Master of Statistics

Apply now for entry in September 2019

Advanced Knowledge

Practical Skills

Professional Views

Big data analytics

Risk management & Basel accords

Data mining

Algorithmic trading

Social Network

Marketing analytics

Spatial data analysis

THE UNIVERSITY OF HONG KONG
FACULTY OF SCIENCE

The degree of Master of Statistics is a one-year full-time / two-year part-time programme, which has been restructured from the previous degree of Master of Social Sciences in Applied Statistics that was launched in September 1987. Since the first graduation in 1989, we expect to have about 950 graduates when the present cohort completes the programme.

This programme is designed to provide a rigorous training in the principles and the practice of statistics. It emphasizes in applications and aims to prepare candidates for further study, research, consulting work and administration in various fields through computer-aided and hands-on experience.

Highlights

- Ranked No.28 worldwide overall#
- Be a knowledgeable statistician in principles and practice
- Experience hands-on applications of methodologies with powerful commercial software
- Could select up to nine electives from the Department's research postgraduate courses
- Join the programme of more than 30 years in curriculum development and delivery
- Select a theme of your interest (Risk Management theme / Data Analytics theme)

 # Based on the Quacquarelli Symonds (QS) World University Ranking by Subject 2018

Programme Learning Outcomes

1. To acquire advanced knowledge in statistics and practical skills of applying appropriate statistical methods, models and techniques, and develop new knowledge and skills through life-long learning
2. To equip with hands-on experience in statistical and risk analyses using commercial statistical software and be competent for data-analytic jobs which require advanced computational skills
3. To make informed decisions on complex real-life problems encountered in the data explosion era
4. To communicate effectively with the layman on statistical issues
5. To critically evaluate and to make proper use of models and techniques for data analyses and risk management, and to appraise the related ethical issues
6. To prepare to be confident statisticians for providing professional view on statistical issues

Master of Statistics Outstanding Performance Scholarship

One scholarship of HK$50,000 shall be awarded annually to a MStat student on the basis of academic merit and quality of coursework.

Lifelong Learning Prizes in Statistics

There are Lifelong Learning Prizes in Statistics, each from $5,000 to $10,000, for students in this programme based on their examination results of the concerned study period.

Reimbursable Course(s) by Continuing Education Fund (CEF)

Five courses in the programme:

- STAT7006 Design and analysis of sample surveys
- STAT8007 Statistical methods in economics and finance
- STAT8014 Risk management and Basel Accords
- STAT8015 Actuarial statistics
- STAT8017 Data mining techniques

are reimbursable courses for the purposes of CEF. All CEF applicants are required to attend at least 70% of the courses before they are eligible for fee reimbursement under the CEF.

持續進修基金
Continuing Education Fund

"Careers in STEM – like Mathematician, Statistician, Data Scientist and Actuary – shape the Best Jobs of 2018, which is no deviation from recent trends."

The 2018 Jobs Related Report by www.careercast.com.

"Integration of statistical inference principles as part of Big Data will be essential to resolve these (big data) challenges."

Extracted from the Federal Big Data Research and Development Strategic Plan by the Executive Office of the President of the USA.

Programme Curriculum

Commencing in September, the curriculum is composed of a total of ´60 credits of courses in either one year for full-time study, or two years for part-time study. The programme offers great flexibilities for students who wish to take a general approach or a specialised theme in Risk Management or Data Analytics. A student may choose to have his/her theme printed on the transcript if he/she has satisfied the requirement of one of the themes. If a student selects an MStat 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. Students must obtain a cumulative GPA of at least 2.0 to graduate.

