

SYLLABUS FOR THE DEGREE OF BACHELOR OF STATISTICS [BStat]

The syllabus applies to candidates admitted to the first year of study of the four-year BStat curriculum in the academic year 2025-26 and thereafter.

Definition and Terminology

1. Each course offered shall be classified as either introductory level course or advanced level course.
2. “Disciplinary core course” is a compulsory course in the professional core which a candidate must pass in the manner provided for in the regulations.
3. “Disciplinary elective course” refers to any course offered in the professional core other than compulsory courses which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabus of the degree curriculum.
4. “Capstone experience course” is an integral part of the degree programme which focuses on integration and application of knowledge and skills gained in the early years of study. It is normally taken in the senior years (year 3 or 4) of study and candidates must complete this for fulfillment of the graduation requirements.
5. “Elective course” means any course offered within the same or another curriculum, other than compulsory courses in the candidate’s degree curriculum, that can be taken by the candidate in order to complete the credit requirements of the degree curriculum.

BStat Curriculum

Candidates must complete the requirements of one of the professional cores: Decision Analytics, Risk Management or Statistics, as one of the graduation requirements. Professional cores shall be displayed on the transcript and Academic Attainment Profile upon candidates’ completion of the programme and fulfillment of the corresponding professional core requirements. Depending on the professional core, the BStat curriculum comprises 240 credits of courses with the following structures:

Course category	Professional core		
	Decision Analytics	Risk Management	Statistics
UG 5 Requirements	54 credits	54 credits	54 credits
Disciplinary Core Courses (Introductory)	42 credits	30 credits	30 credits
Disciplinary Elective Courses (Introductory)	12 credits	12 credits	12 credits
Disciplinary Core Courses (Advanced)	36 credits	48 credits	42 credits
Disciplinary Elective Courses (Advanced)	24 credits	24 credits	30 credits
Capstone Experience Courses	6 credits	6 credits	6 credits
Elective Courses	66 credits	66 credits	66 credits
Total	240 credits	240 credits	240 credits

UG 5 Requirements

Course code	Course	No. of credits
CAES1001	Academic Communication in English ¹	0
CAES9821	Professional and Technical Communication for Statistical Sciences	6
	Chinese language enhancement course specified for the degree curriculum ²	6
	Common Core ³	36
	Artificial Intelligence Literacy courses	6
	Non-credit bearing course in national education and national security education, and any other non-credit bearing courses as may be required from time to time	0
Total		54

¹Unless otherwise exempted through having achieved Level 5 or above in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent.

²Candidates should check with the School of Computing and Data Science for the course code and course title of the Chinese language enhancement course to satisfy the programme and graduation requirements. For those who did not study Chinese language during their secondary education and have not reached the required proficiency level for the Chinese language enhancement course specified for the degree curriculum, they are required to take a course in either Chinese language or Chinese culture offered by the Chinese Language Centre of the School of Chinese in lieu.

³Candidates have to complete 36 credits in the Common Core Curriculum, comprising at least 6 credits and not more than 12 credits from each Area of Inquiry with not more than 24 credits within one academic year except where candidates are required to make up for failed credits.

Disciplinary Core Courses at Introductory Level

For Professional Core in Decision Analytics:

Course code	Course	No. of credits
COMP1117	Computer Programming	6
COMP2113	Programming Technologies	6
COMP2118	Data Structures and Algorithms Essentials	6
MATH1013	University Mathematics II	6
SDST1600	Statistics: Ideas and Concepts	6
SDST2601	Probability and Statistics I	6
SDST2602	Probability and Statistics II	6
Total		42

For Professional Core in Risk Management or Professional Core in Statistics:

Course code	Course	No. of credits
COMP1117	Computer Programming	6
MATH1013	University Mathematics II	6
SDST1600	Statistics: Ideas and Concepts	6
SDST2601	Probability and Statistics I	6
SDST2602	Probability and Statistics II	6
Total		30

Disciplinary Elective Courses at Introductory Level*Select either List A or List B:**List A (for general study)*

Course code	Course	No. of credits
MATH2012	Fundamental Concepts of Mathematics	6
MATH2014	Multivariable Calculus and Linear Algebra	6
Total		12

OR

List B (for advanced study)

Course code	Course	No. of credits
MATH2101	Linear Algebra I	6
MATH2211	Multivariable Calculus	6
Total		12

Disciplinary Core Courses at Advanced Level*For Professional Core in Decision Analytics:*

Course code	Course	No. of credits
MATH3900	Optimization for AI and Data Analytics	6
SDST3600	Linear Statistical Analysis	6
SDST3612	Statistical Machine Learning	6
SDST4609	Big Data Analytics	6
SDST4610	Bayesian Learning	6
SDST4611	High-Dimensional Statistical Learning	6
Total		36

For Professional Core in Risk Management:

Course code	Course	No. of credits
SDST3600	Linear Statistical Analysis	6
SDST3609	The Statistics of Investment Risk	6
SDST3615	Practical Mathematics for Investment	6
SDST3618	Derivatives and Risk Management	6
SDST4601	Time-Series Analysis	6
SDST4607	Credit Risk Analysis	6
SDST4608	Market Risk Analysis	6
SDST4610	Bayesian Learning	6
Total		48

