Texas A&M International University
College of Arts and Sciences
Department of Mathematics and Physics

Master of Science in Mathematics

Graduate Handbook[1]

October 2018

[1] 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 (TAMIU) catalog and in the policy manuals of the Texas A&M University System (TAMUS). Decisions made by the Graduate Council at TAMIU will supersede policies and procedures in this handbook.

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I. INTRODUCTION

1. OBJECTIVES OF THE MASTER OF SCIENCE PROGRAM

Mathematics is intrinsic to almost all fields of human endeavor including physics, chemistry, computer science and engineering. For example, 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 services of pure and applied mathematicians are in high demand.

The principal aim of graduate studies is to allow the student to develop the ability to undertake independent work. Consequently, higher quality work is expected of graduate students. A broad knowledge of the major subjects of concentration and related subjects is expected of students entering the program. To this end, students will do assigned readings, attend classes, colloquia, and conferences, complete coursework, and make use of the library in equipping themselves with the right tools to study effectively.

Depending on the plan chosen, the TAMIU Master of Science (MS) in Mathematics program prepare students for four paths: Thesis, Non-Thesis, Mathematics Education Non-Thesis, and Applied Statistics Non-Thesis. All four program plans prepare students for careers in fields requiring a solid background in quantitative analysis, including mathematics-related jobs in industry, public and governmental positions.

- The Thesis plan prepares students for a doctoral program in mathematics and related fields as well as for teaching mathematics in institutions of higher education.
- The Non-Thesis plan prepares students for teaching mathematics in institutions of higher education, including community colleges.
- The Mathematics Education Non-Thesis plan prepares students for teaching mathematics in community colleges, mathematics education at institutions of higher education, and educational administration career opportunities including K-12 teachers.
- The Applied Statistics Non-Thesis plan prepare students for actuarial valuation, business/data analysis, consulting, etc. It also prepares students for teaching mathematics in institutions of higher education.

II. ADMISSION

1. 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, undergraduate overall GPA, upper level GPA, GPA in the discipline, a Statement of Purpose, and two sealed letters of reference attesting to qualifications of applicant. In addition,

- students must provide proof of the satisfaction of all other requirements of TAMIU for graduate admission;
- students must submit transcripts from all institutions attended and two sealed letters of reference (at least one of which must be from a faculty member who is not a member of the Departmental Graduate Admission Committee) to the Office of Graduate Studies and Research (OGSR) for acceptance into the MS degree program; and
- students will not be fully admitted to the graduate program until all of the above 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.

2. REQUIRED COURSES IN MAJOR

It is strongly recommended that, for the best preparation for success, a student seeking an MS degree in mathematics shall have a deep and broad mathematical knowledge and skills that is equivalent to what is required for a bachelor's degree with a major in mathematics. If a student is seeking an MS degree in mathematics without a bachelor's degree in mathematics, then the following are the minimum requirements as preparation for the graduate coursework: MATH 2415, MATH 3310, MATH 3330, MATH 4310, MATH 4335, and MATH 4345 (see http://www.tamiu.edu/catalog/current). The student's advisor and/or committee may require additional courses if it is thought necessary to prepare the student for a specific field in mathematics.

3. FINANCIAL SUPPORT

Financial supports in the forms of the following are available.

Scholarships:

- Tuition up to $3,000 per year ($1,000 each semester, including summer).
- The Department of Mathematics and Physics 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:

- Graduate Assistant awards of up to $18,000 for 12 months are available for students working up to 20 hours per week in teaching or research while pursuing study towards an advanced degree. OGSR reserve the right to fund these assistantships during summer, if funds permit.

Fellowships:

- Graduate Fellowship awards of up to $6,000 for 9 months are available for students working up to 10 hours per week in teaching or research while pursuing an advanced degree.

Travel Funds:

- Travel funds are available for LBV eligible graduate students attending conferences. Application form is available from the OGSR.

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 9 SCH each spring and fall semester while receiving scholarship, assistantship, or fellowship funding.
- Must maintain a minimum overall GPA of 3.5.
- Application deadline is April 1 (earlier preferred).

