UNIVERSITY OF NORTH CAROLINA, CHARLOTTE
NEW GRADUATE COURSES CURRICULUM PROPOSAL

FROM THE DEPARTMENT OF MATHEMATICS AND STATISTICS

I. <u>TITLE</u>: New Course Proposals for **MAED 5252 Teaching Mathematics to Secondary Learners, MAED 5232 Teaching Mathematics to Middle School Learners**

II. CONTENT OF PROPOSAL

    A. <u>Proposal Summary and Catalog Copy</u>.

    1. Summary. The Department of Mathematics and Statistics proposes to add two courses for students in the Master of Arts in Teaching program. Students enter the MAT program as post baccalaureate students and pursue a program leading to teaching licensure. These courses are the required teaching methods classes for those pursuing a license to teach mathematics in either the Middle Grades or Secondary level. As such, we wish to cross-list these courses with their respective undergraduate courses for pre-service Middle Grades and Secondary level classes, MAED 4252 and MAED 4232, and have developed sufficiently rigorous syllabi to satisfy the requirements for graduate credit with the more rigorous requirement for graduate students described in the individual syllabi (attached). The two courses described in this proposal address these core requirements.

    2. Proposed Catalog Copy.

    MAED 5252. Teaching Mathematics to Secondary School Learners (3).
Prerequisites**:** Admission to the Master of Arts in Teaching Program (Secondary Grades Mathematics emphasis) or consent of the Department. (*Fall*)

    This course is the initial teaching methods course for secondary school mathematics teachers. This course focuses on secondary school mathematics and its relation to the K-12 curriculum. Topics include the development of teaching strategies and activities in secondary school mathematics with an emphasis on problem solving, mathematical connections, communication and assessment, including school-based field experiences. (*Fall*)

    MAED 5232. Teaching Mathematics to Middle School Learners (3). Prerequisites**:** Admission to the Master of Arts in Teaching Program (Middle Grades Mathematics emphasis) or consent of the Department. (*Spring*)

    This course is the initial teaching methods course for middle school mathematics teachers. This course focuses on middle school mathematics and its relation to the K-12 curriculum. Topics include the development of teaching strategies and activities in middle school mathematics with an emphasis on problem solving, mathematical connections, communication and assessment, including school-based field experiences. (*Spring*)

B. <u>Justification</u>

　　1.　Identify the need addressed by the proposal. Students in these courses require graduate level courses to satisfy the requirements of the MAT program. We have been using specially designated Topics classes at the 5000-level to offer these classes. This has caused confusion for students since we routinely offer several Topics courses most every semester. Despite our best advising, MAT students have sometimes registered for an inappropriate class that had had the Topics designation.　The proposed courses will eliminate the confusion.

　　2. Prerequisites/co-requisites.　Students must be accepted as teacher education students in the Master of Arts in Teaching program in the College of Education.

　　3. Course numbering. The course numbering scheme is consistent with the level of content in the proposed courses.　The courses will exclusively serve post baccalaureate students in the College of Education.

　　4. Improvement.　These courses were developed to meet the needs of pre-service Middle Grades and Secondary mathematics teachers and will deepen their knowledge of mathematics learning and learners; the mathematics curriculum as described in the *North Carolina Standard Course of Study;* effective methods for teaching mathematics; and a variety of mathematics assessment techniques in mathematics classrooms.

C. <u>Impact</u>.

　　1. *Groups of students served by this proposal*. These courses will be required of all MAT students who seek licensure to teach mathematics. We plan to begin offering these courses to students entering the MAT Program in Spring 2009.

　　2. *Effect of This Proposal on Existing Courses and Curriculum.*

　　　　a. *When and how often will the courses be taught?* We plan to offer MAED 5252 in the Fall semester and MAED 5232 during the Spring semester. Due to the classroom-based clinical requirement, we do not plan to offer these courses during the summer.

　　　　b. *What is the anticipated enrollment?* We expect each class to have an enrollment of 20-25 students given current levels of students in the MAT program. We will offer at least two sections of each course per semester.

