

**Department of Mathematical and Physical Sciences
College of Arts and Sciences
Texas A&M International University**



**Master of Science Degree in Mathematics
(Thesis, Non-Thesis, and Non-Thesis Education Track)**

Mathematics Graduate Handbook[†]

Fall 2008

[†] This material is provided as a convenient guide to basic information; however, students should be aware that the authoritative, official policies of the University are definitively set forth in the current Texas A&M International University catalog and in the policy manuals of the Texas A&M University System (TAMUS).

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I. Introduction

Objectives of the Masters of Science Degree Program in Mathematics

Mathematics has applications in almost all subjects including physics, chemistry, computer science and engineering. Biologists, sociologists, economists, psychologists, historians and lawyers have vastly benefited from mathematics in their work for drawing conclusions and developing novel techniques of investigation. Accordingly, the needs of pure and applied mathematicians are in high demand.

TAMIU mathematics programs lead to an attractive future for students who may have any of the following goals: to prepare for careers in fields requiring a solid background in quantitative analysis; to further graduate work and a career in research or academia, and to teach at various levels. Our primary focus is on the integration of mathematics with applications. The applications come from theory and tools available from several areas of mathematics. The educational objectives of the Master of Science Degree Program in Mathematics (hereinafter referred to as MS degree) are:

- To prepare students for a Doctoral Program in Mathematics and related fields.
- To prepare students for teaching mathematics in community colleges, institutions of higher education.
- To enrich students' background for teaching Mathematics in high and middle school including k-12 teachers.
- To prepare students for jobs related to mathematics in industry, education, or government.

The principal aim of graduate study is to develop in the student the power of independent work. Consequently, the character of work expected of graduate students is different from that of less-advanced students. A wide knowledge of the major subjects of concentration and related subjects will be expected. To this end, students will do assigned readings, attend lectures, and conferences, and make use of the library in equipping themselves with the right tools to do effective study.

With the thesis or research paper and the thesis defense, students in the program will demonstrate:

- The ability to do independent research (field, laboratory or library based).
- An understanding of the scientific method.
- Familiarity with the scientific literature relevant to their research.
- Advanced knowledge in specific scientific content areas as chosen from their paper topic and the elective courses they selected.

The specific objectives of the thesis, non-thesis, and non-thesis Education track for the MS degree in Mathematics are:

- The thesis track prepares students for a Doctoral Program in Mathematics and related fields.
- The non-thesis track prepares students for teaching mathematics in institutions of higher education, including community colleges.
- The non-thesis education track prepares students for teaching mathematics in community colleges, institutions of higher education, and educational administration career opportunities including k-12 teachers.
- All three program tracks prepare students for careers in industry, public and governmental positions.

II. Admission

Admission Requirements for the Program

Admission to the MS degree program requires a bachelor's degree from an accredited institution with a major in mathematics, mathematics with secondary certification, or related field in science. The student's entire record will be considered including the completed application for admission, overall undergraduate GPA, upper level GPA, GPA in the discipline, a Statement of Purpose, and two sealed letters of reference attesting to qualifications of applicant.

- Satisfaction of all other requirements of Texas A&M International University for graduate admission, including the Graduate Record Examination (GRE). GRE scores must be received by the Office of Graduate Studies and Research before admission to the MS degree program.
- Students must submit transcripts from all institutions attended and two sealed letters of reference (at least one of which from faculty outside the departmental graduate admission committee) together with GRE scores to the Office of Graduate Studies and Research (OGSR) for acceptance into the MS degree program.
- Students will not be fully admitted to the graduate program of the University until all of the above entrance requirements are met. If an applicant does not meet these minimum requirements, OGSR may approve admission of the applicant on a conditional basis using the graduate admission formula.

Stemwork

It is strongly recommended that a student seeking a MS degree in Mathematics should have a bachelor's degree with a major in Mathematics or related field. However, if a student is seeking a MS degree in Mathematics without a Bachelors in Mathematics, then the following are the minimum requirements as preparation for the graduate coursework: MATH 1316 (or MATH 2412), MATH 2413, MATH 2414, MATH 2415, MATH 3310, MATH 3320 (or MATH 3325), MATH 3360, MATH 3365, MATH 4310, MATH 4335 (See TAMIU catalog: <http://www.tamtu.edu/catalog/current/> for details). The student's advisor and/or committee may require additional courses if thought necessary to prepare the student for a specific field in mathematics.

