was introduced in the literature, lots of research has been done and the paradigms have been shifting throughout the years. From programme to policy levels, there are many exemplars worldwide. However, there is still a lack of awareness of environmental education in Hong Kong. With the worldwide trend of environmental protection and conservation, there is huge potential for the development of environmental education in Hong Kong. This course introduces the principles, design, approaches, and development of environmental education.

Assessment: Course work (100%)

ENVM8024 Our planet - an introduction to earth system science (3 credits)

This course is designed to provide ENVM students with a comprehensive introduction to Earth system science. The course is specifically tailored for students who do not have a strong background in earth science but are interested in gaining a solid understanding of the interactions between the lithosphere, atmosphere, and ocean, as well as the cycling of elements within the Earth system. Throughout the course, students will explore the fundamental concepts, principles, and processes that shape the Earth system and influence its dynamics. Emphasis will be placed on developing a holistic perspective of Earth as a complex, interconnected system, and understanding the various feedback mechanisms and interactions that occur among its components.

Assessment: Course work (50%) and examination (50%)

SLGP7115 Sustainability management systems and assessment tools (6 credits)

This course is dedicated to developing student's analytical skills in collecting relevant data, measuring, and tracking the environmental performance of an organization over time. Emphasis will be placed on practical approaches to improving environmental performance over time across organizational functions to support organizations in meeting their environmental and economic goals for multiple sectors.

Also, the course introduces key sustainability assessment tools to assist in resource management. Sustainable resource management requires well-informed decision making based on holistic assessment of the issue at hand. The course aims to equip students with the practical skill to apply sustainability assessment tools (Life Cycle Analysis (LCA), Material Flow Analysis (MFA), and Multi-criteria Decision Analysis (MCDA)) in support of resource management at product-based system, organizational, and regional levels determine the best alternatives.

Discussions will consider the construction and implementation of an Environmental Management System (EMS) to design the integration of environmental interactions that match their specific organizational processes, which lead to the reduction of environmental impacts while increasing operating efficiency of the current internal processes and practices. Issues of continuous improvement based on ISO 14001:2015 standard and framework will also be explored. It will be linked to risk management approaches to monitor and improve environmental performance which will benefit the organization's triple bottom line.

Combining conceptual explanations, practical approaches and a site visit, students will gain a better understanding of the rationale behind the adoption of different sustainable management and assessment tools and acquire the skills of applying these tools to analyze the industrial and urban metabolism in Hong Kong. The course will narrow the focus to businesses and urban projects to enable students to critically assess the implications.

Mutually exclusive with ENVM8011
Assessment: Course work (100%)

SLGP7118 Transparency, accountability and disclosure (6 credits)

Given the importance of standards and guidelines in supporting organizations to adhere to transparency, accountability and disclosure expectations, this course will provide an exploration of the development of standards, guidelines and frameworks. By exploring the frameworks that have developed in direct response to increased demand for organizational accountability, students will learn about those adopted by organizations that in turn have helped to drive the sustainability agenda. Standards, guidelines and frameworks provide a formula or "way of doing things" that describe or promote continuous learning for best practices and provide a point of reference from which to measure improvements and continuous learning. For example professional standards provide a practical and ethical framework for decision-making by instilling a sense of responsibility and accountability as well as increasing our knowledge base through experience, continuing professional development. The fast development of these frameworks have also increased pressure on organization and we see both pros and cons, and thereby Greenwashing will be discussed. Since the demand for an increased demonstration of responsibility by organizations means improvement in performance against environmental, social and governance measures, this course will explore the growth in the disclosure guidelines and frameworks. Discussions will include the most current changes being driven by the ISSB, SAB, TCFD and TNFD, GRI, along with changes occurring in various markets e.g., EU corporate sustainability reporting directive, EU taxonomy regulation, US securities and exchange Commission Climate Disclosure Rule, Canadian government mandatory TCFD-aligned reporting, Japan Financial Services Agency mandatory TCFD reporting and others.