For Professional Core in Statistics:

Course code	Course	No. of credits
SDST3600	Linear Statistical Analysis	6
SDST3602	Statistical Inference	6
SDST3603	Stochastic Processes	6

SDST3620	Modern Nonparametric Statistics	6
SDST3621	Statistical Data Analysis	6
SDST4602	Multivariate Data Analysis	6
SDST4610	Bayesian Learning	6
Total		42

Disciplinary Elective Courses at Advanced Level

For Professional Core in Decision Analytics: select at least 24 credits from List D

List D

Course code	Course	No. of credits
COMP3251	Algorithm Design	6
COMP3252	Algorithm Design and Analysis	6
COMP3278	Introduction to Database Management Systems	6
COMP3407	Scientific Computing	6
SDST3620	Modern Nonparametric Statistics	6
SDST3621	Statistical Data Analysis	6
SDST3622	Data Visualization	6
SDST4011	Natural Language Processing	6
SDST4023	Medical Image Analysis	6
SDST4601	Time-Series Analysis	6
SDST4602	Multivariate Data Analysis	6
SDST4612	Interpretable Machine Learning	6
SDST4613	Causal Inference	6
SDST7609	Research Methods in Statistics	6

For Professional Core in Risk Management: select at least 24 credits from List R

List R

Course code	Course	No. of credits
SDST3602	Statistical Inference	6
SDST3603	Stochastic Processes	6
SDST3610	Risk Management and Insurance	6
SDST3612	Statistical Machine Learning	6
SDST3655	Survival Analysis	6
SDST3910	Financial Economics I	6
SDST3911	Financial Economics II	6
SDST4603	Current Topics in Risk Management	6
SDST4606	Risk Management and Basel Accords in Banking and Finance	6
SDST4614	Quantitative Risk Management	6
SDST7609	Research Methods in Statistics	6
SDST7610	Advanced Probability	6

For Professional Core in Statistics: select at least 30 credits from List S1 and List S2, among which at least 6 credits from List S1, and at least 12 credits from List S2

List S1 (mainstream statistical topics)

Course code	Course	No. of credits
SDST3612	Statistical Machine Learning	6
SDST3655	Survival Analysis	6
SDST4601	Time-Series Analysis	6

List S2 (statistical applications and other advanced topics)

Course code	Course	No. of credits
SDST3021	Modern Biostatistics	6
SDST3604	Design and Analysis of Experiments	6
SDST3606	Business Logistics	6
SDST3607	Statistics in Clinical Medicine and Bio-medical Research	6
SDST3608	Statistical Genetics	6
SDST3613	Marketing Analytics	6
SDST3617	Sample Survey Methods	6
SDST4611	High-Dimensional Statistical Learning	6
SDST4613	Causal Inference	6
SDST7609	Research Methods in Statistics	6
SDST7610	Advanced Probability	6

Capstone Experience Courses

At least 6 credits selected from the following courses:

Course code	Course	No. of credits
SDST3799	Directed Studies in Statistics	6
SDST4710	Capstone Experience for Statistics Undergraduates	6
SDST4766	Statistics Internship	6
SDST4799	Statistics Project	12

Elective Courses (66 credits)

Candidates should take at least 66 credits of courses offered by any department, except Common Core Courses. Candidates would only need to take 60 credits of elective courses should they have taken “SDST4799 Statistics Project” (12 credits) as capstone experience course.

Candidates may choose to take up to four 6-credit postgraduate courses related to their Professional Cores as elective courses, subject to the approval of the Programme Director of BStat, in consideration of class quota and other academic issues.

Impermissible Combinations

Candidates reading Bachelor of Statistics (BStat) programme cannot take the following majors/minors:

For Professional Core in Decision Analytics:

Major in Computer Science
Major in Decision Analytics
Major in Risk Management
Major in Statistics
Minor in Computer Science
Minor in Risk Management
Minor in Statistics

For Professional Core in Risk Management or Professional Core in Statistics:

Major in Decision Analytics
Major in Risk Management
Major in Statistics
Minor in Risk Management
Minor in Statistics

MAJORS AND MINORS (2025-26 INTAKE AND THEREAFTER)**Major in Decision Analytics (96 credits)**Disciplinary Core Courses at Introductory Level (48 credits)

Course code	Course	No. of credits
COMP1117	Computer Programming	6
COMP2113	Programming Technologies	6
COMP2118	Data Structures and Algorithms Essentials	6
MATH1013	University Mathematics II	6
MATH2014	Multivariable Calculus and Linear Algebra	6
SDST1600	Statistics: Ideas and Concepts	6
SDST2601	Probability and Statistics I	6
SDST2602	Probability and Statistics II	6

Note: Students who have completed MATH2014 to fulfil the requirement of their primary major should apply for course replacement with MATH2101 and MATH2211 in lieu.