Curriculum for Full-time study

Two compulsory courses (12 credits)

STAT6008 Advanced statistical inference (6 credits)
STAT6014 Advanced statistical modelling (6 credits)

Curriculum for Part-time study

Two compulsory courses (12 credits)

STAT7003 Foundations of statistics (6 credits)
STAT7004 Linear modelling (6 credits)

Students with prior background has to take a more advanced course from the same area as replacement:

REPLACE…		WITH	
STAT6008	Advanced statistical inference	STAT6009	Research methods in statistics
STAT6014	Advanced statistical modelling	Any other course	
STAT7003	Foundations of statistics	STAT7005	Multivariate methods
STAT7004	Linear modelling	STAT6014	Advanced statistical modelling

Theme-specific elective courses (24 Credits)

Risk Management theme

plus 24 credits from

STAT6013 Financial data analysis (6 credits)
STAT6015 Advanced quantitative risk management and finance (6 credits)
STAT6017 Operational Risk and Insurance Analytics (6 credits)
STAT8003 Time series forecasting (6 credits)
STAT8007 Statistical methods in economics and finance (6 credits)
STAT8014 Risk management and Basel Accords (6 credits)
STAT8015 Actuarial statistics (6 credits)
STAT8017 Data mining techniques (6 credits)
STAT8020 Quantitative strategies and algorithmic trading (6 credits)
STAT8021 Big data analytics (6 credits) NEW
STAT8305 Bayesian statistics (3 credits)

Data Analytics theme

plus 24 credits from

STAT6011 Computational statistics (6 credits)
STAT6014 Advanced statistical modelling (for part-time study only) (6 credits)
STAT6016 Spatial data analysis (6 credits)
STAT7005 Multivariate methods (6 credits)
STAT7007 Categorical data analysis (6 credits)
STAT7008 Programming for data science (6 credits)
STAT8003 Time series forecasting (6 credits)
STAT8016 Biostatistics (6 credits)
STAT8017 Data mining techniques (6 credits)
STAT8019 Marketing analytics (6 credits)
STAT8021 Big data analytics (6 credits) NEW
STAT8302 Structural equation modelling (3 credits)
STAT8305 Bayesian statistics (3 credits)
STAT8306 Statistical methods for network data (3 credits)
STAT8307 Text analytics (3 credits) NEW

Other elective courses (18 credits)

plus at least 18 credits from

STAT6008 Advanced statistical inference (6 credits)
STAT6009 Research methods in statistics (6 credits)
STAT6010 Advanced probability (6 credits)
STAT7006 Design and analysis of sample surveys (6 credits)
STAT7301 Socio-economic statistics for business and public policies (3 credits)
STAT8000 Workshop on spreadsheet modelling and database management (3 credits)
STAT8300 Career development and communication workshop (3 credits)
STAT8304 Current topics in Statistics (3 credits)
Any theme-specific elective courses
Any capstone courses

Capstone requirement (6 credits)

plus 6 credits from

STAT8002 Project (6 credits)
STAT8017 Data mining techniques (6 credits)
STAT8088 Practicum (6 credits)
STAT8089 Capstone project (6 credits)

Apart from the two compulsory courses and capstone requirement, candidates may choose not to follow any theme and may take 42 credits of elective courses in any order, whenever feasible.

Description of Courses

STAT6008 Advanced statistical inference (6 credits)

This course covers the advanced theory of point estimation, interval estimation and hypothesis testing. Using a mathematically-oriented approach, the course provides a formal treatment of inferential problems, statistical methodologies and their underlying theory. It is suitable in particular for students intending to further their studies or to develop a career in statistical research. Contents include: (1) Decision problem – frequentist approach: loss function; risk; decision rule; admissibility; minimaxity; unbiasedness; Bayes' rule; (2) Decision problem – Bayesian approach: prior and posterior distributions, Bayesian inference; (3) Estimation theory: exponential families; likelihood; sufficiency; minimal sufficiency; completeness; UMVU estimators; information inequality; large-sample theory of maximum likelihood estimation; (4) Hypothesis testing: uniformly most powerful (UMP) test; monotone likelihood ratio; UMP unbiased test; conditional test; large sample theory of likelihood ratio; confidence set; (5) Nonparametric inference; bootstrap methods.

Assessment: One 2-hour written examination; 40% coursework and 60% examination

STAT6009 Research methods in statistics (6 credits)

This course introduces some statistical concepts and methods which potential graduate students will find useful in preparing for work on a research degree in statistics. Focus is on applications of state-of-the-art statistical techniques and their underlying theory. Contents may be selected from: (1) Basic asymptotic methods: modes of convergence; stochastic orders; laws of large numbers; central limit theorems; delta method; (2) Parametric and nonparametric likelihood methods: high-order approximations; profile likelihood and its variants; signed likelihood ratio statistics; empirical likelihood; (3) Nonparametric statistical inference: sign and rank tests; Kolmogorov-Smirnov test; nonparametric regression; density estimation; kernel methods; (4) Computationally-intensive methods: cross-validation; bootstrap; permutation methods; (5) Robust methods: measures of robustness; M-estimator; L-estimator; R-estimator; estimating functions; (6) Other topics as determined by the instructor.