Assessment: Course work (100%)

SYLLABUSES FOR THE DEGREE OF
MASTER OF SCIENCE IN THE FIELD OF SPACE SCIENCE
(for students admitted in 2022-23 and thereafter)

A. COURSE STRUCTURE

Each student must complete at least 60 credits of courses, split into 36 credits of core courses, 18 credits of electives, and 6 credits of a capstone project.

Core Courses	
SPSC7002	Introduction to space weather (6 credits)
SPSC7003	Remote sensing in space science (6 credits)
SPSC7004	Radiation detection and measurement (6 credits)
SPSC7005	Space science entrepreneurship (6 credits)
SPSC7007	Data analysis in space science (6 credits)
SPSC7015	Introduction to planetary science (6 credits)
Elective Courses*	
SPSC7006	Small satellite design (6 credits)
SPSC7011	Introduction to space plasma physics (6 credits)
SPSC7014	Big data, AI and machine learning in space science (6 credits)
ELEC6008	Pattern recognition and machine learning (6 credits)
ELEC6026	Digital signal processing (6 credits)
ELEC6100	Digital communications (6 credits)
PHYS8150	Computational physics and its contemporary applications (6 credits)
PHYS8654	General relativity (6 credits)
PHYS8656	Topics in astrophysics (6 credits)
Capstone Project	
SPSC7031	Space science final project (6 credits)

** Timetabling of courses may limit availability of some electives. The actual offering of such electives will be based on student demand.*

B. COURSE CONTENTS

Core Courses

SPSC7002 Introduction to space weather (6 credits)

Our modern lifestyles rely on satellite technology which can be severely affected by the Earth's local particle environment. Much of this is due to the influence of the Sun, which emits large quantities of radiation and charged particles that interact with the Earth's magnetic field. This course covers the fundamentals of space weather, from its origins, to its effects, and forecasting.

Assessment: coursework (50%); written examination (50%)

SPSC7003 Remote sensing in space science (6 credits)

This course introduces the theory behind, and the many practical applications of remote sensing, focusing on applications of satellite-based detectors to monitor the Earth's environment. The course covers the physical principles of remote sensing, including the various spectral signatures in the different parts of the electromagnetic spectrum. Students will learn about the different sensor technologies, and how to characterize and quantify their performance.

Assessment: coursework (50%); written examination (50%)

SPSC7004 Radiation detection and measurement (6 credits)

This course provides an overview of various ways we detect radiation to make physical measurements in space science. It covers the fundamentals of radiation interactions and properties of radiation detectors, including some of the most commonly used ones in contemporary science missions.

Assessment: coursework (50%); written examination (50%)

SPSC7005 Space science entrepreneurship (6 credits)

No longer driven entirely by governmental institutions, developments in frontier space science in modern times also receive boosts from academia, corporations and entrepreneurs alike. Businesses like SpaceX, Blue Origin, or Virgin Galactic are not only capturing people's imagination, but also proving that space provides big business opportunities. This course will cover the basics of designing, launching, and running a business, with a special emphasis on how ventures can be started for the burgeoning space industry.

Assessment: coursework (60%); final case study and presentation (40%)

SPSC7007 Data analysis in space science (6 credits)

This course introduces concepts of data analysis in space science. Techniques ranging from traditional statistical methods to recent machine learning algorithms will be introduced. Applications of these techniques in space science will be the focus in this course for students to understand how they are actually deployed in solving practical problems in space science.

Assessment: coursework (50%); written examination (50%)

SPSC7015 Introduction to planetary science (6 credits)

We live in a golden age of planetary science, with new missions being proposed at an unprecedented rate by all the major space agencies. This course provides a modern understanding of the properties of our Solar System and planetary systems around other stars and of the physical, chemical, and geological processes that

govern their motion and properties. Special attention will be paid to how our knowledge has been enriched by recent discoveries from space missions such as Cassini and Kepler.

Assessment: coursework (50%); written examination (50%)

Elective Courses

SPSC7006 Small satellite design (6 credits)

Small satellites (sometimes referred to as microsatellites, CubeSats, etc.) are becoming increasingly popular. Once proposed mainly for educational purposes, due to their low cost and shorter development time scales, these days many such satellites are being proposed and launched with a range of cutting-edge scientific goals. Microsatellites make full use of the latest achievements in basic technologies such as modern microelectronics, micro mechanics, and advanced materials. This course covers the practical aspects of designing a small satellite, based on the principle of purchasing "off-the-shelf" components, and benefitting from "open source" solutions to many of the technical challenges. Topics include: science instruments and payloads, satellite subsystems, ground networks, space science data and software, ground networks, launchers, and operations.