Disciplinary Core Courses at Advanced Level (30 credits)

Course code	Course	No. of credits
MATH3900	Optimization for AI and Data Analytics	6
SDST3600	Linear Statistical Analysis	6
SDST3612	Statistical Machine Learning	6
SDST4609	Big Data Analytics	6
SDST4611	High-Dimensional Statistical Learning	6

Disciplinary Elective Courses at Advanced Level (12 credits)

At least 12 credits selected from the following courses:

Course code	Course	No. of credits
COMP3251	Algorithm Design	6
COMP3252	Algorithm Design and Analysis	6
COMP3278	Introduction to Database Management Systems	6
COMP3407	Scientific Computing	6
SDST3620	Modern Nonparametric Statistics	6
SDST3621	Statistical Data Analysis	6
SDST3622	Data Visualization	6
SDST4011	Natural Language Processing	6
SDST4023	Medical Image Analysis	6
SDST4601	Time-Series Analysis	6
SDST4602	Multivariate Data Analysis	6
SDST4610	Bayesian Learning	6
SDST4612	Interpretable Machine Learning	6
SDST4613	Causal Inference	6

Capstone Experience Courses (6 credits)

At least 6 credits selected from the following courses:

Course code	Course	No. of credits
SDST3799	Directed Studies in Statistics	6
SDST4710	Capstone Experience for Statistics Undergraduates	6
SDST4766	Statistics Internship	6
SDST4799	Statistics Project	12

Impermissible Combinations

The Major in Decision Analytics is not offered to students reading the following programmes/majors/minors:

Bachelor of Arts and Sciences in Applied Artificial Intelligence
 Bachelor of Engineering in Artificial Intelligence and Data Science
 Bachelor of Engineering in Computer Science
 Bachelor of Engineering in Data Science and Engineering
 Bachelor of Statistics
 Major in Computer Science
 Major in Risk Management
 Major in Statistics
 Minor in Computer Science
 Minor in Statistics

Major in Risk Management (90 credits)Disciplinary Core Courses at Introductory Level (30 credits)

Course code	Course	No. of credits
MATH1013	University Mathematics II	6
MATH2014	Multivariable Calculus and Linear Algebra	6
SDST1600	Statistics: Ideas and Concepts	6
SDST2601	Probability and Statistics I	6
SDST2602	Probability and Statistics II	6

Note: Students who have completed MATH2014 to fulfil the requirement of their primary major should apply for course replacement with MATH2101 and MATH2211 in lieu.

Disciplinary Core Courses at Advanced Level (42 credits)

Course code	Course	No. of credits
SDST3600	Linear Statistical Analysis	6
SDST3609	The Statistics of Investment Risk	6
SDST3615	Practical Mathematics for Investment	6
SDST3618	Derivatives and Risk Management	6
SDST4601	Time-Series Analysis	6
SDST4607	Credit Risk Analysis	6
SDST4608	Market Risk Analysis	6

Disciplinary Elective Courses at Advanced Level (12 credits)

At least 12 credits selected from the following courses:

Course code	Course	No. of credits
SDST3602	Statistical Inference	6
SDST3603	Stochastic Processes	6
SDST3610	Risk Management and Insurance	6
SDST3612	Statistical Machine Learning	6
SDST3655	Survival Analysis	6
SDST3910	Financial Economics I	6
SDST3911	Financial Economics II	6
SDST4603	Current Topics in Risk Management	6
SDST4606	Risk Management and Basel Accords in Banking and Finance	6
SDST4610	Bayesian Learning	6
SDST4614	Quantitative Risk Management	6

Capstone Experience Courses (6 credits)

At least 6 credits selected from the following courses:

Course code	Course	No. of credits
SDST3799	Directed Studies in Statistics	6
SDST4710	Capstone Experience for Statistics Undergraduates	6
SDST4766	Statistics Internship	6
SDST4799	Statistics Project	12

Impermissible Combinations

The Major in Risk Management is not offered to students reading the following programme/majors/minors:

Bachelor of Statistics
 Major in Decision Analytics
 Major in Statistics
 Minor in Risk Management
 Minor in Statistics

Major in Statistics (90 credits)Disciplinary Core Courses at Introductory Level (30 credits)

Course code	Course	No. of credits
MATH1013	University Mathematics II	6
MATH2014	Multivariable Calculus and Linear Algebra	6
SDST1600	Statistics: Ideas and Concepts	6
SDST2601	Probability and Statistics I	6
SDST2602	Probability and Statistics II	6

Note: Students who have completed MATH2014 to fulfil the requirement of their primary major should apply for course replacement with MATH2101 and MATH2211 in lieu.