Financial Support

The Office of Graduate Studies and Research has more information on financial support.

SCHOLARSHIPS:

- Tuition up to \$3,000 per year (\$1,000 each semester, including summer).
- The Department of Mathematical and Physical Sciences may have other scholarship and employment opportunities. Please contact the department Chair for information about these opportunities. Individual faculty members may have limited assistantship opportunities available.

ASSISTANTSHIPS:

- An assistantship is a financial award to a graduate student for part-time work (up to 20 hours per week) in teaching, or research while pursuing study towards an advanced degree. Graduate Assistant awards will be up to \$9,000 per year depending on work assignment.

FELLOWSHIPS:

- A fellowship is a financial award to a graduate student for part-time work (10 hours per week) in teaching or research while pursuing an advanced degree. Graduate Fellowship awards provide up to \$6,000 per year.

GENERAL ELIGIBILITY REQUIREMENTS FOR SCHOLARSHIPS, ASSISTANTSHIPS, AND FELLOWSHIPS BY OGSR:

- Must be a fully admitted graduate student who is working towards a masters or doctoral degree.
- Must enroll in 6 graduate hours each semester (or summer) while you receive scholarship, assistantship, or fellowship money.
- Must maintain a minimum overall GPA of 3.5.
- Application deadline is May 1 (earlier preferred).

GRE/GMAT REIMBURSEMENTS:

- Up to \$200 GRE/GMAT reimbursements per semester will be offered to prospective TAMIU students by OGSR.

ELIGIBILITY REQUIREMENTS FOR REIMBURSEMENTS:

- Must be a fully admitted graduate student who is working towards a master's or doctoral degree.
- Recipients will be required to pay for the initial GRE exam cost. Once enrolled at TAMIU, OGSR will reimburse your GRE exam expenses.

TRAVEL REIMBURSEMENTS:

- Travel reimbursements available for Graduate Students attending conferences. Application available at the Office of Graduate Studies and Research.

More information, forms and brochures can be found at the following website:
http://www.tamiu.edu/gradschool/lamar_bruni_vergara.shtml

III. Degree Requirements

There are three program tracks in the Master of Science degree in Mathematics.

Thesis Program

Required Courses (15 SCH)

MATH 5305 Real Analysis I	3 hours
MATH 5320 Complex Variables I	3 hours
MATH 5330 Abstract Algebra I	3 hours
MATH 5365 Topology	3 hours
MATH 5370 Mathematical Modeling I	3 hours

Synthesized Required Courses¹ (3 SCH = two courses)

MATH 5191 Mathematics Seminar	1 hour
MATH 5252 Internship in Mathematics	2 hours
MATH 5290 Research Methods in Mathematics	2 hours

Mathematics Electives 12 hours

Thesis courses

MATH 5398 Thesis I and MATH 5399 ² Thesis II	6 hours
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Total for Degree: 36 hours

¹Three semester hours chosen from these three courses.

²To be taken after completion of Thesis I & may be repeated as needed.

Non-Thesis Program

Required Courses (15 SCH)

MATH 5305 Real Analysis I	3 hours
MATH 5320 Complex Variables I	3 hours
MATH 5330 Abstract Algebra I	3 hours
MATH 5365 Topology	3 hours
MATH 5370 Mathematical Modeling I	3 hours

Synthesized Required Courses³ (3 SCH = two courses)

MATH 5191 Mathematics Seminar	1 hour
MATH 5252 Internship in Mathematics	2 hours
MATH 5290 Research Methods in Mathematics	2 hours

Mathematics Electives 18 hours

Total for Degree: 36 hours

³Three semester hours chosen from these three courses.

Non-Thesis Education Track Program

Required Mathematics Courses (18 SCH)

MATH 5305 Real Analysis I	3 hours
MATH 5320 Complex Variables I	3 hours
MATH 5330 Abstract Algebra	3 hours
MATH 5365 Topology	3 hours
MATH 5370 Mathematical Modeling I	3 hours
MATH 5375 Probability Theory	3 hours

Required Education Courses⁴ (18 SCH)

EDCI 5315 Design for Instruction	3 hours
EDDP 5327 Educating Diverse Populations: Teaching Diverse Students	3 hours
EDGR 5320 Foundations of Research	3 hours
EDIT 5322 Technology Applications for Secondary Mathematics and Science Teachers	3 hours
EDME 5310 Problem-Solving Techniques for Secondary Mathematics Teachers	3 hours
A course to be chosen from:	
EDME 5390 Issues in Secondary Mathematics Education	3 hours
EDCI 5399 Special Issues in Curriculum and Instruction: Issues in mathematics Education	3 hours

Total for Degree: 36 hours

⁴These courses are offered by the College of Education.

