OFFICE OF CHIEF OPERATIONS OFFICER
Summary of State Board of Education Items
June 19-20 2014

OFFICE OF EDUCATOR LICENSURE

33. Approval of Requests for a Supplemental Endorsement in Secondary Mathematics as recommended by the Commission on Teacher and Administrator Education, Certification and Licensure and Development

Background Information:

The following Teacher Preparation Programs are requesting to modify their secondary mathematics supplemental endorsement program to provide the advanced mathematics preparation teachers needs to teach mathematics at secondary level as outlined by the Common Core State Standards (CCSS) for Mathematics. The proposed program is in alignment with the recommendations of Mississippi Association of Mathematics Teacher Educators (MAMTE).

In addition, the modification to the existing program will better prepare teachers to meet the expectations of the CCSS for mathematics, to assist teachers with more effective preparation for the classroom and enable teachers to meet the Mississippi Department of Education's licensure and endorsement guidelines.

The Commission on Teacher and Administrator Education, Certification and Licensure and Development approved the requests from the following EPPs at their May 13, 2014, meeting:

1. Mississippi College
2. Mississippi State University
3. Mississippi University for Women

Recommendation: Approval

Back-up material attached

Form M
Rev 02-14

Commission Approval Date_____

State Board Approval Date_____

EDUCATION PROGRAM APPROVAL FORM M
MODIFYING AN EXISTING PROGRAM

Institution: Mississippi College	Date Submitted to MDE: February 14, 2014
Institutional Contact: Institutional Contact: Don Locke	Contact's Phone: 601-925-3250 Contact's Email: locke@mc.edu
Proposed Date of Implementation: Fall 2014	Proposal to Modify an Existing: X Teacher Education Program for Initial Licensure □ Advanced Education Program for Certification as an Administrator or Other School Professional

Where applicable, you must include the following documentation:

- Outline of the current program (e.g., program/advisement sheet)
- Outline of the proposed program with clear indication of any proposed changes
- Proposed course syllabi and course descriptions, if applicable
- Documentation of faculty that will provide instruction for the proposed courses/program of study (a faculty table that presents qualifications, which can be a duplicate of a SACS or NCATE table, and provide last two semester assignments and proposed class loads)
- List of two or more programs with the same or similar courses of study (instate or out-of-state), or provide URLs if available online
- Documentation of MS IHL approval (public institutions only)
- Justification of need to make modifications
- Current specialized professional association recognition (SPAs), where applicable
- Any other documentation that further supports the rationale for the proposal

NOTE: Use the spaces below for a brief description; however, please attach a more detailed proposal, and/or duplicate of the proposal submitted to MS IHL for approval where applicable.

Briefly state your request:
Mississippi College would like to modify the Secondary Mathematics Supplemental Endorsement program that is part of our current initial certification programs. This program will provide the advanced mathematics preparation needed to teach mathematics at the high school level as outlined by the *Common Core State Standards for Mathematics*. This program will ensure that those seeking to add certifications to their initial license have appropriate content knowledge to teach mathematics effectively. Our proposed program is in alignment with the recommendations of Mississippi Association of Mathematics Teacher Educators (MAMTE) as well as other programs in the state and region.

Briefly state your rationale/justification for the program modification(s):
An amendment was recently made by the MDE to the policy for obtaining a Secondary Mathematics Supplemental. Previously any 21 mathematics hours or coursework could count towards a secondary math endorsement. MC has proposed changes to the existing program requirements so teachers following the prescribed endorsement guidelines will be better prepared to meet the expectations of the CCSS for mathematics, to assist teacher candidates in more effective preparation for the classroom, and to meet the new policies of the MDE for licensure and endorsements.

Course Descriptions

MAT 213 Applied Linear Algebra 3 semester hours credit

Textbook: Linear Algebra and its Applications , 3nd edition, by Lay
Prerequisites: MAT 101 or the equivalent
Course Description: This course is an introduction to the arithmetic operations and applications of linear algebra. Major emphasis is placed on problem solving and mathematical modeling. Public Domain Software will be utilized extensively to aid with computations and application of the concepts. This course will give the student an understanding of the basic tools of vector and matrix arithmetic. Major topics covered include determinants, linear systems, matrix factorization, linear transformations, eigenvalues and eigenvectors with selected applications.

MAT 207 Elementary Statistics 3 semester hours credit

Text: Essentials of Statistics, 3rd Ed., 2008, Triola
Calculator: Casio *fx*-300MS Plus **strongly** recommended
Prerequisites: MAT 101, 210 or two years of high school algebra
Course Description: A study of elementary statistics for non-majors with an introduction to probability. Emphasis is placed on student understanding and interpretation of statistical data and computation using calculators and computers. Statistics is the basic mathematical tool for drawing certainty from uncertainty. Public policy, the availability of new drugs, the development of new products, comparisons of teaching effectiveness, quality control in production, and even who gets the biggest contract in baseball are based on statistical analysis. The study of statistics develops a set of cognitive and technical skills which include thinking analytically, defining and solving problems, and collecting and analyzing and interpreting data. These understanding and skills are important in preparing students for a lifetime of learning and of service to God and others. This course helps college students understand the basic vocabulary and principles of statistics needed in order to skillfully discern truth in presentations of information.

MAT 304 Modern Plane Geometry 3 semester hours

Prerequisites: MAT 301 and high school geometry or 211
Course Description: A study of Euclidean geometry from the modern axiomatic viewpoint. Some alternatives to Euclidean geometry will be considered. This course is an examination of the axiom systems that underlie plane geometry. It is intended to serve the needs of a general mathematics major to improve skills in theorem proving using the content area of geometry as well as prepare the prospective elementary or secondary mathematics teacher for a future role as an instructor of geometry.

MAT 301 Foundations of Mathematics Course Credit: 3 semester hours

Faculty Qualifications for Math Coursework

Faculty Member Name	Highest Degree, Field, & University	Faculty Rank	Scholarship, Leadership in Professional Associations, and Service	Teaching or other professional experience in P-12 schools
Gann, Melinda	PhD in Mathematics Education, University of Southern Mississippi	Professor	Student Government Association Faculty Award for Mississippi College in 2000, MCTM (Mississippi Council of Teachers of Mathematics) College Teacher of the Year, interim chairperson of the mathematics dept, President of MCMA (Mississippi Collegiate Mathematics Association), Vice-President of MCMA, Vice-Chairman of the LA/MS section of MAA (mathematics Association of America), Chairperson of the Resolutions Committee for the MS/LA section of MAA, served on the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) review panel for the Miss. Dept. of Education.	5 years, teacher 7-12 mathematics, Fort Worth, TX IDS, Castleberry, TX IDS, Newton Country IDS, MS; Mathematics consultant for various school districts in Mississippi, consultant for the Assessment Department of the Mississippi Department of Education (in charge of constructing mathematics state tests for grades 3-8 and the Algebra I exam for the state of Mississippi), writer (and trainer) of Mathematics Common Core implementation for the IMPACT consulting (trained all the teacher k-12 in several Mississippi School districts in the Common Core
Floyd, Teresa	Ph.D. in Curriculum and Instruction-Mathematics Education, University of Missouri-Columbia	Professor	Mississippi Council of Teachers of mathematics (MCTM) Executive Board; LA/MS Section of mathematical Association of America (MAA); National Council of Teacher of Mathematics (NCTM), Mississippi Association of College Mathematics Teachers (MACMT)	15 years math teacher, Pearl High School and Junior High School. Magee Junior High and High School, Hinds County, Joe Cook Junior High School
Leavelle, Tommy	Ph.D., University of North Texas M.A., University of North Texas B.S., Wayland Baptist	Professor of Mathematics	Professor at Mississippi College for 22 years	Assistant Professor at Brown University for 3 years.

Instructor Course load for Fall 2013 and Spring 2014

Charlotte McMath

Spring 2014 - 12 hours

MAT 205	A	Finite Mathematics	24	3.00	
MAT 205	B	Finite Mathematics	24	3.00	
MAT 105	A	Contemporary Mathematics		27	3.00
MAT 206	A	Applied Calculus	27	3.00	

Fall 2013 - 12 hours

MAT 105	A	Contemporary Mathematics	24	3.00	
MAT 105	B	Contemporary Mathematics	24	3.00	
MAT 205	A	Finite Mathematics	24	3.00	
MAT 205	B	Finite Mathematics	24	3.00	

John Travis

Spring 2014 - 9 hours (plus QEP overload)

MAT 222	A	Calculus IV	24		
MAT 301	A	Foundations of Mathematics		27	3.00
MAT 413/5413	A	Linear Algebra	12	3.00	

Fall 2013 - 9 hours

MAT 102	B	Trigonometry
MAT 352	A	Differential Equations
MAT 353	A	Intro Mathmtcl Problty & Stats

MAT 401 A Senior Seminar

MAT 421/5420 A Modern Algebra

Melinda Gann

Spring 2014 12 hours

MAT 207 A Elementary Statistics

MAT 121 Calculus with Analytic Geometry I

MAT 122 Calculus with Analytic Geometry II

MAT 211 Geometry for Teachers

Fall 2013 12 hours

MAT 207 D Elementary Statistics

MAT 210 B Math for Teachers Number Systems

MAT441 A Methods and Materials for Teaching Secondary Math

MAT 5441Z Methods and Materials for Teaching Secondary Math

Teresa Floyd

Spring 2014 12 hours

MAT 212 Math for Teachers Geometry

MAT 102 Trigonometry

MAT 121 Calculus with Analytic Geometry I

MAT 304 Modern Plan Geometry

Fall 2013 15 hours

MAT 121 Calculus with Analytic Geometry

MAT 181 Mathematics with Technology

RATIONALE FOR COURSE SELECTION

The courses outlined above were chosen in order to provide teachers the mathematical content needed to be effective teachers. These courses are in line with recommendations from the Mississippi Association of Mathematics Teacher Educators (MAMTE), the National Council for Teachers of Mathematics NCATE Standards, as well as the recommendations as outlined by the Conference Board of the Mathematical Sciences (CBMS). The recommendations from these organizations are included for your reference.

MAMTE Recommendation for Secondary Mathematics Supplemental Endorsement Program

Supplemental Endorsement Program for Mathematics MAMTE Symposium, May 2012 Revised by MDE Licensure Sub-Committee, July 2012		
6	Calculus	Minimum number of hours: MAMTE strongly suggests to universities/colleges that this DOES NOT include pre-calculus course
3	Geometry	
3	Statistics	
3	Advanced Algebra Course	Linear Algebra Abstract Algebra
6	ELECTIVES (300+ level; Calculus III; Calculus IV; Elementary Functions/Pre-Cal; or Secondary Mathematics Methods Course)	Suggestion: MAMTE strongly suggests a Foundations of Math course and a Methods course

NCTM NCATE Mathematics Content for Secondary

http://www.nctm.org/standards/content.aspx?id=2978

(See attached)

A.2.3 Functional representations (tables, graphs, equations, descriptions, recursive definitions, and finite differences) and notations as a means to describe, interpret, and analyze relationships and to build new functions

A.2.4 Patterns of change in linear, quadratic, polynomial, and exponential functions and in proportional and inversely proportional relationships and types of real-world relationships these functions can model

A.2.5 Linear algebra including vectors, matrices, and transformations

A.2.6 Abstract algebra, including groups, rings, and fields, and the relationship between these structures and formal structures for number systems and numerical and symbolic calculations

A.2.7 Historical development and perspectives of algebra including contributions of significant figures and diverse cultures

A.3. Geometry and Trigonometry

To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to geometry and trigonometry with their content understanding and mathematical practices supported by appropriate technology and concrete models:

A.3.1 Core concepts and principles of Euclidean and non-Euclidean geometries in two and three dimensions

A.3.2 Transformations including dilations, translations, rotations, reflections, glide reflections; compositions of transformations; and the expression of symmetry in terms of transformations

A.3.3 Congruence, similarity and scaling, and their development and expression in terms of transformations

A.3.4 Right triangles and trigonometry

A.3.5 Application of periodic phenomena and trigonometric identities

A.3.6 Identification, classification into categories, visualization, and representation of two- and three-dimensional objects (triangles, quadrilaterals, regular polygons, prisms, pyramids, cones, cylinders, and spheres)

A.3.7 Formula rationale and derivation (perimeter, area, surface area, and volume) of two- and three-dimensional objects (triangles, quadrilaterals, regular polygons, rectangular prisms, pyramids, cones, cylinders, and spheres), with attention to units, unit comparison, and the iteration, additivity, and invariance related to measurements

MATHEMATICS 213

Applied Linear Algebra

MAT 213 Textbook: Linear Algebra and its Applications , 3nd edition, by Lay

Prerequisites: MAT 101 or the equivalent

Course Description: This course is an introduction to the arithmetic operations and applications of linear algebra. Major emphasis is placed on problem solving and mathematical modeling. Public Domain Software will be utilized extensively to aid with computations and application of the concepts.

This course carries 3 hours of academic credit and does not count toward the hours necessary for a mathematics major.

(From the college catalog: This course will give the student an understanding of the basic tools of vector and matrix arithmetic. Major topics covered include determinants, linear systems, matrix factorization, linear transformations, eigenvalues and eigenvectors with selected applications.)

Learning Objectives: The student will demonstrate an understanding of how linear systems are created, solved and utilized. In particular, time permitting, the student will cover:

- Linear Equations in Linear Algebra (Chapter One):
  - Row operations
  - Vector and Matrix equations
  - Linear Independence
  - Linear Transformations
  - Linear models in Business, Science and Engineering
- Matrix Algebra (Chapter Two):
  - Inverses
  - Partitioning
  - Factorizations
  - Applications to Computer Graphics
  - Dimension and Rank
- Determinants (Sections 3.1 and 3.2):
  - Basic computing and properties
- Eigenvalues and Eigenvectors (Sections 5.1, 5.2 and 5.3):
  - Characteristic Equation
  - Diagonalization
- Orthogonality and Least Squares :
  - Inner Products
  - Orthogonal Sets

***Prerequisite*:** MAT 102 (trigonometry) or the equivalent

This course is a study of limits, continuity, the derivative and its applications.

Text: Calculus: Early Transcendental Functions, 4thd ed., Larson, Hostetler & Edwards
ISBN - 10: 0-618-60624-6
ISBN - 13: 978-0-618-60624-5

Calculator: TI 83 or TI 84 recommended

Rationale

This course is intended for mathematics majors and minors and is required of prospective secondary mathematics teachers. Calculus has applications in many fields such as business, science, computer science, and engineering.

Learning Objectives

At the conclusion of the course, successful students should be able to:

-define function, limit, continuity, and derivative
-calculate the limit of a function, if it exists
-determine if a limit doesn't exist
-determine whether a function is continuous
-calculate the derivative of a given function, if the derivative exists
-solve related rate problems
-determine the critical numbers of a function
-determine the relative maximums and relative minimums of a function
-determine the absolute maximums and absolute minimums of a function
-determine the intervals where a function increases and decreases
-determine the intervals where a function is concave downward and concave upward
-graph a function
-solve optimization problems
-compute the differential of a given function

Academic Integrity

Honesty and integrity are basic virtues expected of all students at Mississippi College. The Mississippi College *Student Handbook* (available online) lists the policies and penalties for plagiarism and cheating. On tests, quizzes, and individual out-of-class projects, the work is assumed to be the student's own and no cheating will be tolerated.

2) passing the course at the time of withdrawal
3) does not have excessive absences at the time of withdrawal

MISSISSIPPI COLLEGE ACADEMIC POLICIES:
Students should consult the Mississippi College policy manual located at http://www.mc.edu/resources/publications/policies/ for official information regarding:

- Class attendance - Policy 2.10
- Grading - Policy 2.15
- Cheating - Policy 2.19
- Counseling and Career Services - Policy 2.25
- Research - Policy 2.27
- Counseling and Testing Center - Policy 2.34

Students who may require accomodation due to a documented handicap should follow the procedures located at http://www.mc.edu/about/offices/counseling/disabilities/

The Generic Grading Scale for this course is A = 90-100, B = 80-89, C = 70-79, D = 60-69. Individual instructors are free to choose a different grading scheme so students should consult their section's particular syllabus for the official grading scale to be utilized.

Tutoring Hours:
Hours and location for the departmental tutoring center are posted at http://www.mc.edu/academics/academic-tutoring/ .