Disciplinary Core Courses at Advanced Level (42 credits)

Course code	Course	No. of credits
SDST3600	Linear Statistical Analysis	6
SDST3602	Statistical Inference	6
SDST3603	Stochastic Processes	6
SDST3620	Modern Nonparametric Statistics	6
SDST3621	Statistical Data Analysis	6
SDST4602	Multivariate Data Analysis	6
SDST4610	Bayesian Learning	6

Disciplinary Elective Courses at Advanced Level (12 credits)

At least 12 credits selected from the following courses:

Course code	Course	No. of credits
SDST3021	Modern Biostatistics	6
SDST3604	Design and Analysis of Experiments	6
SDST3606	Business Logistics	6
SDST3607	Statistics in Clinical Medicine and Bio-medical Research	6
SDST3608	Statistical Genetics	6
SDST3612	Statistical Machine Learning	6
SDST3613	Marketing Analytics	6
SDST3617	Sample Survey Methods	6
SDST3655	Survival Analysis	6
SDST4601	Time-Series Analysis	6
SDST4611	High-Dimensional Statistical Learning	6
SDST4613	Causal Inference	6

Capstone Experience Courses (6 credits)

At least 6 credits selected from the following courses:

Course code	Course	No. of credits
SDST3799	Directed Studies in Statistics	6
SDST4710	Capstone Experience for Statistics Undergraduates	6
SDST4766	Statistics Internship	6
SDST4799	Statistics Project	12

Impermissible Combinations

The Major in Statistics is not offered to students reading the following programme/majors/minors:

Bachelor of Statistics
 Major in Decision Analytics
 Major in Risk Management
 Minor in Risk Management
 Minor in Statistics

Minor in Risk Management (48 credits)Disciplinary Elective Courses at Introductory Level (24 credits)

At least 24 credits selected from the following courses:

Course code	Course	No. of credits
MATH1013	University Mathematics II	6
MATH2014	Multivariable Calculus and Linear Algebra	6
SDST1018	Foundations of Data Science	6
SDST1600	Statistics: Ideas and Concepts	6
SDST2601	Probability and Statistics I	6
SDST2602	Probability and Statistics II	6
SDST2604	Introduction to R/Python Programming and Elementary Data Analysis	6

Note: Students who have completed MATH2014 to fulfil the requirement of their primary major should apply for course replacement with MATH2101 and MATH2211 in lieu.

Disciplinary Elective Courses at Advanced Level (24 credits)

At least 24 credits selected from the following courses:

Course code	Course	No. of credits
SDST3600	Linear Statistical Analysis	6
SDST3609	The Statistics of Investment Risk	6
SDST3610	Risk Management and Insurance	6
SDST3615	Practical Mathematics for Investment	6
SDST3618	Derivatives and Risk Management	6
SDST4601	Time-Series Analysis	6
SDST4603	Current Topics in Risk Management	6
SDST4606	Risk Management and Basel Accords in Banking and Finance	6
SDST4607	Credit Risk Analysis	6
SDST4608	Market Risk Analysis	6
SDST4614	Quantitative Risk Management	6

Impermissible Combinations

The Minor in Risk Management is not offered to students reading the following programme/majors/minor:

Bachelor of Statistics
Major in Risk Management
Major in Statistics
Minor in Statistics

Minor in Statistics (48 credits)Disciplinary Elective Courses at Introductory Level (24 credits)

At least 24 credits selected from the following courses:

Course code	Course	No. of credits
MATH1013	University Mathematics II	6

MATH2014	Multivariable Calculus and Linear Algebra	6
SDST1018	Foundations of Data Science	6
SDST1600	Statistics: Ideas and Concepts	6
SDST2601	Probability and Statistics I	6
SDST2602	Probability and Statistics II	6
SDST2604	Introduction to R/Python Programming and Elementary Data Analysis	6

Note: Students who have completed MATH2014 to fulfil the requirement of their primary major should apply for course replacement with MATH2101 and MATH2211 in lieu.

Disciplinary Elective Courses at Advanced Level (24 credits)

At least 24 credits selected from the following courses:

Course code	Course	No. of credits
SDST3021	Modern Biostatistics	6
SDST3600	Linear Statistical Analysis	6
SDST3602	Statistical Inference	6
SDST3603	Stochastic Processes	6
SDST3604	Design and Analysis of Experiments	6
SDST3606	Business Logistics	6
SDST3607	Statistics in Clinical Medicine and Bio-medical Research	6
SDST3608	Statistical Genetics	6
SDST3612	Statistical Machine Learning	6
SDST3613	Marketing Analytics	6
SDST3617	Sample Survey Methods	6
SDST3620	Modern Nonparametric Statistics	6
SDST3621	Statistical Data Analysis	6
SDST3655	Survival Analysis	6
SDST4601	Time-Series Analysis	6
SDST4602	Multivariate Data Analysis	6
SDST4610	Bayesian Learning	6
SDST4611	High-Dimensional Statistical Learning	6
SDST4613	Causal Inference	6

Impermissible Combinations

The Minor in Statistics is not offered to students reading the following programme/majors/minor:

Bachelor of Statistics
Major in Decision Analytics
Major in Risk Management
Major in Statistics
Minor in Risk Management

DESCRIPTION FOR UNDERGRADUATE COURSES OFFERED BY THE SCHOOL OF COMPUTING AND DATA SCIENCE

The courses listed below may not be offered every year. The content and assessment of individual courses may be subject to adjustment upon review each academic year. Students should refer to the most up-to-date course outlines as distributed by individual course coordinators.

