I) until the thesis is completed. A student who does not complete a thesis in the semester for which he or she has registered will receive a grade of IP (In Progress). Failure to register for an incomplete thesis in the next semester will terminate the thesis and will require that the entire thesis process be repeated starting with the submission of a new thesis proposal.

(b) Students choosing to complete a project in lieu of a thesis will produce a project in MATH 5997 Directed Research, based on topics from MATH 5393, demonstrating their ability to undertake a significant curriculum development, perform the appropriate research needed to implement the development, and communicate orally and in writing their understanding of that process. (Guidelines for writing the research project, including the required format and style, are available on the Mathematics Department website, http://math.tamucc.edu/.) MATH 5997 must be passed with a grade of B or better.

(c) Each student in the Curriculum Content Option must defend his or her Thesis or Project, ordinarily during his or her final semester. The student’s graduate committee will administer the defense. For more information, see the Department’s Thesis & Project Guidelines (http://sci.tamucc.edu/~eyoung/Thesis_project_guidelines.pdf).

For Additional Information
Website: http://math.tamucc.edu
Campus Address: Center for Instruction, Room 301; Phone (361) 825-2459
Mailing Address: Department of Mathematics and Statistics, Unit 5825
College of Science and Technology
Texas A&M University-Corpus Christi
6300 Ocean Drive, Corpus Christi, Texas 78412-5825

GrADUAte coUrSes
MATH 5310. 3 sem. hrs. (3:0)
TOPICS IN MATHEMATICS
May not be used for graduate credit towards the MS in mathematics. Course included to provide a suitable vehicle for anticipated future service courses. Grade assigned will be “credit” (CR) or “no credit” (NC). Prerequisite: Dependent on topics course offered.

MATH 5315. 3 sem. hrs. (2.2)
STATISTICAL METHODS IN RESEARCH I
This course is for graduate students in other disciplines and is designed to prepare them to use statistical methods in their research. This is a non-calculus exposition of the concepts, methods and usage of statistical data collection and analysis. Topics include descriptive statistics, the t-test, the one and two-way analysis of variance, multiple comparison tests, and multiple regression. Students also learn how to conduct these analyses using computer software and how to properly report their findings. Prerequisite: MATH 1442, MATH 2342, or the equivalent. Fall, Spring.

MATH 5316. 3 sem. hrs. (2.2)
STATISTICAL METHODS IN RESEARCH II
This course is a continuation of MATH 5315. Topics include: statistical experimental design, randomized blocks and factorial analysis, multiple regression, chi-squared tests, analysis of covariance, non-parametric methods and sample surveys. Emphasis will be placed on the computer analysis of research data and how to properly report statistical findings. Prerequisite: MATH 5315. Spring.

MATH 5321. 3 sem. hrs. (3:0)
PROBLEM SOLVING AND MATHEMATICAL REASONING FOR TEACHERS
An investigation of problems that span a variety of domains with a focus on making and evaluating mathematical arguments, using tools such as manipulatives and technology, identifying and analyzing the connections within and outside of mathematics, and using symbols and representations to communicate mathematical ideas.

MATH 5322. 3 sem. hrs. (3:0)
MATHEMATICS ASSESSMENT
A historical overview of assessment of mathematics, statistical description of norm- and criterion-reference tests, scaling of standardized exams, varieties of assessment and rubrics, the mathematical analysis of error patterns, and equity.

MATH 5323. 3 sem. hrs. (3:0)
MATHEMATICS INSTRUCTION AND MENTORING
A study of how the use of appropriate mathematical content can create and support a mathematics classroom environment in which students are engaged in mathematical problem solving and how to use these understandings to be effective in supporting teacher development.
MATH 5325. 3 sem. hrs. (3:0)
STRUCTURE OF NUMBER CONCEPTS
An in-depth investigation of real and complex number systems, base ten and other number bases, operations and algorithms, divisibility, Euclidean algorithm, congruence, modular arithmetic, and the Fundamental Theorem of Arithmetic, with an emphasis on quantitative and qualitative reasoning.