- Applications
  - ❖ Differential equations
  - ❖ Area of a region between two curves
  - ❖ Volume of a solid of revolution
  - ❖ Length of Arc
  - ❖ Surface Area
- ➢ Techniques of Integration
  - ❖ Integration by parts
  - ❖ Trigonometric integrals
  - ❖ Partial fractions
- ➢ Indeterminate forms and L=H&spital=s Rule

Instruction:

The method of instruction will include lecture, group problem solving, individual problem solving, class discussion, quizzes, and examinations. Each student is expected to have a textbook, writing materials, and a calculator daily. Graphing calculators with symbolic manipulation capabilities are **NOT** allowed. The class demonstrations will use a TI-83 of a TI-84+. (To check one out see Dr. Gann in MCC 318.)

Required Practices:

Students are expected to *attend all class meetings,* ***read*** **the text** (yes, I know. . . a novel idea), complete written homework assignments, review class notes, and prepare for quizzes and tests. Students are also encouraged to promptly seek help (before the next class) from Dr. Floyd when assistance in understanding the material is needed.

Instructional Materials:

Text: Larson, R. E., Hostetler, R.P., & Edwards, B.H. (2007) *Calculus: Early Transcendental Functions* (3rd Ed.). Boston: Houghton Mifflin. ISBN: 978-0-618-60624-5

Graphing Calculator: Classroom demonstrations will use the TI-83. Graphing calculators will be allowed during class and on tests. Models **not permitted** are those with symbolic manipulation capabilities such as the TI-89.

Assessment:

Assessment of the student=s progress will be made through active class participation, homework evaluation, quizzes, and examinations. There will probably be three examinations as time permits (worth 100 points each). A comprehensive final will be given. and it is worth 150 points. The final grade in the course will be based on total points as follows:

90 - 100% of the total points = A
80 - 89% of the total points = B
70 - 79% of the total points = C
60 - 69% of the total points = D

Students who may require accomodation due to a documented handicap should follow the procedures located at http://www.mc.edu/about/offices/counseling/disabilities/

The Generic Grading Scale for this course is A = 90-100, B = 80-89, C = 70-79, D = 60-69. Individual instructors are free to choose a different grading scheme so students should consult their section's particular syllabus for the official grading scale to be utilized.

Tutoring Hours:
Hours and location for the departmental tutoring center are posted at http://www.mc.edu/academics/academic-tutoring/ .

MAT 301
Foundations of Mathematics
Course Credit: 3 semester hours

COURSE DESCRIPTION: *This course is an introduction to the ideas needed for advanced mathematics courses. Topics include set theory, logic, axiom systems, proof techniques, relations, functions, and cardinality. Emphasis will be given to applying proof techniques to material on number systems and other areas of higher mathematics.*

RATIONALE: *As students advance to upper level mathematics courses, they constantly need to apply various proofing techniques. This course is designed to prepare them for these techniques, as well as other topics needed in the advanced courses. This course is required of the mathematics majors and minors and serves as an elective for others.*

COURSE CONTENT: *Topics include set theory, logic, axiom systems, proof techniques, relations, functions, and cardinality. Emphasis will be given to applying proof techniques to material on number systems and other areas of higher mathematics.*

PREREQUISITES: *Mat 122*

COURSE OBJECTIVES: *Students will be able to define, state, discuss, and/or apply the topics listed above in the course description.*

MATERIALS REQUIRED:
Text: *A Transition to Advanced Mathematics* (6th Edition) Smith, Eggen, St. Andre

INSTRUCTIONAL PROCEDURES/TECHNIQUES: *Various instructional procedures are used*

ıtalog Description:

ıMAT 207 Elementary Statistics **Credit, 3 sem. hrs.**

Prerequisites: MAT 101, 210 or two years of high school algebra

A study of elementary statistics for non-majors with an introduction to probability. Emphasis is placed on student understanding and interpretation of statistical data and computation using calculators and computers. Mathematics majors should take MAT 253.

Rationale for Course: Statistics is the basic mathematical tool for drawing certainty from uncertainty. Public policy, the availability of new drugs, the development of new products, comparisons of teaching effectiveness, quality control in production, and even who gets the biggest contract in baseball are based on statistical analysis. The study of statistics develops a set of cognitive and technical skills which include thinking analytically, defining and solving problems, and collecting and analyzing and interpreting data. These understanding and skills are important in preparing students for a lifetime of learning and of service to God and others. This course helps college students understand the basic vocabulary and principles of statistics needed in order to skillfully discern truth in presentations of information.

Learning Objectives: Upon successful completion of this course, the student will be able to:
-correctly define and use statistical terms
-draw and interpret graphs of various types, including scatter diagrams
-compute measures of central tendency, dispersion and position
-use probability as a tool in statistical evaluation
-compute probabilities from a binomial probability distribution
develop information from a normal probability distribution
tate and use the Central Limit Theorem
-make point and interval estimates
-test hypotheses
-compute correlation and regression
-explain how statistics are used in a variety of realistic situations
-evaluate statistical citations for correctness and completeness

Academic Integrity: Honesty and integrity are basic virtues expected of all students at Mississippi College. The*Mississippi College Tomahawk* lists the policies and penalties for plagiarism and cheating. This information can also be found online by going to http://www.mc.edu/publications/policies/ and following the link to Policy 2.19.

Disability Accommodation: If you need special accommodations due to learning, physical, psychological, or other disabilities, please contact Dr. Buddy Wagner in the Counseling and Career Development Center. He may be reached by phone at 925-3354 or by mail at P. O. Box 4016, Clinton, MS 39058.

Learning Environment: The method of instruction will include lecture, group problem solving, individual problem solving, demonstrations, computer lab assignments, video and other library projects, quizzes and examinations. Each student is expected to have a copy of the text, a calculator (Casio *fx*-300*W* **strongly** recommended), writing materials, and an open mind.

Assessment: Assessment of the student's progress will be made through periodic examinations, quizzes, and the grading of other assignments as well as through classroom feedback. There will be three periodic examinations (100 points each), daily work (quizzes and other projects for a total of 150 points), and a comprehensive final examination (150 points) for a total of 600 possible points. Grades will be assigned as follows:

Total Points Earned	Grade
540-600	A
480-539	B

illustrate the differences between Euclidean and non-Euclidean geometries
derstand the concepts/uses of analytic geometry proofs

Academic Integrity

Honesty and integrity are basic virtues expected of all students at Mississippi College. The *Mississippi College Undergraduate Catalog* lists the policies and penalties for plagiarism and cheating. Additional information is included in Policy 2.19 in the *Mississippi College Tomahawk.* On homework, tests, quizzes, and individual out-of-class projects, the work is assumed to be the student's own and no cheating will be tolerated.

Outline of Topics

Axiomatic Systems
Axiom Sets For Geometry
Neutral Geometry
Euclidean Geometry of the Plane
Analytic and Transformational Geometry
Non-Euclidean Geometries

Methods of Instruction

The method of instruction will include lecture, group problem solving, individual problem solving, and examinations. Each student is expected to have a copy of the text, a student copy of *Geometer's Sketchpad* or lab access, writing materials, and an open mind. On homework, tests, quizzes, and individual out-of-class assignments, the work is assumed to be the student's own and no cheating will be tolerated.

- ☐ **Attempt** to complete all homework assigned **before** the next class meeting.
- ☐ See Dr. Floyd **before the next class meeting** if you are unable to complete most of the homework that is assigned.

INSTRUCTOR=S RESPONSIBILITIES

- ☐ Begin (and end) class on time.
- ☐ Be prepared to explain content, vocabulary, symbols, etc.
- ☐ Demonstrate mathematical relationships and proofs.
- ☐ Evaluate student comprehension of content, vocabulary, symbols, etc.

MISSISSIPPI COLLEGE ACADEMIC POLICIES:

Students should consult the Mississippi College policy manual located at http://www.mc.edu/resources/publications/policies/ for official information regarding:

- Class attendance - Policy 2.10
- Grading - Policy 2.15
- Cheating - Policy 2.19
- Counseling and Career Services - Policy 2.25
- Research - Policy 2.27
- Counseling and Testing Center - Policy 2.34

Students who may require accomodation due to a documented handicap should follow the procedures located at http://www.mc.edu/about/offices/counseling/disabilities/

The Generic Grading Scale for this course is A = 90-100, B = 80-89, C = 70-79, D = 60-69. Individual instructors are free to choose a different grading scheme so students should consult their section's particular syllabus for the official grading scale to be utilized.

Tutoring Hours:

Hours and location for the departmental tutoring center are posted at http://www.mc.edu/academics/academic-tutoring/ .

Mississippi College

Secondary Mathematics Supplemental Endorsement

Program Requirements

To be eligible for a supplemental mathematics endorsement, teacher candidates must complete the following 21 hour required program of study:

Required Math Courses (12 hours)

- Calculus I - Math 121
- Calculus II - Math 122
- Foundations of Mathematics - Math 301
- Modern Plane Geometry - Math 304

Additional math requirements include:

- **A three hour statistics course (3 hours)**
  Candidates may choose either
  - Mat 207 - Elementary Statistics **OR**
  - Mat 353 - Introduction to Probability and Statistics

- **A three hour algebra course (3 hours)**
  Candidates may choose either
  - Mat 213 - Introduction to Linear Algebra **OR**
  - Mat 413 - Linear Algebra **OR**
  - MAT 421 - Modern Algebra

- **One additional three hour mathematics course (3 hours)**
  - Any mathematics course numbered Mat 221 or higher

0608

MISSISSIPPI DEPARTMENT OF EDUCATION
Ensuring a bright future for every child

EDUCATION PROGRAM APPROVAL REQUEST FORM

Institution: Mississippi State University

Submitted by: Donna Shea

Contact phone and/or email:

662-325-7684 dshea@colled.msstate.edu

Date submitted to TAP: _____

Commission approval date: _____

State Board approval date: _____

Proposed date of program implementation/modification:

Proposal request and support materials are provided for approval to implement:
__x__ New Program ____ Modifications to Existing Program ____ New Licensure Requirement

In addition to your current education program course list/description, you must provide, where applicable:

1) **a copy of the proposed new program**
2) **the current program with clear indication of proposed modifications**
3) **any evidence of institutions (state, regional or national) with the same or a similar course of study**
4) **list of qualified faculty, course assignments, and vitas**
5) **course descriptions and syllabi for courses within the proposed program (indentify and new courses)**
6) **any other documentation that further supports the proposal**

NOTE: Use the spaces below for a brief statement of your proposal request. Additional sheets may be attached that include a formal request and detailed proposal components.

Please state your specific request:

Mississippi State University requests to offer a course of study for a supplemental endorsement in Secondary Mathematics and is submitting this proposal, which meets the Mississippi State Board of Education Requirements.

Briefly state your rationale:
There is a shortage of secondary mathematics teachers in many school districts in Mississippi. Mississippi State University wishes to resume the offering of the supplemental endorsement in Secondary Mathematics through the proposed course of study.

NOTE: Program approval is subject to standard review procedures that involve several entities and, therefore, timelines for final approval may vary. After TAP approves the program proposal, it may then be subject to presentation for approval by the Licensure Commission on Teacher and Administrator Education, Certification and Licensure and Development and the State Board of Education before program candidates are eligible for Mississippi Teacher Licensure.

Email this form to Gail Gettis at ggettis@mde.k12.ms.us or fax to 601-359-1728.

Proposed New Program

The proposed course of study requires the following 21 credit hours.

- Calculus
  - MA 1713 Calculus I
  - MA 1723 Calculus II
- Advanced Algebra Course
  - MA 3113 Introduction to Linear Algebra
- Statistics
  - MA/ST 3123 Introduction to Statistical Inference
- Geometry
  - MA 3463 Foundations of Geometry
- Foundations
  - MA 3053 Foundations of Mathematics
- Methods
  - EDS 3633 Secondary Mathematics Education

NOTE: All current transfer equivalencies from articulation agreements will be honored as they relate to this course of study.

Catalog descriptions for the courses in the proposed course of study are as follows:

MA 1713 Calculus I
(Prerequisite: ACT Math subscore 26, or grade of C or better in 1323 or 1453). Three hours lecture. Analytic geometry; functions; limits; continuity; derivatives of algebraic functions; applications of the derivative. Honors section available.

MA 1723 Calculus II
(Prerequisite: Grade of C or better in MA 1713). Three hours lecture. Antidifferentiation; the definite integral; applications of the definite integral; differentiation and integration of transcendental functions. Honors section available.

MA 3113 Introduction to Linear Algebra
(Prerequisite: MA 1723). Three hours lecture. Vector spaces; matrices; linear transformations; systems of linear equations; characteristic values and characteristic vectors.

MA 3123 Introduction to Statistical Inference
(Prerequisite:ACT math subscore 24, or grade of C or better in MA 1313). Two hours lecture. Two hours laboratory. Basic concepts and methods of statistics, including descriptive statistics, probability, random variables, sampling distribution,estimation,hypothesis testing, introduction to analysis of variance, simple linear regression. (Same as ST 3123).

MA 1433 Informal Geometry and Measurement
(Prerequisites: C or better in both MA 1413 and MA 1423). Three hours lecture. Measurements and informal geometry. (For Elementary and Special Education majors only).

MA 3053 Foundations of Mathematics
(Prerequisite: MA 1723). Three hours lecture. The logical structure of mathematics; the nature of a mathematical proof; applications to the basic principles of algebra and calculus.

EDS 3633 Secondary Mathematics Education
(Prerequisite: Admission to Teacher Education). Three hours lecture. Examine the concepts and tools used to teach mathematics in the secondary classroom, connections between algebra and geometry concepts, and national and state mathematics standards.

Current Program and Indications of Proposed Modifications

In the past, elementary education students could add a supplemental endorsement to their teaching license by completing 21 hours of mathematics coursework. With the dissolution of this endorsement at the state level, the proposed course of study is introduced.

The courses outlined above were chosen in order to provide teachers the mathematical and pedagogical knowledge needed to be effective secondary mathematics teachers. These courses are in accordance with recommendations from the Mississippi Association of Mathematics Teacher Educators (MAMTE), the National Council of Teachers of Mathematics NCATE Standards, as well as the recommendations outlined by the Conference Board of the Mathematical Sciences (CBMS).

Evidence of Institutions with the same or a similar course of study

Arkansas
http://arkansased.org/educators/licensure/adding_licensure.html

- Passing content area Praxis score, AND;
- University program of study
  (Univ. or AR - http://coehp.uark.edu/MathematicsALP.pdf)
  - 21 hours in math including:
    - college algebra
    - calculus
    - geometry
    - 2 math electives (any level)
    - 2 math electives (3000-4000 level)

South Carolina
http://ed.sc.gov/agency/se/Educator-Certification-Recruitment-and-Preparation/Certification/documents/TeacherCertificationManual.pdf

- Passing content area examination score, AND;
- 26 hours in math outlined by state department including:
  - 6 hours of algebra (abstract, matrix, and linear)
  - 3 hours of geometry
  - 8 hours of calculus
  - 9 hours of math electives (probability, statistics, applied math, discrete math, number theory, analysis, advanced algebra, advanced geometry)

Tennessee
http://www.tn.gov/education/lic/add.shtml

- Passing content area Praxis score AND completion of a university program
  (TN Tech Univ - http://www.tntech.edu/files/teachered/math_add.pdf)
  - 22 hours in math including:
    - calculus
    - matrix algebra
    - concepts of math
    - geometry
    - statistical methods
    - history of math
- OR Passing Praxis content area examination score (only for those teachers that currently hold a 7-12 license in another area)

Florida
http://www.fldoe.org/edcert/rules/6A-4-0262.asp

- BS or higher with a major in mathematics, OR;
- BS or higher with 30 hours in mathematics including, OR;
  - 6 hours of calculus
  - Geometry
  - Probability or statistics
  - Abstract or linear algebra

BS or higher with specialization in physics AND 21 hours of mathematics including the above listed courses.

Evidence of Qualified Faculty

Robert Banik, MS, Mississippi State University, 2007 – Mr. Banik is an instructor in the Department of Mathematics and Statistics at Mississippi State University and teaches courses including MA 1713.

Marjorie Crittenden, Ed.S., University of Alabama at Birmingham,1985 – Ms. Crittenden is an instructor in the Department of Mathematics and Statistics at Mississippi State University and teaches courses including MA 1723.

