**MATH 3817 Dynamic Programming and Inventory Models (3,3,0) (E)**

Prerequisite: MATH 2207 Linear Algebra, MATH 2206 Probability and Statistics, MATH 3205 Linear and Integer Programming

This course introduces basic principles, classical models, popular algorithms and various applications in other fields of inventory management and dynamic programming.

**MATH 3825 Life Insurance and Life Contingencies (3,3,0) (E)**

Prerequisite: MATH 2206 Probability and Statistics or equivalent

To introduce the theory of life insurance and life contingencies with application to insurance problems. Students will learn some of the major issue in the field of actuaries.

**MATH 3826 Markov Chain and Queuing Theory (3,3,0) (E)**

Prerequisite: MATH 2207 Linear Algebra, MATH 2206 Probability and Statistics, MATH 3205 Linear and Integer Programming

This course introduces basic principles, classical models, popular algorithms and various applications in other fields of Queuing Theory and Markov Chain.

**MATH 3827 Network Models (3,3,0) (E)**

Prerequisite: MATH 2207 Linear Algebra, MATH 3205 Linear and Integer Programming

This course aims to introduce basic principles, classical models, popular algorithms and various applications in other fields of network programming.

**MATH 3830 Numerical Linear Algebra (3,3,0) (E)**

Prerequisite: 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 3835 Quality Control and Management (3,3,0)**

Prerequisite: MATH 2206 Probability and Statistics

This course aims to equip students with a variety of modern statistical methods, such as control charts, acceptance sampling plans and capability analysis, for continuing quality and productivity improvement in the manufacturing industry and service industry. Students will develop the skills necessary to decide whether or not bulk delivered services and products are of acceptable quality, to investigate the suitability of a process for performance of a given task, and to identify opportunities for immediate performance improvement. Contemporary quality management systems such as total quality control and six-sigma will be introduced.

**MATH 3840 Numerical Analysis of Delay Differential and Volterra Function Equations (3,3,0)**

Prerequisite: 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) (E)**

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 4205 Topics in Probability Theory and Stochastic Processes (3,3,0)**

Prerequisite: MATH 2205 Multivariate Calculus, MATH 2206 Probability and Statistics

This course introduces topics from conditional expectations, Markov chains, Markov processes, Brownian motion, and martingales, and their applications to stochastic calculus.

**MATH 4206 Derivatives I (3,3,0) (E)**

Prerequisite: MATH 2205 Multivariate Calculus, MATH 2206 Probability and Statistics

This course introduces the theory and practice of pricing and hedging of derivative securities. It covers equity and index, foreign currency, commodity, and interest-rate derivatives. Basic mathematical concepts and the institutional structure of derivative markets are discussed.

**MATH 4207 Computational Finance (3,3,0)**

Prerequisite: MATH 2205 Multivariate Calculus, MATH 2206 Probability and Statistics

This course introduces basic numerical methods, numerical solutions of PDEs and probabilistic methods.

**MATH 4215 Time Series Analysis (3,3,0)**

Prerequisite: MATH 2205 Multivariate Calculus, MATH 2206 Probability and Statistics

This course introduce various kinds of time series models, including ARIMA, GARCH, unit roots and co-integration, vector autoregressive models. Students will gain hands-on experience with all models learned in this course.

**MATH 4216 Mathematical Finance (3,3,0) (E)**

Prerequisite: MATH 2205 Multivariate Calculus, MATH 2206 Probability and Statistics

This course introduces topics from replication of trading strategies, arbitrage, completeness, martingale representation theorem, fundamental theorem of finance, stochastic differential equations, and Black-Scholes formula of option pricing.

**MATH 4405 Coding Theory and Cryptography (3,3,0)**

Prerequisite: MATH 3406 Abstract Algebra and MATH 3426 Number Theory

This course will introduce the exciting fields of coding theory and cryptography to students. Students will study the mathematics behind encrypting and decrypting secret messages as mathematics has played an important role in developing and breaking codes. Furthermore, we will introduce coding schemes for detecting and correcting errors that occur during the data transmission. To study these symbiotic disciplines, you need to make use of the knowledge of basic linear algebra, abstract algebra, number theory, probability, and combinatorics. You will also develop skills in problem solving and logical reasoning.