Thesis / Non-Thesis Program Comparison

Thesis / Non-Thesis Program Comparison

	Non-thesis	Thesis	Non-thesis Education Track
Required Courses	MATH 5305 Real Analysis I 3 MATH 5320 Complex Variables I 3 MATH 5330 Abstract Algebra I 3 MATH 5365 Topology 3 MATH 5370 Mathematical Modeling I 3	MATH 5305 Real Analysis I 3 MATH 5320 Complex Variables I 3 MATH 5330 Abstract Algebra I 3 MATH 5365 Topology 3 MATH 5370 Mathematical Modeling I 3	MATH 5305 Real Analysis I 3 MATH 5320 Complex Variables I 3 MATH 5330 Abstract Algebra 3 MATH 5365 Topology 3 MATH 5370 Mathematical Modeling I 3 MATH 5375 Probability Theory 3
Synthesized Required Courses (3 hours)	MATH 5191 Mathematics Seminar 1 MATH 5252 Internship in Mathematics 2 MATH 5290 Research Methods in Mathematics 2	MATH 5191 Mathematics Seminar 1 MATH 5252 Internship in Mathematics 2 MATH 5290 Research Methods in Mathematics 2	EDME 5390 Issues in Secondary Mathematics Education 3 EDCI 5399 Special Issues in Curriculum and Instruction: Issues in Mathematics Education 3
Elective Courses or Required Education Courses	Graduate Mathematics Courses 18	Graduate Mathematics Courses 12	EDCI 5315 Design for Instruction 3 EDDP 5327 Educating Diverse Populations: Teaching Diverse Students 3 EDGR 5320 Foundations of Research 3 EDIT 5322 Technology Applications for Secondary Mathematics and Science Teachers 3 EDME 5310 Problem-Solving Techniques for Secondary Mathematics Teachers 3
Thesis		MATH 5398 Thesis I 3 MATH 5399 Thesis II 3	
TOTAL SCH	36	36	36

Additional Degree Requirement Details

- Thesis track requires a thesis, seminar on the thesis and a successful defense. Thesis research can be laboratory or field based, or both. All graduate students are encouraged to present their ongoing research at Texas A&M System Pathways to the Doctorate Student Research Symposium in the Fall, LBV Annual University Academic Conference in the Spring and The Department of Mathematical and Physical Sciences' Fall Student Conference to be held in the Fall each year.
- Non-thesis track requires evidence of research; literature, field and/or laboratory-based, a seminar on the research and a successful presentation based on them.
- Students need to complete the program within five years, as courses taken more than five years ago do not count towards a degree program.

Retention Requirements (See Academic Regulations for Graduates in TAMIU Catalog)

- A minimum grade point average of 3.0 ("B") on a 4.0 scale computed on all graduate work attempted must be maintained in the major.
- No more than six (6) semester credit hours with a letter grade of "C" earned at this university will be accepted for a master's degree.

Timeline / Deadlines

These are suggested times for completing the thesis or non-thesis degree in two years.

1. University Application Filed
 - First working day in April for summer or fall semester entry.
 - First working day in November for spring semester entry.
2. GRE & Transcripts in the Office of Graduate Studies and Research
 - Transcripts should be submitted with application.
 - No more than six hours of graduate work in program before GRE submitted to office.
3. OGSR's Acceptance Letter
 - May for summer or fall semester entry.
 - January for spring semester entry.
4. Approved Degree Plan
 - Complete the request for services of a graduate advisory committee form in the appendix.
 - Request a faculty member for advisory committee no later than end of second semester.
 - Degree plan approved no later than end of second semester.
 - Discussion of thesis proposal by the end of second semester.
5. Thesis Proposal Submitted (if applicable)
 - By the end of third semester.