Lorriane Hughes, MS, Mississippi State University, 2000 – Ms. Hughes is an instructor in the Department of Mathematics and Statistics at Mississippi State University and teaches courses including MA 1723.

Jessica Ivy, Ph.D., University of Mississippi, 2011 – Dr. Ivy is a Visiting Assistant Professor in the Department of Curriculum, Instruction, and Special Education at Mississippi State University and teaches courses, including EDS 3633.

Corlis Johnson, Ph.D., Emory University, 1981 – Dr. Johnson is an Associate Professor and Associate Department Head in the Department of Mathematics and Statistics at Mississippi State University and teaches courses including MA 3053.

Dana Franz, Ph.D, Texas A & M University, 2001 – Dr. Franz is an Associate Professor in the Department of Curriculum, Instruction, and Special Education at Mississippi State University and advises mathematics education students.

Seth Oppenheimer, Ph.D., University of Texas at Austin, 1987 - Dr. Oppenheimer is a Professor in the Department of Mathematics and Statistics at Mississippi State University and teaches courses including MA 3463.

Chuanxi Qian, Ph.D., University of Rhode Island, 1993 – Dr. Qian is a Professor in the Department of Mathematics and Statistics at Mississippi State University and teaches courses including MA 3113.

Robert Smith, Ph.D., University of Arkansas, 1983 – Dr. Smith is an Associate Professor in the Department of Mathematics and Statistics at Mississippi State University and teaches courses including MA 3113.

Rebecca Wood, MA, Mississippi State University, 1992 – Ms. Wood is a lecturer in the Department of Mathematics and Statistics at Mississippi State University and teaches courses including MA 3123.

Syllabi for Included Courses

Effective Fall, 2011

MA 1713 Calculus I

Text: *Calculus*, 7th Edition, James Stewart.
Online Homework Access: Enhanced WebAssign

Policies and Recommendations

1. **Students are required to purchase access to Enhanced WebAssign, and so instructors must make online homework a component of their course.** The calculus Committee recommends that online homework and quizzes be weighted between 10-20% of the overall grade for the course.

2. Sections taught by Graduate Teaching Assistants will have standardized assignments, tests and policies determined by their supervisor.

3. No graphing calculators are allowed in MA 1713 and 1723. Scientific calculators are permissible at the discretion of the instructor.

4. Performance in Calculus I is now part of the University's instructional effectiveness assessment program. The Department has been required to identify three objectives/skills and to report students' performance. Instructors should record data on questions on tests and the final exam on each of the following:
   i. Use differentiation formulas to find the equation of the line tangent to the graph of a function at a given point.
   ii. Find the absolute extrema of a function on a closed, bounded interval.
   iii. Use first and second derivatives to determine the shape of the graph of a function.

   We have set the goal that at least 70% of students in MA 1713 will score 70% or more on test and final exam questions corresponding to these three objectives.

5. The Calculus Committee recommends 3-4 in-class tests in a MWF section (2-3 tests in a 75 min section). A comprehensive final examination is required and should be weighted 25-30% of the overall course grade.

6. Attendance should be recorded in all freshman-level courses and excessive (≥ 2) absences reported via online via *Pathfinders*.

7. Instructors may choose to reward students for (near) perfect attendance, but the Calculus Committee recommends that this not exceed 3% of the overall average.

MA 1713
Sample MWF Syllabus Fall, 2011

Unit I. Preliminaries (5 hours)

WebAssign Introduction and Registration

Section
1.1. Functions
Topics: Evaluation of functions; graphs of functions, domain and range; piece-wise defined functions.

Appendix D. Trigonometric Functions
Basic trigonometry and graphs of trigonometric functions

1.2. More Examples of Functions
Rational, trigonometric and algebraic functions

1.3. Operations on Functions
Scaling, shifting and reflecting functions; algebraic operations on functions; composition of functions

Unit II. Limits and Continuity (6 hours)

1.5. The Limit of a Function
Limits using graphical and numerical representations; one-sided limits; infinite limits and vertical asymptotes

1.6. Algebraic Properties of Limits
"Limit laws"

1.8 Continuity
Continuity at a point; common types of discontinuities; continuity of rational functions, trig functions and composition of continuous functions; continuity on intervals; the Intermediate value Theorem.

Review
Test 1

Unit III. The Derivative of a Function (6 hours)

2.1. Derivatives and Rates of Change
Definition of the derivative at a point and interpretations as rate of change and slope

2.2. The Derivative as a Function
Graph of the derivative; higher order derivatives

2.3. Differentiation Formulas
Algebraic properties of the derivative.

2.4. Derivatives of Trigonometric Functions
The derivatives of functions involving the sine, cosine and tangent functions.

2.5. The Chain Rule

Review
Test 2 (Sections 2.1—2.5)

2.6. Implicit Differentiation
Functions defined implicitly by an equation; tangents to curves.

2.7. Rates of Change in the natural and Social Sciences
Applications including velocity and acceleration of a particle; electric current, and others.

2.8. Related Rates

2.9. Linear Approximation
Estimates using the linear approximation of a differentiable function.

Unit IV Applications of the Derivative (11 hours)

3.1. Maxima and Minima
Absolute and local extrema; the Extreme Value Theorem; relative extrema and critical points.

3.2. Mean Value Theorem

Review
Test 3 (Sections 2.6—3.2)

3.3. How Derivatives Affect the Shape of a Graph
Finding intervals on which a function is monotonic; concavity and inflection points

3.4. Limits at Infinity: Horizontal Asymptotes

3.5. Summary of Curve Sketching

Unit V Optimization and Antidifferentiation (5 hours)

3.7. Optimization Problems
Additional applications.

3.9. Antidifferentiation
Antiderivative formulas from derivative formulas; initial value problems.

Review

Test 4 (Sections 3.3—3.9)

Review

Final Exam (Units II—V)

Summary:

33 lecture hours, 5 hours review, 4 hours tests, and 3 hours final exam
total: 45 hours

Grading:
1000 points total
Homework (& Quizzes): 150 points
Tests: 600 points (150/test)
Final: 250 points

Effective Spring, 2012

MA 1723 Calculus II

Text: *Calculus*, 7th Edition, James Stewart.
Online Homework Access: Enhanced WebAssign

Policies and Recommendations

1. **Students are required to purchase access to Enhanced WebAssign, and so instructors must make online homework a component of their course.** The calculus Committee recommends that online homework and quizzes be weighted between 10-20% of the overall grade for the course.

2. Sections taught by Graduate Teaching Assistants will have standardized assignments, tests and policies determined by their supervisor.

3. No graphing calculators are allowed in MA 1713 and 1723. Scientific calculators are permissible at the discretion of the instructor.

4. The Calculus Committee recommends 3-4 in-class tests in a MWF section (2-3 tests in a 75 min section). A comprehensive final examination is required and should be weighted 25-30% of the overall course grade.

5. Attendance should be recorded in all freshman-level courses and excessive ($\geq$2) absences reported via online via *Pathfinders*.

6. Instructors may choose to reward students for (near) perfect attendance, but the Calculus Committee recommends that this not exceed 3% of the overall average.

MA 1723
Sample MWF Syllabus

Unit I. The Definite Integral (8 hours not including time for test and review)
Emphasis in Section 4.2 should be on developing an intuitive understanding of the definite integral as a limit of Riemann sums rather than technicalities of manipulation.

Section

3.9. Review of Antidifferentiation

4.1. Area and Distance
Emphasize the area problem in preparation for the next section

4.2. The Definite Integral
Approximations by Riemann sums; interpretation of the definite integral as area.
Properties of the definite integral.

4.3. Fundamental Theorem of Calculus
Parts 1 and 2

4.4. Indefinite Integrals and the "Net Change Theorem"
Applications of part 2 of the Fundamental Theorem.

4.5. Integration by Substitution

Review
Test 1

Unit II. Applications (5 hours)

5.1. Area Between Curves

5.2. Volume of Solids by Cross-Sections

5.4. Work

5.5. Average Value of a Function
This will be useful in Section 8.5 (Probability)

Unit III. Trancendental Functions (10 hours)
Section 6.5 is omitted because of time constraints

6.1. Inverse Functions

6.2. Exponential Function

6.3. Logarithmic Functions

6.4. Differentiation of Logarithmic Functions

Review
Test 2

6.6. Inverse Trigonometric Functions
Emphasize *arcsin*, *arctan* and *arcsec* which are used in Trigonometric Substitution, Section 7.3.
6.8. Indeterminate Forms and L'Hospital's Rule

Unit IV. Techniques of Integration (10 hours)
Cover integration by parts in Section 7.1 thoroughly. Limit discussion of trig integrals in Section 7.2 to basics: $\int \sin^n x \cos^m x\, dx$ and $\int \tan^n x \sec^m x\, dx$ for small n and m. Limit coverage of trigonometric substitution similarly. Partial fraction decomposition remains important in theory and appears in problems in differential equations. But limit problems to basic forms.

7.1. Integration by Parts

7.2. Trigonometric Integrals

7.3. Trigonometric Substitution

7.4. Partial Fraction Decomposition

7.8. Improper Integrals.
This will be needed for Section 8.5 (Probability) and the Integral Test in Calculus III.

Review
Test 3

8.5. Probability (2 hours)
The College of Engineering asked that this topic be included in Calculus II.

Review

Final Exam

Summary:

35 lecture hours, 4 hours review, 3 hours tests, and 3 hours final exam
Total: 45 hours

Grading:
1000 points total
Homework (& Quizzes): 150 points
Tests: 600 points
Final: 250 points

MA 3113 **Introduction to Linear Algebra** Effective Fall, 2011

Text: *Linear Algebra and Its Applications*, 4th Edition, by David C. Lay

This course will present the main concepts and terminology of linear algebra that play an essential role in science and engineering. The Linear Algebra Curriculum Study Group suggests that an introductory course in linear algebra should be viewed as a service course for the various disciplines that employ techniques of linear algebra. Applications illustrating the pervasive use of linear algebra in engineering and the sciences should be included in the course. Utilization of technology is strongly encouraged.

An Introduction to Mathematica for Linear Algebra is available at
http://www2.msstate.edu/~lmiller/tutorials.html (a Mathematica 6 notebook).

A *Mathematica 8.0* manual for linear algebra along with projects and exercises is available at www.pearsonhighered.com/irc (registration required). Copies of these files are available on the Jasper drive: Data\LMiller\Linear Algebra\Lay

Chapter

1. Linear Equations Sections 1.1–1.5, 1.7–1.9 ..... 7 hours
Important Skills and Ideas Solve a system by row reduction. Determine when a system is consistent. Write the general solution in parametric vector form. Describe existence or uniqueness of solutions in terms of pivot positions. Determine when a homogeneous system has nontrivial solutions. Describe the solution set of a nonhomogeneous system as a translation of the solution set of the corresponding homogeneous system. Determine when a vector is in the subset spanned by specified vector. Exhibit a vector as a linear combination of vectors. Determine whether the columns of an $m \times n$ matrix span $\mathbb{R}^m$. Determine if the columns are linearly independent. Determine whether a set of vectors in $\mathbb{R}^n$ are linearly independent. Find the standard matrix for a linear transformation. Describe the action of operators on $\mathbb{R}^2$, in particular dilations, rotations and projections. Determine if a linear transformation is one-to-one or onto.

2. Matrix Algebra Sections 2.1–2.5, 2.8, 2.9 ..... 7 hours
Important Skills and Ideas Know the definition and properties of matrix product. Know the relation between matrix multiplication and composition of transformations. Compute the inverse of a matrix using row reduction. Use a matrix inverse to solve a system of equations. Use matrix algebra to solve matrix equations. Use the Invertible Matrix Theorem to connect various properties of square matrices. Compute entries in a product of partitioned matrices. Construct an LU factorization of a matrix A, and use such a factorization to solve a system $Ax = b$. Know the subspaces of $\mathbb{R}^2$ and $\mathbb{R}^3$; interpret span$\{u\}$ and span$\{u, v\}$ geometrically. Determine if a set of vectors spans $\mathbb{R}^n$. Determine if a set of vectors is a basis for a subspace W of $\mathbb{R}^n$. Find the coordinate vector of a vector relative to a given basis. Find bases for nul(A) and col(A). Find the dimension of a subspace. Know the Rank Theorem.

3. Determinants Sections 3.1–3.2 ..... 2 hours
Important Skills and Ideas Compute det(A) using a cofactor expansion, taking advantage of 0's. Compute a determinant by triangularization. Know the properties of determinants with respect to inverses, products, transposes and scalar multiples.

5. Eigenvalues and Eigenvectors Sections 5.1-5.3, 5.5-5.7 ..... 6 hours
Important Skills and Ideas Use the characteristic polynomial to find eigenvalues of a matrix. Find a basis for an eigenspace. Determine if a matrix is diagonalizable. Diagonalize a matrix, and show how to use the diagonalization to compute powers of the matrix. Solve the recursive equation $x_{k+1} = Ax_k$ in terms of the eigenvalues and eigenvectors of the diagonalizable matrix A and determine the long-term behavior of the dynamical system in terms of a dominant eigenvalue. Know properties of complex eigenvalues of a real matrix. Express $x \mapsto \begin{pmatrix} a & -b \\ b & a \end{pmatrix} x$ as a rotation and a dilation and express a real, 2×2 matrix with complex eigenvalues A in the form $A = P \begin{pmatrix} a & -b \\ b & a \end{pmatrix} P^{-1}$. Describe the behavior of the dynamical system $x_{k+1} = Ax_k$. Solve a first order linear system $x'(t) = Ax(t)$ for A diagonalizable, and, in the 2×2 case, describe trajectories of solutions.

Introduction to *Mathematica* Lab ..... 1 hours

6. Orthogonality and Least-Squares Sections 6.1–6.6 ..... 6 hours
Important Skills and Ideas Compute the length of a vector, distance between vectors. Normalize a vector. Check a set for orthogonality. Express a vector v as $v = v_1 + v_2$ where v_1 is parallel to a given vector u and v_2 is orthogonal to u. Know the identity $\text{col}(A)^{\perp} = \text{nul}(A^T)$, and compute the orthogonal complement of a subspace. Use the Gram-Schmidt process to obtain an orthogonal basis for a subspace. Compute the QR factorization of a matrix and use it to solve linear systems. Compute the orthogonal projection of a vector onto a subspace. Find the distance of a vector to a subspace. Find a least squares solution of a system $Ax = b$, and compute the least squares error. Find the least squares line (or other curve) that best fits given data.

4. Function Spaces Sections 4.1 and parts of 4.3, 4.5, 6.7 and 6.8 ..... 6 hours
Important Skills Know the definition of a vector space and the notions of linear independence and dimension in this setting. Know the dimension of P_n, the space of polynomials of degree $\leq n$. Find the coordinate vector of a polynomial relative to a given basis. Determine if a set of polynomials is linearly independent. Compute $\|f\|$ and $\langle f, g \rangle$ in $C[a, b]$ with respect to the usual integral inner product. Compute the best approximation of a function by polynomials of degree $\leq n$, and know how this relates to orthogonal projections. Find the n^{th} order Fourier approximation of a function on $[0, 2\pi]$.

Summary: 34 lecture hours, 1 hour lab, 3 hours tests, 4 hours review and 3 hours final exam:**45 total**

Math 3463 Section 1
Foundations of Geometry
SPRING, 2014

Instructor: Seth F. Oppenheimer, math office: Allen 447, 325–7156 (Department of Mathematics and Statistics: 325-3414), Honors office: 210C Griffis Hall, 325-2522, e–mail: seth@math.msstate.edu.

Time and Location: TTH, 2:00p.m. - 3:15p.m.. ALLEN 22

Office Hours: TTH 3:30 p.m. until 5:00 p.m.. Note that I welcome drop ins at other times. I will sometimes have meeting during scheduled hours.

Webpage: The class web page will include assignments and other information. It may be found off of my web page at www2.msstate.edu/~seth.

Prerequisites: The prerequisites of this course are MA 1723 and MA 3053. If you do not have them, you should drop the course. If you do not, there is a possibility the department will drop you from the course.

Textbook: **Foundations of Plane Geometry Second Edition** by Harvey I. Blau.

Material: I hope to cover most of the book. Note that I will skip some of the material on logic and proofs, assuming you already know it.

