REGULATIONS FOR THE DEGREE OF
MASTER OF STATISTICS
(MStat)

(See also General Regulations)

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 Statistics is a postgraduate degree, awarded for the satisfactory completion of a prescribed course of study in statistics with emphasis on applications.

MS 1.   In these regulations, and in the syllabuses for the degree of M.Stat., unless the context otherwise requires:-

'Course' means a course of instruction leading to one paper in the examination, as defined in the syllabus;

'Paper' means one or more of the following tests: a theoretical examination paper, a practical examination paper, a project paper, an assessment of field practice, a thesis, and a dissertation, as prescribed in the syllabus of the course leading to it;

'Prerequisite' means a course which a candidate must have completed successfully before being permitted to take the course in question.

Admission requirements

MS 2.   To be eligible for admission to the courses leading to the degree of Master of Statistics a candidate

    (a)   shall comply with the General Regulations;

    (b)   shall hold

        (i) a Bachelor's degree with honours of this University; or

        (ii) another qualification of equivalent standard from this University or from another University or comparable institution accepted for this purpose; and

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

Qualifying examination

MS 3.   (a)   A qualifying examination may be set to test the candidate's formal academic ability (including calculus and linear algebra) or his ability to follow the courses of study prescribed. It shall consist of one or more written papers or their equivalent, and may include a project report.

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

Award of degree

MS 4.   To be eligible for the award of the degree of Master of Statistics a candidate

    (a)   shall comply with the General Regulations; and

    (b)   shall complete the curriculum and satisfy the examiners in accordance with the regulations set out below.

Length of curriculum

MS 5.   (a)   The curriculum shall extend over not less than two academic years of part-time study, with a minimum of 300 hours of prescribed work, and shall include an examination in eight papers, all to be held in the manner prescribed in the syllabuses.

(b)   A candidate with appropriate qualification and professional experiences may, on production of appropriate certification of having satisfactorily completed any of the courses as specified in the syllabuses, be exempted from those courses in the curriculum when he/she is admitted to the M.Stat. programme, subject to the approval of the Head of Department.

Completion of curriculum

MS 6.   To complete the curriculum, a candidate

(a)   shall follow the courses of instruction and complete satisfactorily all prescribed written work and field work;

(b)   shall satisfy the examiners in the prescribed courses and in any prescribed form of examination; and

(c)   if appropriate, shall complete and present a satisfactory project paper in lieu of one written paper in the examination, if such option is provided in the syllabus.

Examinations

MS 7.   (a)   Where so prescribed in the syllabuses, coursework or a project paper may constitute part or whole of the examination for one or more courses.

(b)   An assessment of the candidate's coursework during his studies, including completion of written assignments and participation in field work or laboratory work, as the case may be, will be taken into account in determining the candidate's result in each paper. Except where otherwise stated, the weight assigned to coursework will be 25% of the total marks.

MS 8.   A candidate who has failed to satisfy the examiners at his first attempt in not more than half of the total number of courses to be examined, whether by means of written examination papers, project paper and coursework assessment, during any of the academic years of study, may be permitted

(a)   to present himself *either* for re-examination in the course or courses of failure, with or without repeating any part of the curriculum *or* for examination in the same number of new courses, except that courses designated as compulsory are not replaceable under this provision; or

(b)   to repeat a year of the curriculum and present himself for examination in the courses prescribed for the repeated year.

MS 9.   Subject to the provisions of Regulation MS 6(c), a candidate who has failed to present a satisfactory project paper may be permitted to submit a new or revised project paper within a specified period.

MS 10.   A candidate who has failed to satisfy the examiners in any prescribed field work or practical work may be permitted to present himself for re-examination in field work or practical work within a specified period.

MS 11.   A candidate who is unable because of illness to be present for one or more papers in any written examination other than that held in his final academic year of study may apply for permission to present himself at a supplementary examination to be held before the beginning of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from the examination.

MS 12. A candidate who

    (a)   is not permitted to present himself for re-examination in any written paper or any course examined by means of coursework assessment, or in field work or practical work in which he has failed to satisfy the examiners and is not permitted to repeat a year of the curriculum under the provisions of Regulation MS 8; or

    (b)   has failed to satisfy the examiners in any written paper or any course examined by means of coursework assessment, or field work or practical work at a second attempt; or in any new course selected under the provision of MS 8(a); or

    (c)   is not permitted to submit a new or revised project paper under the provisions of Regulation MS 9; or

    (d)   has failed to submit a satisfactory new or revised project paper under the provisions of Regulation MS 9

may be required to discontinue his studies under the provisions of General Regulation G 12.

Examination results

MS 13. At the conclusion of the examination, and after presentation of the project paper if applicable, a pass list shall be published. A candidate who has shown exceptional merit at the whole examination may be awarded a mark of distinction, and this mark shall be recorded in the candidate's degree diploma.

SYLLABUS FOR THE DEGREE OF
MASTER OF STATISTICS

The Department of Statistics and Actuarial Science offers a postgraduate programme leading to the degree of Master of Statistics, extending over two years of part-time study. The programme is designed to provide graduates with a training in the principles and practice of statistics. Candidates should have knowledge of linear algebra and calculus.