6. Thesis Proposal Approved (If applicable)
 - By the end of the third semester including completed thesis proposal coversheet form.
7. Completion of Course Work
 - At the end of the fourth semester.
 - An examination committee appointed by the chair of the Department of Mathematical and Physical Sciences will prepare and evaluate the comprehensive exam. A student must pass an exam that covers three courses, of the student's choice, among the required Mathematics courses in the given track. All degree requirements must be completed within 5 calendar years.
8. Application for Graduation
 - Beginning of final semester.
9. Oral Defense (If applicable)
 - Final semester of the program.
10. Final Thesis Cleared (If applicable)
 - Before graduation.
11. Comprehensive Exam
 - All students of the MS degree program must pass a three-hour written comprehensive exam. Only students who have taken all required mathematics courses are eligible to take the exam. All parts of the written comprehensive exam must be completed at one physical sitting. If any part of the exam is failed, the student must repeat that part of the exam (or an equivalent part of the exam, as determined by agreement with the student's advisor) the next time the exam is offered. If any part of the examination is failed three times consecutively, the student will not be eligible for the degree. In such an event, the student will need to repeat the entire program and pass the comprehensive exam in order to receive the degree. Students must register intent to take the comprehensive examinations with the Department Chair no later than the third Friday of the semester in which the exam will be taken.

Thesis Advisory Committee

The student on the thesis track will have a thesis committee that will assist with the thesis by reading and evaluating the thesis; and preparing, administering, and evaluating the defense of the thesis. The committee will consist of three members of the graduate faculty from the Department of Mathematical and Physical Sciences and/or an external graduate faculty member chosen by the student with advice from the student's advisor. The student's advisor[‡] (chair of the thesis advisory committee) is a graduate mathematics faculty that will serve as the student's major professor for the thesis research. An external member may be added to the committee: (1) to provide expertise in the field of research, or (2) to provide interdisciplinary view points to student's work.

[‡] The student's advisor must be a graduate faculty member holding a terminal degree in mathematics in the rank of assistant, associate or professor of mathematics.

Advice to Graduate Students Following the Thesis Program

You choose your own faculty advisor for a thesis-based degree plan. Some students enter the university with the intention of working with a particular member of the faculty; others are not as certain about their specific interests, or have a thesis topic in mind. Upon entering, you will be assigned a temporary advisor to guide you in planning your course work and in selecting a possible thesis topic. You are under no obligation to conduct thesis research with your temporary advisor, and many students decide to work with another faculty member. The faculty has your best interests in mind, and will help you make the best choice of advisor and thesis topic.

The overall timetable for completion of the MS degree requirements usually spans two to three calendar years. Some students are able to finish earlier, while others require more time. During the first semester, your temporary advisor will advise you in planning your course of study. During the second semester, the student chooses a thesis advisor (if applicable) and establishes a thesis committee. Field and analytical work on the thesis are ordinarily conducted during the summer semester, although coursework may be arranged so that fieldwork could be conducted during the winter and early spring. During the third semester, the student generally completes necessary coursework while continuing thesis research and the fourth semester is generally devoted to completion of the thesis research, writing, and defense of the thesis.

Many students find it necessary to complete the thesis during the second summer. Others require more time to complete the degree requirements because of the nature of the research, financial needs, or other factors. The Office of Graduate Studies and Research has established a time limit of 5 calendar years for completion of the MS degree based on the catalog year when a student submitted the application.

Thesis

The College of Arts and Sciences has a thesis manual available online. However, the students must consult with his/her advisor and thesis advisory committee on the format of the thesis.

IV. Curriculum

Courses

MATH 5191 Mathematics Seminar. One semester hour.

A seminar presents diverse topics from pure and applied mathematics. Students are encouraged to present a series of articles, journals and portions of monographs during the class meetings. May be repeated once when topics vary. Prerequisites: Graduate standing and permission of instructor.

MATH 5252 Internship in Mathematics. Two semester hours.

Students are encouraged to have directed internships in a public or private organization appropriate to the student's career objective/desire. Taken during the last year of the student's program of study, student has to provide that the nature of the assignment undertaken in the organization has relevant mathematics components. Prerequisites: Graduate standing and permission of the department and instructor.

MATH 5290 Research Methods in Mathematics. Two semester hours.