MATH 5326. 3 sem. hrs. (3:0)
STRUCTURE OF PATTERNS AND ALGEBRA
Algebraic reasoning incorporating the use of technology. This course includes investigations of patterns, relations, functions, and analysis, with a focus on representations and the relationships among them.

MATH 5327. 3 sem. hrs. (3:0)
STRUCTURE OF GEOMETRY AND MEASUREMENT
An investigation of concepts and principles in geometry and measurement with emphases on deductive reasoning and on inductive reasoning with the use of dynamic geometry software.

MATH 5328. 3 sem. hrs. (3:0)
STRUCTURE OF PROBABILITY AND STATISTICS
An investigation of the principles and applications of probability and descriptive and inferential statistics.

MATH 5329. 3 sem. hrs. (3:0)
STRUCTURE OF MODELING WITH RATES OF CHANGE
A study of rates of change through modeling. Direct applications of rates of change to number concepts, algebra, geometry, probability, and statistics.

MATH 5330. 3 sem. hrs. (3:0)
EQUATION OF MATHEMATICAL SYSTEMS
Covers the evolution of mathematical concepts and thought from ancient to modern times, including women and men who played key roles, from original and secondary sources. Provides a better understanding of the historical development of larger context for topics studied in other courses, and deepens understanding and appreciation of these topics. This course is intended to benefit current and future mathematics teachers. Prerequisite: MATH 5321 or consent of the instructor. Fall.

MATH 5332. 3 sem. hrs. (3:0)
INTEGRATING TECHNOLOGY IN MATHEMATICS EDUCATION
An introduction to technology appropriate for the mathematics classroom, including calculators, CAS systems, handhelds, computer software and multimedia. This course is intended for in-service mathematics teachers at the middle/high school level. Prerequisite: MATH 5321 or consent of the instructor. Fall.

MATH 5333. 3 sem. hrs. (3:0)
NUMERICAL LINEAR ALGEBRA

MATH 5334. 3 sem. hrs. (3:0)
ADVANCED DIFFERENTIAL EQUATIONS
A continuation of MATH 3315, Differential Equations. Relying heavily on linear algebra concepts, this course covers linear systems of differential equations; introductory operator theory; existence, uniqueness and continuity of solutions; stability of equilibria; planar nonlinear systems; and the Poincaré-Bendixson Theorem. Several applications are covered to illustrate the mathematical concepts. Prerequisites: MATH 3311 and MATH 3315. As needed.

MATH 5335. 3 sem. hrs. (3:0)
NUMERICAL ANALYSIS
Error estimation. Solution of non-linear equations. Interpolation. Numerical differentiation and integration. Finite differences and finite elements. Numerical methods for ODE’s and PDE’s. Prerequisites: MATH 3311, MATH 3470, MATH 3315, MATH 4315; also COSC 1435 or COSC 5311 or equivalent. As needed.

MATH 5336. 3 sem. hrs. (3:0)
LINEAR STATISTICAL MODELS
Review of basic concepts in probability theory. Principles of estimation and model building. Linear models, especially ANOVA and regression. Non-parametric alternatives. Prerequisites: MATH 3311, 3342, and 3470. As needed.

MATH 5337. 3 sem. hrs. (3:0)
SPATIAL STATISTICS
An introduction to methods of spatial statistics commonly used in scientific settings. Topics include the nature of geospatial sampling, analysis and modeling of spatial point patterns, and development and analysis of common continuous spatial models such as kriging. Additional topics to be covered, as time and student interest permit, include Bayesian modeling, hierarchical environmental modeling, and spatiotemporal modeling. Use of appropriate software is emphasized. Prerequisite: MATH 3342 or MATH 5315.

MATH 5338. 3 sem. hrs. (3:0)
OPTIMIZATION
Unconstrained optimization, necessary and sufficient conditions for solutions, basic algorithms. Constrained optimization, KKT conditions, linear programming, convex programming, algorithms. Prerequisites: MATH 4301.

MATH 5339. 3 sem. hrs. (3:0)
REAL ANALYSIS
This course includes such topics as sequences and series of constants and functions, the Riemann integral, Fourier Series, and an introduction to Lebesgue measure and integration. Prerequisites: MATH 4301. As needed.