D.　<u>Resources Required to Support the Proposal</u>

　　1. *Personnel.*

　　　　a.　*Requirements for new faculty, part-time teaching, student assistants, and/or increased load on present faculty*.　Since these courses have been taught for the past four years as Topics classes, there is no need for additional personnel.

b. The following Mathematics faculty are eligible to teach the courses on a rotating basis: Jeong-Lim Chae, Vic Cifarelli, Anthony Fernandes, Kim Harris, Adalira Sáenz-Ludlow, and the Teacher-in-Residence. In addition, David Pugalee and Adam Harbaugh from the College of Education have served as instructors in our methods classes in the past and thus are eligible to teach the courses.

1. *Physical Facilities*. No new physical facilities are required.

2. *Equipment and Supplies*. No new equipment or supplies are needed.

3. *Computers*. No new computer usage by students or faculty is required.

4. *Audio-Visual*. No new audio-visual equipment or services are required.

5. *Other Resources*. No other additional resources are required.

6. *Funding*. No new or additional funding will be required.

E. Consultation with the Library and Other Departments or Units

1. *Library Consultation*.

a. Library consultation was initiated with Ms. Barbara Tierney on December 8, 2000.

b. The UNC Charlotte reference librarians report that the UNC Charlotte library holdings are adequate to support this proposal (copy attached).

2. *Consultation with Other Departments or Units*.

Dr. Barbara Edwards, Associate Dean, College of Education
Dr. Melba Spooner, Chair, Middle, Secondary and K-12 Education, College of Education
Dr. Adam Harbaugh, Middle, Secondary and K-12 Education, College of Education
Dr. David Pugalee, Middle, Secondary and K-12 Education, College of Education

F. Initiation and Consideration of the Proposal

1. *Originating Unit*. The proposal originated within the Mathematics Education Committee within the Department of Mathematics and Statistics. On October 1, 2008, the Committee voted unanimously in favor of the proposal.

2. *Other considering units*. None.

3. *Council on General Education (COGE).* This proposal was not submitted to COGE.

G. Attachments

   1. Library Consultation Forms.

   2. Consultation Letter of Support Memo

   3. Course Syllabi for MAED 5232 and MAED 5252

J. Murrey Atkins Library
Memorandum

TO: Dr. Vic Cifarelli

FROM: Barbara G. Tierney
                 Liaison Librarian to the Mathematics Dept.

DATE: May 23, 2008

RE: Consultation with Library for Course and Curriculum Proposal
Date of initiation of consultation with Library Reference personnel: Request received May 21, 2008

Request authorization to create **MAED 5232 Teaching Mathematics to Middle School Learners.** This course is the initial teaching methods course for middle school mathematics teachers. This course focuses on middle school mathematics and its relation to the K-12 curriculum. Topics includes the development of teaching strategies and activities in middle school mathematics with an emphasis on problem solving, mathematical connections, communication, disclosure, and assessment, including school-based field experiences.

SUMMARY OF REFERENCE LIBRARIAN'S EVALUATION OF HOLDINGS:
Evaluator: Barbara G. Tierney   Date: May 23, 2008
Check one: **1.   Holdings are superior.**
              2.   Holdings are adequate Please see Comments
              3.   Holdings are adequate only if department purchases add.holdings
              4.   Holdings are inadequate

Comments:
I find that the J. Murrey Atkins Library has adequate holdings (including print and electronic indexes, databases, journals and books) to support this proposed new course. Please see below for details regarding the library holdings that will support this course:

Relevant Reference Indexes and Databases (Electronic and Print)
Academic Search Premier
ERIC
MathSci

Relevant Journals: (Selected Titles from the Atkins Library Collection)
Canadian Journal of Science, Mathematics and Technology Information
Educational Studies in Mathematics
Focus on Learning Problems in Mathematics
International Journal of Science and Mathematics Education
Journal of Mathematical Behavior
Journal of Mathematics Teacher Education
Journal for Research in Mathematics Education
Mathematics Education Research Journal
Mathematics Educator
School Science and Mathematics

Books:

Required Text:
Huetinck, L., & Munshin, S. (2008) Teaching mathematics for the 21st century: Methods and activities for grades 6-12 (3rd ed). Upper Saddle River, NJ: Prentice Hall.
 (Atkins Library has this in Gen. Collections)

A search of the Atkins Library online catalog using the below listed relevant Library of Congress Subject Headings reveals the following current holdings:

L.C. Subject Heading or Keyword	Total # Titles	#Titles 2002+
Mathematics –Study and Teaching(Middle School)	43	36
Mathematics Teachers-Training of	16	0

Also, grade-appropriate sample mathematics textbooks, workbooks, and kits available in the Atkins Library Curriculum Instructional Materials Center.

Conclusion:
I find that the J. Murrey Atkins Library has adequate holdings (including print and electronic indexes, databases, journals and books) to support this proposed new course. I recommend that the Mathematics Department continue submitting requests to the Library for updated books in the above listed subject areas.

Barbara Tierney, Math Dept. Liaison Librarian   May 23, 2008
Signature of Evaluating Librarian   Date

J. Murrey Atkins Library
Memorandum

TO: Dr. Vic Cifarelli

FROM: Barbara G. Tierney
                     Liaison Librarian to the Mathematics Dept.

DATE: May 23, 2008

RE: Consultation with Library for Course and Curriculum Proposal
Date of initiation of consultation with Library Reference personnel: Request received May 21, 2008

Request authorization to create **MAED 5252 Teaching Mathematics to Secondary School Learners.** This course is the initial teaching methods course for secondary school mathematics teachers. This course focuses on secondary school mathematics and its relation to the K-12 curriculum. Topics includes the development of teaching strategies and activities in secondary school mathematics with an emphasis on problem solving, mathematical connections, communication, disclosure, and assessment, including school-based field experiences.

SUMMARY OF REFERENCE LIBRARIAN'S EVALUATION OF HOLDINGS:
Evaluator: Barbara G. Tierney   Date: May 23, 2008
Check one: **1.   Holdings are superior.**
                      5.   Holdings are adequate Please see Comments
                      6.   Holdings are adequate only if department purchases add. holdings
                      7.   Holdings are inadequate

Comments:
I find that the J. Murrey Atkins Library has adequate holdings (including print and electronic indexes, databases, journals and books) to support this proposed new course. Please see below for details regarding the library holdings that will support this course:

Relevant Reference Indexes and Databases (Electronic and Print)
Academic Search Premier
ERIC
MathSci

Selected Relevant Journals available from the Atkins Library Collection:
Canadian Journal of Science, Mathematics and Technology Information
Educational Studies in Mathematics
Focus on Learning Problems in Mathematics
International Journal of Science and Mathematics Education
Journal of Mathematical Behavior
Journal of Mathematics Teacher Education
Journal for Research in Mathematics Education
Mathematics Education Research Journal
Mathematics Educator
School Science and Mathematics

Books:

Required Text:
Huetinck, L., & Munshin, S. (2008) Teaching mathematics for the 21st century: Methods and activities for grades 6-12 (3rd ed). Upper Saddle River, NJ: Prentice Hall.
 (Atkins Library has this in Gen. Collections)

A search of the Atkins Library online catalog using the below listed relevant Library of Congress Subject Headings reveals the following current holdings:

L.C. Subject Heading or Keyword	Total # Titles	#Titles 2002+
Mathematics–Study and Teaching (Secondary Sch.)	19	4
Mathematics Teachers-Training of	16	0

Also, grade-appropriate sample mathematics textbooks, workbooks, and kits available in the Atkins Library Curriculum Instructional Materials Center.

Conclusion:
I find that the J. Murrey Atkins Library has adequate holdings (including print and electronic indexes, databases, journals and books) to support this proposed new course. I recommend that the Mathematics Department continue submitting requests to the Library for updated books in the above listed subject areas.