Assessment: One 2-hour written examination; 25% coursework and 75% examination

STAT6010 Advanced probability (6 credits)

This course provides an introduction to measure theory and probability. The course will focus on some basic concepts in theoretical probability which are important for students to do research in actuarial science, probability and statistics. Contents include: sigma-algebra, measurable space, measure and probability, measure space and probability space, measurable functions, random variables, integration theory, characteristic functions, convergence of random variables, Hilbert spaces, conditional expectations, martingales.

Assessment: One 2-hour written examination; 25% coursework and 75% examination

STAT6011 Computational statistics (6 credits)

This course aims to give postgraduate students in statistics a background in modern computationally intensive methods in statistics. It emphasizes the role of computation as a fundamental tool of discovery in data analysis, of statistical inference, and for development of statistical theory and methods. Contents include: Bayesian statistics, Markov chain Monte Carlo methods including Gibbs sampler, the Metropolis-Hastings algorithm, and data augmentation; Generation of random variables including the inversion methods, rejection sampling, the sampling/importance resampling method; Optimization techniques including Newton's method, expectation-maximization (EM) algorithm and its variants, and minorization-maximization (MM) algorithms; Integration including Laplace approximations, Gaussian quadrature, the importance sampling method, Numerical optimization and integration, EM algorithm and its variants, Simulation and Monte Carlo integration, Importance sampling and variance reduction techniques; and other topics such as Hidden Markov models, neural networks, and Bootstrap methods.

Pre-requisites: Students should not be taking or have taken STAT8305 Bayesian statistics or equivalent

Assessment: One 2-hour written examination; 25% coursework and 75% examination

STAT6013 Financial data analysis (6 credits)

This course aims at introducing statistical methodologies in analyzing financial data. Financial applications and statistical methodologies are intertwined in all lectures. Contents include: recent advances in modern portfolio theory, copula, market microstructure and high frequency data analysis.

Assessment: One 2-hour written examination; 40% coursework and 60% examination

STAT6014 Advanced statistical modelling (6 credits)

This course introduces modern methods for constructing and evaluating statistical models and their implementation using popular computing software, such as R or Python. It will cover both the underlying principles of each modelling approach and the model estimation procedures. Topics from: (i) Generalized linear models; (ii) Mixed models; (iii) Kernel and local polynomial regression; selection of smoothing parameters; (iv) Generalized additive models; (v) Hidden Markov models and Bayesian networks.

Assessment: One 2-hour written examination; 50% coursework and 50% examination

STAT6015 Advanced quantitative risk management and finance (6 credits)

This course covers statistical methods and models of importance to risk management and finance and links finance theory to market practice via statistical modelling and decision making. Emphases will be put on empirical analyses to address the discrepancy between finance theory and market data. Contents include: Elementary Stochastic Calculus; Basic Monte Carlo and Quasi-Monte Carlo Methods; Variance Reduction Techniques; Simulating the value of options and the value-at-risk for risk management; Review of univariate volatility models; multivariate volatility models; Value-at-risk and expected shortfall; estimation, back-testing and stress testing; Extreme value theory for risk management.

Assessment: One 2-hour written examination; 25% coursework and 75% examination

STAT6016 Spatial data analysis (6 credits)

This course covers statistical concepts and tools involved in modelling data which are correlated in space. Applications can be found in many fields including epidemiology and public health, environmental sciences and ecology, economics and others. Covered topics include: (1) Outline of three types of spatial data: point-level (geostatistical), areal (lattice), and spatial point process. (2) Model-based geostatistics: covariance functions and the variogram; spatial trends and directional effects; intrinsic models; estimation by curve fitting or by maximum likelihood; spatial prediction by least squares, by simple and ordinary kriging, by trans-Gaussian kriging. (3) Areal data models: introduction to Markov random fields; conditional, intrinsic, and simultaneous autoregressive (CAR, IAR, and SAR) models. (4) Hierarchical modelling for univariate spatial response data, including Bayesian kriging and lattice modelling. (5) Introduction to simple spatial point processes and spatio-temporal models. Real data analysis examples will be provided with dedicated R packages such as geoR.