For the description of courses offered outside the School of Computing and Data Science, please refer to the syllabuses of the respective programmes in the corresponding teaching departments.

INTRODUCTORY LEVEL COURSES

COMP1117 Computer Programming (6 credits)

This is an introductory course in computer programming. Students will acquire basic Python programming skills, including syntax, identifiers, control statements, functions, recursions, strings, lists, dictionaries, tuples and files. Searching and sorting algorithms, such as sequential search, binary search, bubble sort, insertion sort and selection sort, will also be covered.

Assessment: 50% continuous assessment and 50% examination

COMP2113 Programming Technologies (6 credits)

This course covers intermediate to advanced computer programming topics on various technologies and tools that are useful for software development. Topics include Linux shell commands, shell scripts, C/C++ programming, and separate compilation techniques and version control. This is a self-learning course; there will be no lecture and students will be provided with self-study materials. Students are required to complete milestone-based self-assessment tasks during the course. This course is designed for students who are interested in Computer Science / Computer Engineering.

Assessment: 70% continuous assessment and 30% examination

COMP2118 Data Structures and Algorithms Essentials (6 credits)

This course covers essential concepts in data structures and algorithms including arrays, linked lists, trees and graphs, stacks and queues, priority queues, balanced trees, sorting algorithms and basic complexity analysis. This course is designed for students interested in pursuing a minor in Computer Science or those from different disciplines seeking prerequisite knowledge for other CS courses. (Note: This course is not for students majoring in Computer Science/Artificial Intelligence and Data Science/Applied AI.)

Assessment: 40% continuous assessment and 60% examination

SDST1018 Foundations of Data Science (6 credits)

The course introduces basic concepts and methodology of data science to junior undergraduate students. The teaching is designed at a level appropriate for all undergraduate students with various backgrounds and without pre-requisites.

Students will engage in a full data work-flow including collaborative data science projects. They will study a full spectrum of data science topics, from initial investigation and data acquisition to the communication of final results.

Specifically, the course provides exposure to different data types and sources, and the process of data curation for the purpose of transforming them to a format suitable for analysis. It introduces elementary notions in estimation, prediction and inference. Case studies involving less-manicured data are discussed to enhance the computational and analytical abilities of the students.

Assessment: 100% continuous assessment

SDST1600 Statistics: Ideas and Concepts (6 credits)

The course aims at providing a broad overview of statistics for students who aspire to major in Decision Analytics, Risk Management or Statistics. It focuses on the roles of statistics as a scientific tool with applications to a wide spectrum of disciplines, and as a science of reasoning which has revolutionized modern intellectual endeavours. It lays a panoramic foundation for a formal study of statistics at the university level.

Assessment: 60% continuous assessment and 40% examination

SDST2601 Probability and Statistics I (6 credits)

The discipline of statistics is concerned with situations in which uncertainty and variability play an essential role and forms an important descriptive and analytical tool in many practical problems. Against a background of motivating problems this course develops relevant probability models for the description of such uncertainty and variability.

Assessment: 40% continuous assessment and 60% examination

SDST2602 Probability and Statistics II (6 credits)

This course builds on SDST2601, introducing further the concepts and methods of statistics. Emphasis is on the two major areas of statistical analysis: estimation and hypothesis testing. Through the disciplines of statistical modelling, inference and decision making, students will be equipped with both quantitative skills and qualitative perceptions essential for making rigorous statistical analysis of real-life data.

Assessment: 40% continuous assessment and 60% examination

SDST2604 Introduction to R/Python Programming and Elementary Data Analysis (6 credits)

This course is designed to provide a first-level introduction to Python programming for statistics. This course focuses on learning the basic programming skills in Python with

examples and applications in elementary statistical analysis. The programming skills involved can be applied to input and output of data sets, work with different data types, manipulation and transformation of data, random sampling, descriptive data analysis, and production of professional summary reports with high-quality graphs.

Assessment: 100% continuous assessment

ADVANCED LEVEL COURSES

COMP3251 Algorithm Design (6 credits)

The course introduces various algorithm design techniques, including divide and conquer, greedy, and dynamic programming, and studies selected topics on graph algorithms. These techniques can be used to design better algorithms in various areas of computer science. The course also gives an overview of NP-complete problems.

Assessment: 50% continuous assessment and 50% examination

COMP3252 Algorithm Design and Analysis (6 credits)

The course studies principles of algorithm design and the analysis of sophisticated algorithms (regarding proof of correctness and time complexity). Topics include divide-and-conquer, dynamic programming, greedy algorithms, graph algorithms, network flow, geometric algorithms, and NP-completeness. The course puts emphasis on mathematical rigor; it expects students to figure out the mathematics and logic that make algorithms work. Students can form pairs to discuss the assignments and are required to write rigorous proofs of correctness and analysis independently.

