MATH 3660 Operations Research II (3,3,0) (E)
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)
Prerequisite: 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) (E)
Prerequisite: MATH 1111-2 Mathematical Analysis I & II, MATH 1120 Linear Algebra, and MATH 2130 Real Analysis or consent of instructor
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)
Prerequisite: 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) (E)
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 3805 Regression Analysis (3,3,0)
Prerequisite: MATH 2206 Probability and Statistics, MATH 2207 Linear Algebra, or equivalent
This course aims to provide an understanding of the classical and modern regression analysis and techniques which are widely adopted in various areas such as business, finance, biology, and medicine. There have been great developments in the past decades such as nonlinear regression, robust regression, nonparametric and regression. With the help of a statistical package such as SAS, Matlab or R, students can analyse multivariate data by modern regression techniques without any difficulty.

MATH 3806 Multivariate Analysis and Data Mining Applications (3,3,0)
Prerequisite: MATH 2206 Probability and Statistics or equivalent, MATH 2207 Linear Algebra
To provide an understanding of the classical multivariate analysis and modern techniques in data mining. Very often, observations in the social, life and natural sciences are multidimensional or very high dimensional. This kind of data sets can be analysed by techniques in multivariate analysis and/or data mining. With the help of statistical package, such as Matlab, students will learn how to treat real multivariate problems.

MATH 3807 Simulation (3,2,1)
This course aims to introduce basic technique in computer simulation. Two computer software packages (one for continuous systems and one for discrete systems) will be taught. Various practical problems will be modeled, discussed, and simulated through computer simulation. Upon completion of this course, students should be able to simulate a wide range of practical problems in the daily life.

MATH 3815 Design and Analysis of Experiments (3,3,0)
Prerequisite: MATH 3805 Regression Analysis
To provide an understanding of various kinds of experimental designs involving factorial and uniform designs as well as design for computer experiments. The experimental design has a long history and has been widely used in industry, agriculture, quality control, natural sciences and computer experiments. They can be applied to survey design as well. Therefore, they are useful in business and social sciences. The statistical package, SAS and UD4.0 will be used to support the lecture.

MATH 3816 Design and Analysis of Surveys (3,3,0)
Prerequisite: MATH 2206 Probability and Statistics or equivalent
To provide students with a good understanding of survey operations, survey sampling methods and the corresponding analyses of data. Important points in questionnaire design will also be addressed in the course. Students will form teams to do course projects. On completion of the course, students should be able to design, carryout, and write reports based on a professional survey.

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