MATH 1130   Discrete Structures   (3,2,1) (E)
This course addresses a variety of fundamental topics in computer science, including propositional logic, proof technique, set theory, combinatorics, graph theory, and Boolean algebra.

MATH 1140   Computational Mathematics   (3,3,0)
Prerequisite: MATH 1000 Supplementary Mathematics (Calculus and Linear Algebra) or Grade D or above in AL Pure Mathematics
This course aims to introduce Computer Science major students to the basic concepts in modern computational mathematics and its application. It provides various solid fundamental concepts and knowledge for modelling, real life application and optimization. Topics include advanced vector Algebra, number system, linear systems, various numerical methods, power method, numerical optimization and multivariable calculus. Practical applications and programming techniques are both emphasized.

MATH 1205   Discrete Mathematics   (3,3,0) (E)
This course integrates the fundamental topics in discrete mathematics and linear system. These topics, including propositional logic, proof methods, set theory, combinatorics, graph algorithms, Boolean algebra, and system of linear equations, are essential for precise processing of information.

MATH 1550   Calculus and Linear Algebra   (3,3,0)
This course introduces topics in linear algebra, mathematical analysis and differential equations. Applications to chemistry are provided.

MATH 1570   Advanced Calculus   (3,3,0) (E)
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   (3,3,0) (E)
                Chemistry**
This course introduces topics in linear algebra, mathematical analysis and differential equations. Applications to chemistry are provided.

**MATH 2005   Probability and Statistics for   (3,3,0)
                Computer Science**
Antirequisite: MATH 2006 Probability and Statistics for Science and MATH 2206 Probability and Statistics
Prerequisite: MATH 1005 Calculus; student with credit for MATH 2006 or MATH 2206 are not allowed to take MATH 2005 for further credit
This course aims to provide an understanding of the basic concepts in probability and statistical analysis, and focuses on applied probability and statistics. Students will learn the fundamental concepts of random variables, the basic concepts and techniques of parameter estimation and hypothesis testing. After taking this course, students will be able to apply the concepts to real-life IT/engineering problems and use popular statistics software to perform analysis.

**MATH 2006   Probability and Statistics for   (3,3,0) (E)
                Science**
Antirequisite: MATH 2005 Probability and Statistics for Science and MATH 2206 Probability and Statistics
Prerequisite: MATH 1005 Calculus; students with credit for MATH 2005 or MATH 2206 are not allowed to take MATH 2006 for further credit
This course aims to provide an understanding of the basic concepts in probability and statistical analysis, and focuses on applied probability and statistics. Students will learn the fundamental concepts of random variables, the basic concepts and techniques of parameter estimation and hypothesis testing. After taking this course, students will be able to apply the concepts and methods to solve different problems in Science and use popular statistics packages to perform analysis.

MATH 2110   Differential Equations   (3,3,0) (E)
Prerequisite: MATH 1111 Mathematical Analysis I, MATH 1112 Mathematical Analysis II and 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) (E)
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) (E)
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) (E)
Prerequisite: 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   (3,1,2)
                Software**
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 2205   Multivariate Calculus   (3,3,1) (E)
Prerequisite: MATH 1005 Calculus, MATH 2207 Linear Algebra or MATH 1205 Discrete Mathematics (*recommended*)
This course deals with calculus and functions of several variables. Students should know the basic concepts and technique of univariate calculus. Some knowledge on linear algebra, such as matrix notations and calculations, is preferred. Topics include partial derivative, multiple integral, and their theories and applications.

MATH 2206   Probability and Statistics   (3,3,1) (E)
Antirequisite: MATH 2005 Probability and Statistics for Science and MATH 2206 Probability and Statistics
This course deals with probability and statistical methods. The emphasis is on what, how, when and why certain probability model and statistical methods can and cannot be applied. Topics include exploratory data analysis, distributions of random variable, estimation, hypothesis testing, analysis of variance, simple linear regression and nonparametric methods. Students are required to solve a variety of problems by using calculators and statistical tables.