Barbara Tierney, Math Dept. Liaison Librarian   May 23, 2008
Signature of Evaluating Librarian   Date

Memorandum

To: Dr. Victor Cifarelli, Department of Mathematics and Statistics

From: Melba Spooner, Chair, Middle, Secondary, and K-12 Education

Date: 4/30/2009

Re: Proposals for MAED 5232 Teaching Mathematics to Middle School Learners and MAED 5252

Teaching Mathematics to Secondary Learners

The Department of Middle, Secondary, and K-12 supports the development of the two methods courses identified above for teaching mathematics to middle and secondary school learners. The courses have been taught under topics number for several years to students in the Master of Arts in Teaching Program (phase I). This is an appropriate and needed step in formalizing the name and number of the required courses in this program.

MAED 5232
Teaching Mathematics to Middle School Learners
Credit Hours: 3

Proposed Catalog Copy:

MAED 5232 *Teaching Mathematics to Middle School Learners* **(3)** This course is the initial teaching methods course for middle school mathematics teachers. This course focuses on middle school mathematics and its relation to the K-12 curriculum. Topics include the development of teaching strategies and activities in middle school mathematics with an emphasis on problem solving, mathematical connections, communication, disclosure, and assessment, including school-based field experiences. (*Spring*)

Course Prerequisites: Admission to the Master of Arts in Teaching Program (Middle Grades Mathematics emphasis) or consent of the Department.

Required Text:
Huetinck, L., & Munshin, S. (2008). *Teaching mathematics for the 21st century: Methods and activities for grades 6-12 (3rd ed.).* Upper Saddle River, NJ: Prentice Hall.

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

Additional resources will come from professional journals that focus on the teaching and learning of mathematics including:

> *Canadian Journal of Science, Mathematics and Technology Education*
> *Educational Studies in Mathematics*
> *Focus on Learning Problems in Mathematics*
> *International Journal for Mathematics Teaching and Learning*
> *International Journal of Technology in Mathematics Education*
> *International Journal of Science and Mathematics Education*
> *Journal of Mathematical Behavior*
> *Journal of Mathematics Teacher Education*
> *Journal for Research in Mathematics Education*
> *Mathematics Education Research Journal*
> *Mathematics Educator*
> *School Science and Mathematics*

Course Rationale: This course will provide a foundation for the development of middle grades mathematics teachers. Students will explore mathematics content appropriate to middle grades mathematics teaching and develop effective pedagogical skills that are responsive to the instructional needs of students.

This course will incorporate standards from various organizations concerned with the preparation of teachers: The North Carolina Performance Based Licensure Project, sponsored by the North

Carolina Department of Public Instruction (NCDPI), the Interstate Teacher Accreditation (INTASC), National Council for Accreditation of Teacher Education (NCATE), the National Board for Professional Teacher Standards (NBPTS), and the National Council of Teachers of Mathematics (NCTM).

Objectives:

Upon completion of this course, successful students will have:

1. Developed an understanding of the nature and structure of mathematics appropriate for teaching mathematics in the middle grades.

2. Utilized their mathematics background to develop ideas and concepts necessary for developing mathematical understanding in middle school mathematics students.

3. Designed instruction appropriate for middle school mathematics students.

4. Utilized methods, ideas, and materials in mathematics pedagogy, learning theory, and human development in the teaching of mathematics.

5. Developed appropriate curriculum materials and use appropriate instructional techniques for diverse and varied student populations.

6. Developed respect for equity in sex, race, gender, social class, sexual orientation, and various cultures.

7. Developed skills to meet the needs of special populations in the mathematics classroom.

Course Format: Lecture and discussion.

Course Content:

The course is organized around the following themes:

  I. The Mathematics Curriculum for Grades 6-8 (Text Chapters 1-5)
  1. Historical overview
  2. Scope and Sequence
  3. Basis for decisions regarding selection of content
  4. State mathematics standards
  5. Standards of the National Council of Teachers of Mathematics
 II. Mathematics Instruction (Chapters 6-10)
  1. Using learning outcomes as the basis for instructional decisions
  2. Problem Solving
  3. The use of physical materials and models
  4. The stages of an effective mathematics lesson
  5. Modifying instruction for special and diverse learners
  6. Management issues
  7. Promoting Mathematical Literacy

8. Technological Resources
9. Authentic and alternative assessment

III. Issues and trends in the teaching of mathematics (Chapters 11-12)
1. Mathematics anxiety and negative attitudes toward mathematics
2. Socio-cultural constructions of mathematics
3. Research trends in mathematics education
4. Assessment issues, including basic skills, competency testing, and related assessment issues.