STRUCTURE AND EVALUATION

The period of study extends over two years part-time commencing in September. All courses offered are on a semester basis. Candidates must take four courses in each year of study. In the first year, students should take courses STAT7003, STAT7004, STAT7005 and STAT7006. In the second year, there are elective courses. The Department will consider the student's wish in course prescription, but will also take into account the details of the student's undergraduate training.

Not all the elective courses listed below will necessarily be offered in the second year.

Unless stated otherwise, the weights assigned to performance in the examination and an assessment of coursework in evaluating a candidate's final grade in each course will be in the ratio 75:25.

Core Courses

STAT7003.   Foundations of statistics

Motivated by real problems involving uncertainty and variability, this course introduces the basic concepts and principles of statistical inference and decision-making. Ideas developed will include probability modelling, statistical distributions; parametric classes; Bayesian inference; the likelihood principle; maximum likelihood estimation; likelihood ratio tests; testing lattices of hypotheses. (Only under exceptional academic circumstances can this core course be replaced by an elective course.)

STAT7004.   Linear modelling

Much of the analysis of variability is concerned with locating the sources of the variability, and many current statistical techniques investigate these sources through the use of 'linear' models. This course presents a unified theory of such statistical problems including regression; variance and covariance analyses; design of experiments; and their practical implementation with statistical packages. Assessment: 40% coursework, 60% examination.

Elective courses

STAT7005.   Multivariate methods

In many disciplines the basic data on an experimental unit consist of a vector of possibly correlated measurements. Examples include the chemical composition of a rock; the results of clinical observations and tests on a patient; the household expenditures on different commodities. Through the challenge of problems in a number of fields of application, this course considers appropriate statistical models for explaining the patterns of variability of such multivariate data. Topics include: multiple, partial and canonical correlation; multivariate regression; tests on means and covariances; multivariate ANOVA; principal components analysis; factor analysis; discriminant analysis and classification; cluster analysis; multidimensional scaling. Assessment: 40% coursework, 60% examination.

STAT7006.   Survey research methods

Inferring the characteristics of a population from those observed in a selection or sample from that population is a situation often forced on us for economic, ethical or technological reasons. Against the background of practical situations, this course considers the basic principles, practice and design of sampling techniques to produce objective answers free from bias. Emphasis will be on current and local problems.

STAT8002.   Project

A project in any branch of statistics or probability will be chosen, through consultation between students and lecturers. A substantial written report is required. This must be submitted by April 30 of the academic year. (A detailed proposal will be required, which should not be overlapped with the other courses. Availability of this course is subject to approval.)

STAT8003.   Time series forecasting

A time series consists of a set of observations on a random variable taken over time. Such series arise naturally in climatology, economics, finance, environmental research and many other disciplines. In additional to statistical modelling, the course deals with the prediction of future behaviour of these time series. This course distinguishes different types of time series, investigates various representations for them and studies the relative merits of different forecasting procedures. Assessment: 40% coursework, 60% examination.

STAT8012.   Reading course

This course consists of supervised reading supplemented by written work and prescribed coursework. A candidate will specialize in one topic under the guidance of a lecturer. Topics vary yearly depending on the current interests of staff. A written report is required in lieu of a written examination paper. It must be completed and submitted by April 30 of the academic year. (A detailed proposal with specific topics and scope of the reading course will be required. Availability of this course is subject to approval.)

STAT8013.   Statistical data analysis

This course develops the practical skills needed to deal with real data collected locally or internationally. Consulting experience may be presented in the form of case studies. A project paper may be used in place of all or part of the written examination.

STAT8014.   Risk analysis

"Risk" is a familiar subject to the people of Hong Kong. Hong Kong has weathered many crises. In the financial sector, the subject called value-at-risk or VAR is highly relevant. Financial risk is certainly not the only phenomenon that Hong Kong people have experienced. We have problems such as geohazards and environmental hazards (e.g. red tides, air pollution and water pollution). It is well recognized that many crisis events exhibit similar features and are amenable to statistical analysis and modelling. Some of the usual statistical techniques in risk analysis are Monte Carlo simulation and extreme value analysis. This course aims to look at these approaches to some detail and apply them to some real data sets.
Assessment: 40% coursework, 60% examination.

STAT8015.   Actuarial statistics

The main focus of this module will be on financial mathematics of compound interest with an introduction to life contingencies and statistical theory of risk. Topics include simple and compound interest, annuities certain, yield rates, survival models and life tables, population studies, life annuities, assurances and premiums; reserves, joint life and last survivor statuses, multiple decrement tables, expenses, individual and collective risk theory.

STAT8016.   Biostatistics

Statistical methodologies and applications in fields of medicine, clinical research, epidemiology, biology and biomedical research are considered.

The types of statistical problems encountered will be motivated by experimental data sets. Important topics include design and analysis of randomized clinical trials, group sequential designs and crossover trials; survival studies; diagnosis; statistical analysis of the medical process.

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 statistical data mining techniques and show how to use them to make better decisions. Topics include data preparation, association rules, trees and rules for classification and regression, cluster analysis, classical statistical models and non-linear models such as neural networks.
Assessment: 100% coursework.

EXAMINATION

The courses shall be examined by one three hour written paper with the exception of STAT8002 and STAT8012, STAT8017 and possibly STAT8013.