Deadlines: To drop without penalty: January 17. To drop with a "W" and a fee: February 24 at 5:00 pm.

Attendance: For a course this level, I do not take attendance. However, failure to attend will mean missing material and, I hope, some insights not present in the book.

Calculators: Calculators capable of storing alphabetical information are prohibited on exams.

Grading: We will have a comprehensive final on Monday, May 5 from 3:00 p.m. to 6:00 p.m. This final will count as 25% of your class grade. I will give in–class exams as well. The average of which will be 45% of your class grade. I will collect your homework for grading. I will only grade *some* of the problems on each homework. I will collect homework on assigned dates. Your homework average will be 20% of your class grade. I will be experimenting with projects on projective geometry. These projects will count for 10% of your grade. I may hold some extra optional sessions on the projective geometry material. I usually hold problems sessions before each exam is students wish. I reserve the right to add some other forms of evaluation such as oral presentations or group work in computing your homework grade.

If you have missed an exam, it will be counted as a zero. Let me know as soon as possible those dates on which you will not be able to take an exam and I will try to avoid scheduling exams on those dates. If something comes up after an exam is scheduled, we will try to schedule an earlier sitting of the exam. If I find that you are guilty of academic dishonesty, I will seek the maximum possible penalty. Your exams will be a mixture of problems similar to homework problems, definitions, short answer, and true and false questions, and, of course, proofs.

http://students.msstate.edu/honorcode/

Description of the Course

I am assuming that the majority of students in this class are planning on teaching. Most of you will eventually find yourself teaching geometry. That is why the main thrust of this course is a deep understanding of Euclidean geometry. This means understanding the unstated assumptions in Euclid too. These unstated assumptions and the nagging suspicion that something was just "not right" about the parallel postulate of Euclid, led to much of the geometrical research in the last 150 years. This means that we will also examine the revolution named non–Euclidean geometry. I hope that we will also get an understanding of formal system, models, and the attempt to capture intuition in a set of axioms.

How can you succeed in this course?

1. Have the proper background. I will assume that you know Calculus I, II, III, Foundations of Mathematics, and high school geometry well.
2. The way we study geometry is by reading and writing proofs.
3. Come to class and take notes. Read through your notes after class and copy them clearly, filling in all details.
4. Read the book and work through all examples.
5. I will expect you to know the definitions; learn them.
6. Work problems. A musician doesn't become good by watching other people practice and a quarterback doesn't win the Heisman Trophy by watching other people throw passes. You must practice. The usual rule of thumb is to spend three hours studying for every hour of class. Since we meet about 3 hours a week, you will be spending at least 12 hours a week on this class.
7. Form study groups and help each other. There is no better way to get something down pat than to explain it to someone else.
8. Ask questions. Ideally, a mathematics class is a conversation between the students and the instructor. If the students treat the instructor merely as a lecturer, they might as well just stay home and read the book. You must ask me questions when you are confused or lost. It is best if you ask in class because it is a good bet that if you are confused, then so are a number of your classmates.
9. See me outside of class whenever you need help. Come to my office during office hours or make an appointment to see me. In fact, I am around most of the time and you can drop in or call me; if I am not completely tied up, I'll see you.

GOOD LUCK!

Remember: The only dumb question is the question unasked.

Spring 2014

MA 3053 Foundations of Mathematics I

Course Outline

Text: *Mathematical Proofs: A Transition to Advanced Mathematics*, 3rd Edition, Chartrand, Polimeni, and Zhang

This course is designed as a "transition course" from lower division mathematics courses, where the emphasis is on computations and applications, to courses where the focus in on the study of more formal abstract mathematics. In this course, students learn to write proofs and to express mathematical ideas with a level of rigor that will be needed in more advanced courses. This involves learning the traditional language of mathematics and the standard techniques of constructing proofs. Careful exposition in writing mathematics is stressed throughout the course. Moreover, this class is a prerequisite for MA 3163 Introduction to Modern Algebra, MA 3463 Foundations of Geometry, and MA 4633 Advanced Calculus I.

The specific topics to be covered are as follows:

Chapter 0: Communicating Mathematics
Learning mathematics; mathematical writing; using symbols; mathematical expressions; common words and phrases in mathematics.

Chapter 1: Sets
Describing a set; set operations; indexed collections of sets; partitions of sets; Cartesian products of sets.

Chapter 2: Logic
Statements; negation, disjunction, and conjunction of statements; implications, biconditional statements, tautologies, and contradictions; logical equivalence; quantified statements; characterizations of statements.

Chapter 3: Direct Proof and Proof by Contrapositive
Trivial and vacuous proofs; direct proofs; proof by contrapositive; proof by cases; proof evaluations.

Chapter 4: More on Direct Proofs and Proof by Contrapositive
Proofs involving divisibility of integers; proofs involving congruence of integers; proofs involving sets; fundamentals of set operations; proofs involving Cartesian products of sets.

Chapter 5: Existence and Proof by Contradiction
Counterexamples; review of three proof techniques; existence proofs; disproving existence statements.

Chapter 6: Mathematical Induction
The Principle of Mathematical Induction; generalized mathematical induction; proof by minimum counterexample; the Strong Principle of Mathematical Induction.

Chapter 7: Prove or Disprove
Conjectures in mathematics; revisiting quantified statements; testing statements.

Chapter 8: Equivalence Relations
Relations; equivalence relations; congruence modulo n.

Chapter 9: Functions
The definition of a function; injections, surjections, and bijections; composition of functions; inverse functions; permutations.

Chapter 10: Cardinalities of Sets
Numerically equivalent sets; denumerable sets; uncountable sets; comparing cardinalities of sets; the Schroder-Bernstein Theorem.

Chapter 11: Proofs in Number Theory
Divisibility properties of integers; The Division Algorithm; greatest common divisor; The Euclidean Algorithm; The Fundamental Theorem of Arithmetic.

Grading:

Homework	-- 100 points
3 Exams	-- 300 points
Final Exam	-- 200 points
TOTAL	600 points

A letter grade will be assigned to a course average as follows:

A (90%-100%) **B (80%-89%)** **C (70%-79%)** **D (60%-69%)** **F (0%-59%)**

Fall 2013 Course Outline for MA/ST 3123 Introduction to Statistical Inference

Section 01 M W 1:00
Section 02 T R 12:30

- Syllabus
- Section 1.1 Statistics Basics
- Section 1.2 Simple Random Sampling
- Section 2.1 Variable and Data
- Section 2.2 Grouping Data Start
  - Quantitative-Continuous
  - Graph of Data
  - Quantitative discrete
  - Graph of Data
- Section 2.3 Grouping Data
  - Qualitative: Bar Graph
  - Contingency Tables
  - Stem and Leaf Plots
- Section 2.4 Distribution Shapes
- Lab Handout #1: Class reads handout and duplicates the tables and graphs
- Lab Assignment #1 : Mailed to students account for later printing and completion
  Due in one week .

- Section 3.1 Measures of Center
- Section 3.2 Measures of variation
  Grouped-Data Formulas
  Empirical Rule
- Section 3.3 The Five-Number Summary
- Section 3.4 Descriptive measures for Populations; Standardized variable
- Section 14.2 The Regression Equation
- Section 14.4
  Lab period: Use Soft ware to create scatter plot, examine linear correlation, coefficient of determination, regression equation.
- Lab Assignment #2: Mailed to students. Due in one week.
- Test #1 - Chapters 1,2,3,14
- Section 4.1 and 4.2 Probability Basics and Events
- 4.3 Some Rules of Probability
- 4.4 Contingency Tables: Joint and Marginal Probabilities
- 4.5 Conditional probability
- Section 4.6 the Multiplication Rule; Independence
- Section 5.1 Discrete Random Variable and Probability Distributions
- Section 5.2 The Mean and Standard Deviation of a Discrete Random Variable
- Section 5.3 The Binomial Distribution
- Section 6.1-6.2 The Normal Distribution

- Section 6.3 working with Normally Distributed Variables
- Section 7.1 and 7.2 Mean and Standard Deviation of a Sample Mean
- Chapter 7.3 Central Limit Theorem
- Lab Assignment #3 for chapter 7. Central Limit Theorem
- Test #2 – Chapters 4,5,6,7
- Chapter 8.1-8.2 Confidence Intervals
- Section 8.3 Margin of Error
- Section 8.4 Confidence Intervals when sigma is unknown.
- Chapter 9.1 The Nature of Hypothesis Testing
- Section 9.2 Terms, Errors, and Hypotheses
- Section 9.3 P-Values
- Section 9.4 Hypothesis Tests for One Population Mean when Sigma is Known
- Section 9.5 Hypothesis Tests for One Population Mean when Sigma is Unknown
- Chapter 10.2 Inferences for Two Population Means: Sigmas Assumed Equal
- Section 10.3 Inferences for Two Population Means, Using Independent Sample: Standard Deviations Not Assumed Equal
- Section 10.5 Inferences for Two Population Means, Using Paired Samples
- Chapter 12.1 Confidence Intervals for One Population Proportion
- Section 12.2 Hypothesis Tests for One Population Proportion
- Section 12.3 Inferences for Two Population Proportions
- Test #3 – Chapters 8,9,10,12
- Chapter 13.1 The Chi-Square Distribution
- Section 13.2 Chi-Square Goodness of Fit Test
- Section 13.4 Chi-Square Independence Test
- Chapter 16.1 The F-Distribution/Basic Properties
- Section 16.2 One-Way ANOVA: The Logic
- FINAL EXAM

EDS 3633: Secondary Mathematics Education

CREDIT: 3 Semester Hours

PREREQUISITE: Admission to Teacher Education

CATALOGUE DESCRIPTIONS: (Prerequisite: Admission to Teacher Education.

- 3633: Examine the concepts and tools used to teach mathematics in the secondary classroom, connections between algebra and geometry concepts, and national and state mathematics standards.

COURSE OBJECTIVES:

1. The student will become thoroughly familiar with the Mississippi Frameworks, the National Standards for math and science, and INTASC.
   INTASC # 1, 2, 5, 7, & 9; CFPO # 1, 2, & 10
2. The student will gain proper speaking skills.
   INTASC # 6, CFPO # 7
3. The student will demonstrate proper use of technology in the classroom.
   INTASC # 6, CFPO # 10
4. The student will develop proper teaching techniques.
   INTASC # 1, 2, & 3; CFPO # 5, 6, & 7

TOPICS:

I. Problem Solving and Strategies in Mathematics and Science Classrooms, Instructional Strategies and Facilitating Open versus Guided Inquiry (12 contact hours)
II. History and Status of Mathematics and Science Education (6 contact hours)
III. NCTM Process Standards and Scientific Methods (12 contact hours)
IV. Current Content and Practice Standards, including CCSSM (9 contact hours)
V. Classroom Communication, Questioning, and Discourse (6 contact hours)
VI. Developing Judicious Users of Technology (3 hours)
VII. Effective Planning (9 contact hours)
VIII. Learning Progressions (6 contact hours)
IX. Importance of Mathematically and Scientifically Literate Society (6 hours)

REQUIRED TEXTS AND MATERIALS:

- Mathematics Students: NCTM Student E-Membership available for $39 at nctm.org. Select ***Mathematics Teacher*** as journal you can view electronically. This access will be necessary, as many readings will come from this journal.
- *Common Core State Standards for Mathematics*. Visit http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf or use the QR code below to download the CCSS-M or download the app to your phone or other device.
- Binder or other method for organizing class materials with six labeled dividers. Organization of these materials should include the following sections:
  A. POD Journal
  B. Article Reviews

C. Problem Sets
D. Field Experience Reflections
E. Projects (include Science Fair Assignment, History Project, Standards Project)
F. UbD Unit Plan

RECOMMENDED TEXT:

Math Teachers: *Focus in High School Mathematics: Reasoning and Sense Making* (2009). The National Council of Teachers of Mathematics.

Science Teachers: Herr, Norman (2008). *The Sourcebook for Teaching Science: Strategies, Activities, and Instructional Resources (Grades 6-12).* ISBN: 978-0-7879-7298-1.

METHODS OF INSTRUCTION: Methods of instruction will include primarily discussion, demonstrations, presentations, hands-on-activities, and projects. All students are responsible for material assigned. They will collaboratively and individually to accomplish assigned tasks.

PARTICIPATION AND PROFESSIONALISM:
As a future teacher, you are expected to be a professional. Participation and professionalism in this class count as 10% of your final grade and 100 points. Deductions include, but are not limited to the following:

Disrespect to other students or instructor:	10 point deduction per incident
Tardy to class:	5 point deduction per incident
Not prepared for class:	5 point deduction per incident
Absence:	5 point deduction per incident after 2 absences

ASSIGNMENTS:

	Point Value	**% of Score**	**Due Date**
Article Reviews*	100	10%	
Problem Sets*	100	10%	
Field Experience Reflections*	150	15%	**4/23**
Science Fair Assignment*	50	5%	**2/24**
Quizzes	50	5%	
History of Math/Sci Ed Project* w/pres.	100	10%	**1/29**
Standards Project* w pres.	150	15%	**2/26**
Course Portfolio with POD journal	100	10%	**4/28**
UbD Unit with Presentation	100	10%	**3/24**
Participation and Professionalism	100	10%	
TOTAL	1000	100%	

EDS 3633: Secondary Mathematics Education

ASSIGNMENT SUBMISSIONS:
All assignments should be submitted in class. Courses indicated with an asterisk (*) above, should ALSO be submitted via MyCourses by beginning of class on the due date. Assignments will not be accepted via email. If an assignment is submitted late, the timestamp on MyCourses will be used to determine the point deduction.

LATE ASSIGNMENTS:
All assignments should be completed by the announced due dates. If an assignment is submitted by the beginning of the following class period, the deduction is 10% of assignment points. No late assignments will be accepted after that time without medical or university excuse documentation.

GRADING:

Grading Scale

90-100 %	A
80-89%	B
70-79%	C
60-69%	D
Below 60%	F

Academic Honesty:
In the event of an occurrence of academic misconduct, the guidelines and procedures outlined in the Academic Misconduct Policy will be followed. The guidelines and procedures may be accessed on the web at http://www.msstate.edu/web/security/html.

Flexibility Clause:
The aforementioned requirements, assignments, policies, etc. are subject to change. Candidates' experiences and needs, as well as emerging knowledge, will be considered in modifying this course syllabus.

Students with Disabilities:
In accordance with section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act, Mississippi State University reasonably accommodates students who demonstrate, through appropriate documentation, a qualified disability. The department of Student Support Services (SSS) is the designated unit on campus where students with disabilities identify themselves when requesting academic accommodations. For additional information, contact SSS at 325-3335or visit http://www.sss.msstate.edu/.

Library Resources:
Rachel Cannady, the education librarian at the Mitchell Memorial Library, can help you with your research questions. Please contact her at rcannady@library.msstate.edu to set up a research consultation or get assistance with any of your research needs. The MSU Libraries also has an Information Portal for distance learners (http://guides.library.msstate.edu/distancelearners) as

well chat and phone reference services available Sunday through Friday for when you need immediate answers (http://library.msstate.edu/askalibrarian).

EDS 3633: Secondary Mathematics Education

Resources:

Ball, L. & Stacey, K. Teaching strategies for developing judicious technology use. In W. J. Masalski, & P. C. Elliot (Eds.), *Technology-supported mathematics learning environments*. Reston, VA: The National Council of Teachers of Mathematics, Inc.

Bright, G. & Joyner, J. (2004). Dynamic classroom assessment: linking mathematical understanding to instruction in middles grades and high school. Vernon Hills, IL: ETA Cuisenaire.

Brown, C.A. & Smith, M.S. (1997). Supporting the development of mathematical pedagogy. *The Mathematics Teacher*, 90(2).

Hodges, T. & Conner, E. (2011). Reflections on a technology-rich mathematics classroom. *The Mathematics Teacher*, 104(6).

Lumpkin, B. & Strong, D. (1995). Multicultural Science and math connections.Portland, Maine: J. Weston Publishers.

Murdock, J., Kamischke, E., & Kamischke, E. (2002). *Discovering algebra: An investigative approach.* Emeryville, CA: Key Curriculum Press.

National Council of Teachers of Mathematics (1999). Mathematics assessment: A practical handbook for grades 9-12. Reston, VA: Author.