Assessment: coursework (50%); written examination (50%)

SPSC7011 Introduction to space plasma physics (6 credits)

Most of space is filled with plasma, the fourth state of matter where freely moving charges from ionized gas interact with (and generate) electric and magnetic fields, leading to a complicated set of phenomena. This course will provide an introduction to the field, covering such topics as plasma characteristics, electromagnetic waves in cold plasmas, collision theory, magnetohydrodynamics (MHD), force-free magnetic-field configurations, stochastic processes, and interaction of particles and waves. The course will emphasize some of the applications of plasma physics in the fields of geophysics and astrophysics.

Assessment: coursework (50%); written examination (50%)

SPSC7014 Big data, AI and machine learning in space science (6 credits)

Artificial Intelligence (AI), Machine Learning and Big Data analytics are interdependent disciplines that are increasingly influential in the real world under the broad umbrella of data science. They have found widespread applications in all branches of science and technology and have direct application in space and satellite technologies. This course introduces the basics of all these areas. Data analytics is the science of analyzing raw data to make conclusions, a particular challenge in the Big data era, while machine learning (ML) is a technique enabling computers to learn without being explicitly programmed and is part of the broader concept of Artificial Intelligence (AI). Key concepts across these fields will be explored including practical processes, techniques and algorithms. There will be a focus on real-world examples with specific emphasis on applications in space and planetary sciences. The course will also cover some ML software packages in Python and R. Examples in all areas will be drawn from contemporary research in fields such as astrophysics, particle physics and complex systems, including rare source identification from vast data, training sets, smart classification, time series, imaging and spectral analyses.

Assessment: coursework (50%); written examination (50%)

ELEC6008 Pattern recognition and machine learning (6 credits)

This course aims at providing fundamental knowledge on the principles and techniques of pattern recognition and machine learning.

Specifically, the course covers the following topics: Bayes decision theory; parametric and non-parametric methods; linear discriminant functions; unsupervised learning and clustering; feature extraction; neural networks; context-dependent classification; case studies.

Pre-requisite: A good background in linear algebra, programming experience.
Mutually exclusive with: COMP7504 Pattern recognition and applications

Assessment: coursework (25%); written examination (75%)

ELEC6026 Digital signal processing (6 credits)

This course provides an introduction to the fundamental concepts of digital signal processing (DSP) including a wide variety of topics such as discrete-time linear time invariant systems, sampling theorem, z-transform, discrete-time/discrete Fourier transform, and digital filter design. Furthermore, the course will also discuss in detail about other advanced topics in digital signal processing such as multidimensional signals and systems, random processes and applications, and adaptive signal processing.

Assessment: coursework (30%); written examination (70%)

ELEC6100 Digital communications (6 credits)

This course aims at enabling the fundamental understanding of the digital communication systems. After an overview on basic probability and random processes, the course will cover the modulation and demodulation. Then, performance analyses under additive white Gaussian noise channel and fading channel are examined. This is followed by topics on spatial diversity and channel equalization.

Mutually exclusive with: ELEC6014 and ELEC6045

Assessment: coursework (40%); written examination (60%)

PHYS8150 Computational Physics and its Contemporary Applications (6 credits)

This course shows the power of computational approach to solving physics and related problems, which is complimentary to the traditional experimental and theoretical approaches. Students are expected to spend a significant fraction of time in actual programming. Topics include: Introduction to computational physics; ordinary differential equation for classical physical problems; partial differential equation for classical and quantum problems; matrix method and exactly diagonalization for classical and quantum problems; Monte Carlo methods for statistical physics and quantum many-body physics; numerical methods for phase transitions and machine learning approaches to physics problems.