This course deals with the basic tools of the mathematics to better understand mathematical research. Analytical concepts, survey research, in some cases, statistical/computational software and their methods will be the basis of this course. Prerequisites: Graduate standing and permission of the instructor.

MATH 5303 Number Theory I. Three semester hours.

This first course in number theory introduces algebraic number theory as well as the analytic methods. Topics include: Number fields, algebraic integers, ideals and units, ideal class groups, ramification theory, quadratic and cyclotomic fields, zeta-functions and L-series. Prerequisites: Graduate standing and permission of instructor.

MATH 5304 Number Theory II. Three semester hours.

Topics include: Artin reciprocity law, topics from field theory; modular functions and elliptic curves, Diophantine equations, distribution of prime numbers, computations applications of algebraic curves over finite fields such as elliptic curve cryptography and coding. Prerequisite: Graduate standing and permission of instructor.

MATH 5305 Real Analysis I. Three semester hours.

This is a course on Lebesgue measure and integration. The classical L_p spaces will be defined and basic results established, such as the Holder and Minkowski inequalities and completeness of the spaces. Prerequisite: Graduate standing and permission of instructor.

MATH 5306 Linear Algebra. Three semester hours.

Topics include: Canonical structure theorems, diagonalization, the spectral theorem, inner-product spaces, and their applications and extensions. Prerequisite: Graduate standing and permission of instructor.

MATH 5311 Real Analysis II. Three semester hours.

Topics include: Fourier series, introduction to Hilbert Spaces, the spectral theorem for compact linear operators on Hilbert spaces with applications to differential equations. Prerequisites: Graduate standing and permission of instructor.

MATH 5312 Functional Analysis I. Three semester hours.

This is the first course in Functional Analysis. Topics include: Topological vector spaces, Banach spaces, the open mapping and closed graph theorems, the Hahn-Banach theorem, duality and weak topologies. Prerequisites: Graduate standing and permission of instructor.

MATH 5315 Combinatorics. Three semester hours.

This course discusses discrete mathematical structures, especially the enumeration and the optimization problems related to them. Algorithmic (constructive) aspects will be emphasized. Course work involves computer programming projects. Topics include: basic tools of combinatorics, graphs and networks, relations, the counting problems, the existence problems, the combinatorial optimization. Prerequisites: Graduate standing and permission of instructor.

MATH 5316 Graph Theory. Three semester hours.

This is a basic course in graph theory. Fundamental concepts of graph theory will be investigated. Topics include: directed graphs, trees and distance, spanning trees, coloring of graphs, planar graphs, edges and cycles. Prerequisites: Graduate standing and permission of instructor.

MATH 5320 Complex Variables I. Three semester hours.

This is the first course on functions of one complex variable. It will begin with the complex number system and will treat topics such as power series, analytic functions, Mobius transformations, complex integrations, residue calculus, singularities, and Schwarz's Lemma. Prerequisite: Graduate standing and consent of instructor.

MATH 5321 Complex Variables II. Three semester hours.

This is the second course on functions of one complex variable. Topics include: conformal mappings, convex functions, the Hadamard Three Circles Theorem, compactness, convergence in the space of analytic functions, Runge's theorem, analytic continuation and Riemann surfaces, harmonic functions, entire functions, and Picard's Theorems. Prerequisites: Graduate standing and permission of instructor.

MATH 5330 Abstract Algebra I. Three semester hours.

This is the first course in Abstract Algebra. The main topics in this course will be groups, rings, fields, subgroups, quotient groups, ideals, homomorphisms and introduction to field extensions. There will be classical examples of permutation groups, polynomial rings and integral domains, questions of factorization, ideals and fundamental homomorphism theorems. Prerequisite: Graduate standing and consent of instructor.

MATH 5331 Abstract Algebra II. Three semester hours.

Topics include modules, finite fields, Fundamental Theorem of Field Theory, algebraic extensions, the classification of finite fields, Fundamental Theorem of Galois Theory, and the cyclotomic extension. Prerequisites: Graduate standing and permission of instructor.

MATH 5340 Differential Geometry. Three semester hours.

This course is an introduction to the differential geometry of n -dimensional manifolds. Topics include: Riemannian manifolds, differential forms and Stokes Theorem. (Note that differential geometry is relevant to differential equations, mathematical physics, as well as other areas of sciences). Prerequisites: Graduate standing and permission of instructor.