Assessment: One 2-hour written examination; 50% coursework and 50% examination

STAT6017 Operational risk and insurance analytics (6 credits)

This course aims to provide the foundation of operational risk management and insurance. Special emphasis will be put on the analytical and modeling techniques for operational risk and insurance. Contents include fundamentals of operational risk and Basel regulation, loss distribution, estimation of risk models, copula and modeling dependence, insurance and risk transfer for operational risk.

Assessment: One 2-hour written examination; 25% coursework and 75% examination

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.)

Assessment: One 3-hour written examination; 25% coursework and 75% examination

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

Assessment: One 3-hour written examination; 25% coursework and 75% examination

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 for one-sample and two-sample problems; profile analysis; test for covariances structure; multivariate ANOVA; principal components analysis; factor analysis; discriminant analysis and classification.

Assessment: One 3-hour written examination; 40% coursework and 60% examination

STAT7006 Design and analysis of sample surveys (6 credits) (CEF code: 21Z02633-A)

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.

Assessment: One 3-hour written examination; 25% coursework and 75% examination

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: One 3-hour written examination; 50% coursework and 50% examination

STAT7008 Programming for data science (6 credits)

In the big data era, it is very easy to collect huge amounts of data. Capturing and exploiting the important information contained within such datasets poses a number of statistical challenges. This course aims to provide students with a strong foundation in computing skills necessary to use R or Python to tackle some of these challenges. Possible topics to be covered may include exploratory data analysis and visualization, collecting data from a variety of sources (e.g. Excel, web-scraping, APIs and others), object-oriented programming concepts and scientific computation tools. Students will learn to create their own R packages or Python libraries.

Assessment: 100% coursework

STAT7301 Socio-economic statistics for business and public policies (3 credits)

Huge volumes of socio-economic statistics are compiled and published on society and the economy by Governments and other bodies locally and elsewhere. Strong ability of business managers and authorities concerned to make effective reference to relevant data greatly enhances the quality of decision making in business and public policy processes. Students will learn about globally adopted standards for the compilation and dissemination of important data, such as those on population, labour, economic structure (in particular GDP), productivity, prices, trade, finance, housing, health and education; how to obtain them; and appropriate methods of utilizing them for the purposes of understanding socio-economic phenomena and making sound decisions. Ample practical examples drawn from Hong Kong and elsewhere will be presented.

Assessment: One 1.5-hour written examination; 40% coursework and 60% examination

STAT8000 Workshop on spreadsheet modelling and database management (3 credits)

This course aims to enhance students' IT knowledge and skills which are essential for career development of statistical and risk analysts. The course contains a series of computer hands-on workshops on Excel VBA programming, MS-Access and SQL and C++ basics.

Assessment: 100% coursework, assessment of this course is on a pass or fail or distinction basis

STAT8002 Project (6 credits)

A project in any branch of statistics or probability will be chosen under the supervision of individual staff member. A substantial written report is required. Availability of this course is subject to approval.

Pre-requisites: Students should not be taking or have taken STAT8089 Capstone Project or equivalent

Assessment: 60% written report and 40% oral presentation

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: One 3-hour written examination; 40% coursework and 60% examination

STAT8007 Statistical methods in economics and finance (6 credits) (CEF code: 23Z08031-3)

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.

Assessment: One 3-hour written examination; 25% coursework and 75% examination

STAT8014 Risk management and Basel Accords (6 credits) (CEF code: 23Z02504-5)

Being an important financial centre, Hong Kong has always been on the alert for risk in the banking and financial industry. We have weathered many attacks and crises over the past decades. Following the deep and long lasting global financial crisis started in 2007/08, this risk has been the primary focus of most people. This course will provide, and it is paramount for people in or related to the industry be fully aware of the relevant risk management, including the nature, the culture, the framework, the cycle, the measurement (with focus on market, credit and operational risks) and the mitigation techniques, along with the knowledge of the Basel Accords and practical critical issues.

