

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

For students admitted in 2021-22 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 five fields: Applied Geosciences, 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.

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**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 with honours 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 with honours in a relevant science (e.g. physics, astronomy, earth science, mathematics) or engineering, 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); and
  - (v) shall satisfy the examiners in a qualifying examination if required.
- (b) A candidate who does not hold a Bachelor's degree with honours 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.
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**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.

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### **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.
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### **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, 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.

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### **Period of study**

**Sc25** The curriculum of the Master of Science 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.

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### **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.
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### **Dissertation or Project**

**Sc27** The title of the dissertation or project shall

- (a) for the full-time mode of Master of Science (except MSc in Environmental Management), 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 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);
  - (c) 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;
  - (d) 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);
  - (e) for the full-time curriculum of Master of Science in the field of Physics, be submitted by October 15 and the dissertation or project report shall be submitted not later than the last Friday in May of the first year of study;
  - (f) for the part-time curriculum of Master of Science in the field of Physics, be submitted by October 15 of the first academic year and the dissertation or project report shall be submitted not later than the last Friday in May 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 worker, which shows his/her share of the work) undertaken after registration as a candidate for either degree.

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### 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.

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**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.
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**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 two weeks of the examination.

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### 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.
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### 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.

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### 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'

Courses which are graded according to (b) 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

**SYLLABUSES FOR THE DEGREE OF  
MASTER OF SCIENCE IN THE FIELD OF APPLIED GEOSCIENCES  
(for students admitted in 2021-22 and thereafter)**

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**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	^Geology principles and practice (6 credits)
GEOS7011 OR GEOS7033	*Advanced geology of Hong Kong (6 credits) OR ^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)
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 geomaterials (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)
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\* For students with a first degree in Geology or a related subject

^ For students whose first degree is not in Geology or a related subject

△ Not a core course for students taking course GEOS7022 and students whose first degree is not in Geology or a related subject

+ Students with a first degree in Civil Engineering cannot take this course for credits

# As directed by the programme director

Core courses for students with a first degree in Geology or a related subject:

GEOS7011, 7012, 7015, 7016, 7020, 8001, 8002, 8003, 8020, 8021, 8101, 8102, 8104, 8204 – 66 credits.

Course GEOS7022 may be substituted for course GEOS8204.

Core courses for students whose first degree is not in Geology or a related subject:

GEOS7010, 7012, 7015, 7016, 7020, 7021, 7033, 8001, 8002, 8003, 8020, 8101, 8102 – 66 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 geomaterials (6 credits)
GEOS8204	Basic structural mechanics and behaviour (3 credits)
GEOS8205	Mathematics I (6 credits)
GEOS8206	Mathematics II (6 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)**

A review of fundamental concepts in geoscience, including earth and geological processes, surface processes, minerals and rocks, geological structures and geological map interpretation. The course also introduces the rocks and geological formations of Hong Kong.

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

**GEOS7011 Advanced geology of Hong Kong (6 credits)**

This advanced course examines specialist aspects of the rocks and geological formations and structures of Hong Kong and their significance in the context of geotechnical engineering, environmental management and resource development. Topics include volcanic and granitic rocks, sedimentary and metamorphic rocks, weathering processes, superficial deposits, geology 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%)

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### **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%)

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### **GEOS7016    Soil mechanics (3 credits)**

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

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

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### **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. Work is required on the project during the summer following the second semester. 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%)

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### **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%)

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### **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%)

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**GEOS7024 Management (3 credits)**

This subject provides the graduate with basic knowledge of project management practice. It will cover most of the following: engineering processes, programming and procurement strategies; contact management; construction site safety, health and environmental aspects; quality control and quality assurance.

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

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**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%)

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**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%)

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**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%)

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**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%)

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**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%)

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### **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%)

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### **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 GEOS7016

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

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### **GEOS8102 Rock engineering and geomaterials (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%)

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### **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%)

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**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%)

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**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%)

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**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%)

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**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.<sup>1</sup>

<sup>1</sup> for those taking the Engineering Geology Theme or the Engineering Geology with HKIE Approved Courses Theme of the MSc in Applied Geosciences

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#### **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.