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

III. DEGREE REQUIREMENTS

1. DEGREE PLANS

1.1. THESIS

Required Courses (15 SCH)

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

Synthesized Required Courses (3 SCH)

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

Mathematics Electives (12 SCH)

Thesis (6 SCH)

MATH 5398 Thesis I	3 SCH
MATH 5399 Thesis II	3 SCH

Total for Degree	**36 SCH**

1.2. NON-THESIS

Required Courses (15 SCH)

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

Synthesized Required Courses (3 SCH)

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

Mathematics Electives (18 SCH)

Total for Degree	**36 SCH**

1.3. APPLIED STATISTICS NON-THESIS

Required Mathematics Courses (15 SCH)	
MATH 5305 Real Analysis I	3 SCH
MATH 5320 Complex Variables	3 SCH
MATH 5330 Abstract Algebra I	3 SCH
MATH 5365 Topology	3 SCH
MATH 5375 Probability Theory	3 SCH
Electives Mathematics Courses (6 SCH)	
Required Statistics Course (3 SCH)	
STAT 5390 Case Seminar in Applied Statistics	3 SCH
Elective Statistics Courses (12 SCH)	
Two courses to be chosen from	
STAT 5300 - Categorical Data Analysis	3 SCH
STAT 5305 - Applied Data Analysis	3 SCH
STAT 5310 - Statistical Models for Clinical Trials	3 SCH
STAT 5340 - Quality Control and Improvement	3 SCH
STAT 5341 - Applied Multivariate Analysis	3 SCH
Two courses to be chosen from	
STAT 5306 - Generalized Linear Models with Applications	3 SCH
STAT 5322 - Theory of Sampling and Surveys	3 SCH
STAT 5327 - Computational Models in Statistics	3 SCH
STAT 5328 - Regression and Applied Series Models	3 SCH
STAT 5329 - Analysis of Variance in Experimental Design Models	3 SCH
STAT 5387 - Statistical Models for Spatial Data	3 SCH
Total for Degree	**36 SCH**

1.4. MATHEMATICS EDUCATION NON-THESIS

Required Mathematics Courses (18 SCH)	
MATH 5305 Real Analysis I	3 SCH
MATH 5320 Complex Variables	3 SCH
MATH 5330 Abstract Algebra I	3 SCH
MATH 5365 Topology	3 SCH
MATH 5370 Mathematical Modeling I	3 SCH
MATH 5375 Probability Theory	3 SCH

Required Education Courses (15 SCH)	
EDCI 5315 Design for Instruction	3 SCH
EDDP 5327 Educating Diverse Populations: Teaching Diverse Students	3 SCH
EDGR 5320 Foundations of Research	3 SCH
EDIT 5322 Technology Applications for Secondary Mathematics and Science Teachers	3 SCH
EDME 5310 Problem-Solving Techniques for Secondary Mathematics Teachers	3 SCH
One Course Chosen from (3 SCH)	
EDME 5390 Issues in Secondary Mathematics Education	3 SCH
EDCI 5399 Special Issues in Curriculum and Instruction: Issues in Mathematics Education	3 SCH
Total for Degree	**36 SCH**

2. ADDITIONAL DEGREE REQUIREMENT DETAILS

- Thesis plan requires a thesis and a successful oral defense. Students are encouraged to present their research outcomes in conferences, e.g. Texas A&M System Pathways to the Doctorate Student Research Symposium in Fall, TAMIU Annual LBV Academic Conference in Spring, and Department of Mathematics and Physics Fall Student Conference in Fall each year.
- Students are encouraged to complete the program within three years. Courses taken in a degree program will be valid for only five years.

3. RETENTION REQUIREMENTS

- If either of a student's cumulative GPA falls below 3.000, he or she will be considered to be scholastically deficient. If the minimum GPA is not attained by the end of next semester of enrollment, the student will be dropped from graduate studies.
- Students who receive a D, F, or more than two Cs for coursework listed on their degree plan will be dropped from graduate studies.
- The procedures for dismissal and expulsion are explained in the TAMIU Student Handbook.

4. COMPREHENSIVE EXAMS

- Only students who have satisfactorily completed all required courses are eligible to take the exam.