MATH 5340. 3 sem. hrs. (3:0)
ABSTRACT ALGEBRA
Basic structure theorems for groups, rings, and fields. Additional topics selected from Sylow’s theorem, symmetry groups, algebraic coding theory, and Galois theory. Prerequisite: MATH 4306. As needed.
MATH 5360. 3 sem. hrs. (3:0)  
COMBINATORICS AND GRAPH THEORY  
Topics to include basic counting rules, connectivity, graph coloring and applications, chromatic polynomials, trees and their applications to searching and sorting, generating functions, recurrence relations, the Pigeonhole Principle, Eulerian and Hamiltonian chains and paths, and applications. Prerequisites: MATH 2305 and MATH 3313 or the equivalent. As needed.

MATH 5370. 3 sem. hrs. (3:0)  
MODELING OF NATURAL SYSTEMS  
This course is designed to expose science and technology majors to models of real problems arising in the environment and ecology. Students will learn how to create solvable models of the real world situations and how to find answers on the posted questions by using tools of mathematics and computing. There will be modeling and simulations of tides in the Gulf of Mexico, multi-species models of the food chains, circulation of carbon, water, and oxygen. Students will learn new tools based on calculus and elementary statistics such as numerical algorithms, Monte-Carlo methods, Markov Processes, multivariate analysis, evaluation of stability, methods of extrapolation (predictions) and interpolations. Prerequisite: MATH 2413 or MATH 5329, and MATH 1442 or MATH 2342, or equivalent.

MATH 5375. 3 sem. hrs. (3:0)  
APPLIED ANALYSIS  
Topics to include basic theory of Euclidean, Banach and Hilbert spaces, calculus of variations and optimal control, elements of system analysis, and elements of complex analysis. All theoretical topics will be illustrated by real application. Prerequisite: MATH 5351 or MATH 4301.

MATH 5378 3 sem. hrs. (3:0)  
MATHEMATICAL MODELING  
Modeling of applied problems using analytical, stochastic, and dynamical methods. Prerequisite: Completion of 24 semester hours towards the Applied Computational option of the M.S. in Mathematics degree.

MATH 5390. 3 sem. hrs. (3:0)  
SPECIAL TOPICS IN MATHEMATICS  
Prerequisite: Varies.

MATH 5393. 3 sem. hrs. (3:0)  
LITERATURE REVIEW AND RESEARCH METHODOLOGY  
Reading, analyzing, and synthesizing mathematics education research literature for the purpose of informing teaching practice. Includes a study of qualitative research with a focus on the components of a research study (research question(s), literature review, conceptual framework, methods, analysis, findings) and the relationships among them.

MATH 5394. 1-3 sem. hrs. (1:0)  
RESEARCH METHODS IN MATHEMATICS  
This course develops an ability to independently investigate a technical topic of interest, and the skills necessary to successfully communicate on that topic. The student learns how to find, organize, assimilate, and report on technical information derived from published sources. Specific areas of study include literature searches, technical word processing, technical writing style, and oral presentation techniques. The instructor and selected additional faculty members review and critique oral and written reports submitted throughout the semester. A final paper and a formal presentation are submitted in lieu of a final exam in the final semester. This course is a co-requisite for all other courses (except thesis) taken by students in the Applied and Computational Mathematics option.

MATH 5396. 3 sem. hrs. (3:0)  
DIRECTED INDEPENDENT STUDY  
Study in areas of current interest. See College description for further details. Prerequisite: Permission of the instructor. May not be substituted for regularly scheduled offerings.

MATH 5995. 3-9 sem. hrs. (9:0)  
THESIS  
Students may register for 3 to 9 semester hours of thesis per semester. Only 3 hours total will count toward the MS degree in mathematics. Prerequisite: MATH 5394 and a Thesis Proposal signed by the student’s committee. Fall, Spring, Summer.

MATH 5997. 3-9 sem. hrs. (9:0)  
DIRECTED RESEARCH  
Students work with an advisor to complete and present their proposed research project from MATH 5393. Students may register for 3 to 9 semester hours of directed research per semester. Only 3 hours total will count toward the MS degree in mathematics. Prerequisite: MATH 5393 and a Project Proposal signed by the student’s committee. Fall, Spring, Summer.