Assessment: coursework (70%); written examination (30%)

PHYS8654 General Relativity (6 credits)

This course serves as a graduate level introduction to general relativity. It provides conceptual skills and analytical tools necessary for astrophysical and cosmological applications of the theory. Topics include: The principle of equivalence; inertial observers in a curved space-time; vectors and tensors; parallel transport and covariant differentiation; the Riemann tensor; the stress-energy tensor; the Einstein gravitational field equations; the Schwarzschild solution; black holes; gravitational waves detected by LIGO, and Freidmann equation.

Assessment: coursework (50%); written examination (50%)

PHYS8656 Topics in Astrophysics (6 credits)

This course covers high energy processes, basic theory of stellar structure and evolution, and introduction to compact objects. It follows a vigorous mathematical treatment that stresses the underlying physical processes. Topics include: Radiation mechanisms; stellar structure equations; polytropic model; elementary stellar radiation processes; simple stellar nuclear processes; stellar formation; late stage of stellar evolution; supernova explosion; compact stellar; cosmic rays; if time permits, additional selected topics will be covered.

Assessment: coursework (50%) and examination (50%)

Capstone Project

SPSC7031 Space science final project (6 credits)

Students must carry out a research project in any aspect of space science under the guidance of a faculty member from the MSc in Space Science program. Students are encouraged to approach faculty members in their areas of interest as soon as possible, in order to choose an appropriate project. Students may either propose a topic of interest, participate in any existing projects of the faculty member, or else they will be assigned a project after consultation with the course coordinator. An oral presentation is required and a written report must be submitted.

Assessment: oral presentation (25%); written report (75%)

SYLLABUSES FOR THE DEGREE OF
MASTER OF SCIENCE IN THE FIELD OF PHYSICS
(for students admitted in 2024-25 and thereafter)

A. COURSE STRUCTURE

To be eligible for the award of the MSc in the field of Physics, a student shall complete at least 60 credits of courses. Courses with 3 or 6 credits are offered in the first and/or second semesters while courses with 9 credits are year-long courses spanning both the first and second semesters. If a student selects a course whose contents are similar to a course (or courses) which he/she has taken in his/her previous study, the Department may not approve the selection in question.

CURRICULUM
(applicable for both full-time and part-time modes)

Compulsory Courses (9 credits)

PHYS8201	Basic Research Methods In Physical Science (6 credits)
PHYS8970	Physics Seminar (3 credits)

Disciplinary Electives (42 credits)

Take at least 42 credits from Lists A and B with at least 18 credits must be chosen from List A:

List A:

PHYS8150	Computational Physics and its Contemporary Applications (6 credits)
PHYS8351	Graduate Quantum Mechanics (6 credits)
PHYS8450	Graduate Electromagnetic Field Theory (6 credits)
PHYS8550	Graduate Statistical Mechanics (6 credits)
PHYS8701	Physics Experimental Techniques (6 credits)

List B:

PHYS8152	Data Analysis in Physics, Astronomy and Space Science (6 credits)
PHYS8153	Big Data, AI and Machine Learning in Physics, Astronomy and Space Science (6 credits)
PHYS8352	Quantum Information (6 credits)
PHYS8551	Topics in Solid State Physics (6 credits)
PHYS8552	Condensed Matter Physics (6 credits)
PHYS8654	General Relativity (6 credits)
PHYS8656	Topics in Astrophysics (6 credits)
PHYS8750	Nanophysics (6 credits)
PHYS8751	Device Physics (6 credits)
PHYS8850	Topics in Particle Physics (6 credits)
PHYS8852	Photonics and Metamaterials (6 credits)

Capstone Requirement (9 credits)

PHYS8971	Capstone Project (9 credits)

B. COURSE CONTENTS

Compulsory Courses

PHYS8201 Basic Research Methods in Physical Science (6 credits)

This course introduces basic research methods commonly used in various sub-fields in physics. It comprises of four modules, each introduces commonly used research methods in physics. Students are required to take two out of the four modules. They are

1. *Astrophysical techniques*: Commonly used techniques and packages in astrophysical data gathering and data analysis are introduced.
2. *Computational physics and modelling techniques*: Commonly used computational physics and physical modelling methods are introduced.
3. *Experimental physics techniques*: Commonly used experimental physics apparatus and techniques are introduced.
4. *Theoretical physics*: Commonly used techniques in mathematical and theoretical physics are introduced.