- Thesis-track students are only required to pass the comprehensive exam in the major field of their thesis; a minor field is optional. Non-thesis-track students are required to pass written comprehensive exam for two areas. Education non-thesis-track students are also required to pass two written comprehensive exams, one in the area of mathematics and one in the area of education. Applied Statistics non-thesis-track students are also required to pass two written comprehensive exams in one area of mathematics and one area of statistics.
- 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, the student will not be eligible for the degree. In such an event, the student will need to repeat the entire program.
- The student must pass the comprehensive exam in order to receive the degree.
- Students must register intent to take the comprehensive examinations with the Department Chair and/or Graduate Advisor no later than the third Friday of the semester in which the exam will be taken. Registered comprehensive examinees may request for copies of previous comprehensive exams from the Graduate Advisor.

5. ETHICS

TAMIU graduate students should recognize that they represent their intellectual community in a special way. Our institution's reputation depends upon what our graduates achieve and upon how they conduct themselves. The University expects graduate students to conduct themselves in accord with principles appropriate to mature and rational individuals. A detailed description of the Student Conduct Code is available in the TAMIU Student Handbook (see http://www.tamiu.edu/studentaffairs/StudentHandbook1.shtml).

6. GRADUATE ADVISORY COMMITTEE

Soon after enrolling for graduate coursework, and no later than the end of the second semester of study, each student in thesis plan must request a Graduate Advisory Committee. For students in non-thesis plan, a Graduate Advisory Committee is not required but is highly recommended.

The committee should include at least four tenured or tenure-track faculty members who are members of the Graduate Faculty at TAMIU. The committee chair, one of the four members, must be from the student's major field and one member must be from a different field. If the student wishes to include more than four faculty members on the committee, approval by the committee chair is required.

Once the committee has been chosen and the designated faculty members have agreed to serve, the student must obtain their signatures on the form Request for Service on a Graduate

Advisory Committee. The student takes this form to the OGSR, where it is kept as part of the student's academic records. A copy of this form should also be submitted to the Department Chair.

The student's advisory committee, in consultation with the student, will design a coherent and viable degree plan and a reasonable timetable for executing it. Upon advisement, each student will receive a copy of a checklist for graduate students and faculty advisors which will clarify the various stages of the student's expected progress toward the degree.

The advisory committee, under the direction of the Department Chair, will have the responsibility for the following:

- Counseling the student on academic matters
- Evaluating the student's progress toward completion of the degree program
- Preparing the comprehensive examination
- Assisting with the thesis research proposal
- Administering and attending the defense of the thesis

All graduate students should schedule regular appointments with their committee chairs each semester. At the end of each semester, the committee chair must record that the student is making satisfactory progress toward the completion of the degree. Any student who temporarily or permanently drops out of a graduate program must provide a written explanation to the chair of the advisory committee, who will file a report with the Department Chair and the Office of Graduate Studies & Research.

For more information about Graduate Advisory Committee, please see TAMIU OGSR Graduate Handbook (see http://www.tamiu.edu/gradschool/HandbooksandManuals.shtml).

7. TIMELINE/DEADLINES

The following are suggested timeline/deadlines for completing the thesis or non-thesis degree within two years.

1) Application for Admission
   - First working day in April for summer or fall semester entry
   - First working day in November for spring semester entry
2) GRE and Transcripts
   - Transcripts shall 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) Degree Plan and Graduate Advisory Committee
   - A degree plan shall be submitted no later than the end of the second semester
   - A Graduate Advisory Committee shall be requested no later than the end of the

second semester

5) Thesis Proposal (only for students in thesis plan)
   - Discussion of thesis proposal by the end of the second semester
   - Thesis proposal shall be submitted by midterm of the third semester
   - Thesis proposal shall be approved by the end of the third semester
6) Completion of Coursework
   - Fourth semester
7) Comprehensive Exams
   - Fourth semester
8) Application for Graduation
   - Beginning of the final semester
9) Oral Defense (only for students in thesis plan)
   - One month before graduation
10) Thesis Cleared (only for students in thesis plan)
   - Two weeks before graduation

IV. CURRICULUM

1. One-and-a-Half Year Cycle of Graduate Courses

The Department of Mathematics and Physics intends to offer all required courses on a one-and-a-half year cycle basis. A three-year mathematics graduate courses schedule is available in the homepage of the department: http://www.tamiu.edu/coas/depts/dmps/mathprog.shtml. Other elective courses are offered on an as-needed basis when sufficient enrollment is anticipated. Please consult the College of Education for offering of the education courses in mathematics education non-thesis plan and the University Catalog (http://www.tamiu.edu/catalog/) for any revisions of course curriculums to occur.

