MATH 2207   Linear Algebra   (3,3,1) (E)
Introduction to linear equations, matrices, determinants, vector spaces and linear transformations, bases, inner products, orthogonality, eigenvalues and eigenvectors, diagonalization, least squares problems and other applications. The course emphasizes matrix and vector calculations and applications.

MATH 2215   Mathematical Analysis   (3,3,1) (E)
Prerequisite: MATH 1005 Calculus or MATH 1006 Advanced Calculus I or MATH 1205 Discrete Mathematics (*recommended*)
This course places its main weight on mathematical analysis with using $\varepsilon-\delta$ argument s an introduction to proofs. It pays special attention to developing the students' ability to read and write proofs. Covered materials include sets and functions, real numbers, open and closed sets, limits of sequences and series, limits and continuity of functions, infinite series, and sequences.

MATH 2216   Statistical Methods and Theory   (3,3,1) (E)
Prerequisite: MATH 1005 Calculus or HKDSE Mathematics with Module 1/2, MATH 2207 Linear Algebra or MATH 2205 Multivariate Calculus (*recommended*)
This course deals with the elementary probability theory and the mathematical foundation of some commonly used statistical methods. First the rigorous mathematical frame of the probability theory based upon the concepts of random variables and probability distributions are introduced. The general procedures of statistical inference, such as parameter estimation, hypothesis test, analysis of variance are demonstrated with detailed discussion about their mathematical features. Students are required to comprehend the most commonly used probability distributions and their relations. Central Limit Theorem and related statistical application should be well understood. Several optimal schemes for the estimation accuracy and the hypothesis test power form another important part of the course.

MATH 2217   Advanced Calculus II   (3,3,0) (E)
Prerequisite: MATH 1006 Advanced Calculus I
This course deals with the basic theory of analysis in real-valued functions in single variable. It provides students with a good foundation for more advanced courses in the mathematical science major. Topics include integration and series.

MATH 2220   Partial Differential Equations   (3,3,0) (E)
Prerequisite: 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) (E)
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) (E)
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 2770   Internship I   (1,0,0)
Prerequisite: Students must apply to and receive permission from the co-op coordinator preferably one semester in advance
This is a work experience programme available to students in MATH. Interested students should contact departmental advisors as early in their careers as possible, for proper counselling.

MATH 2780   Internship II   (1,0,0)
Prerequisite: MATH 2770 Internship I, and students must apply to and receive permission from the co-op coordinator preferably one semester in advance
This is a work experience programme available to students in MATH. Interested students should contact departmental advisors as early in thier careers as possible, for proper counselling.

MATH 3205   Linear and Integer Programming   (3,3,0) (E)
Prerequisite: MATH 2207 Linear Algebra
This course aims to introduce students to the fundamental topics in Linear and Integer programming. Students will learn theory, techniques and applications of linear programming and integer programming. Some modeling techniques will be also introduced for linear and integer programming. However, the interior point theory will not be covered.

MATH 3206   Numerical Methods I   (3,3,0) (E)
Prerequisite: MATH 1005 Calculus and MATH 2207 Linear Algebra
This introductory course presents students some classical and commonly used numerical methods in various disciplines involving computing and numerical approximation and solution of equations. The course teaches students how to choose an appropriate numerical method for a particular problem and to understand the advantages and limitations of the chosen numerical scheme for a given mathematical problem so that results from the computation can be properly interpreted. The course also highlights important theoretical considerations on convergence and stability for numerical algorithm design.

MATH 3285   Job Practicum I   (1,0,0)
Prerequisite: Year II or above and students must apply to and receive permission from the co-op coordinator preferably one semester in advance
This is the first time of work experience available to students in the Department of Mathematics. Interested students should contact departmental advisors as early in their careers as possible, for proper counselling.

MATH 3286   Job Practicum II   (1,0,0)
Prerequisite: MATH 3285 Job Practicum I and students must apply to and receive permission from the co-op coordinator preferably one semester in advance
This is the second time of work experience available to students in the Department of Mathematics.

MATH 3287   Job Practicum III   (1,0,0)
Prerequisite: MATH 3286 Job Practicum II and students must apply to and receive permission from the co-op coordinator preferably one semester in advance
This is the third time of work experience available to students in the Department of Mathematics.

MATH 3405   Ordinary Differential Equations   (3,3,0) (E)
Prerequisite: MATH 2215 Mathematical Analysis, MATH 2207 Linear Algebra
This course aims to introduce students to the basic theory of linear ordinary differential equations (ODE) with constant and variable coefficients and the modeling of diverse practical phenomena by ODE. Students will learn both quantitative and qualitative methods for solving these equations. Topics include first and second order scalar ODE, systems of first order ODE, autonomous systems of ODE, existence and uniqueness theorem, Laplac transform for initial value problems, regular and