MATH 1570 Advanced Calculus (3,3,0)
Prerequisite: Year I standing
This course gives students fundamental mathematical knowledge in a wide variety of areas including vector algebra, vector differentiation and integration, as well as an introduction to baisc linear algebra.

MATH 1590 Calculus and Linear Algebra for Chemistry (3,3,0)
This course introduces topics in linear algebra, mathematical analysis and differential equations. Applications to chemistry are provided.

MATH 1680 Manage your Money without Formulas (3,3,0)
This course is intended to introduce basic growth models to fancy and complicated annuity models. Formulas are useful only for regular patterns, however, that is not what going on around us. Students will explore a sequence of financial problems with Hong Kong daily life examples in order to improve their sensitivity to numbers and helps them take control of their financial situations.

MATH 1690 Mathematics of Fairness (3,3,0)
This course is intended to introduce how mathematics can help in searching for procedures to ensure a fair and equitable resolution of conflicts. It will provide students with skills and concepts to identify, model and solve social problems. Hong Kong social issues will be used as examples in order to enhance students' interests.

MATH 1710 Numbers Save the Day (3,3,0)
Every time we use computer or make a telephone call, we use devices that rely on numbers to operate. Numbers play many roles in our everyday lives, it is used to describe the natural world, to communicate information, and to model important daily applications. This course shows how the study of numbers and their properties make all these roles possible.

MATH 1720 Speaking of Statistics (3,3,0)
Misuse and mislead of statistical arguments are commonly found in Hong Kong. This course introduces ways to present data in proper statistical sense. The objective of this course is to teach students to develop the statistical thinking, and to apply critical thinking skills effectively to their reading, writing, and even learning.

MATH 2110 Differential Equations (3,2,1)
Prerequisite: MATH 1120 Linear Algebra
This course aims to introduce students to the basic theory of ordinary
differential equations and the modelling of diverse practical phenomena by ordinary differential equations by a variety of examples. Students will learn both quantitative and qualitative methods for solving these equations. Topics include first and second order differential equations, linear systems of first order differential equations, autonomous systems of differential equations, existence and uniqueness theorem and Laplace transform to initial value problem.

MATH 2130 Real Analysis (3,3,0)
Prerequisite: MATH 1111 Mathematical Analysis I
This course provides an introduction to measure theory, Lebesgue integration, L^P spaces, and Fourier analysis. Equipped with this knowledge, students are prepared for further studies in numerical analysis, functional analysis and advanced probability theory.

MATH 2140 Numerical Methods I (3,3,0)
Prerequisite: Year II standing
This course provides students with the ideas underlying commonly used numerical methods. It teaches students how to choose an appropriate numerical method for a particular problem and to interpret the resulting output. It also highlights important considerations on convergence and stability for numerical algorithm design.

MATH 2150 Mathematical Analysis III (3,3,0)
Prerequisites: MATH 1111-2 Mathematical Analysis I & II
(MATH 1120 Linear Algebra is not required but recommended)
This course deals with vectors calculus. It provides basic concept on several variables real-valued functions. Topics include sequences in space, limit and continuity, differentiation, Riemann integrals, multiple integrals, line integrals and surface integrals.

MATH 2160 Mathematical and Statistical Software (3,1,2)
Prerequisite: COMP 1170 Structured Programming
This course teaches students how to use some popular software packages for solving problems in various areas of mathematics, statistics and operations research. Examples of software packages that may be covered are MATLAB, SAS, S-plus, LINDO, and Latex. Students will learn both how to use these software packages to efficiently to solve the related problems and how to interpret the results. Such knowledge should be useful for students' course work, projects and future careers.

MATH 2220 Partial Differential Equations (3,3,0)
Prerequisites: MATH 1111 Mathematical Analysis I and MATH 2110 Differential Equations
This course treats the theory and solution techniques for partial differential equations appearing in physics, biology, chemistry and social sciences.

MATH 2230 Operations Research I (3,3,0)
Prerequisite: MATH 1120 Linear Algebra
This course aims to introduce students some fundamental topics in operations research. Students will learn theory, techniques and applications of linear programming, network programmes, dynamic programming and inventory control problems.

MATH 2610 Graph Theory (3,3,0)
Prerequisite: Year II standing
This course covers some fundamental concepts and principles of graph theory. Some algorithms of graphs are also discussed. Students will learn some techniques to solve some graph problems.

MATH 2630 Number Theory (3,3,0)
Prerequisite: Year II standing
This course will provide an introduction to the theory of numbers. Basic concept such as divisibility, congruence, diophantine equations will be covered. Some applications such as cryptography will be introduced.

MATH 3591 Mathematical Science Project I (3,0,9)
Prerequisite: Year III standing
This is a half-year individual project which usually relates to an interdisciplinary or applied topic, and requires knowledge and skill acquired in various courses. A thesis and an oral presentation are required upon completion of the project.

MATH 3592 Mathematical Science Project II (3,0,9)
Prerequisites: MATH 3591 Mathematical Science Project I and Recommendation by the supervisor
This is an extension of MATH 3591 for outstanding students, who are now supposed to conduct more innovative further developments for their results obtained in MATH 3591. A thesis and an oral presentation for Project I are waived but will be required upon completion of Project II.

MATH 3620 Numerical Methods II (3,3,0)
Prerequisite: MATH 2140 Numerical Methods I
As a continuation of MATH 2140 Numerical Methods I, this course covers techniques for numerical solution of mathematical problems. Students are introduced to widely-used computer software packages. At the same time the underlying ideas of algorithms are taught.

MATH 3640 Theoretical Numerical Analysis (3,3,0)
Prerequisite: MATH 2140 Numerical Methods I
This course provides a theoretical understanding of the major

ideas of numerical analysis. Emphasis is placed on the study of underlying principles, error bounds, convergence theorems, etc. in the area of numerical analysis.

