REGULATIONS FOR THE DEGREE OF
MASTER OF STATISTICS
(MStat)

These regulations apply to students admitted in the academic year 2008-2009 and thereafter.

(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.

Admission requirements

MS 1.   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 another University or comparable institution acceptable for this purpose; and
      (c)   shall pass a qualifying examination if so required.

Length of curriculum

MS 2.   (a)   The curriculum of the part-time programme shall extend over not less than two academic years of study. Candidates shall not be permitted to complete the curriculum in more than 3 academic years, except with the approval of the Faculty Board.
      (b)   A candidate with appropriate qualification and professional experiences may, on production of appropriate certification of having satisfactorily completed any of the two compulsory courses as specified in the syllabuses, be exempted from those courses and be replaced by other elective courses in the curriculum when he/she is admitted to this programme, subject to the approval of the Head of Department.

Award of degree

MS 3.   To be eligible for the award of the degree of Master of Statistics, a candidate shall
      (a)   comply with the General Regulations; and
      (b)   successfully complete the curriculum in accordance with the regulations set out below.

Completion of curriculum

MS 4.   To successfully complete the curriculum, a candidate shall follow courses of instruction and shall satisfy the examiners in the prescribed courses and in any prescribed form of examination in accordance with the regulations set out below.

Examinations

MS 5.   (a)   In any course where so prescribed in the syllabus, coursework or a project report may constitute part or whole of the examination for the course.
      (b)   Except where otherwise stated, the assessment weight assigned to coursework will be 25% of the total marks.

MS 6.　　If during any academic year a candidate has failed at his/her first attempt in a course or courses, but is not required to discontinue his/her studies by Regulation MS 8, the candidate may be permitted to present himself/herself

　　(a)　for re-examination in the failed course or courses before the next academic year, resulting in no more than a pass grade under this provision; or

　　(b)　for repeating the curriculum and re-examination in the failed course or courses in the next academic year; or

　　(c)　for enrolment and examination in substitute courses of equal number of credits of the failed course or courses, noting that under this provision a course that is designated as compulsory cannot be substituted.

MS 7.　　Failure to undertake the examination of a paper as scheduled shall normally result in automatic failure in that paper.　A candidate who, because of illness, is unable to be present for one or more papers in any written examination may apply for permission to present himself/herself at a special examination for the paper(s) in question before the next academic year begins.　Any such application shall be made on the form prescribed within two weeks of the day of the examination of the paper in question.　A special examination authorized under these circumstances shall not be subject to Regulation MS 6(a).

MS 8.　　A candidate who

　　(a)　during any academic year has failed in half or more than half the number of credits of all the courses to be examined in that academic year, or

　　(b)　has failed at a repeated attempt in any course

may be required to discontinue his/her studies.

Examination results

MS 9.　　At the conclusion of all the examinations, a pass list of candidates who have successfully completed all the degree requirements 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 training in the principles and practice of statistics.　Candidates should have knowledge of matrices and calculus.

STRUCTURE AND EVALUATION

The period of study extends over two years part-time commencing September.　All courses offered are on a semester basis.　Candidates must take at least 48 credits in the two years of study.　Among the 48 credits of courses, students should take the two compulsory courses STAT7003 and STAT7004.　Only under exceptional academic circumstances can the compulsory course STAT7003 or STAT7004 be replaced by an elective course.

The programme offers great flexibilities for students who wish to take a general approach or a specialized theme in Risk Management or Statistical Informatics.

Risk Management theme
The required courses are as follows: STAT7003, STAT7004, STAT8003, STAT8007, STAT8014, STAT8017 and any two of other courses.

Statistical Informatics theme
The required courses are as follows: STAT7003, STAT7004, STAT7005, STAT7006, STAT7007, STAT8017 and any two of other courses.

A student may choose to have his/her theme printed on the transcript if he/she has satisfied one of the theme requirements above.

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.

Compulsory Courses

STAT7003.   Foundations of statistics (6 credits)

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; the likelihood principle; maximum likelihood estimation; likelihood ratio tests; hypotheses testing. (Only under exceptional academic circumstances can this compulsory course be replaced by an elective course.)

STAT7004.   Linear modelling (6 credits)

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. (Only under exceptional academic circumstances can this compulsory course be replaced by an elective course.)

Elective courses

STAT7005.   Multivariate methods (6 credits)

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 (6 credits)

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.

STAT7007.   Categorical data analysis (6 credits)

Many social and medical studies, especially those involving questionnaires, contain large amounts of categorical data. Examples of categorical data include presence or absence of disease (yes / no), mode of transportation (bus, taxi, railway), attitude toward an issue (strongly disagree, disagree, agree, strongly agree). This course focuses on analyzing categorical response data with emphasis on hands-on training of analyzing real data using statistical software such as SAS. Consulting experience may be presented in the form of case studies. Topics include: classical treatments of 2 and 3-way contingency tables, measures of association and nonparametric methods; generalized linear models, logistic regression for binary, multinomial and ordinal data, loglinear models, Poisson regression; Modelling repeated measurements; generalized estimating equations. Assessment: 40% coursework, 60% examination.

STAT8002.   Project (6 credits)

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 (6 credits)

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.

STAT8005.   Selected topics in statistics (6 credits)

The purpose of this course is to broaden the students' knowledge of statistics by studying three to four contemporary topics motivated by applications of statistics. These topics will build on the theory and methods covered in the core courses. Approximately an equal amount of time will be spent on each topic. The topics offered each year depend on student interests and staff availability. After completing the course, students will acquire knowledge and skills of some advanced statistical techniques for solving real life problems. Topics may be selected from: statistical genetics, portfolio selection, credibility risk, market segmentation, statistics in sports, bootstrap methods, Bayesian methods, structural equation modelling, nonlinear regression. Assessment: 30% coursework, 70% examination.

STAT8007.   Statistical methods in economics and finance (6 credits)

This course provides a comprehensive introduction to state-of-the-art statistical techniques in economics and finance, with emphasis on their applications to time series and panel data sets in economics and finance. Topics include: regression with autocorrelated errors, modelling returns and volatility; instrumental variables and two stage least squares; panel time series models; unit root tests, co-integration, error correction models.
Prerequisite: STAT8003 (or equivalent)

STAT8012.   Reading course (6 credits)

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.)

STAT8014.   Risk analysis (6 credits)

"Risk" is a familiar subject to the people of Hong Kong. Hong Kong has many weathered 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 (6 credits)

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 (6 credits)

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 (6 credits)

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

Each course shall be examined by one three-hour written paper with the exception of STAT8002, STAT8012 and STAT8017.