National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

National Governors Association Center for Best Practices, Council of Chief State School Officers (2010). Common Core State Standards (Mathematics). National Governors Association Center for Best Practices, Council of Chief State School Officers, Washington D.C.

Reinhart, S.C. (2000). Never say anything a kid can say. *Mathematics Teaching in the Middle School*, 5(8).

Serra, M. (2003). *Discovering geometry: An investigative approach.* Emeryville, CA: Key Curriculum Press.

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP) 2011 Reading and Mathematics Assessments. SY 2010-2011 Consolidated State Performance Report Part I. Retrieved August 10, 2012 from http://www2.ed.gov/admins/lead/account/consolidated/sy08-09part1

Vitas for Qualified Faculty

Robert Banik

Curriculum Vitae

September 18, 2013

Address:
1865 Mt Olive Road
Starkville, MS 39759
(662) 323 – 2389

Email: banik@math.msstate.edu

Education:

Mississippi State University — August 2005 – August 2007
Master of Science in Mathematics — GPA: 3.72 / 4.00

Mississippi University for Women — August 2003 – May 2005
Bachelor of Science in Mathematics — GPA: 3.68 / 4.00

Northeast Mississippi Community College — August 2001 – May 2003
Associate of Arts in Mathematics — GPA: 3.77 / 4.00

Experience:

Undergraduate Advising Coordinator — August 2012 – Present
Duties: Advise students for spring/summer orientations and advise new and current departmental students in mathematics.

Trigonometry Coordinator — January 2010 – August 2013
Duties: Coordinated Trigonometry courses for Graduate Assistants
Prepared original material in Trig book for honorarium

Instructor for Mississippi State University — August 2010 – Present
Duties: Taught Intermediate Algebra, College Algebra, Trigonometry, Business Calculus, and Calculus I in various semesters
Taught for the MathPlus program during summer
Work in Math Domain (Computer Lab)
Teach 12 to 15 hrs per semester

Lecturer for Mississippi State University — August 2007 – July 2010
Duties: Taught Intermediate Algebra, College Algebra, Trigonometry, and Business Calculus in various semesters
Work in Math Domain (Computer Lab)
Teach 12 to 15 hrs per semester

Graduate Teaching Assistant at MSU — August 2005 – June 2007
Duties: Taught College Algebra
Taught Trigonometry
Helped develop Math Domain
Worked in Computer Lab
Helped professors with grading, etc.
Won the Donald Zacharis Teaching Assistant of the Year Award (2007)

Office Assistant in MUW Math Dept. December 2003 – May 2005
Duties: Answered phones
Ran errands

Skills: Have worked with MyMathLab, iLearn, MathZone, Mathematica, Maple, Microsoft Office 2007, WebCT (MyCourses), eInstruction MOBI devices, knowledge of NCTM standards from educational coursework

Relative Coursework: Principles of Curriculum Development
Ordinary Differential Equations
Calculus of Variations
Integral Equations
Introduction to Partial Differential Equations

Presentations: Presented at Creating Futures through Technology Conference (CFTTC) March 2010, Biloxi, MS

Presented at Mississippi Educational Computing Association (MECA) February 2012, Jackson, MS

Presented at Louisiana-Mississippi Mathematical Association of Two-Year Colleges (LaMsMATYC) Fall Conference
September 2013

October 21, 2013

RESUME

MARJORIE W CRITTENDEN
626 S Montgomery St Apt. 9
Starkville, Mississippi 35759
(662) 324-0778
mcrittenden@math.msstate.edu

EXPERIENCE

2002 – Present	**Mississippi State University** Instructor, Department of Mathematics and Statistics
1985 - 2004	**University of Alabama at Birmingham** Part-time Instructor in the Mathematics Department
1995 - 2002	**Vestavia Hills Board Of Education** A.P. Calculus and Pre-Calculus Teacher at Vestavia Hills High School
1998 – 2000	**Birmingham Southern College** Part-time Instructor in the Mathematics Department
1989 - 1992	**Jefferson State Junior College** Part-time Instructor in the Mathematics Department
1972 – 1995	**Bessemer Board of Education** College Prep Mathematics and A.P. Calculus Teacher at Jess Lanier High School

EDUCATION

1986	**Educational Specialist Degree in Mathematics Education** University of Alabama at Birmingham
1978	**Master of Science in Mathematics** University of Alabama at Birmingham Areas of Concentration: Algebra and Operations Research
1972	**Bachelor of Arts in Mathematics** University of Alabama

AWARDS

- Recipient MSU State Pride Faculty Award 2011
- Co-PI of the MSU MA/ST 2113 Redesign Team which received a $50,000 grant from the Mississippi Institutions of Higher Learning.
- Finalist for the 2001 Ellen Gregg Ingalls Award for Excellence in Teaching, University of Alabama at Birmingham
- Awarded a Vestavia Hills Foundation grant for Project CALC - Calculator Assisted Learning in Calculus
- Awarded Bessemer Education Foundation grant for Project SMART - Strengthen Mathematics and Reasoning through Technology.

CREATIVE ACTIVITIES

2011 Developed a recitation supplement for Elementary Statistics which is to be included in the MSU custom edition of Elementary Statistics by Neil Weiss; published by Pearson Education

2010 Developed a supplement for Intermediate Algebra which was included in the MSU custom edition of Intermediate Algebra by Lial, Hornsby, and McGinnis; published by Pearson Education

2009 Member of the MA/ST 2113 Redesign Committee and responsible for the development of course materials to support the redesign.

2005 Development of the curriculum for the Algebra Project Summer Program at Mississippi State.

2004-2005 Development of a College Algebra Placement Test (with Betty Scarborough). The test is to determine whether students with low ACT mathematics sub-scores are adequately prepared to take College Algebra without taking Intermediate Algebra first.

2004-2005 Development of the syllabus and on-line assessment for Intermediate Algebra using MyMathLab. This was piloted in 2004 and is in full use with the opening of the Math Domain in Fall 2005.

COMMITTEES AND SERVICE TO THE UNIVERSITY

2013-2014 Committee for Evaluation of Graduate Teaching Assistants
Calculus I-IV Course Committee
Math Domain Assistant to the Coordinator

CONFERENCES/WORKSHOPS

Summer 2011	Turning Technology Workshop, MSU Center for Teaching and Learning
Spring 2010	The NCAT Redesign Workshops
Spring 2009	The NCAT Redesign Workshops
Spring 2008	The NCAT Redesign Workshops
January 2006	MSU Teaching Workshop for Science, Engineering, & Mathematics
November 2004	International Conference on Technology in Collegiate Mathematics

CITIZENSHIP USA

Resume Spring 2014

Lorraine A. Hughes
723 Sunnyland Dr.
Starkville, MS 39759
(662-323-3446)

EDUCATION

Mississippi State University Graduate School
MS in Mathematics May 2000
Accounting courses Fall 2008-Spring 2009
Data Analysis Fall 2009 Financial Management Spring 2010
EDS 6633 Methods of Teaching Mathematics Fall 2010
EDS 8243 Advance Planning and Managing of Learning Fall 2010

University of Houston
Summer Courses in Chemistry, Physics Education
1989, 1990

State University of New York
Maritime College, Bronx, New York
BS in Meteorology May 1978

WORK EXPERIENCE

Mississippi State University
Department of Mathematics and Statistics.
Instructor: Summer 2000-Present Continuous.
Courses taught: Calculus I, Calculus II ,College Algebra, Trigonometry, Business Calculus, Introduction to Statistics ST2113 and ST3123,
Summer 2001(IAQL Institute)
GTA (Mathematics): Fall 1998, spring 1999, and spring 2000.

Service:

- MA 1713 Calculus Committee member.2011-2014
- Co-PI: Noyce STEM Teachers Scholars, DUE-0934886 ($887,737)
- Chair: Undergraduate Recruiting Committee Fall 2007-2014
- Graduate Student Recruitment Committee 2013-2014
- Member of Advising Committee since Fall 2002-2014
- Scholarship Committee Department of Mathematics 2009-present
- College of Arts and Sciences Scholarship Committee 2012-2014
- Evaluation of Teaching Assistants Committee
- MA 1323 Trigonometry Course Committee Chairperson Fall 2006-2010
- Statistics Committee 2004-2010

Grace Christian School, Louisville, MS
Teacher; Fall 1995 – spring 2000
Courses taught: Algebra, Geometry, Trigonometry, and Calculus
Duchesne Academy, Houston, Texas
Middle School Science Teacher; fall 1989 – spring 1991
Administrative responsibilities: Student Counsel Faculty Advisor
Science Fair Coordinator
Marian Christian High School, Houston, Texas; May 1986-May 1989

MARINE INDUSTRY

Lykes Brothers Steamship Company, Houston, Texas
Line Supervisor; Far East and Mediterranean
Bunker Fueling Coordinator
1983-1986
Fullbright and Jaworski Law Firm
Legal Assistant
Houston, Texas Sept 1982-Nov.1983
Exxon Company USA
Marine Department
Houston, Texas
Third Mate Aug 1978-Aug 1982

HONORS

- NASA Certificate of Recognition as a Mentor in MUST project.
- MSU Image and National Society of Black Engineers Faculty Award 2007
- MSU Image and National Society of Black Engineers Faculty Award 2006
- MSU- Masters Graduate Teaching Assistant 2000 Award

MILITARY EXPERIENCE:

- United States Navy Reserve- May 1978 -1982
- Military Sealift Command Gulf-110 1982-1984
- U. S. Navy Ready Reserve 1984-1994

ACCOMPLISHMENTS

- United States Coast Guard Third Mates License 1978
- United States Coast Guard Second Mates License 1980
- Radar Certified 1978
- Certified Fire Fighter 1978
- Radio Operators License 1978

Community Involvement

- Starkville Community Theater Board Member
- Distinguished Young Women of Starkville Planning Committee member.

PERSONAL

- Married with four lovely daughters.
- Music Minister at New Covenant Church in Starkville

Corlis P. Johnson
Curriculum Vita
January 2014

Department of Mathematics and Statistics
Mississippi State University
Mississippi State, MS 39762
Telephone: (662) 325-3414 (Work)
(662) 327-6604 (Home)
E-mail: cjohnson@math.msstate.edu

Education:

Ph.D., Mathematics, 1981	Emory University, Atlanta, Georgia Dissertation Title: Constructions of Neofields and Right Neofields Advisor: Dr. Trevor Evans
M.A., Mathematics, 1974	University of Michigan, Ann Arbor, Michigan
B.S., Mathematics, 1973	Jackson State University, Jackson, Mississippi

Appointments:

1999-present	Associate Professor of Mathematics, Mississippi State University, Department of Mathematics and Statistics
1983-1999	Assistant Professor of Mathematics, Mississippi State University, Department of Mathematics and Statistics
1980-1983	Assistant Professor of Mathematics, Jackson State University, Department of Mathematics
1978-1980	Graduate Teaching Assistant, Department of Mathematics and Computer Science, Emory University

Administrative Experience:

October 2011 - December 2011, May 2012-August 2012,	Acting Head, Department of Mathematics and Statistics, Mississippi State University.
June 2002-present	Associate Head, Department of Mathematics and Statistics, Mississippi State University, Mississippi State, MS.
May 2001-present	Graduate Coordinator, Department of Mathematics and Statistics, Mississippi State University, Mississippi State, MS.

Publications:

1. Cyclic Neofields satisfying $(1 + x)(1 + (-x)) = 1$, *Algebras, Groups and Geometries*, 20(2003), 117-124.
2. Neofields satisfying $1 + 1 = 0$, *Algebras, Groups and Geometries*, 17(2000), 408-416.

3. The Construction of GDQ-Algebras from Quasigroups with Sharply Automorphism Groups, *Algebras, Groups and Geometries,* 16(1999), 319-327.
4. Group Distributive Quasigroup Algebras, *Algebras, Groups and Geometries,* 14(1997), 259-269.
5. Sub-neofields of Finite Neofields, *Algebras, Groups and Geometries,* 11(1994), 113-126.
6. Complete Mappings, Neofields, and Dihedral Groups, *Journal of the Mississippi Academy of Sciences,* Vol. XXXI (1986), 147-152.

Grants:

Research

1. *Determination of the Admissibility of Certain Classes of Nonabelian Groups,* National Science Foundation, Minority Research Initiation (MRI) Program, Award #: 8614696, January 1, 1987- January 31, 1988; $9,742. (Principal Investigator)
2. *Obtaining Mutually Orthogonal Latin Squares from Right Neofields of Characteristic 2,* Jackson State University, Faculty Research and Publications Committee, 1981-1982; $2,050. (Principal Investigator)

Teaching

1. *Strengthening Teachers in Algebra, Number Theory, and Discrete Mathematics (STAND),* Mississippi State University, Office of Research, June 13-27, 1998; $6,350. (Co-principal Investigator)
2. *Institute for Algebra and Quantitative Literacy for Middle School Teachers* , Mississippi Institutes of Higher Learning, April 2001–April 2002; $70,000. (Co-principal Investigator)

Other

1. *Increasing Participation in Computer Science, Engineering and Mathematics (CSEM) Through Scholarships*, National Science Foundation, Award #: NSF-DUE-9987228, February 1, 2000- January 31, 2005; $494,650. (Co-principal Investigator)
2. *Increasing Participation in Computer Science, Engineering and Mathematics (CSEM) Through Scholarships,* National Science Foundation, Award #: NSF-DUE- 0422501, September 1, 2004 – August 31, 2008; $399,972. (Co-principal Investigator)
3. *Meeting for CSEMS Principal Investigators,* National Science Foundation, Award #: 0305131, May 15, 2003 – April 30, 2006; $154,323. (Co-principal Investigator)
4. *Scholarships to Attract and Retain Tomorrow's Scientists, Mathematicians, and Engineers,* National Science Foundation, Award #: NSF-DUE: 0630901, January 1, 2007 – December 31, 2011; $500,000. (Principal Investigator)
5. *Redesign of MA/ST 2113 Introduction to Statistics;* Mississippi Institutes of Higher Learning; September 1, 2008 – March 31, 2010; $50,000; (Co-principal Investigator).
6. *Steel Magnolias: Southern, Rural Women in STEM*; National Science Foundation Partnerships for Adaptation, Implement and Dissemination (PAID) Program; July 1, 2013-June 30, 2016; $748,788; Co-PI with Donna Reese (PI), Julia Hodges (Co- PI), Jeralynn Cossman (Co-PI), and Nancy Reichert (Co-principal Investigator). [Pending]
7. *RISE UP: Retention in STEM Education of Underrepresented Groups*; Howard Hughes Medical Institute; September 1, 2014-August 31, 2019; $2,500,000; Co-PI with Svein Saebo (PI), Debbie Beard (Co-PI), Debra Mlsna (Co-PI), Dwayne Wise (Co-PI), Mary Celeste Reese (Co-PI), and

Donna Pierce (Co-PI). |Pending]

Research Presentations:

1. *Constructing Neofields from Sharply Transitive Automorphism Groups*, University of Southern Mississippi Weekend Algebra Conference, April 20-22, 2001, Hattiesburg, MS.
2. *The Construction of GDQ-Algebras from Quasigroups with Sharply Transitive Automorphism Groups*, Mathematical Association of America, Louisiana-Mississippi Section Meeting, March 23-24, 2001, Oxford, MS.
3. *Neofields Satisfying 1 + 1 = 0*, Mathematical Association of America, Louisiana-Mississippi Section Meeting, March 4-6, 1999, Jackson, MS.
4. *Group Distributive Quasigroup Algebras*, University of Southern Mississippi Weekend Algebra Conference, April 17-19, 1998, Hattiesburg, MS.
5. *Group Distributive Quasigroup Algebras*, Mathematical Association of America, Louisiana-Mississippi Section Meeting, March 1, 1997, Jackson, MS.
6. *Admissible Subgroups of Finite Groups*, Mathematical Association of America, Louisiana-Mississippi Section Meeting, February 28, 1987, Columbus, MS.
7. *Complete Mappings, Neofields, and Dihedral Groups*, Mississippi Academy of Sciences Meeting, February 21, 1986, Biloxi, MS.
8. *The Construction of Right Neofields*, Mississippi State University, Department of Mathematics and Statistics Colloquium, June 30, 1983.
9. *Obtaining Mutually Orthogonal Latin Squares from Right Neofields of Characteristic 2*, Mathematical Association of America, Louisiana-Mississippi Section Meeting, February 13, 1982, Lafayette, LA.
10. *The Construction of Right Neofields from Right Admissible Groups*, Mississippi Academy of Sciences Meeting, March 6, 1981, Jackson, MS.
11. *Combinatorial Applications of Neofields*, Jackson State University, Department of Mathematics Seminar, March 25, 1980.
12. *Using Algebras to Solve Combinatorial Problems*, Atlanta University, Department of Mathematics Seminar, February 1980. (Invited)

Other Presentations:

1. *Latin Squares*, invited presentation at the MSU Math Club meeting held on April 18, 2007.
2. *Why is Math Important?*, invited presentation at the "Gear Up Fall Parent Meeting", Columbus High School, November 29, 2005.
3. *Who was Sonya Kovalevsky?*, talk presented at the Sonya Kovalevsky High School Day Program, April 22, 2005, Mississippi State University.
4. *Life Without the Associative Law (Applications of Nonassociative Algebras in Geometry and Combinatorics)*, talk presented to a Modern Algebra class at Mississippi University for Women, November 3, 1997. (Invited).
5. *Revitalizing Mathematics for the Twenty-first Century*, Keynote Address, Jackson State University Mathematics Fair, February 21, 1992. (Invited).
6. *Career Opportunities in Mathematics and Statistics*, Lee High School, Columbus, MS, October 19, 1983.