Assessment: One 3-hour written examination; 40% coursework and 60% examination

STAT8015 Actuarial statistics (6 credits) (CEF code: 23Z02505-3)

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.

Assessment: One 3-hour written examination; 25% coursework and 75% examination

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.

Assessment: One 3-hour written examination; 40% coursework and 60% examination

STAT8017 Data mining techniques (6 credits) (CEF code: 21Z08023-7)

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.

Pre-requisites: Students should not be taking or have taken STAT8089 Capstone Project or equivalent

Assessment: 100% coursework

STAT8019 Marketing analytics (6 credits)

This course aims to introduce various statistical models and methodology used in marketing research. Special emphasis will be put on marketing analytics and statistical techniques for marketing decision making including market segmentation, market response models, consumer preference analysis and conjoint analysis. Contents include market response models, statistical methods for segmentation, targeting and positioning, statistical methods for new product design.

Assessment: One 3-hour written examination; 40% coursework and 60% examination

STAT8020 Quantitative strategies and algorithmic trading (6 credits)

Quantitative trading is a systematic investment approach that consists of identification of trading opportunities via statistical data analysis and implementation via computer algorithms. This course introduces various methodologies that are commonly employed in quantitative trading.

The first half of the course focuses at strategies and methodologies derived from the data snapshotted at daily or minute frequency. Some specific topics are: (1) techniques for trading trending and mean-reverting instruments, (2) statistical arbitrage and pairs trading, (3) detection of "time-series" mean reversion or stationarity, (4) cross-sectional momentum and contrarian strategies, (5) back-testing methodologies and corresponding performance measures, and (6) Kelly formula, money and risk management. The second half of the course discusses statistical models of high frequency data and related trading strategies. Topics that planned to be covered are: (7) introduction of market microstructure, (8) stylized features and models of high frequency transaction prices, (9) limit order book models, (10) optimal execution and smart order routing algorithms, and (11) regulation and compliance issues in algorithmic trading.

Pre-requisites: Pass in STAT6013 Financial data analysis or equivalent

Assessment: One 2-hour written examination; 60% coursework and 40% examination

STAT8088 Practicum (6 credits)

This course is open to students of Master of Statistics Programme only. It provides students with first-hand experience in the applications of academic knowledge in a real-life work environment. To be eligible, students should be undertaking a statistics-related or risk-management-related practicum with no less than 160 hours in at least 20 working days spent in a paid or unpaid position. It is possible for part-time students to complete their practicum within their current place of employment. The practicum will normally take place in the second semester or summer semester for full-time students or during the second year for part-time students.

Assessment: Upon completion of the practicum, each student is required to submit a written report and to give an oral presentation on his/her practicum experience. Supervisors will assess the students based on their performance during the practicum period. Assessment of this course is on a Pass or Fail or Distinction basis with 3 criteria: (1) supervisor's evaluation, (2) written report, (3) oral presentation. Please note that fail in fulfilling any of the 3 criteria satisfactorily would lead to a "Fail" grade in the course.

STAT8089 Capstone project (6 credits)

This project-based course aims to provide students with capstone experience to work on a real-world problem and carry out a substantial data analysis project which requires integration of the knowledge they have learnt in the curriculum. Students will work in small groups under the guidance of their supervisor(s). The project topic is not limited to academic context, but can also be extended to a community or corporate outreach project. Students will need to find an interesting topic of their own, conduct literature search regarding the most recent research related to the problem, make suggestions to improve the current situations or even solve the problem identified in their project. A substantial written report is required.

Pre-requisites: Students should not be taking or have taken STAT8002 Project or STAT8017 Data mining techniques or equivalent

Assessment: 15% project proposal; 50% written report and 35% oral presentation

STAT8300 Career development and communication workshop (3 credits)

The course is specially designed for students who wish to sharpen their communication and career preparation skills through a variety of activities including lectures, skill-based workshops, small group discussion and role plays. All of which aim to facilitate students in making informed career choices, provide practical training to enrich communication, presentation, time management and advanced interview skills, and to enhance students' overall competitiveness in the employment markets.