Assessment: 50% continuous assessment and 50% examination

COMP3278 Introduction to Database Management Systems (6 credits)

This course studies the principles, design, administration, and implementation of database management systems. Topics include: entity-relationship model, relational model, relational algebra, database design and normalization, database query languages, indexing schemes, integrity and concurrency control.

Assessment: 50% continuous assessment and 50% examination

COMP3407 Scientific Computing (6 credits)

This course provides an overview and covers the fundamentals of scientific and numerical computing. It focuses on topics in numerical analysis and computation, with discussions on applications of scientific computing.

Assessment: 50% continuous assessment and 50% examination

SDST3021 Modern Biostatistics (6 credits)

This course is designed to introduce students the state-of-the-art study designs and statistical analysis methods in biomedical studies including randomized and observational studies, Bayesian inference, phase II and phase III clinical trials and adaptive designs.

Assessment: 40% continuous assessment and 60% examination

SDST3600 Linear Statistical Analysis (6 credits)

The analysis of variability is mainly concerned with locating the sources of the variability. Many statistical techniques investigate these sources through the use of 'linear' models. This course presents the theory and practice of these models.

Assessment: 40% continuous assessment and 60% examination

SDST3602 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 solid and rigorous treatment of inferential problems, statistical methodologies and the underlying concepts and theory. It is suitable in particular for students intending to further their studies or to develop a career in statistical research.

Assessment: 40% continuous assessment and 60% examination

SDST3603 Stochastic Processes (6 credits)

This is an introductory course in stochastic processes. It will cover the basic concepts of the theory of stochastic processes and explore different types of stochastic processes including Markov chains, Poisson processes and Brownian motions.

Assessment: 40% continuous assessment and 60% examination

SDST3604 Design and Analysis of Experiments (6 credits)

Scientific research often requires proper design and analysis of experiments. This course aims to introduce the basic principles of experimental design; to explain the concepts and to develop the statistical skills in model-based analysis of experiment.

Assessment: 25% continuous assessment and 75% examination

SDST3606 Business Logistics (6 credits)

Modern business corporations are increasingly using logistics as a management tool, for example, in capital budgeting problems, production planning, scheduling, transportations and deciding location for a new factory. This course addresses the business applications of logistics.

Assessment: 100% continuous assessment

SDST3607 Statistics in Clinical Medicine and Bio-medical Research (6 credits)

In clinical research, medical data are often observed which motivates the application of statistical methodology to the clinical observational and decision-making process. Also, statistical problems often arise from clinical trial designs. It involves phase I, II, III and IV clinical trial designs, both Bayesian and frequentist approaches, sample size and power calculation. No knowledge in biology or medicine is assumed; the course provides the necessary biomedical background when the statistical problems are introduced.

Assessment: 25% continuous assessment and 75% examination

SDST3608 Statistical Genetics (6 credits)

This course aims to provide students with a fundamental knowledge of DNA profiling in human identification and genetic epidemiology in gene mapping and to understand how statistical theory and methods are applied to solve forensic DNA and genetic problems.

Assessment: 25% continuous assessment and 75% examination

SDST3609 The Statistics of Investment Risk (6 credits)

Most investments involve some risk. The decision to invest or not is usually made against a background of uncertainty. Whilst prediction of the future is difficult, there are statistical modelling techniques which provide a rational framework for investment decisions, particularly those relating to stock markets and the markets for interest rates, commodities and currencies. Building upon research, both in Hong Kong and abroad, this course presents the prevailing statistical theories for prices and price-change in these vital markets.

Assessment: 40% continuous assessment and 60% examination

SDST3610 Risk Management and Insurance (6 credits)

This course provides knowledge on basic risk and its management, as well as basic financial planning through insurance products, to students. It allows students to understand the statistical, financial and legal principles underlying the techniques for managing the insurable risks faced by organisations and individuals. This course aims at students who have minimal background in quantitative methods, it involves very minimal quantitative calculations.

Assessment: 25% continuous assessment and 75% examination

SDST3612 Statistical Machine Learning (6 credits)

Machine learning is the study of computer algorithms that build models of observed data in order to make predictions or decisions. Statistical machine learning emphasizes the importance of statistical methodology in the algorithmic development. This course provides a comprehensive and practical coverage of essential machine learning

concepts and a variety of learning algorithms under supervised and unsupervised settings.

Assessment: 100% continuous assessment

SDST3613 Marketing Analytics (6 credits)

This course is designed to provide an overview and practical application of trends, technology and methodology used in the marketing survey process including problem formulation, survey design, data collection and analysis, and report writing. Special emphasis will be put on statistical techniques particularly for analysing marketing data including market segmentation, market response models, consumer preference analysis and conjoint analysis. Students will analyse a variety of marketing case studies.

Assessment: 50% continuous assessment and 50% examination

SDST3615 Practical Mathematics for Investment (6 credits)

This course introduces the fundamental concepts of financial mathematics which plays an important role in the development of basic actuarial techniques. Practical applications of these concepts are also covered.