2. Mathematics 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 monograms during the class meetings. May be repeated once when topics vary. Prerequisites: Graduate standing and permission of instructor (formerly MATH 51 90).

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 1to 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: MATH 5303.

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: MATH 5305 and knowledge equivalent to MATH 3310.

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: MATH 5305 and knowledge equivalent to MATH 3310.

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: MATH 5320.

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: MATH 5330.

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: MATH 5365 and knowledge equivalent to MATH 2415 and MATH 4335.

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: MATH 5350.

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: MATH 5305.

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 CRJNC 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 CRINC basis. A good standing in MATH 5398 Thesis I is required. If grade of IP is received, student must enroll again for credit.

3. EDUCATION COURSES

EDCI 5315 *Advanced Instructional Methods*. Three semester hours.
Designed to develop enhanced knowledge and practice in the use of instructional tools and methods relating to instructional theory. Beginning with a review of theoretical foundations of instruction, the course will progress through the acquisition of additional tools for formally developing instruction to the development of an individual project centering upon an integrated learning (thematic) unit. Emphasis will be placed upon technology tools that aid course development and delivery. Alternative assessment design, technology delivery of instruction, techniques for authentic instruction, and other concepts will be incorporated into the final project. 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 m 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.

4. STATISTICS COURSES IN THE PROGRAM

STAT 5300 *Categorical Data Analysis*. Three semester hours.
In this course students will be exposed to statistically significant techniques beyond those of linear regression. Topics to be covered include the Generalized Likelihood Ratio test, theory of a generalized linear model, Poisson regression, logistic regression, and analysis of data on a more categorical basis among others.

STAT 5305 *Applied Data Analysis*. Three semester hours.
Concepts related to the theory and application of analysis of significance in data samples, probabilistic inference, expectation, hypothesis testing, and other statistical analysis methods.

STAT 5306 *Generalized Linear Models with Applications*. Three semester hours.
In a broader statistical context, simple discrete statistical modeling does not suffice. To accommodate the analysis of mixed discrete and continuous models and other more general samples, this course implements generalized linear models. This is an extension on linear regression analysis.

STAT 5310 *Statistical Methods for Clinical Trials*. Three semester hours.
This course is designed around the design of data collection and analysis related to experiments conducted in a clinical setting. Approaches towards minimizing bias in sampling and category responses are emphasized.

STAT 5322 *Theory of Sampling and Surveys*. Three semester hours.
This course will cover the theory and application of methods geared towards sample intake and survey conduct. Topics include simple random sampling, proportion estimates, regression estimation, cluster sampling, multistage design, and more.

STAT 5327 *Computational Methods in Statistics*. Three semester hours.
This course will focus on statistically significant computing methods, such as the R programming language, and the implementation of models relevant to such studies.

STAT 5328 *Regression and Applied Time Series Models*. Three semester hours.
This course focuses on the study of data correlated over a certain period of time. The correlation of such

data can be analyzed using various tools including ARIMA models, suitability estimates, forecast predictions, smoothing methods, cross correlation, lagged regressions, use of time series variables, intervention analysis, longitudinal analysis, multivariate time series, and frequency domain analysis to name a few.

STAT 5329 *Analysis of Variance in Experimental Design Models*. Three semester hours.
Experimental data can be correlated via an analysis of the variances related to the data, with a statistically significantly large enough sample. This course focuses on the use of ANOVA methodology to encourage proper model selection for statistical analysis in a laboratory setting.

STAT 5340 *Quality Control and Improvement*. Three semester hours.
This course is designed for the study of the theory and application of statistical methods in order to assess the integrity of statistically analyzable processes (like mass production). Methods to increase quality management and productivity while considering variables, attributes, various analysis methodologies, sampling, graphing, model selection, and others will be studied.