MATH 3650 Topology (3,3,0)
Prerequisites: MATH 1111-2 Mathematical Analysis I & II
This course covers the essential concepts of topological spaces. Important topological properties are also taught to lay the ground work for further studies.

MATH 3660 Operations Research II (3,3,0)
Prerequisite: MATH 1120 Linear Algebra
This course aims to introduce students to some fundamental and advanced topics in operations research. Students will learn theory, techniques, and applications of integer programming, queuing theory, Markov decision process, and nonlinear programming.

MATH 3670 Differential Geometry (3,3,0)
Prerequisites: MATH 1120 Linear Algebra and MATH 2110 Differential Equations
This course teaches students the mathematical tools of classical differential geometry. Applications to curve and surface designs are also given.

MATH 3680 Applied Functional Analysis (3,3,0)
Prerequisites: MATH 1111-2 Mathematical Analysis I & II, MATH 1120 Linear Algebra, and MATH 2130 Real Analysis
This course aims at familiarizing the student with the basic concepts, principles and methods of functional analysis and its applications. Functional analysis plays an important role in the applied sciences as well as in mathematics itself. Roughly speaking, functional analysis develops the tools from calculus and linear algebra further to the more general setting where one has vector spaces comprising functions or general abstract infinite-dimensional vector spaces. Problems from various application areas can then be conveniently posed in this common general set up, and solved using the techniques of functional analysis. The basic objects studied in functional analysis are vector spaces with a notion of distance between vectors, and continuous maps between such vector spaces. This interplay between the algebraic and analytic setting gives rise to many interesting and useful results, which have a wide range of applicability to diverse mathematical problems, such as from numerical analysis, differential and integral equations, optimization and approximation theory.

MATH 3720 Complex Analysis (3,3,0)
Prerequisites: MATH 1111-2 Mathematical Analysis I & II
This course provides an up-to-date introduction to the basic theory of analytic functions of one complex variable. Residue Theorem and its applications to the evaluation of integrals and sums will be one of the main objectives. Also conformal mappings and their applications will be discussed.

MATH 3760 Abstract Algebra (3,3,0)
Prerequisite: MATH 1120 Linear Algebra
This course covers some properties of groups, rings and fields. Permutations groups and polynomial rings are included. Application of permutation group on counting and application of finite field on error correcting code are included.

MATH 3780 Geometries: Theory and Applications (3,3,0)
Prerequisite: Year III standing
The study of geometry has come a long way since the brilliant work in Euclid's Elements. This course aims at enhancing students' understanding and appreciation of the salient branches of geometry, including the development and applications of Euclidean and non-Euclidean geometries, differential geometry, and fractals.

MATH 3830 Numerical Linear Algebra (3,3,0)
Prerequisites: MATH 1120 Linear Algebra, MATH 2140 Numerical Methods I
This course aims to provide a thorough discussion of the advanced topics and state of art development in numerical linear algebra. This subject emphasizes on both the theoretical analysis and the computer applications of numerical linear algebra in various areas.

MATH 3840 Numerical Analysis of Delay Differential and Volterra Function Equations (3,3,0)
Prerequisites: MATH 1120 Linear Algebra and MATH 2140 Numerical Methods I or consent of the instructor
This course will provide a thorough introduction to the numerical analysis and the computational solution of functional differential and integral equations with delay (or retarded) arrangements. Starting with a brief review of the basic theory of delay differential and more general Volterra functional equations, it will lead the students to the current "state of the art" in this very active area of numerical analysis.

MATH 3850 Optimization Theory and Techniques (3,3,0)
Prerequisite: Year II or Year III standing, or consent of the instructor
This course aims to provide the fundamental theory and techniques in unconstrained and constrained optimization, to introduce some existing numerical software packages, and to offer some interdisciplinary techniques and applications related to optimization.

MATH 3980 Special Topics in Mathematics (3,3,0)
This course is devoted to the study of up-to-date and important topics in different areas of applied mathematics. Emphasis is laid on the continuation and consolidation of those fundamental applied courses offered in the programme. It is specifically designed with the flexibility to take advantage of visiting scholars from other institutions to introduce topics that are under current research.

MATH 3990 Advanced Topics in Mathematics (3,3,0)
This course is devoted to the study of up-to-date and important topics in different areas of applied mathematics. Emphasis is laid on the continuation and consolidation of those fundamental applied courses offered in the programme. It is specifically designed with the flexibility to take advantage of visiting scholars from other institutions to introduce topics that are under current research.

MATH 7010 Topics in Graph Theory (3,3,0)
Prerequisite: Postgraduate standing or consent of instructor
This course provides fundamental concepts and principles of graph theory to students who might be interested to pursue research in that field, or to graduate students who wants exposure to graph theory. It will give a survey on recent results and possible research directions. While graduate standing in Mathematics or related area may find this subject useful.

MATH 7020 Finite Element Methods (3,3,0)
Prerequisite: Postgraduate standing or consent of instructor
To introduce the concepts of finite element methods, typical elements in engineering applications, demonstrate the use of software packages, and to introduce the convergence theory of the finite element method.

MATH 7030 Numerical Linear Algebra (3,3,0)
Prerequisite: Postgraduate standing or consent of instructor
This course covers the advanced topics in numerical linear algebra. Theoretical issues as well as practical computer applications will be addressed.

MATH 7050 Optimization Theory and Techniques (3,3,0)
Prerequisite: Postgraduate standing or consent of instructor
This course introduces the fundamental theory and techniques for both unconstrained and constrained optimization. Overview of the existing numerical software packages will be addressed.