Assessment: coursework (100%)

PHYS8970 Physics Seminar (3 credits)

This course aims to initiate students into research culture and to develop a capacity for communication with an audience of varied background. Students attend and take part in a specified number of colloquia and seminars organized by the Department of Physics to expose themselves to various topics of contemporary physics research and to learn the technique of professional physics presentations. Students arerequired to give an oral presentation, normally on materials related to their Capstone Project. Students are also required to submit assignments based on the colloquia attended to receive a pass in this course.

Assessment: written assignments (50%), oral presentation (50%)

Disciplinary Electives

PHYS8150 Computational Physics and its Contemporary Applications (6 credits)

This course shows the power of computational approach to solving physics and related problems, which is complimentary to the traditional experimental and theoretical approaches. Students are expected to spend a significant fraction of time in actual programming. Topics include: Introduction to computational physics; ordinary differential equation for classical physical problems; partial differential equation for classical and quantum problems; matrix method and exactly diagonalization for classical and quantum problems; Monte Carlo methods for statistical physics and quantum many-body physics; numerical methods for phase transitions and machine learning approaches to physics problems.

Assessment: coursework (70%) and examination (30%)

PHYS8152 Data Analysis in Physics, Astronomy and Space Science (6 credits)

This course introduces concepts of data analysis in physics, astronomy and space science. Techniques ranging from traditional statistical methods to more recent machine learning methods will be introduced. Applications of these techniques in physics, astronomy and space science will be the focus in this course for students to understand how they are deployed in solving actual problems.

Assessment: coursework (50%) and examination (50%)

PHYS8153 Big Data, AI and Machine Learning in Physics, Astronomy and Space Science (6 credits)

Artificial Intelligence (AI), Machine Learning and Big Data analytics have found widespread applications in all branches of science and technology. The objective of this course is to introduce concepts of AI and big data analytics, with focus on their applications in physics, astronomy and space science. Selected advanced examples on how big data science and deep learning can be applied in physics, astronomy and space science will be introduced to provide students a flavor of the contemporary research in the field.

Assessment: coursework (50%) and examination (50%)

PHYS8351 Graduate Quantum Mechanics (6 credits)

This course introduces postgraduates to the theory and advanced techniques in quantum mechanics, and their applications to selected topics in condensed matter physics. The course covers the following topics: Dirac notation; quantum dynamics; the second quantization; symmetry and conservation laws; permutation symmetry and identical particles; perturbation and scattering theory; introduction of relativistic quantum mechanics.

Assessment: coursework (50%) and examination (50%)

PHYS8352 Quantum Information (6 credits)

This course covers the theory of quantum information and computation and its applications in physics and computer science. Topics include: Quantum computer; quantum algorithms; quantum error correction; quantum information processing; quantum entanglement and quantum cryptograph.

Assessment: coursework (50%) and examination (50%)

PHYS8450 Graduate Electromagnetic Field Theory (6 credits)

The aim of this course is to provide students with the advanced level of comprehending on the theory of classic electromagnetic field, enabling them to master key analytical tools for solving real physics problems. This course introduces and discusses the following topics: Boundary-value problems in electrostatics and Green's Function method; electrostatics of media; magnetostatics; Maxwell's equations and conservation laws; gauge transformations; electromagnetic waves and wave guides.

Assessment: coursework (50%) and examination (50%)

PHYS8550 Graduate Statistical Mechanics (6 credits)

This course covers advanced topics in equilibrium statistical physics. Topics include: Ensemble theory; theory of simple gases, ideal Bose systems, ideal Fermi systems; statistical mechanics of interacting systems; statistical field theory; some topics in the theory of phase transition may be selected.