STAT 5341 *Applied Multivariate Analysis*. Three semester hours.
This course covers the study of more sparsely correlated data. Among the topics are the theory and application of advanced testing of correlations and analysis of varied aggregate data techniques such as cluster and discriminant analysis. Factor analysis is covered in detail, as is graphical display of multivariate data, sample correlations, inference, conditional distribution and partial correlation, principal component analysis, and multivariate analysis of variance.

STAT 5387 *Statistical Models for Spatial Data*. Three semester hours.
This course will cover the linear and general linear regression models with respect to smoothing and in the context of large correlated samples taken over multi-dimensional regions. Some programming experience is recommended for proper implementation of the models and samples to be discussed.

STAT 5390 *Case Seminar in Applied Statistics*. Three semester hours.
The student, guided by a chosen faculty member(s), will prepare a project related to statistics and applied mathematics. The student then presents the results in a seminar during the student's final semester that usually lasts 75 minutes followed by a short Q&A session. This replaces the comprehensive examination requirement. Students must exhibit a working knowledge of two useful computer languages or data analysis software packages.

V. DEPARTMENT FACULTY

The faculty in the Department of Mathematics and Physics 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 market place. For the current research interests of the faculty, visit the webpage of the Department: http://www.tamiu.edu/coas/depts/dmps/.

VI. POLICIES

1. PLAGIARISM AND CHEATING

Plagiarism is the presentation of someone else's work as your own. It occurs when you:

1) Borrow someone else's facts, ideas, or opinions and put them entirely in your own words, you must acknowledge that these thoughts are not your own by immediately citing the source in your paper. Failure to do this is plagiarism.
2) Borrow someone else's words (short phrases, clauses, or sentences), you must enclose the copied words in quotation marks as well as citing the source. Failure to do this is plagiarism.
3) Present someone else's paper or exam (stolen, borrowed, or bought) as your own, you have committed a clearly intentional form of intellectual theft and have put your academic future in jeopardy. This is the worst form of plagiarism.

Here is another explanation from the 2010, sixth edition of the *Manual of The American Psychological Association* (APA):

Plagiarism: Researchers do not claim the words and ideas of another as their own; they give credit where credit is due. Quotations marks should be used to indicate the exact words of another. Each time you paraphrase another author (i.e., summarize a passage or rearrange the order of a sentence and change some of the words), you need to credit the source in the text.

The key element of this principle is that authors do not present the work of another as if it were their own words. This can extend to ideas as well as written words. If authors model a study after one done by someone else, the originating author should be given credit. If the rationale for a study was suggested in the Discussion section of someone else's article, the person should be given credit. Given the free exchange of ideas, which is very important for the health of intellectual discourse, authors may not know where an idea for a study originated. If authors do know, however, they should acknowledge the source; this includes personal communications. (pp. 15-16)

Consult the Writing Center or a recommended guide to documentation and research such as the *Manual of the APA* or the *MLA Handbook for Writers of Research Papers* for guidance on proper documentation. If you still have doubts concerning proper documentation, seek advice from your instructor prior to submitting a final draft.

1.1 Penalties for Plagiarism: Should a faculty member discover that a student has committed plagiarism, the student should receive a grade of 'F' in that course and the matter will be referred to the Honor Council for possible disciplinary action. The faculty member, however, may elect to give freshmen and sophomore students a "zero" for the assignment and to allow them to revise the assignment up to a grade of "F" (50%) if they believe that the student plagiarized out of ignorance or carelessness and not out of an attempt to deceive in order to earn an unmerited grade. This option should not be available to juniors, seniors, or graduate students, who cannot reasonably claim ignorance of documentation rules as an excuse.

Caution: Be very careful what you upload to Turnitin or send to your professor for evaluation. Whatever you upload for evaluation will be considered your final, approved draft. If it is plagiarized, you will be held responsible. The excuse that "it was only a draft" will not be accepted.