Professional Service:

Organized the CSEMS PI Regional Conference held at Mississippi State University on May 8-9, 2005; member of the Steering Committee for NSF-DUE CSEM Principal Investigators Conference (September 11-13, 2003); referee for the journal *Discrete Mathematics;* member of the Editorial Board of the journal *Algebras, Groups and Geometries* (beginning 2000); reviewed grant proposals for the National Science Foundation Teacher Enhancement and Preparation Division, Washington, D.C., March 29-31, 1990; Vice-chairman(1986-1987), Chairman (1987-1988)--Mathematics, Statistics, and Computer Science Division of the Mississippi Academy of Sciences.

Memberships in Professional Organizations:

American Mathematical Society (1978-present); Mathematical Association of America (1978-present); National Association of Mathematicians (1990-present); Mississippi Academy of Sciences (1980-1995), Mathematics, Statistics, and Computer Science Division Vice-chairman 1986-1987, Chairman 1987-1988; Mississippi State University Faculty and Professional Women Organization (1987-1990), Treasurer 1988-1989; Council on Minority Affairs (MSU) (1983-present).

Service Activities (Mississippi State University):

University

Graduate Coordinator Advisory Council, June 2, 2010 – present.
Ad Hoc Task Force for Reviewing courses in the University Core Curriculum, 2002-2003.
Academic Accommodations Committee, 2002-present.
Evaluator for the International Session of the University Graduate Teaching Assistant Workshop, 2002-2006; 2011, 2013.
Evaluator for the Microteaching Simulation/Classroom Certification Evaluation session of the University Graduate Teaching Assistant Workshop, August 2013 and January 2014.

Scholarship Recognition Day Committee, 1988-1990.

College of Arts and Sciences

Arts and Sciences Selection Committee for the MSU Hall of Fame, 1988-1989.

Department of Mathematics and Statistics

1984-1985	MA 1263 (Finite Mathematics) Committee
1985-1986	MA 1263 (Finite Mathematics) Committee, Chair
1986-1987	MA 1263 (Finite Mathematics) Committee, Chair
	MA 1613 (Business Calculus I) Committee
1987-1988	MA 1263 (Finite Mathematics) Committee, Chair
	Graduate Coordinating Committee
1988-1989	MA 1463 (Finite Mathematics),

	MA 1613, MA 1623 (Business Calculus I and II) Committee, Chair
	Graduate Algebra Committee
1989-1990	Graduate Algebra Committee, Chair
	Promotion and Tenure Committee
	MA 1253 (Trigonometry) Committee
1990-1991	Graduate Algebra Committee
	Promotion and Tenure Committee
	MA 3113 (Linear Algebra) Committee, Chair
	Scholarship Committee
1991-1992	MA 1463 (Finite Mathematics), MA 1613, MA 1623 (Business Calculus I and II) Committee, Chair
	Graduate Algebra Committee, Chair
	Promotion and Tenure Committee
	Self-study Committee
	Scholarship Committee
1992-1993	MA 1463 (Finite Mathematics), MA 1613, MA 1623 (Business Calculus I and II) Committee, Chair
	Graduate Algebra Committee, Chair
	Scholarship Committee
	Department Head Search Committee
1993-1994	MA 1463 (Finite Mathematics), MA 1613, MA 1623 (Business Calculus I and II) Committee, Chair
	Graduate Algebra Committee, Chair
	Promotion and Tenure Committee
	Library Committee
	Department Head Search Committee
1994-1995	Graduate Algebra Committee, Chair
	Promotion and Tenure Committee
	Evaluation of Teaching Assistants Committee
	Screening Committee
	Undergraduate Curriculum Committee
1995-1996	Promotion and Tenure Committee
	Graduate Coordinating Committee
	Evaluation of Teaching Assistants Committee
	Screening Committee
1996-1997	Graduate Coordinating Committee
1997-1998	Graduate Coordinating Committee
	Graduate Algebra Committee
	Department Head Search Committee
	Screening Committee
	Evaluation of Teaching Assistants Committee
	Undergraduate Curriculum Committee
	Committee for the revision of the Promotion and Tenure Document
1998-1999	Graduate Coordinating Committee
	Graduate Algebra Committee

	Evaluation of Teaching Assistants Committee
	Executive Committee
1999-2000	Evaluation of Teaching Assistants Committee, Chair
	Graduate Algebra Examination Committee, Chair
	Graduate Coordinating Committee
	Promotion and Tenure Committee
	Department Head Search Committee
	Evaluation of Classroom Teaching Committee
2000-2001	Evaluation of Teaching Assistants Committee, Chair
	Graduate Algebra Examination Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator) from May 15, 2001
	Promotion and Tenure Committee
	Screening Committee
2001-2002	Evaluation of Teaching Assistants Committee, Chair
	Graduate Algebra Examination Committee
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Promotion and Tenure Committee
2002-2003	Evaluation of Teaching Assistants Committee, Chair
	Graduate Algebra Examination Committee
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
2003-2004	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
2004-2005	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Graduate Algebra Examination Committee
	Student Recruitment Committee
2005-2006	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Student Recruitment Committee
2006-2007	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Student Recruitment Committee
	Department Head Search Committee
	5-Year Review Committee, Chair
2007-2008	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Graduate Student Recruitment Committee
	Undergraduate Student Recruitment Committee
	5-Year Review Committee, Chair
	Interim Undergraduate Coordinator (5-16-07 to 8-15-07)
	MAIS Committee
	ST/MA 2113 Course Redesign Committee
2008-2009	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)

	Graduate Student Recruitment Committee
	Undergraduate Student Recruitment Committee
	MAIS Committee
	ST/MA 2113 Course Redesign Committee
	5-Year Review Committee, Chair
	Institutional Effectiveness/Assessment Committee, Chair
2009-2010	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Graduate Student Recruitment Committee
	Undergraduate Student Recruitment Committee
2010-2011	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Graduate Student Recruitment Committee
	Undergraduate Student Recruitment Committee
2011-2012	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Graduate Student Recruitment Committee
	Scholarship Committee
	Undergraduate Student Recruitment Committee
2012-2013	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Graduate Student Recruitment Committee
	Scholarship Committee
	Undergraduate Student Recruitment Committee
2013-2014	Evaluation of Teaching Assistants Committee, Chair
	Graduate Coordinating Committee, Chair (Graduate Coordinator)
	Graduate Student Recruitment Committee
	Scholarship Committee
	Undergraduate Student Recruitment Committee

Other

1988-1989	Department Head Search Committee for Civil Engineering
1994	Served as a judge in the Graduate Paper Competition for the Sixth Annual National Black Graduate Student Conference.
2012-2013	Dean of the College of Arts & Sciences Search Committee

Advising

Served as major professor for eight master's students in mathematics (directed seven Master's Projects); served as minor professor for two doctoral students in electrical engineering; served on doctoral students' committees in mathematics; served on several master's students' committees in mathematics; served on master's student's committee in electrical engineering; served as faculty advisor for undergraduate mathematics majors (1994-2003); served as faculty advisor for first-year students in the Master of Science Program in Mathematics (2001-present); served as faculty mentor for several CSEMS and S-STEM Fellows 2000-2011; Department of Mathematics & Statistics Interim Undergraduate Coordinator (May 16, 2007 – August 15, 2007).

Major Professor/ Master's Projects Directed

1. Bonnie Oppenheimer, M.S., Mathematics, 1991 (Non-thesis option)
2. Sandra Turek, M.S., Mathematics , 1995
   The Relationship Between Balanced Complete Block Designs, Latin Squares, and Projective Planes.
3. Laura Pendergest, M.S., Mathematics, 1997
   Automorphism Groups of Graphs
4. Tameka Shaw, M.S., Mathematics, 1999
   Orthomorphisms of Groups
5. Hope Carr, M.S., Mathematics (Applied Track), 2000
   Mutually Orthogonal Latin Squares and Balanced Incomplete Block Designs
6. Clint Martin, M.S., Mathematics (Applied Track), 2000
   Kirkman Triple Systems of order less than 81
7. Veda Fritch, M.S., Mathematics, 2000
   Near-fields and Doubly Transitive Groups
8. Misty D. Norris, M.S., Mathematics, 2009
   Error-correcting Codes

Minor Professor

1. Sonjay Rekhi, Ph.D., Electrical Engineering, 1994
   Dissertation: *Automatic Layout Synthesis of Leaf Cells*
   (Major Professor: James Trotter)

Committee Member on Doctoral and Master's Committees

Mathematics/Mathematical Sciences

1. Craig T. Boden, M.S. Mathematics (Applied Track), 1991
   Master's Thesis: *Numerical Methods for Solving Stiff Differential Equations*
2. Charles Stanley Dickens, M.S., Mathematics, 1993
3. Elizabeth Doll, M.S., Mathematics, 1993
4. Andrew Neal Woods, M.S., Mathematics, 1993
5. Tapan Kumar Tiwari, M.S., Mathematics, 1994
6. Teresa Jean Loper, M.S., Mathematics, 1994
7. Chad Edward Brown, M.S., Mathematics, 1994
8. John Paul Travis, Ph.D., Mathematical Sciences, 1994
   Dissertation: *On Twists for C Tensor Surfaces and Solids with Applications to Grid Generation*
9. Marlies Elmore, M.S., Mathematics, 1995
10. Patrick Daniel Wilz, M..S. Mathematics, 1995
11. Scott Caldwell, M.S., Mathematics, 1996
12. Bobby Jarrell, M.S., Mathematics, 1997
13. Penny Pepper, M.S., Mathematics, 1997
14 Hathaikarn Wattanataweekul, M.S., Mathematics, 1999
15. Mark Riggs, M.S., Mathematics (Applied Track), 1999
16. Jennifer Alsworth, M.S., Mathematics, 2000

17. Bo Yang, Ph.D., Mathematical Sciences, 2002
    Dissertation: *Boundary Value Problems for Ordinary Differential Equations*
18. Hathaikarn Wattanataweekul, Ph.D., Mathematical Sciences, 2006
    Dissertation: *Convex Analysis and Flows in Infinite Networks*
19. Amy Marolt, M.S., Mathematics, 2006
20. Yijun Sun, Ph.D., Mathematical Sciences, 2006
    Dissertation: *Global Attractivity of Higher Order Nonlinear Difference Equations*
21. Suman Balasubramanian, Ph.D., Mathematical Sciences, 2009
    Dissertation: *On the Erdos-SoS Conjecture and the Cayley Isomorphism Problem*
22. Jinglong Ye, Ph.D., Mathematical Sciences, 2009
    Dissertation: *Infinite Semipositone Systems*
23. Nicole McGee, M.S., Mathemaics, 2009
24. Wing-Sum Au, M.S., Mathematics, 2010
25. Jahmario Williams, Ph.D., Mathematical Sciences, 2013
    Dissertation: *Positive radial solutions for singular p-Laplacian boundary value problems*
26. Soumya Bhoumik, Ph.D., Mathematical Sciences, 2013
    Dissertation: *On the automorphism groups of almost circulant graphs and digraphs*
27. Bonnie Sessions, M.S., Mathematics, 2013

Electrical Engineering

1. Joseph Tyler Durham, M.S., Electrical Engineering, 1998
   Thesis: *Estimating a Quantization Bound for Turbo Codes using Fixed-Point Arithmetic*

Courses Taught:

Graduate Courses

Modern Higher Algebra I and II, Group Theory*, Graph Theory*, Number Theory*, Discrete Mathematics*, Topics in Geometry. (*Split-level, graduate/undergraduate)

Undergraduate Courses

General Topology, Modern Algebra, Foundations of Mathematics, Linear Algebra, Topics in Geometry, Probability and Statistics, Honors Calculus (I, II, and III), Calculus (I, II, III, IV), Plane Trigonometry, Business Calculus (I and II), Finite Mathematics and Introduction to Calculus, College Algebra, Intermediate Algebra, Basic Concepts in Mathematics.

Honors and Awards:

1. Recipient of a State Pride Faculty Award, Fall 2010.
2. Selected as a member of the Inaugural Class of Honors Faculty at Mississippi State University, Fall 2006.
3. Certificate of Appreciation, MSU IMAGE/National Society of Black Engineers, Spring 2004.
4. Included in the article *"Profiles of Selected Black Women who Teach Mathematics at Four year Colleges and Universities in the United States (2002)"*, The Journal of Blacks in Higher Education, No. 34, Winter 2001/2002.
5. Selected as an Outstanding Young Woman of America, 1982.

6. Cited as one of the first 35 Black Women in the United States to earn a Ph.D. in Pure Mathematics in the Journal of African Civilizations, Vol. 4, No. 1, 1982, p. 63, in the article *Black Women in Mathematics in the United States*, Patricia C. Kenschaft.
7. National Fellowships Fund Fellow 1973-1978.
8. Valedictorian, Class of 1973, Jackson State University.

Jessica T. Ivy

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jessicaivy@gmail.com

EDUCATIONAL AND PROFESSIONAL CREDENTIALS

Education

University of Mississippi, University, MS
Ph.D. in Education, emphasis in Secondary Education, May 2011

University of Mississippi, University, MS
Master of Education, Curriculum and Instruction, Secondary Education, May 2008

University of Mississippi, University, MS
Bachelor of Arts in Education, Mathematics Education, May 2006

Licensure

State of Mississippi, Class AAAA, 7 – 12 Mathematics, License No. 192383, Exp. 6/2020

PROFESSIONAL EXPERIENCE

Visiting Assistant Professor, Department of Curriculum, Instruction, and Special Education, Mississippi State University, January 2012 – present

Grant Opportunities Coordinator, Center for Mathematics and Science Education, University of Mississippi, August 2011 – January 2012

Adjunct Instructor, Department of Mathematics, University of Mississippi, Mathematics for Elementary School Teachers I, II (MATH 245, 246), August 2009 – December 2011

Graduate Research Fellow, Center for Mathematics and Science Education, University of Mississippi, June 2007 – May 2011

High School Mathematics Teacher, Booneville School District
Booneville High School, August 2006 – May 2007

High School Mathematics Summer School Teacher, Alcorn County School District
Biggersville High School, June – July 2006

PEER REVIEWED PUBLICATIONS

Ivy, J., & Franz, D. (2013). Two classroom portraits demonstrating the interplay of secondary mathematics teachers' TPACK on their integration of the mathematical practices. In D. Polly (Ed.), Common Core Math and Technology. Hershey, PA: IGI Global, 213 – 225.

Moser, K., & Ivy, J. (2013). World language teachers: Self-perceptions of their TPACK. Modern Journal of Language Teaching Methods, 3(2), 167-190.

PEER REVIEWED PRESENTATIONS

Ivy, J. (November 2013) *The foreign nature of language in your classroom.* National Council of Teachers of Mathematics Regional Conference, Louisville, KY.

Ivy, J., Franz, D., Steimle, A., McShea, C., Peters, M., Livingston, C., & Floyd, T. (September 2013) *Graduate programs informational session.* Mississippi Council of Teachers of Mathematics Annual Conference, Biloxi, MS.