Course Requirements

Class Meetings: A great deal of the information shared in this class will stem from discussions, lectures, and activities. Because of this, prompt and regular attendance is mandatory. If you have to be absent on a day an assignment is due, you may fax or email the assignment to me or have another student bring the assignment to class. If the absence is the result of an emergency situation, then you are expected to contact the instructor as soon as possible.

Attendance: Punctual and regular attendance is a minimum expectation for this course. Two absences will result in a letter grade drop. Three or more absences will result in a grade of U.

Assignments

Grades will be based on the following assignments and grading scale. Activities indicated with an asterisk (*) indicate activities required of the graduate students that are not required of the undergraduates in MAED 4232.

Assignment	%
Chapter Quizzes	10%
Group Presentation	10%
Video Journal	15%
Research Articles	10%
Lesson Plans	15%
Problem Presentation	5%
WebQuest	5%
Clinical Requirements	10%
*Case Analysis	10%
*Website Presentation and Evaluation	10%
Total	**100%**

Grading Scale (Percentage):
     A: 90-100
     B: 80-89
     C: 70-79
     U: 0-69

The assignments are described in the following paragraphs.

Chapter Quizzes (10%)
At the beginning of each class meeting, you may receive a short quiz on the chapter assigned for that class meeting. The purpose of the quiz is to assess your initial understanding of the reading and to hold you accountable for reading the text. There will be 4 to 6 quizzes given throughout the semester. There will be no make-ups given for a missed quiz.

Group presentation (10%):
Students will work alone or with a partner to interpret and present information from an assigned course reading. You will need to sign up for presentations on the first day of class. It will be your responsibility to present the material from the chapter to your classmates. The mathematical activities in the chapter should not be included as part of your presentation. However, activities that reinforce the concepts of the presentation are encouraged. The mode of delivery is up to you. <u>Audience participation, graphics, and handouts are expected.</u> A non-exhaustive list of suggestions for presentation modes are as follows: PowerPoint, lecture, discussion, questioning and answers, jig-saw, KWL, overheads, demonstration, game show, modeling, activity-based, outline, concentration cards, tri-fold brochure, newsletter, video clips, cooperative learning groups, learning centers. See the rubric below. **Time limit: one hour**. Scoring Rubric provided in Appendix A.

Video Journal (15%):
You will be required to choose and view six videos throughout the semester and record summaries and reflections on each video. The specifics for these assignments will be provided separately.

Research Articles (10%):
Prepare **two** reflective analyses of journal articles from any of the research journals provided in Appendix B. Your analysis will require you to summarize the major theme(s) of the article and reflect on how this information could impact mathematics teaching and student learning. The articles should be chosen to coincide with one or more of the NCTM content and process standards. The connection to the NCTM standards should be explicit in your analysis. See format below.

Lesson Plans (5+5+5=15%):
You will design 3* related mathematics lessons that will be evaluated on the basis of their content, but also on the justification for the selection of various techniques, resources, and other components. These lessons should be parts to a cohesive mini-unit of lessons (together with the WebQuest, see below). ***<u>Lessons must not primarily be skills-based and may not include materials from a commercial textbook.</u>*** Each lesson is required to have the following elements:
   a. Introduction of a new concept or skill,
   b. Involves the use of calculators or other technology or appropriate manipulative, and
   c. Involves the students in a problem solving experience.