Assessment: 50% continuous assessment and 50% examination

SDST3617 Sample Survey Methods (6 credits)

This course will cover design and implementation of sample surveys and analysis of statistical data thus obtained. Survey design includes overall survey design, design of sampling schemes and questionnaires, etc. Sampling methods include sample size determination, sampling and non-sampling errors and biases, methods of estimation of parameters from survey data, imputation for missing data etc.

Assessment: 50% continuous assessment and 50% examination

SDST3618 Derivatives and Risk Management (6 credits)

Nowadays all risk managers must be well versed in the use and valuation of derivatives. The two basic types of derivatives are forwards (having a linear payoff) and options (having a non-linear payoff). All other derivatives can be decomposed to these underlying payoffs or alternatively they are variations on these basic ideas. This course aims at demonstrating the practical use of financial derivatives in risk management. Emphases are on pricing and hedging strategies, and the no-arbitrage principle.

Assessment: 40% continuous assessment and 60% examination

SDST3620 Modern Nonparametric Statistics (6 credits)

The course aims to acquaint students with the fundamentals, basic properties and use of classical and modern nonparametric statistical methods for data analysis.

Assessment: 50% continuous assessment and 50% examination

SDST3621 Statistical Data Analysis (6 credits)

Building on prior coursework in statistical methods and modeling, students will gain a deeper understanding of the entire process of data analysis, using both frequentist and Bayesian tools. The course aims to develop skills of model selection and hypotheses formulation so that questions of interest can be properly formulated and answered. An important element deals with model review and improvement, when one's first attempt does not adequately fit the data. Students will learn how to explore the data, build reliable models, and communicate the results of data analysis to a variety of audiences. Assessment: 50% continuous assessment and 50% examination

SDST3622 Data Visualization (6 credits)

This course will focus on how to work with statistical graphics, graphics that display statistical data, to communicate and analyze data. Students will learn a set of tools such as R to create these graphics and critically evaluate them. Assessment: 100% continuous assessment

SDST3655 Survival Analysis (6 credits)

This course is concerned with how models which predict the survival pattern of humans or other entities are established. This exercise is sometimes referred to as survival-model construction. Assessment: 40% continuous assessment and 60% examination

SDST3910 Financial Economics I (6 credits)

This course is on option pricing and hedging. The course will concentrate on the theory and idea of derivatives pricing and risk management. Assessment: 25% continuous assessment and 75% examination

SDST3911 Financial Economics II (6 credits)

This course is an advanced course on the option pricing theory. The course covers Black-Scholes equation and stochastic calculus, and interest models. Assessment: 60% continuous assessment and 40% examination

SDST4011 Natural Language Processing (6 credits)

Natural language processing (NLP) is a subfield of artificial intelligence, focusing on understanding human language. In essence, NLP is interested in building a tool that can use language like humans. This course will introduce the mathematical, statistical and

computational challenges in natural language processing. It covers main applications of NLP techniques and a range of models in structured prediction and deep learning. In this course, students will gain a thorough introduction to cutting-edge machine learning and deep learning techniques for NLP.

Assessment: 100% continuous assessment

SDST4023 Medical Image Analysis (6 credits)

Medical imaging has been a critical part in modern healthcare procedures. Its primary use is to visualize the human body at different levels (e.g., at organ, tissue, cell, and molecular levels) using different imaging modalities (e.g., those in radiology, pathology, dermatology, ophthalmology, microscopy, and genetics). The objective of this course is to provide students with an overview of the machine learning and deep learning methods in medical image processing and analytics. We will study many of the current methods used to enhance and extract useful information from medical images. A variety of medical image diagnostic scenarios will be used as examples to motivate the methods.

Assessment: 50% continuous assessment and 50% examination

SDST4601 Time-Series Analysis (6 credits)

A time series consists of a set of observations on a random variable taken over time. Time series arise naturally in climatology, economics, environment studies, finance and many other disciplines. The observations in a time series are usually correlated; the course establishes a framework to discuss this. This course distinguishes different type of time series, investigates various representations for the processes and studies the relative merits of different forecasting procedures. Students will analyse real time-series data on the computer.

Assessment: 40% continuous assessment and 60% examination

SDST4602 Multivariate Data Analysis (6 credits)

In many designed experiments or observational studies, the researchers are dealing with multivariate data, where each observation is a set of measurements taken on the same individual. These measurements are often correlated. The correlation prevents the use of univariate statistics to draw inferences. This course develops the statistical methods for analysing multivariate data through examples in various fields of application and hands-on experience with the statistical software SAS.