MATH 5350 Ordinary Differential Equations I. Three semester hours.

This is the first course in ordinary differential equations. The course will include systems of linear differential equations, two dimensional autonomous systems, existence, uniqueness and continuation of solutions, dependence of solutions on initial conditions and parameters. Prerequisite: Graduate standing and permission of instructor.

MATH 5355 Advanced Topics in Mathematics. Three semester hours.

Advanced topics selected from the fields of pure or applied mathematics. May be repeated when topic changes. Prerequisite: Graduate standing and permission of instructor.

MATH 5360 Partial Differential Equations. Three semester hours.

This is a basic course in partial differential equations. The course will cover the following: first order linear partial differential equations, classification of second order equations and canonical forms, Fourier series and integrals, the wave equation, the Cauchy problem for hyperbolic equations, the heat equation, the weak maximum principle, the strong maximum principle, the Laplace equation, Green's function and Poisson's formula. Prerequisite: Graduate standing and permission of instructor.

MATH 5365 Topology. Three semester hours.

This is an introductory course in point-set topology. The course will include topological spaces, continuous functions, connectedness, separation axioms. Tychonoff's theorems, para-compactness, complete metric spaces and function spaces will also be discussed. Prerequisite: Graduate standing and permission of instructor.

MATH 5367 Numerical Methods for PDE I. Three semester hours.

A study of algorithms for the numerical solution of hyperbolic and parabolic partial differential equations using the finite difference method; stability and convergence of methods and error bounds. Applications from physics and engineering will be emphasized. Prerequisites: Graduate standing and permission of instructor.

MATH 5368 Numerical Methods for PDE II. Three semester hours.

A study of algorithms for the numerical solution of elliptic partial differential equations using the finite difference method; stability and convergence of methods and error bounds. Applications from physics and engineering will be emphasized. Prerequisites: Graduate standing and permission of instructor.

MATH 5370 Mathematical Modeling. Three semester hours.

This is the first course in mathematical modeling. Topics include: linear equations and models, non-linear equations and models, modeling with linear systems, modeling with non-linear systems, mathematical modeling and dynamical systems, non-homogeneous systems, empirical models and linear regression, bifurcation and chaos. Working knowledge of a computer programming language is preferred. Prerequisites: Graduate standing and permission of instructor.

MATH 5375 Probability Theory. Three semester hours.

Topics include: distribution functions, random variables, expectation, independence, convergence concepts, law of large numbers, characteristic functions, the central limit theorem, conditional expectation, martingales and Brownian. Prerequisites: Graduate standing and permission of instructor.

MATH 5398 Thesis I. Three semester hours.

To be scheduled by the student in consultation with his/her advisor. Prerequisite: Graduate standing and permission from the student's thesis advisory committee. Approval of the major professor and the department chair. All core courses should be completed prior to beginning thesis work preferably during the last year of the student's program of study. Evaluation of performance in this course is on CR/NC basis. If grade of IP is received, student must enroll again for credit.

MATH 5399 Thesis II. Three semester hours.

To be scheduled by the student in consultation with his/her advisor. Prerequisite: Graduate standing and permission from the student's thesis advisory committee. Approval of the major professor and the department chair. Evaluation of performance in this course is on CR/NC basis. A good standing in MATH 5398 Thesis I is required. If grade of IP.

The following education courses are applicable to the non-thesis education track program only:

EDCI 5315 Design for Instruction. Three semester hours.

Theories, principles, and current research on development and learning, from birth through adulthood, are studied. Appropriate curriculum, organizational plans, and instructional strategies for different stages of development are explored. Prerequisite: Graduate standing.

EDDP 5327 Educating Diverse Population: Teaching Diverse Students. Three semester hours.

The major emphasis of this course is to develop a strong foundation in responding to human diversity. Includes extensive examination of strategies for promoting equity and inclusion. Prerequisite: Graduate standing.

EDGR 5320 Foundations of Educational Research. Three semester hours.

This course provides the competencies required for a critical understanding, evaluation, and utilization of published educational research. The course covers quantitative as well as qualitative research methods. Topics include problem formulation and refinement; research design, sampling; measurement and data collection, data analysis techniques, and the inference process. Pre-requisite: Graduate Standing.