Problem Presentation (5%)
Each student will be asked to present a non-routine problem appropriate for grades 6-8. The problem should be type-written on a plain white sheet of paper. The problem and at least one

solution method (not just the answer) should be copied and distributed to the other members of the class and the instructor for distribution at the end of the presentation. On copies for distribution please include your name, date of your presentation, type of problem & level (if applicable), how problem might be used (opener, POW, etc.) & the source. *The student will present the problem*, indicating at what level and for what purpose the problem could be used (opening activity, puzzle, problem of the week, etc.), then give the other students about 8 minutes to solve the problem. At the end of the 8 minutes the student presenter should first ask if someone has solved the problem and let the student(s) who solved the problem explain his/her solution(s); explain the solution to the problem with that student's(s') help or explain the solution himself/herself. **In all cases the presenter should try to involve the other students as much as possible.** Students will be graded on their presentation and choice of problem. Choose a problem that will be interesting to your audience and challenging to your students (not impossible for your classmates). Do not use any problems which have been presented in class. Design the problem so that it can be presented in class using just overhead/elmo, calculators, and possibly manipulatives. Then both the problem and solution method can be distributed after your presentation. Total length of presentation should be **no more than 15 minutes**.

WebQuest (5%)
You will design a WebQuest that fits into your mini-unit along with the two lesson-plans. The content and pedagogy of this assignment must be related to but different from the two lesson plans. Further descriptions of these assignments are provided below.

Clinical Requirements (10%):
Students will complete at least **15 clinical hours in a mathematics classroom or in mathematics setting** and submit a clinical log of the hours completed. Lateral entry teachers (LET) must complete 10 of hours observing mathematics colleagues. LETs will complete an observation form, which will be distributed in class.

Case Analysis (10%)
You will analyze two case studies representing the teaching and learning of mathematics and in the context of the content and process standards of NCTM.

Website Presentation and Evaluation (10%):
You will need to critically evaluate **three** mathematics-related websites which you might use as a middle school mathematics teacher.

MAED 5252
Teaching Mathematics to Secondary Learners
Credit Hours: 3

Proposed Catalog Copy:

MAED 5252 *Teaching Mathematics to Secondary School Learners* (**3**) This course is the initial teaching methods course for secondary school mathematics teachers. This course focuses on secondary school mathematics and its relation to the K-12 curriculum. Topics include the development of teaching strategies and activities in secondary school mathematics with an emphasis on problem solving, mathematical connections, communication, disclosure, and assessment, including school-based field experiences. (*Fall*)

Course Prerequisites: Admission to the Master of Arts in Teaching Program (Secondary Grades Mathematics emphasis) or consent of the Department.

Required Text:
Huetinck, L., & Munshin, S. (2008). *Teaching mathematics for the 21st century: Methods and activities for grades 6-12 (3rd ed.).* Upper Saddle River, NJ: Prentice Hall.

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

Additional resources will come from professional journals that focus on the teaching and learning of mathematics including:

> *Canadian Journal of Science, Mathematics and Technology Education*
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> *International Journal of Technology in Mathematics Education*
> *International Journal of Science and Mathematics Education*
> *Journal of Mathematical Behavior*
> *Journal of Mathematics Teacher Education*
> *Journal for Research in Mathematics Education*
> *Mathematics Education Research Journal*
> *Mathematics Educator*
> *School Science and Mathematics*

Course Rationale: This course will provide a foundation for the development of secondary grades mathematics teachers. Students will explore mathematics content appropriate to secondary grades mathematics teaching and develop effective pedagogical skills that are responsive to the instructional needs of students.

This course will incorporate standards from various organizations concerned with the preparation of teachers: The North Carolina Performance Based Licensure Project, sponsored by the North Carolina Department of Public Instruction (NCDPI), the Interstate Teacher Accreditation (INTASC), National Council for Accreditation of Teacher Education (NCATE), the National Board for Professional Teacher Standards (NBPTS), and the National Council of Teachers of Mathematics (NCTM).

Objectives:

Upon completion of this course, successful students will have:

1. Developed an understanding of the nature and structure of mathematics appropriate for teaching mathematics in the secondary grades.

2. Utilized their mathematics background to develop ideas and concepts necessary for developing mathematical understanding in secondary school mathematics students.

3. Designed instruction appropriate for secondary school mathematics students.

4. Utilized methods, ideas, and materials in mathematics pedagogy, learning theory, and human development in the teaching of mathematics.