Assessment: coursework (50%) and examination (50%)

PHYS8551 Topics in Solid State Physics (6 credits)

This course covers a broad introduction to modern theory of the solid state physics. Some selected advanced topics will also be discussed. Topics include: Crystal structures and symmetry; the reciprocal lattice and X-ray diffraction; lattice vibration and thermal properties; free electron of metals; band structures and Bloch theory; nearly free electrons and tight binding approximations; semi-classical model of electron dynamics; Boltzmann equation; transport and optical properties of metals and semiconductors; interaction and collective excitations. If time permits, magnetism and superconductivity will also be covered.

Assessment: coursework (50%) and examination (50%)

PHYS8552 Condensed Matter Physics (6 credits)

This course introduces many-body physics in quantum matter. Systems consisting of many particles (bosons or fermions) display novel collective phenomena that individual particles do not have, for example, ferromagnetism and superfluidity. It aims to introduce students the general principles behind these phenomena, such as elementary excitations, spontaneous symmetry breaking, adiabatic theorems, emergent topological phases of matter, etc. Theoretical language useful in the interpretation of experiments, such as linear response theory and response functions, will be discussed. This course will focus on the phenomena of emergent many-body states that require not only the effect of quantum statistics but also that of inter-particle interaction. Examples include: Ferromagnetism, Fermi liquid, superfluidity, superconductivity, and the quantum Hall states. Some general themes related to these quantum states, such as elementary excitation, Ginzburg-Landau description, spontaneous symmetry breaking, and topological phases of matter will be discussed. This course is intended for both experimentalists and theorists. While there are no official prerequisites, students who would like to take this course are assumed to have sufficient knowledge on quantum mechanics and statistical mechanics.

Assessment: coursework (100%)

PHYS8654 General Relativity (6 credits)

This course serves as a graduate level introduction to general relativity. It provides conceptual skills and analytical tools necessary for astrophysical and cosmological applications of the theory. Topics include: The principle of equivalence; inertial observers in a curved space-time; vectors and tensors; parallel transport and covariant differentiation; the Riemann tensor; the stress-energy tensor; the Einstein gravitational field equations; the Schwarzschild solution; black holes; gravitational waves detected by LIGO, and Freidmann equation.

Assessment: coursework (50%) and examination (50%)

PHYS8656 Topics in Astrophysics (6 credits)

This course covers high energy processes, basic theory of stellar structure and evolution, and introduction to compact objects. It follows a vigorous mathematical treatment that stresses the underlying physical processes. Topics include: Radiation mechanisms; stellar structure equations; polytropic model; elementary stellar radiation processes; simple stellar nuclear processes; stellar formation; late stage of stellar evolution; supernova explosion; compact stellar; cosmic rays; numerical solving of stellar structure equation; if time permits, additional selected topics will be covered.

Assessment: coursework (50%) and examination (50%)

PHYS8701 Physics Experimental Techniques (6 credits)

This course provides a detailed account of some common experimental techniques in physics research. It introduces the basic working principles, the operational knowhow, and the strength and limitations of the techniques. It will discuss and train students of the following techniques:

1. Noise and Data Analysis
2. Computer Grid
3. Raman spectroscopy and photoluminescence
4. Temporal characterization of ultrashort laser pulses
5. Chirped Pulse Amplification – Technique to amplify laser pulses
6. Cryogenics and low-noise electrical measurements
7. Nanofabrication techniques
8. Free-Electron Nanophotonics
9. Scanning Probe Microscopy
10. Electron and X-Ray Diffraction
11. Photoemission Spectroscopy
12. Transmission Electron Microscopy
13. Radiation Detection and Measurements in Nuclear Physics

Assessment: coursework (100%)

PHYS8750 Nanophysics (6 credits)

This course is designed to deliver fundamental concepts and principles of nano physics to fresh postgraduate students, mostly focusing on the transport properties of the low-dimensional electronic systems under external electric and/or magnetic fields. It will cover various topics in nano physics, such as zero-, one-, and two-dimensional electronic gas systems, quantum dots, graphene and 2D materials, semiconductor heterostructures, quantum Hall effects, Coulomb blockade effects, single electron effects, field effect transistors, phase-coherent interference effects, and more. While most discussions will be made based on experimental findings, the basics of the relevant theories will also be covered using the tight-binding model, basic quantum mechanics, and Landauer-Büttiker formula. The principles and applications of nano fabrication and low-temperature measurement techniques will also be discussed.