Caution: Also, do not share your electronic files with others. If you do, you are responsible for

the possible consequences. If another student takes your file of a paper and changes the name to his or her name and submits it and you also submit the paper, we will hold both of you responsible for plagiarism. It is impossible for us to know with certainty who wrote the paper and who stole it. And, of course, we cannot know if there was collusion between you and the other student in the matter.

1.2 Penalties for Cheating: Should a faculty member discover a student cheating on an exam or quiz or other class project, the student should receive a "zero" for the assignment and not be allowed to make the assignment up. The incident should be reported to the chair of the department and to the Honor Council. If the cheating is extensive, however, or if the assignment constitutes a major grade for the course (e.g., a final exam), or if the student has cheated in the past, the student should receive an "F" in the course, and the matter should be referred to the Honor Council. Under no circumstances should a student who deserves an "F" in the course be allowed to withdraw from the course with a "W."

1.3 Student Right of Appeal: Faculty will notify students immediately via the student's TAMIU e-mail account that they have submitted plagiarized work. Students have the right to appeal a faculty member's charge of academic dishonesty by notifying the TAMIU Honor Council of their intent to appeal as long as the notification of appeal comes within 10 business days of the faculty member's e-mail message to the student. The *Student Handbook* provides more details.

1.4 Use of Work in Two or More Courses: You may not submit work completed in one course for a grade in a second course unless you receive explicit permission to do so by the instructor of the second course.

2. STUDENTS WITH DISABILITIES

Texas A&M International University seeks to provide reasonable accommodations for all qualified persons with disabilities. This University will adhere to all applicable federal, state, and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal education opportunity. It is the student's responsibility to register with the Director of Student Counseling and to contact the faculty member in a timely fashion to arrange for suitable accommodations.

3. STUDENT ATTENDANCE AND LEAVE OF ABSENCE (LOA) POLICY

As part of our efforts to assist and encourage all students towards graduation, TAMIU provides LOA's for students, including pregnant/parenting students, in accordance with the Attendance Rule (Section 3.24) and the Student LOA Rule (Section 3.25), which includes the "Leave of Absence Request" form. Both rules can be found in the TAMIU Student Handbook (URL: http://www.tamiu.edu/studentaffairs/StudentHandbook1.shtml).

4. PREGNANT AND PARENTING STUDENTS

Under Title IX of the Education Amendments of 1972, harassment based on sex, including harassment because of pregnancy or related conditions, is prohibited. A pregnant/parenting student must be granted an absence for as long as the student's physician deems the absence

medically necessary. It is a violation of Title IX to ask for documentation relative to the pregnant/parenting student's status beyond what would be required for other medical conditions. If a student would like to file a complaint for discrimination due to his or her pregnant or parenting status, please contact the TAMIU Title IX Coordinator (Lauren A. Jones, J.D., 5201 University Boulevard, KL 159B, Laredo, TX 78045, TitleIX@tamiu.edu, 956.326.2857) and/or the Office of Civil Rights (Dallas Office, U.S. Department of Education, 1999 Bryan Street, Suite 1620, Dallas, TX 75201-6810, 214.661.9600).

The University advises a pregnant or parenting student to notify his or her professor once he or she is aware that accommodations for such will be necessary. It is first recommended that the student and professor attempt to work out the reasonable accommodations with each other. The Office of Student Conduct and Community Engagement (Mayra Hernandez, MGHernandez@tamiu.edu) can assist the student and professor in working out the reasonable accommodations. In the event that a student will need a leave of absence for a substantial period of time from the University, the University urges the student to consider a Leave of Absence as outlined in the Student Handbook. As part of our efforts to assist and encourage all students towards graduation, TAMIU provides LOA's for students, including pregnant/parenting students, in accordance with the Attendance Rule and the Student LOA Rule. Both rules can be found in the TAMIU Student Handbook (http://www.tamiu.edu/scce/studenthandbook.shtml).

VII. APPENDICES-FORMS

Thesis flowchart and timeline and following forms are found at the website of TAMIU Graduate School http://www.tamiu.edu/gradschool/ThesisForms.shtml.

Request for Services of a Graduate Advisory Committee
Thesis or Dissertation Proposal Coversheet
Written Thesis (MS-MA) Approval Form
Copyright and Availability Form