EDIT 5322 Technology Application for Secondary School Mathematics and Science Teachers. Three semester hours.

An intensive concentration on the development and enhancement of various technology applications used in the secondary science and mathematics classroom. Specific attention will be paid to skill with graphing calculators, mathematics and science software packages used in the middle school classroom, and other pertinent electronic-based resources. Significant time in the computer laboratory is a major component of this course.

EDME 5310 Problem-solving Techniques for Secondary School Mathematics Teachers. Three semester hours.

An intensive exploration of successful problem-solving techniques for the secondary mathematics teacher. Emphasis will be placed upon recognizing and developing individual competency in the various best practices associated with successful transfer of both content and skill in mathematics. Additional focus will cover pragmatic and proven techniques for engaging students who are challenged in language, cognitive ability, and/or interest in mathematics.

EDME 5390 Issues and Problems in Secondary Mathematics Education. Three semester hours.

Specific attention will be focused on various contemporary issues concerning the teaching of mathematics to secondary students. Group discussions, debates and other classroom methodologies may be employed by the course instructor to fully develop students' interest, knowledge base, and inquiry into issues related to successful mathematics instruction.

EDCI 5399 Special Issues in Curriculum and Instruction: Issues in Mathematics Education. Three semester hours.

Course examines timely topics of concern to educators involved in making decisions regarding counseling decisions. May be repeated when topic changes. Prerequisites: Graduate standing and permission of instructor.

Two-Year Cycle of Graduate Courses

This two-year cycle of courses is subject to change and merely depends on adequate enrollment in these courses. Elective courses, except MATH 5355, *Advanced Topics in Mathematics*, will be offered on a two-year cycle or an as-needed basis. Please consult the College of Education for offering of the education courses in non-thesis education track program.

A semester-by-semester projection for the offering of mathematics required courses during the first five years

Required Courses	1 st Year			2 nd Year			3 rd Year			4 th Year			5 th Year		
	S1	S2	SS	S1	S2	SS	S1	S2	SS	S1	S2	SS	S1	S2	SS
MATH 5305	X			X			X			X			X		
MATH 5320		X			X			X			X			X	
MATH 5330	X			X			X			X			X		
MATH 5365			X			X			X			X			X
MATH 5370		X			X			X			X			X	
MATH 5375‡															
MATH 5191‡															
MATH 5252‡															
MATH 5290‡															

‡ These courses are taught on an as-needed basis.

V. Department Faculty

The faculty in the Department of Mathematical and Physical Sciences has a diverse array of research interests to accommodate every student's need in the program and to cater to the present demands in the marketplace. The current research interests of the faculty are given below:

Faculty Member	Degree & Institution	Teaching & Research Interests
Dr. Terutake Abe, Asst. Professor of Mathematics	Ph.D., The Johns Hopkins University	Algebraic Geometry and Number Theory
Dr. Rafic A. Bachnak, Professor of Systems Engineering/Chair	Ph.D., Ohio University	Embedded Systems, Robotics and Automation, System Integration, and Computer Vision
Dr. Fethi Belkhouche, Asst. Professor of Systems Engineering	Ph.D., Tulane University	Robotics, Image Processing
Dr. Eduardo E. Chappa, Asst. Professor of Mathematics	Ph.D., University of Washington	Integral Geometry, Inverse Problems
Dr. Rohitha Goonatilake, Assoc. Professor of Mathematics and Graduate Faculty Advisor	Ph.D., Kent State University	Probability Theory and Analysis

Dr. Juan H. Hinojosa, Professor of Physics	Ph.D., The Johns Hopkins University	Planetary Physics, Potential Theory, Gravity Gradient Tensor Analysis, Thermal Convection, Numerical Modeling
Dr. Tongdan Jin, Asst. Professor of Systems Engineering	Ph.D., Rutgers University	Stochastic Reliability Modeling and Optimization; Stochastic in Financial Engineering
Dr. Firooz Khosraviyani, Assoc. Professor of Computer Science and Mathematics	Ph.D., University of Wales, U.K.	Group Representation and Group Character Theories, Data Structures and Algorithms, Linguistics in Mathematics Education and Learning Theories
Dr. Runchang Lin, Asst. Professor of Mathematics	Ph.D., Wayne State University	Numerical Analysis and Applied Mathematics
Dr. Qingwen Ni, Assoc. Professor of Physics	Ph.D., University of North Texas	Magnetic Resonance Imaging and Nuclear Magnetic Resonance
Dr. Chihiro Oshima, Asst. Professor of Mathematics and Academic Advisor	Ph.D., University of Iowa	Mathematical Logic and Universal Algebra
Dr. Chen-Han Sung, Professor of Mathematics, Computer Science, and Industrial Engineering	Ph.D., University of California-Berkeley	Applied Mathematics, Artificial Intelligence, Industrial Engineering as well as Mathematics and Science Education
Dr. Fuming Wu, Asst. Professor of Computer Science	Ph.D., University of Haifa	Petri Nets and Modeling of Dynamic Information Systems, Fixed and Wireless Networking Technologies, Emerging Technologies and Applications in Internet Computing, Computer Information Security and Bioinformatics