Assessment: coursework (60%) and examination (40%)

PHYS8751 Device Physics (6 credits)

The growth in the past 70 years of modern electronics industry has had great impact on society and everyday life, the foundation of which rests upon the semiconductor physics and devices. This course aims at presenting a comprehensive introductory account of the physics and operational principles of some selected and yet classic semiconductor devices, microelectronic and optoelectronic. The course is primarily designed for postgraduates but can be of interest to senior undergraduates in physics, electrical and electronic engineering and materials science. Students are assumed to have acquired some basic knowledge of quantum mechanics, statistical mechanics, and solid state physics, though a review of the physics of semiconductors will be given in the beginning of the course. This course begins by giving a review of solid state physics, particularly of the physics of semiconductors. It is then followed by discussions of the fundamentals and practical aspects of PN-junctions and rectifying diodes, amplifying and switching devices like bipolar and field-effect transistors (e.g. MOSFET), light-emitting and detection devices such as LEDs, laser diodes, and photodetectors. If time allows, a brief discussion of some special devices will be presented.

Assessment: coursework (50%) and examination (50%)

PHYS8850 Topics in Particle Physics (6 credits)

This course covers selected topics in both theoretical and experimental aspects of particle physics. Topics include: Fundamental particles; symmetry and conservation law; Feynman diagrams; electromagnetic interaction; weak interaction; strong interaction; particle accelerator and detector.

Assessment: coursework (50%) and examination (50%)

PHYS8852 Photonics and metamaterials (6 credits)

In the last two decades, tremendous progress has been made in the manipulation of light propagation using structured photonic media – metamaterials, with negative refraction, super-imaging and invisibility cloaking as the most well-known examples. These new discoveries are paving ways towards many potential applications of photonic structures, including imaging, display, holography and information processing. This course aims at providing the fundamental understanding of the interaction of light with structured media whose unit cells are much smaller than the wavelength of light, and the design and functionalities of various metamaterial-based photonic devices. The course text is primarily designed for senior undergraduate students and postgraduate students and requires some knowledge on electromagnetism and optics. On the other hand, it will also be of interest to graduate students since it includes some most recent results in the field of metamaterials and nanophotonics. Topics include: Modeling of interaction of light with periodic structures, gratings, photonic crystals; coupled mode theory; interaction of light with metals, covering both propagating and localized surface plasmon polaritons; effective-medium description of the unconventional electromagnetic properties of metamaterials, such as negative permeability and negative refraction, zero refractive index, hyperbolic metamaterial, chirality and bi-anisotropy; design of the unit cells of the metamaterials based on plasmonic structures for achieving various electromagnetic properties and functionalities; transformation optics and invisibility cloaks; metamaterial devices, including super-imaging lenses, meta-lenses, metasurface holography etc.; nonlinear optical properties of metamaterials and metasurfaces; photonic systems with Parity-time symmetry; metamaterial approach for designing the topological properties for light.

Assessment: coursework (50%) and examination (50%)

PHYS8971 Capstone Project (9 credits)

This capstone course provides students with the opportunity to study a specific research-type problem by themselves, either theoretical, experimental or numerical, under the supervision of an academic staff using the knowledge the student gained in their entire MSc study.

For theoretical and numerical projects: Students will receive training in research literature reading and reviewing, and make investigation which is close to research work in nature, under the supervision of a staff member. Students may need to perform some original calculations, to fill in mathematical gaps of some sophisticated derivations, or a combination of both. For numerical projects, students also need to use computers to find numerical or simulation results.

For experimental projects: Students will carry out experiments in research labs under the supervision of a staff member. Students will receive a comprehensive training in advanced experimental techniques, including preparation of samples, determination of physical properties, measurement of small signals obscured by noise, laser, high-vacuum and low-temperature techniques and so on. Wide reading of the relevant scientific literature and originality in experimental design are expected.

It is expected that most of the projects would involve team work.

Pre-requisites: Pass or already enrolled in PHYS8201 Basic Research Methods in Physical Science and PHYS8970 Physics Seminar

Assessment: oral presentation (30%) and written report (70%)