Ivy., J., & James, J. (2013, January). Sustained professional development: A vehicle for promoting mathematically proficient leaders in elementary schools. Association of Mathematics Teacher Educators Annual Conference, Orlando, FL.

Franz, D., & Ivy, J. (2013, January). Formalizing a school-university partnership. What's in it for me? Association of Mathematics Teacher Educators Annual Conference, Orlando, FL.

Ivy, J. (2012, September). Technology in practice. Mississippi Council of Teachers of Mathematics Annual Conference, Starkville, MS

Ivy, J. (2011, April). Secondary mathematics teachers' perceptions of their integration of instructional technologies. The University of Mississippi Graduate Student Council Poster Symposium, Oxford, MS.

Riales, J., James, J. & Ivy, J. (2011, January). Algebra for all: Using TI-Navigator to provide equal opportunities to at-risk students. Association of Mathematics Teacher Educators Annual Conference, Irvine, CA.

James, J. & Ivy, J. (2010, October). Developing mathematically proficient leaders in elementary schools. Mississippi Council of Teachers of Mathematics Annual Conference, Hattiesburg, MS.

Ivy, J. (2009, November). x to Why: Tools for development of productive dispositions in algebra. National Council of Teachers of Mathematics Regional Conference, Minneapolis, MN.

Barlow, A., Steimle, A., Ivy, J., Fillingim, J., James, J. & Wells, E. (2009, February). Mission possible: Overcoming obstacles faced in an elementary mathematics methods course. Association of Mathematics Teacher Educators Annual Conference, Orlando, FL.

INVITED PRESENTATIONS

Dougherty, B. & Ivy, J. (2013, June). Generalizing big ideas to support big learning. NCTM Algebra Readiness Institute (Keynote): Grades 6-8, New Orleans, LA

Ivy, J. & Riales, J. (2011, January). Teaching with technology. Mississippi NASA Space Grant Consortium Annual Teachers' Conference, Oxford, MS.

Ivy, J. & Riales, J. (2010, January). How to incorporate NCTM's five process standards in your classroom. Mississippi NASA Space Grant Consortium Annual Teachers' Conference, Oxford, MS.

Ivy, J. & James, J. (2009, January). From graphing calculators to interactive tools: How to use the TI-Navigator system to improve teaching and learning in the classroom. Mississippi NASA Space Grant Consortium Annual Teachers' Conference, Oxford, MS.

Ivy, J. (2008, January). Raising the standard. Mississippi NASA Space Grant Consortium Annual Teachers' Conference, Oxford, MS.

RECENT RESEARCH

Communication Barriers in Mathematics Classrooms, 08/2012 – present

This qualitative research study includes the use of a series of language-embedded mathematics tasks to provide a foundation for discussion of the challenges faced by both English Language Learners and native English speakers in the mathematics classroom. The study participants are pre-service teachers, and the setting is a senior-level mathematics methods course.

A Survey of Foreign Language Teachers' TPACK, 01/2012 – 05/2012

The purpose of this study was to obtain a vision of the Technological, Pedagogical, and Content Knowledge (TPACK) of in-service foreign language teachers. Data from more than one hundred teachers participated in the study, which was shared through the ACTFL listserv and assessed self-perceptions and beliefs of each themes of TPACK.

NSF RDE-FRI, (Award No: 0726300), 9/01/07-8/31/2010, The Effectiveness of Texas Instruments

Navigator Technology on Algebra I Achievement

This project examined the effectiveness of TI-Navigator technology on Algebra I achievement and attitudes on high school students with diagnosed learning disabilities or who were considered "at risk of academic failure." Duties included facilitation of the administration of pre-and post-tests and surveys, scoring of pre and post-tests, creation the database for survey results, maintaining a log that was used by teachers to record their technology usage, and design and facilitation of professional development.

Secondary Mathematics Teachers' Perceptions of their Integration of Instructional Technologies, 09/2010 – 03/2011 (Dissertation study)

The purpose of this qualitative study was to explore secondary mathematics teachers' perceptions of their progression through the levels described in the TPACK development model. Data, including teacher interviews, sample lessons, and classroom observations, were collected and analyzed for common themes.

MaPLES Initiative, 2009 - 2010 (Congressional Initiative, United States Department of Education)

The University of Mississippi's Center for Mathematics and Science Education (CMSE) implemented and evaluated a model for improving mathematics education at the elementary grade levels. The goals of this project were to provide data demonstrating significant improvement in teacher content knowledge and pedagogical skills, as well as improved student understanding and performance on mathematics content assessments.

SERVICE

Advisor, Kappa Delta Pi Honors Society, Mississippi State University, Fall 2013 – present

College of Education Scholarship Committee, Mississippi State University, Fall 2013 – present

CISE Scholarship Committee, Mississippi State University, Fall 2013 - present

Mississippi Excellence In Teaching Program Advisory Board Member - Spring 2013 - present

Mississippi Representative to Praxis II Middle School Math Score Setting Study, March 2013

Secondary Education Faculty OCFBI Liaison, Mississippi State University, Fall 2012 - present

Day One Team Mentor, Mississippi State University, Fall 2012

Mission 2020 Task Force for Creation of Departmental Mission Statement and Goals, Fall 2012

Mississippi Council of Teachers of Mathematics Consultant for Annual Meeting, Fall 2012

Mathematics Teacher Education Partnership Member, Spring 2012 - present

Advisory Board Member, NCTM Algebra Readiness Task Force, Fall 2011 - present

Preservice Teacher STAI-B Evaluator, The University of Mississippi, 2007 - 2010

Family Math Night Presenter & Facilitator, Lee County Schools, 2009 – 2010

MathCamp Coordinator/Instructor, Center for Mathematics and Science Education, 2007 - 2010

Dana Pomykal Franz, Ph.D.

EDUCATION

Trinity University	Math Education & Special Education	BA, 1987
Trinity University	School Administration	MA, 1991
Texas A&M University	Educational Psychology	PhD, 2001

APPOINTMENTS

2009- Present	Associate Professor, Curriculum, Instruction, and Special Education, College of Education, Mississippi State University (MSU)
2003-2009	Assistant Professor, Curriculum & Instruction, College of Education, MSU
2002-2003	Instructor, Curriculum & Instruction, College of Education, MSU
2002	University Field Supervisor, Secondary Mathematics, College of Education, University of Texas at San Antonio
1998-2002	Adjunct Professor, Curriculum & Instruction, College of Education, University of Texas at San Antonio
1999-2000	Math Teacher & Math Coordinator, Alamo Heights High School, Robbins Academy, San Antonio, TX
1997-1999	Coordinator and Teacher, Alamo Heights High School, Academic Support Center, San Antonio, TX
1992-1997	Mathematics Teacher, Alamo Heights High School, San Antonio, TX
1990-1992	Graduate Assistant, Center for Educational Leadership, Department of Education, Trinity University, San Antonio, TX,
1987-1990	Mathematics Teacher, Judson High School, Converse, TX,

PUBLICATIONS

Related to project proposal (selected)

Thompson, N., Miller, N, & Franz, D. P. (in-press). Comparing on-line and face to face experiences of non-traditional students. *Quarterly Journal in Distance Education.*

Ivy, J., & Franz, D. (2013). Two classroom portraits demonstrating the interplay of secondary mathematics teachers' TPACK on their integration of the mathematical practices. In D. Polly (Ed.), Common Core Math and Technology. Hershey, PA: IGI Global, 213 – 225.

Franz, D. P, Thompson, N. L., Miler, N. C. (2013). A comparison of teacher's perceptions of perceived barriers regarding the implementation of common planning time at two middle schools. In Merten, S. B., Anfara, V. A., Caskey, M. M. & Flowers, N. (Eds.), The Handbook in Research in Middle Level Education, Vol 8. Charlotte, NC: Information Age Publishing.

Franz, D. P. & Thompson, N. L. (2012). Common core state standards for mathematics and assessments: (mis)alignment. *Delta Journal of Education 2*(2), 139-154.

Franz, D. P., Thompson, N. L., Fuller, B.D., Hare, R. D., Miller, N. C., & Walker, J. T. (2010). Evaluating mathematics achievement of middle school students in a looping environment. *School Science and Mathematics, 110*(6), 298-308.

Other (selected)

Miller, N., Thompson, N. & Franz, D. P. (2009). Being proactive in the cyberage: strategies to safeguard young adolescents. *Middle School Journal 41*(1), 28-35.

Seth Fredric Oppenheimer

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Fax: 662 325–0005

U.S. Citizen

EDUCATION

1. Doctor of Philosophy in Mathematics (December 1987), The University of Texas at Austin. Thesis: A Partial Differential Equation Arising from the Dynamics of Gas Adsorption, Advisor: Ralph E. Showalter
2. Bachelor of Arts in Mathematics (June 1982), The University of Chicago.
3. Smicha student, ALEPH rabbinical program, 2006-present.

PROFESSIONAL EXPERIENCE

1. Director of Undergraduate Research, Shackouls Honors College, Mississippi State University, January 2012 to date.
2. Interim Head of The Department of Philosophy and Religion, Mississippi State University–July 1, 2008 to August 15, 2009.
3. Professor of Mathematics, Mississippi State University — August 2003 to date.
4. Professor of Computational Engineering, Mississippi State University — August, 2003 to date.
5. Director of the program in General Liberal Arts, College of Arts and Sciences, Mississippi State University–September, 1995 to August, 2002.
6. Tenured Associate Professor of Mathematics, Mississippi State University — August, 1994 to August, 2003.
7. Associate Professor of Computational Engineering, Mississippi State University — July, 2002 to August, 2003.
8. Undergraduate Coordinator, Department of Mathematics and Statistics, Mississippi State University — May 1994 to August, 2002.
9. Assistant Professor of Mathematics, Mississippi State University — August, 1988 to August, 1994.

[0]revised 2/9/2014

10. Lecturer, The University of Texas at Austin — September 1987 to August 1988.

11. Assistant Instructor, The University of Texas at Austin — September 1986 to August 1987.

12. Departmental Ombudsman, The University of Texas at Austin — June 1984 to August 1986.

13. Teaching Assistant, The University of Texas at Austin — September 1982 to May 1984.

14. Part–Time Instructor, Austin Community College — June 1985 to August 1988.

15. Junior Tutor, The University of Chicago — September 1980 to June 1981.

Current Research

My main interest is interdisciplinary mathematical modeling with a whole problem approach. That is, I work with experimentalists in engineering and science to develop models of the particular phenomena they are interested in, use the tools of mathematical analysis to determine answers to questions such as is the model well-posed, does the model have the qualitative properties seen in experiment. I proceed to use experimental data to solve the necessary inverse problems to calibrate the model. Finally, using the model predictions I suggest directions for future experimentation. Often such problems raise novel mathematical questions which I then investigate.

REFEREED PUBLICATIONS

1. **An Abstract Spectral Approximation Theorem From the Theory of Semigroups,** Applied Mathematics and Computation 47:185–199 (1992).

2. **A Model of Forced Drying,** J. of Math. Analysis and Applications, Vol. 178, No. 2(1993), pp. 553-566.

3. **Mixtures, Convection, Diffusion, and Adsorption Under the Assumption of Equilibrium Partitioning,** Differential and Integral Equations, Vol. 6, No. 6(1993), pp. 1367-1381.

4. **Adsorption in R^n,** Differential and Integral Equations, Volume 7, Number 2, March 1994, pp. 483–500.

5. With Gordon W. Clark, **Quasireversibility Methods for Non–Well–Posed Problems,** Electronic Journal of Differential Equations, Vol. 1994, No. 8, pp. 1-9 (1994).

6. **The sorption of mixtures under linear equilibrium partitioning and chemical transformation**, Mathematical Methods in the Applied Sciences, Vol. 18, pp. 803–823 (1995).

7. **A model for batch tests**, Canadian Applied Mathematics Quarterly, Vol. 3, pp. 89–98 (1995).

8. With Hai Dang, **On the existence and uniqueness of solutions for a boundary value problem**. Journal of Mathematical Analysis and Applications, Vol. 198(1996), no. 1, 35–48..

9. With D. D. Hai, **Singular boundary value problems for P-Laplacian like equations.** The Proceedings of The Royal Society of Edinburgh, 127A, 975–981, 1997.

10. With K. Ames, G. Clark, and J. Epperson, **A comparison of regularizations for an ill-posed problem**, Mathematics of Computation 67(1998) No. 224, 1451–1471.

11. **A convective flow problem with a repeated network micro–structure.** The Dynamics of Continuous, Discrete, and Impulsive Systems 6(1999), 553–567.

12. With D. D. Adrian and A. N. Alshawabkeh, **A River Water Quality Model for Periodic BOD Discharge Concentration**. Mathematical Problems in Engineering, Volume 5 (1999), pp 193–221.

13. **A convection and diffusion problem in a network**. Applied Mathematics and Computation 112 (2000) 223–240.

14. With W. L. Kingery, K. Willeford, and F. X. Han, **A quadrature technique for reaction rate identification.** Nonlinear Analysis, Series B: Real World Applications 2(2001) pp 135–144.

15. With William L. Kingery and FengXiang Han, **Phase Plane Analysis and Dynamical Systems Approaches to the Study of Metal Sorption in Soils.** "Sorption/desorption of heavy metals in soils", H. M. Salim and D. L. Sparks Editors. CRC Press (2001), pp 109–130.

16. With Mohsen Razzaghi and Falih Ahmad, **A collocation–type method approximation for radiative transfer problems in a slab medium.** Microwave and Optical Technology letters, Vol. 28 (2001), pp 307–311.

17. With Mohsen Razzaghi and Falih Ahmad, **Numerical solution of radiative transfer problems by Galerkin-type approximation methods in a slab medium**, Physica Scripta, Vol. 64 (2001), pp 97–101.

18. With Mohsen Razzaghi and Falih Ahmad, **On the application of wavelets to remote sensing.** Appeared in the (refereed) proceedings of 3ECPA, the 3^{rd} European Conference on Precision Agriculture, Montpelier, France, pp 289–293, 2001.

19. With Mohsen Razzaghi and Falih Ahmad, **Tau method approximation for radiative transfer problems in a slab medium**. Journal of Quantitative Spectroscopy & Radiative Transfer 72 (2002) 439–447.

20. With Mohsen Razzaghi, **Quadrature approaches to the solution of two point boundary value problems**, The proceedings of the Louisiana-Mississippi Section of The Mathematical Association of America, Spring 2002. (Expository). http://www.mc.edu/campus/users/travis/maa/proceedings/spring2002/index.html

21. With Mohsen Razzaghi, Michael Cox, and Falih Ahmad, **On the solution of an Integro-differential equation in pattern recognition and remote sensing**, in "microwave nondestructive evaluation and imaging 2002", Matteo Pastorino, Editor. Transworld Research, pp 48–62, 2002.

22. With R. L. Carr, H. Chambers, J. R. Richardson, and J. E. Chambers, **Modeling the interactions of mixtures of organophosphorus Insecticides with cholinesterase**, Proceedings of the Fifth Mississippi State Conference on Differential Equations and Computational Simulations May 18 - 19, 2001, Electronic Journal of Differential Equations, pp 89–99, 2002.

23. With Mohsen Razzaghi and Falih Ahmad, **A Legendre Wavelets Method for the Radiative Transfer Equation in Remote Sensing**, Journal of Electromagnetic Waves and Applications, Vol. 16, 1681–1693, 2002

24. With Mohsen Razzaghi and Falih Ahmad, **A discrete bidirectional reflectance model in remote sensing**, , Journal of Quantitative Spectroscopy & Radiative Transfer, Vol. 77, 335-343, 2003

25. With Mohsen Razzaghi, **On the Application of Hybrid Functions for Radiative Transfer Problems**, (refereed), Proceedings of the American Society of Photogrammetry and Remote Sensing (ASPRS) 2003 Annual Meeting, Alaska, 10 pages, 2003 (to appear)

26. With Kelleher, Brian P.; Han, Feng X.; Willeford, Kenneth O.; Simpson, Myrna J.; Simpson, Andre J.; Kingery, William L. **Dynamical Systems and Phase Plane Analysis of Protease-Clay Interactions**. Langmuir (2003), 19(22), 9411-9417.