VI. Appendix

Prepared: October 2008

**TEXAS A&M INTERNATIONAL UNIVERSITY
COLLEGE OF ARTS AND SCIENCES
DEPARTMENT OF MATHEMATICAL AND PHYSICAL SCIENCES**

CHECKLIST FOR GRADUATE STUDENTS AND FACULTY ADVISORS

Student's Name: _____

Major: _____

Advisory Committee Chair: _____

Dept: _____

This checklist is provided to help you and your Advisory Committee keep track of your progress through the various stages of graduate study.

ACTIVITY	COMPLETION DATE	EXPECTED COMPLETION DATE
1. Univ. & Dept. Applications Filed	_____	_____
2. GRE & Transcripts in Admissions Office	_____	_____
3. Dean's Acceptance Letter	_____	_____
4. Approved Degree Plan	_____	_____
5. Completion of Course Work	_____	_____
6. Comprehensive Exam	_____	_____
7. Thesis Proposal Submitted (If applicable)	_____	_____
8. Thesis Proposal Approved (If applicable)	_____	_____
9. Oral Defense (If applicable)	_____	_____
10. Final Thesis Cleared (If applicable)	_____	_____
11. Application for Graduation	_____	_____



TEXAS A&M INTERNATIONAL UNIVERSITY
A Member of The Texas A&M University System

College of Arts and Sciences
DEPARTMENT OF MATHEMATICAL AND PHYSICAL SCIENCES

REQUEST FOR SERVICES OF A GRADUATE ADVISORY COMMITTEE

Name: _____ Student I.D. Number: _____

Degree: _____ Catalog Year: _____

The above student has requested that I serve on his/her Graduate Advisory Committee. I understand that serving on this committee requires that I be reasonably available to this student for consultation and guidance. Additionally, I understand that I, along with the other members of the committee, have a particular and direct responsibility for the following:

- Designing a degree plan in consultation with the student
- Assisting with the thesis
- Reading and evaluating the thesis
- Preparing, administering and evaluating the defense of the thesis

Cognizant of the above responsibilities, I agree to serve on the Graduate Advisory Committee of the above named student.

Advisory Committee Chair Date

Advisory Committee Member Date

Advisory Committee Member Date

External Member Date
(If chosen)

Department Chair for Approval Date

**TEXAS A&M INTERNATIONAL UNIVERSITY
COLLEGE OF ARTS & SCIENCES
DEPARTMENT OF MATHEMATICAL AND PHYSICAL SCIENCES**

THESIS PROPOSAL COVERSHEET

I submit for approval the following proposal:

Major: _____

Tentative Title: (Title should be concise and the nature of the proposal research clearly stated.)

Journal Model: _____

This proposal includes ___ attached sheets. (Proposals should be at least ten pages in length.)

This proposal should present concise information covering the following:

1. Objectives: (Make a clear statement of the results you hope to accomplish through the proposed research.)
2. Present status of the question: (Summarize the previous research in this area, especially citing any gaps which the study may help to fill. Include definite citations in your summary.)
3. Procedure: (Indicate clearly the methods you will use in gathering and analyzing data to accomplish the objectives.) (For further instructions refer to the Thesis Manual.)

APPROVAL:

Advisory Committee Chair Signature

Student's Signature Date

Advisory Member Signature

Type Student's Name

Advisory Member Signature

Student ID Number

External Member Signature
(if chosen)

Mailing Address

Department Chair Signature Date

Dean of the College Signature Date