Assessment: 50% continuous assessment and 50% examination

SDST4603 Current Topics in Risk Management (6 credits)

This course aims to broaden students' knowledge in risk management theories through in-depth financial case studies analysis. The various risk measures are demonstrated and discussed with the application of the financial theories covered in the core courses. The topics offered each year depend on current financial issues related to the risk

management's perspective. To strengthen presentation skills in public speaking and presentation; quick response to dynamic financial news and be able to process risk management analysis. Students work in rotating groups to prepare and present cases.
Assessment: 100% continuous assessment

SDST4606 Risk Management and Basel Accords in Banking and Finance (6 credits)

To provide comprehensive knowledge and in-depth understanding of risk management in the banking and finance industry to students. The focus is on management with basic measurement fundamentals only forming a part of the course. Accordingly, minimal background in quantitative methods will be required and involved. However, basic financial product (eg: bonds, swaps, options) knowledge will be required.
Assessment: 40% continuous assessment and 60% examination

SDST4607 Credit Risk Analysis (6 credits)

Credit risk has always been a significant financial risk in the banking industry. It is related to the possibility of loss arising from defaults on debts, swaps, or other counterparty instruments. Credit risk may also result from a change in the value of an asset resulting from a change in the counterparty's creditworthiness. This course will introduce students to quantitative models for measuring and managing credit risk. It also aims to provide students with an understanding of the credit risk methodology used in the financial industry and the regulatory framework in which the credit risk models operate.
Assessment: 40% continuous assessment and 60% examination

SDST4608 Market Risk Analysis (6 credits)

Financial risk management has experienced a revolution in the last decade thanks to the introduction of new methods for measuring risk, particularly Value-at-Risk (VaR). This course introduces modern risk management techniques covering the measurement of market risk using VaR models and financial time series models, and stress testing.
Assessment: 50% continuous assessment and 50% examination

SDST4609 Big Data Analytics (6 credits)

In the past decade, huge volume of data with highly complicated structure has appeared in every aspect, such as social web logs, e-mails, video, speech recordings, photographs, tweets and others. The efficient extraction of valuable information from these data sources becomes a challenging task. This course focuses on the practical knowledge and skills of some advanced analytics and statistical modeling for solving big data problems.
Assessment: 100% continuous assessment

SDST4610 Bayesian Learning (6 credits)

This course will provide a comprehensive introduction to the Bayesian framework for statistical inference. Students will learn how to apply advanced simulation techniques for posterior computation, which also have wider applications within statistics. This course is particularly suitable for students who intend to pursue further studies or a career in research.

Assessment: 50% continuous assessment and 50% examination

SDST4611 High-Dimensional Statistical Learning (6 credits)

This course will provide a comprehensive introduction to high-dimensional statistics. Students will learn practical techniques and concepts for handling statistical estimation and inference when faced with large number of variables. These skills are essential for students working with large data sets.

Assessment: 50% continuous assessment and 50% examination

SDST4612 Interpretable Machine Learning (6 credits)

This course focuses on the interpretability of machine learning methods. In this course, students will first revisit classic statistical learning models with a focus on interpretability. They will then learn model-agnostic methods that help explain general machine learning models, and explore current progress in interpreting neural networks. Through a combination of lectures, case studies, and hands-on exercises, students will gain the necessary skills to apply these principles to real-world problems.

Assessment: 100% continuous assessment

SDST4613 Casual Inference (6 credits)

This course will provide a rigorous introduction to modern causal inference. Students will learn how to define and identify causal effects from data, and avoid common pitfalls and misconceptions when drawing causal conclusions. The course will have a strong focus on statistical estimation, and equip students with practical tools to answer causal questions. This course is particularly suitable for students who intend to pursue further studies or a career in statistical and epidemiological research.

Assessment: 40% continuous assessment and 60% examination

SDST4614 Quantitative Risk Management (6 credits)

This course covers more in-depth topics in quantitative risk management including risk measures, copulas and dependence, risk aggregation and capital allocation, dynamic portfolio management and advanced topics in extreme value theory. Students having foundation knowledge in elementary risk modelling can advance to this course to further their study in quantitative risk analysis.

Assessment: 40% continuous assessment and 60% examination

SDST7609 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. Assessment: 40% continuous assessment and 60% examination

SDST7610 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. Assessment: 40% continuous assessment and 60% examination

CAPSTONE EXPERIENCE COURSES

SDST3799 Directed Studies in Statistics (6 credits)

The student undertakes a self-managed study on a topic in statistics under the supervision of a staff member. The topic is preferably one not sufficiently covered in the regular curriculum. The directed study can be a critical review or a synthesis of published work on the subject, or a laboratory or field study that would enhance students' understanding of the subject. The project may not require an element of originality. Assessment: 100% continuous assessment

SDST4710 Capstone Experience for Statistics Undergraduates (6 credits)

This project-based course aims to provide students with capstone experience to formulate and investigate real life problems in the area of statistics, risk management, finance, climate, social science, medicine and scientific research by integrating and applying the statistical theories and quantitative techniques learnt in their junior university years. Assessment: 100% continuous assessment

SDST4766 Statistics Internship (6 credits)

This course is offered to BStat students and students majoring in Decision Analytics/Risk Management/Statistics who take on a minimum of 160 hours of internship work related to their major disciplines. It provides students with first-hand experience in the applications of academic knowledge in a real-life work environment. Assessment: 100% continuous assessment

SDST4799 Statistics Project (12 credits)

Each year a number of projects suitable for BStat students and students majoring in Decision Analytics/Risk Management/Statistics will be offered to provide students with practical experience in approaching a real problem, in report writing and in oral presentation.

Assessment: 100% continuous assessment