27. Janice E. Chambers and Seth F. Oppenheimer, **Organophosphates, Serine Esterase Inhibition, and Modeling of Organophosphate Toxicity,** Toxicol. Sci., Feb 2004; 77: 185 - 187.

28. With K. Renee Fister and C. Maeve McCarthy, **The recovery of a time dependent parameter**. Siam Journal on Applied Mathematics(2006), Vol. 66 (4), pp 1407-1423.

29. Stephen Pruett, Ruping Fan, and Seth Oppenheimer, **Greater Than Additive Suppression of TLR3-Induced IL-6 Responses by Administration of Dieldrin and Atrazine,** . J. ImmunotoxicologyVolume 3, Issue 4 December 2006, pages 253 - 262.

30. S.F. Oppenheimer R. Fan, and, S. Pruett, **A model for gene activation**, Electronic Journal of Differential equations, conference 17 (2009) pp 197-206.

31. Kris M. Hart, Anna N. Kulakova, Christopher C. R. Allen, Andre J. Simpson, Seth F. Oppenheimer, Hussain Masoom, Denis Courtier-Murias, Ronald Soong, Leonid A. Kulakov, Paul V. Flanagan, Brian T. Murphy, and Brian P. Kelleher. 2013. **Tracking the Fate of Microbially Sequestered Carbon Dioxide in Soil Organic Matter**. Environmental Science And Technology, 47, pp5128-5137.

32. Kris M. Hart , Seth F. Oppenheimer, Brian W. Moran, Christopher C.R. Allen, Vassilis Kouloumbos, Andre J. Simpson, Leonid A. Kulakov, Leon Barron , Brian P. Kelleher. 2013. **CO2 uptake by a soil microcosm.** Soil Biology & Biochemistry. 57, pp615-624.

33. Renee Fister K, McCarthy ML, Oppenheimer SF, Collins C., **Optimal control of wild mosquitoes through sterile insect release and habitat alteration**. Math Biosci. 2013 Aug;244(2):201-12. doi: 10.1016/j.mbs.2013.05.008. Epub 2013 Jun 3

OTHER PUBLICATIONS

Several poems and essays have been published over the years in primarily Jewish periodicals. Recently, I have been publishing some poetry and essays online at http://thefaithlab.info/author/rabbi-seth-oppenheimer/

INVITED TALKS

1. **Finite Difference Equations: A Quick Route to Applications for High School Students** (1 hour), NCTM Southern Regional Conference, Little Rock, Arkansas, November 1992.

2. **A model for batch tests,** a talk for the Undergraduate Mathematics Club of Mississippi College, Clinton, MS, April, 1995.

3. **Convection and Diffusion in a Finite Network** (45 minutes), International Conference on Dynamical Systems & Differential Equations,Southwest Missouri State University, Springfield, Missouri, May 29–June 1, 1996

4. **A model for batch tests,** Georgia Southern University, Statesboro, Georgia, March, 1998.

5. **A model for pollution in rivers** and (for the student club) **Phase plane analysis in soil science.** Lamar University, Lamar, Texas, March, 2000.

6. **A model for pollution in rivers.** Emory University, Atlanta, Georgia, April, 2000.

7. **A new model for the population of a highly vagile insect.** Georgia Southern University, Statesboro, Georgia, April, 2000.

8. **Improved subpixel resolution via repeated measurements and point spread function deconvolution.** Murray State University, Murray, Kentucky, September, 2000.

9. with Mark Riggs, **Recovery of a Flux through a Mold Wall,** the minisymposium Constructive Algorithms in Inverse Problems at 2002 SIAM 50th Anniversary and Annual Meeting, Philadelphia, Pennsylvania, July 8-12, 2002.

10. Principal lecturer at **Biomathematics in the Commonwealth workshop** in Murray Kentucky from June 24-25, 2005: **Models of spatially varying biological and bio-medical phenomena using partial differential equations**

11. **Biological modeling using ordinary differential equations,** Louisiana State University Health Science Center, January 9, 2006.

12. **Tour of Mathematical Models in Biology**, Computational Biology Seminar Series, Mississippi State University, November 29, 2006

13. **A diffusion model for the release of sterile mosquitoes**. 2008 Fall Southeastern Meeting of the AMS,Huntsville, AL, October 24-26, 2008

14. **A Model for Gene Activation**. Invited BioMaPS seminar at Murray State University, Murray, KY, November, 2008

15. In the realm of nonmathematical talks, I am frequent speaker in religion and social science classes at Mississippi State University and other nearby schools, as well as at local churches and civic groups on religion in general and Judaism in particular.

CONTRIBUTED PAPERS

1. **Adsorption in R^n**, 95^{th} Annual Joint meeting of the AMS and the MAA, Phoenix, Arizona, January 1989.

2. **The Geometry of the Determinant**, Annual Meeting of the LA-MS Section of the MAA, Biloxi, Mississippi, February 1989.

3. **Some Approximation Theorems for Non-linear First Order Problems Governed by Linear Semigroups**, Southeastern Atlantic Regional Conference on Differential Equations, University of North Carolina, Charlotte, October 1989.

4. **Some Approximation Theorems for Non-linear First Order Problems Governed by Linear Semigroups, An Application**, 96^{th} Annual Joint meeting of the AMS and the MAA , Louisville, Kentucky, January 1990.

5. **Spaces of Weakly Directionally Differentiable Functions**, Southeastern Atlantic Regional Conference on Differential Equations, Virginia Tech, Blacksburg, Virginia, November 1990.

6. **Adsorption in R^n Part II: The Sponge Dries Out**, 97^{th} Annual Joint meeting of the AMS and the MAA, San Francisco, California, January 1991.

7. With T.E. Myers, **Adsorption in the Presence of Salt (the set up of the model)**, Southeastern Atlantic Regional Conference on Differential Equations, Mississippi State University, Mississippi, October 1991.

8. With T.E. Myers, **Adsorption in the Presence of Salt (An existence theorem)**, 98^{th} Annual Joint meeting of the AMS and the MAA , Baltimore, Maryland, January 1992.

9. **A Model for Adsorption with Time Dependent Partitioning Coefficients**, Evolution Equations Conference, Baton Rouge, Louisiana, January 1993.

10. **Some Results for a System of Nonlinear Evolution Equations**, 99^{th} Annual Joint meeting of the AMS and the MAA, San Antonio, Texas, January 1993.

11. **Some Remarks on Spectral Approximation**, The Mississippi State Annual Conference on Differential Equations and Computational Simulations, Starkville, Mississippi, March, 1993.

12. **Mixtures Under Spatially and Temporally Linear Equilibrium Partitioning and Nonlinear Chemical Transformations**, Differential Equations Conference sponsored by Ohio University, Athens, Ohio, August, 1993.

13. **A Model for Batch Tests with Competitive Sorption and Chemical Transformations**, Southeastern Atlantic Regional Conference on Differential Equations, Wilmington, North Carolina, October, 1993.

14. **A multisite sorption model**, Texas Partial Differential Equations Meeting, Austin, Texas, April, 1994.

15. **Sorption of mixtures without equilibrium partitioning**, Southeastern Atlantic Regional Conference on Differential Equations, Knoxville, Tennessee, October, 1994.

16. With Stacy E. Howington and John F. Peters, **A convective flow problem with a repeated network micro–structure**, Second Mississippi State Conference on Differential Equations and Computational Simulations, Starkville, Mississippi, March, 1995.

17. **A Model of Pervaporation**, Southeastern Atlantic Regional Conference on Differential Equations, Emory University, Atlanta Georgia, October, 1996.

18. With D. D. Hai, **Singular boundary value problems for P-Laplacian like equations**, Southeastern Atlantic Regional Conference on Differential Equations, Vanderbilt University, Nashville, Tennessee, October, 1997.

19. With D. D. Adrian and A. N. Alshawabkeh, **Analytical Water Quality Model for Periodic BOD Discharge Concentration**, Southeastern Atlantic Regional Conference on Differential Equations, Auburn University, Auburn, Alabama, October, 1998.

20. With W. L. Kingery, K. Willeford, and F. X. Han, **A quadrature technique for reaction rate identification,** First Southern Symposium On Computing, University of Southern Mississippi, Hattiesburg, Mississippi, December 4-5, 1998

21. **A new model for the population of a highly vagile insect,** Fourth Mississippi State Conference on Differential Equations and Computational Simulations, Starkville, Mississippi, May, 1999.

22. With Paul Waltman, **A model for the bioremediation of a river.** Southeastern Atlantic Regional Conference on Differential Equations, University of Richmond, Richmond, Virginia, October, 1999.

23. **A new model for the population of a highly vagile insect.** Southeastern Atlantic Regional Conference on Differential Equations, Virginia Tech., Blacksburg, Virginia, October, 2000.

24. With Mark S Riggs, **Recovery of a boundary flux using far boundary data**, 107^{th} Annual Joint meeting of the AMS and the MAA,New Orleans, Louisiana, January 2001.

25. With R. L. Carr, H. Chambers, J. R. Richardson, and J. E. Chambers, **Modeling the Interactions of Organophosphorus Insecticides with Cholinesterase**, Fifth Mississippi State Conference on Differential equations and computational simulations, Mississippi State, Mississippi, May 18-19, 2001.

26. With W. L. Kingery, C. Smith, and D. Shaw, **Toward a model for local kinetics in mixed soils**. Southeastern Atlantic Regional Conference on Differential Equations, Wake Forest University., Winston-Salem, North Carolina, November, 2001.

27. With William L. Kingery, **The effect of the assumption of equilibrium partitioning in the modeling of chemical sorption and transport**. 108^{th} Annual Joint meeting of the AMS and the MAA,San Diego, California, January 2002.

28. With Mohsen Razzaghi, **Quadrature approaches to the solution of two point boundary value problems**, Annual meeting of the Louisiana-Mississippi Section of The Mathematical Association of America, Northwestern State University, Natchitoches, LA., March, 2002.

29. With R. Shivaji, **An Ordering Principle for a Harvesting Model**, Southeastern Atlantic Regional Conference on Differential Equations, University of Tennessee, Knoxville, Tennessee, October, 2002

30. With R. L. Carr, H. Chambers, and J. E. Chambers, **An attempt to model biological reactions and deduce an unknown mechanism,** Kennesaw State University, Kennesaw Georgia, October 2003.

31. Seth F. Oppenheimer, Shane Burgess, Janice Chambers, **A model for parathion desulfuration in a liver sinusoid**, The 24th Annual Southeastern-Atlantic Regional Conference on Differential Equations, October 22&23, 2004, Chattanooga, TN.

32. Seth F. Oppenheimer, Shane Burgess, Janice Chambers, **A model for parathion desulfuration in a liver sinusoid**, Sixth Mississippi State UAB Conference on Differential equations and computational simulations, Mississippi State, Mississippi, May, 2005.

33. Seth F. Oppenheimer and Gary Ervin, **A model for an invasive species**, The 27th Annual Southeastern-Atlantic Regional Conference on Differential Equations, October 19 & 20, 2007, Murray, KY.

34. Seth F. Oppenheimer, Steve Pruett, and Ruping Fan, **A model for gene activation**, Seventh Mississippi State UAB Conference on Differential equations and computational simulations, Birmingham, AL, November, 2007.

35. **A model for the release of sterile mosquitoes;** The 29th Southeastern Atlantic Regional Conference on Differential Equations, Mercer University in Macon, GA on October 16 & 17, 2009.

36. **A model for the release of sterile mosquitoes;** DIFFERENTIAL EQUATIONS WEEKEND, November 7, 2009, Memphis, Tennessee

GRANTS AND CONTRACTS

1. A travel grant from the Southeastern Atlantic Regional Conference on Differential Equations, Virginia Tech, Blacksburg, Virginia, November 1990. ($267.81)

2. Research contract DACW 39–91–M–5359 to model the behavior of salt water sediments in adsorption columns, September, 1991 – July, 1992. ($21,197.00)

3. Research contract DACW 39–92–M–6776 to study the stability of a model for the behavior of salt water sediments in adsorption columns with respect to certain parameters and to approximate those parameters, September, 1992 – May, 1993. ($15,822.00)

4. Research contract DACA 39–93–M–4716 to model the behavior of explosive contaminated soils in adsorption columns where chemical transformations might occur, May, 1993 – August, 1993. ($19,588.00)

5. A travel grant from the NSF to attend a meeting on Mathematical Approaches to the Study of Nonlinear Materials in Fayetteville, Arkansas, March, 1994. ($300.00)

6. Research contract DACA39–94–K–0018 to develop and study new models for groundwater flow which are either independent of or take into account remediation site size. March, 1994 –December, 1994. ($33,961)

7. Consultant on the NSF grant of Sandra H. Harpole and Jere W. Hess, Jr: **Learn to Work,** ESI–95556464, from 1996–1999. Developed and presented projects demonstrating industrial applications of high school level mathematics. Six weeks of full support each summer covered.

8. With Mohsen Razzaghi (Co–PI). NASA grant NCC1399001 99070609, **Inverse Scattering Techniques for the Recovery of Spatially Varying Properties in Agriculture and Forestry**, July, 1999–November, 1999. ($12,622)

9. With Mohsen Razzaghi (Co-PI). NASA grant NCC1399001 99070609 continuation, **Inverse Scattering Techniques for the Recovery of Spatially Varying Properties in Agriculture and Forestry**, December, 1999–November, 2000. ($90,223)

10. With Janice E. Chambers (PI), Howard Chambers (Co–PI), and Russell L. Carr (Co PI). American Chemistry Council Grant, **Cumulative risk assessment for mixtures with a common mode of action.** July 1, 2000–June 30, 2002. ($250,764)

11. With Joseph Massey (Co-PI), Michael Cox (Co-PI), William L. Kingery (Co-PI), and Mohsen Razzaghi (Co-PI). NASA grant NCC1399001 99070609, **Remote sensing of soil physico-chemical properties and their use in agricultural and environmental applications,** January, 2001–December, 2003. ($507,737).

12. Consulting contract with Center For Educational Partnerships (PREPS Inc.), Give three inservice programs high school algebra I teachers (written by Bonnie L. Oppenheimer), 2001–2002 academic year. ($600)

13. With Jerald Ainsworth (PI), Janice Chambers (Co-PI), Russel Carr (Co-PI), Peter Ryan (Co-PI), Scott Willard (Co-PI), Alan Wood (Co-PI), Wai K. Ma (Co-PI), and Dawn Luthe (Co-PI), **Mississippi EPSCOR Research Infrastructure Improvement**, January, 2002–December, 2004. (($693,006–granted. I later withdrew from this grant.)

14. National Institutes of Health grant 5 P20 RR017661-02, **A Model for Parathion Desulfuration in a Liver Sinusoid**, 9/1/03-6/30/04 ($16,876). (This is a COBRE grant under a larger NIH program grant with Janice Chambers as PI.)

15. National Institutes of Health grant P20 RR017661-03, **A Model for Parathion Desulfuration in a Liver Sinusoid** (a continuation of the previous grant), 9/1/04-6/30/05 ($27,146). (This is a COBRE grant under a larger NIH program grant with Janice Chambers as PI.)

16. National Institutes of Health grant P20 RR017661-04, **A Model for Parathion Desulfuration in a Liver Sinusoid** (a continuation of the previous grant), 07/01/05 - 06/30/06 ($20,208). (This is a COBRE grant under a larger NIH program grant with Janice Chambers as PI.)

17. National Science Foundation grant EPS-0556308 06040292 01/01/07 - 12/31/07 ($24,949) **Dynamic spatio-temporal modeling of plant invasion**, (I am co-PI with Gary Ervin of the Biological Sciences Department)

18. IHL-Teacher Quality Grant: Matrix: Math Achievement Through Reading in eXcess At the Secondary Level. CO-PI, Hopper (PI), (Franz (Co-PI) 5/08-8/08

19. National Science Foundation grant DUE1043398, 9/15/2010-8/31/2012, Climate Literacy Partnership in the Southeast United States, senior personnel, McNeal (PI)

20. National Science Foundation grant DUE1043398, ($50,000) 9/15/2011-8/31/2012, Climate Literacy Partnership in the Southeast United States-network expansion, Co-PI, Smith (PI)

OTHER MEETINGS ATTENDED

1. The Annual Texas PDE Seminar, The University of Texas at Austin, April 1987.

2. The Annual Joint meeting of the AMS and the MAA, Atlanta, Georgia, January 1988.