Assessment: 100% coursework, assessment of this course is on a pass or fail or distinction basis

STAT8304 Current topics in Statistics (3 credits)

The purpose of this course is to broaden the students' knowledge of statistics by studying some contemporary topics motivated by applications of statistics. These topics will build on the theory and methods covered in the compulsory courses. 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.

Assessment: One 1.5-hour written examination; 40% coursework and 60% examination

STAT8305 Bayesian statistics (3 credits)

This course introduces Bayesian methodologies and computational techniques of Markov chain Monte Carlo (MCMC). It covers fundamental Bayesian concepts, modeling and inference, including prior specification, posterior distribution, posterior predictive, Bayes factor, Bayesian hypothesis testing, Bayesian hierarchical modeling, and Bayesian decision theoretic analysis. From the computational perspective, it covers rejection sampling, importance sampling, Metropolis-Hastings algorithm, Gibbs sampling, and data augmentation MCMC techniques. Statistical software R and Python will be used for Bayesian computation.

Pre-requisites: Students should not be taking or have taken STAT6011 Computational statistics or equivalent

Assessment: One 1-hour written examination; 25% coursework and 75% examination

Summer Courses:

STAT8021 Big data analytics (6 credits) NEW

The recent explosion of social media and the computerization of every aspect of life resulted in the creation of volumes of mostly unstructured data (big data): web logs, e-mails, video, speech recordings, photographs, tweets and others. This course aims to provide students with knowledge and skills of some advanced analytics and statistical modelling for solving big data problems. Students are required to possess basic understanding of R language.

Pre-requisites: Pass in STAT8017 Data mining techniques or equivalent; students should not be taking or have taken STAT8307 Text analytics or equivalent

Assessment: 100% coursework

STAT8302 Structural equation modelling (3 credits)

Structural Equation Modelling (SEM) is a general statistical modelling technique to establish relationships among variables. A key feature of SEM is that observed variables are understood to represent a small number of "latent constructs" that cannot be directly measured, only inferred from the observed measured variables. This course covers the theories of structural equation models and their applications. Topics may include path models, confirmatory factor analysis, structural equation models with latent variables, Sub-models including multiple group analysis, MIMIC model, second order factor analysis, two-wave model, and simplex model, model fitness, model identification, and Comparison with competing models.

Pre-requisites: Pass in STAT7005 Multivariate methods or equivalent

Assessment: One 1.5-hour written examination; 50% coursework and 50% examination

STAT8306 Statistical methods for network data (3 credits)

The six degrees of separation theorizes that human interactions could be easily represented in the form of a network. Examples of networks include router networks, the World Wide Web, social networks (e.g. Facebook or Twitter), genetic interaction networks and various collaboration networks (e.g. movie actor coloration network and scientific paper collaboration network). Despite the diversity in the nature of sources, the networks exhibit some common properties. For example, both the spread of disease in a population and the spread of rumors in a social network are in sub-logarithmic time. This course aims at discussing the common properties of real networks and the recent development of statistical network models. Topics may include common network measures, community detection in graphs, preferential attachment random network models, exponential random graph models, models based on random point processes and the hidden network discovery on a set of dependent random variables.

Assessment: One 1.5-hour written examination; 50% coursework and 50% examination

STAT8307 Text analytics (3 credits) NEW

The textual data constitutes and enormous proportion of unstructured data which is characterized as one of 'V's in Big Data. The logical and computational reasonings are applied to transform large collection of written resources to structured data for use in further analysis, visualization, integration with structured data in database or warehouse, and further refinement using machine learning systems. This course introduces the methodology of text mining and text analytics. Topics are selected from natural language processing, word representation, text categorization and clustering, topic modelling and sentiment analysis. Students are required to possess basic understanding of R language.

Pre-requisites: Pass in STAT8017 Data mining techniques or equivalent; Students should not be taking or have taken STAT8021 Big data analytics or equivalent

Assessment: 100% coursework

Programme Duration and Class Schedules

The programme extends over not less than one academic year for the full-time study, and not less than two academic years for the part-time study. Teaching will take place mostly in day-time from Monday to Saturday for courses having course codes STAT6XXX, and on weekday evenings (7:00 – 10:00 p.m.), and Saturday mornings (9:30 a.m. – 12:30 p.m.) and afternoons (2:00 – 5:00 p.m.) for courses having course codes STAT7XXX or STAT8XXX. All lectures are conducted in English at HKU.

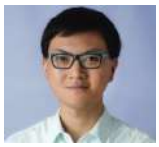
Optional Summer Courses

- A 12-hour preparatory course in matrices and calculus for part-time students who need to rejuvenate their skills (August, 2019).
- A 6-hour introductory course to the use of the language R for data analysis and graphics. This beginners' course covers data handling, graphics, mathematical functions and some basic statistical techniques. (August, 2019)
- A 12-hour tutorial in SAS for all the students who need to rejuvenate their skills in data management using SAS (August, 2019).

Target Students

The programme is for individuals who wish to acquire the knowledge, practical skills and professional views in statistics. Although most students come from a wide range of disciplines, those who have no former training in statistics should have considerable working experience.

Students Testimonial



Over the past 2 years, the MStat program brought me a fruitful experience. Not only I learnt a lot about advanced data analytics techniques, but also got a lot of hands-on experience in applying them to practical problems. It also opens my mind about the range of application of statistics and data analytics in different fields. Moreover, the program provides me with the opportunity to meet with people from different backgrounds and we shared experience with each other. I am an actuary and there is an increasing focus on predictive analytics in my current field, hence the program gives me sound foundation to explore how to apply the techniques learnt to discover predictive patterns and relationships for business uses.

WONG Cheuk Yin [MStat Part-time Graduate 2018]
Senior Actuarial Consultant, HSBC Insurance (Asia) Ltd

The MStat program gives opportunities for students to decide their paths. For those who would like to go into research areas, capstone and other advanced courses will fit you. For those who want to start their career ASAP like me, you can complete an internship instead of doing academic projects. The professors and lecturers are also very helpful.

LI Yi [MStat Full-time Graduate 2018]
Associate in Consulting, PwC

My year of being in the MStat programme was definitely a fruitful year, and one that I will cherish. It was one full of discoveries and excitement, in which I had the opportunity to explore and learn more about statistical knowledge, and how it could possibly connect to the real world. It even helped me understand the beauty of statistics, hence bringing me a lot of joy. The programme has also proven to be beneficial in my work as a football trader in the Hong Kong Jockey Club, as it has equipped me with the knowledge and techniques needed. For instance, in the football field, every little move that a player makes could be used as a statistic, hence involving math. Thus, the MStat programme has been very useful in helping me analyze and comprehend such information. All in all, I am very thankful for the programme as it was very helpful and has allowed me to do my best in the workplace.

KEUNG Ka Chun [MStat Full-time Graduate 2018]
Football trader, Hong Kong Jockey Club

The MStat programme has widened my horizon and completely redirected my career path. The program supports our study with diverse courses not only traditional statistical topic, financial applications but also statistical learning such as data mining and computational statistics. More importantly, the professors are always helpful in answering students' questions with regard to academic study and career development. After communicating with several professors, I got a chance to work as a student research assistant on medical image analysis and that is the start of my current career path. In short, students can gain far more than you expect here no matter on professional skills or on personal development, as long as they are willing to explore.

WU Xinheng [MStat Full-time Graduate 2018]
PhD in Engineering and IT, The University of Sydney

The Master of Statistics of the University of Hong Kong enables students to acquire both a solid understanding of statistical theory and extensive knowledge about its state-of-the-art applications. Thanks to the variety of the courses offered in this programme, I could learn more about new areas in statistics, data analytics and risk management. What I liked most during my MStat studies was their friendly professors and staff who taught me very valuable lessons about statistics and life. Overall, the MStat programme is a truly enriching experience which will help students get one step closer to their career goals.

Alejandro COBO PIEKENBROCK [MStat Full-time Graduate 2017]
Analyst in Finance Division, Morgan Stanley Asia International Limited

In the past year in MStat, I met a lot of friends with different backgrounds, but with a similar characteristic: being interested in data. The programme provides many options which helped us choose our career paths in the future. For students who follow data analytics theme, students could learn more about computational statistics, biostatistics and data mining. For students who choose risk management theme, they would have the skills to analyse financial data and apply statistical methods in the fields of economics and finance. The group project for capstone can also train our cooperation and time planning, as well as improve our skills of presentation and report writing. In short, as long as you are willing to learn, you will find the value of MStat.

WANG Qian [MStat Full-time Graduate 2017]
Associate in Risk Consulting, PwC

SAS Innovative Data Mining Application Award Winning Teams 2018

Examples of backgrounds of admitted students in recent years:

HKSAR Government departments/units:

- Research Manager
- Researcher (Statistics)
- Research Officer
- Immigration Officer
- Statistical Assistant
- Statistical Officer

Education profession:

- Consultant
- Senior Lecturer
- Teacher
- Website Editor
- Research Assistant
- Teaching Assistant

Banking and finance profession:

- Executive Director
- Vice President
- Head of Business Intelligence
- Senior Manager
- Manager
- Business Analyst Manager
- Credit Risk Manager
- Financial Crime Compliance Assistant Manager
- Lead Financial Data Analyst
- Actuarial Analyst
- Quantitative Analyst
- Equity Research Associate
- Fund Accountant
- Senior Project Officer
- Credit Officer
- Associate Director
- Senior Traded Risk Analytics Manager
- Development Specialist
- Hedge fund Operation Specialist
- Bank Analyst
- Operations and Data Management Officer
- Consultant Specialist
- Business and Credit Control Manager

Private companies:

- Director
- Assistant Vice President
- Head of Corporate Administration and Operation
- Senior Consultant
- Consulting Engineer
- Technical Service Delivery Manager
- Deputy Manager
- Data Scientist
- Business Intelligence Analyst
- Marketing Executive
- Solution Scheme Specialist
- Software Engineer
- Analyst Programmer
- Quantitative Developer
- Software Developer
- System Analyst
- Trading Analyst
- Senior Industrial Engineering Officer
- Data Analytics Engineer

Tuition Fees

The composition fee for the full-time programme is HK$160,000# for the 2019 intake and that for the part-time programme is HK$80,000# per year for two years. The fee shall be payable in two instalments over one year for full-time study or in four instalments over two years for part-time study. In addition, students are required to pay Caution Money (HK$350), refundable on graduation subject to no claims being made, and Graduation Fee (HK$350).

The University allows Occasional Students to enroll in individual courses without registering in any particular programme of study. Tuition fee for an Occasional Student is HK$2,670# per credit in the academic year 2019-20.

 # Subject to approval

Requirements

A Bachelor's degree with Honours, or equivalent qualification, with knowledge of matrices and calculus. Full-time applicants should have knowledge of introductory statistics and linear modelling.

Application

Online application can be accessed via
https://www.aal.hku.hk/tpg/

Application Deadline

Main Round: December 14, 2018
Clearing Round: 12 noon, January 31, 2019

Programme Director

Dr YK Chung

BSc, MPhil CUHK; PhD HK
Department of Statistics & Actuarial Science

Enquiries

Ms Esther Cheung
Department of Statistics & Actuarial Science
Tel: 3917 2467 Email: mstat@saas.hku.hk

Programme Details:
https://www.saasweb.hku.hk/programme/mstat.php

Support for International Students

https://cedars.hku.hk/
Useful information for students:
https://cedars.hku.hk/publication.php

Advisory Board Members

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SAS Institute Limited

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Mr DKT Leung	BA, MBA *HK*
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Dr GD Li	BSc, MSc *Peking*; PhD *HK*
Dr WT Li	BSc *USTC*; PhD *Rutgers*
Professor WK Li	BSc, MA *York*; PhD *W Ont*
Dr ZH Liu	ScD *Harvard*
Dr GCS Lui	MSocSc *Birm*; MPhil *CUHK*; PhD *HK*
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Dr AJ Zhang	BSc, MPhil *HKBU*; MSc, PhD *Michigan*
Dr ZQ Zhang	BSc *Nankai*, MSc *E China Normal*; PhD HK
Dr K Zhu	BSc *USTC*; PhD *HKUST*

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