5. Developed appropriate curriculum materials and use appropriate instructional techniques for diverse and varied student populations.

6. Developed respect for equity in sex, race, gender, social class, sexual orientation, and various cultures.

7. Developed skills to meet the needs of special populations in the mathematics classroom.

Course Format: Lecture and discussion.

Course Content:

The course is organized around the following themes:

I. The Mathematics Curriculum for Grades 9-12 (Text Chapters 1-5)
1. Historical overview
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1. Using learning outcomes as the basis for instructional decisions
2. Problem Solving
3. The use of physical materials and models

4. The stages of an effective mathematics lesson
5. Modifying instruction for special and diverse learners
6. Management issues
7. Promoting Mathematical Literacy
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III. Issues and trends in the teaching of mathematics (Chapters 11-12)
1. Mathematics anxiety and negative attitudes toward mathematics
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Assignments

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Assignment	%
Chapter Quizzes	10%
Group Presentation	10%
Video Journal	15%
Research Articles	10%
Lesson Plans	15%
Problem Presentation	5%
WebQuest	5%
Clinical Requirements	10%
*Case Analysis	10%
*Website Presentation and Evaluation	10%
Total	**100%**

Grading Scale (Percentage):

A: 90-100
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The assignments are described in the following paragraphs.

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Group presentation (10%):
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Video Journal (15%):
You will be required to choose and view six videos throughout the semester and record summaries and reflections on each video. The specifics for these assignments will be provided separately.

Research Articles (10%):
Prepare **two** reflective analyses of journal articles from any of the research journals provided in Appendix B. Your analysis will require you to summarize the major theme(s) of the article and reflect on how this information could impact mathematics teaching and student learning. The articles should be chosen to coincide with one or more of the NCTM content and process standards. The connection to the NCTM standards should be explicit in your analysis. See format below.

Lesson Plans (5+5+5=15%):
You will design 3* related mathematics lessons that will be evaluated on the basis of their content, but also on the justification for the selection of various techniques, resources, and other components. These lessons should be parts to a cohesive mini-unit of lessons (together with the WebQuest, see below). ***Lessons must not primarily be skills-based and may not include materials from a commercial textbook.*** Each lesson is required to have the following elements:

      a. Introduction of a new concept or skill,
      b. Involves the use of calculators or other technology or appropriate manipulative, and

      c.   Involves the students in a problem solving experience.

Problem Presentation (5%)
Each student will be asked to present a non-routine problem appropriate for grades 9-12. The problem should be type-written on a plain white sheet of paper. The problem and at least one solution method (not just the answer) should be copied and distributed to the other members of the class and the instructor for distribution at the end of the presentation. On copies for distribution please include your name, date of your presentation, type of problem & level (if applicable), how problem might be used (opener, POW, etc.) & the source. *The student will present the problem*, indicating at what level and for what purpose the problem could be used (opening activity, puzzle, problem of the week, etc.), then give the other students about 8 minutes to solve the problem. At the end of the 8 minutes the student presenter should first ask if someone has solved the problem and let the student(s) who solved the problem explain his/her solution(s); explain the solution to the problem with that student's(s') help or explain the solution himself/herself. **In all cases the presenter should try to involve the other students as much as possible.** Students will be graded on their presentation and choice of problem. Choose a problem that will be interesting to your audience and challenging to your students (not impossible for your classmates). Do not use any problems which have been presented in class. Design the problem so that it can be presented in class using just overhead/elmo, calculators, and possibly manipulatives. Then both the problem and solution method can be distributed after your presentation. Total length of presentation should be **no more than 15 minutes**.

WebQuest (5%)
You will design a WebQuest that fits into your mini-unit along with the two lesson-plans. The content and pedagogy of this assignment must be related to but different from the two lesson plans. Further descriptions of these assignments are provided below.

Clinical Requirements (10%):
Students will complete at least **15 clinical hours in a mathematics classroom or in mathematics setting** and submit a clinical log of the hours completed. Lateral entry teachers (LET) must complete 10 of hours observing mathematics colleagues. LETs will complete an observation form, which will be distributed in class.

Case Analysis (10%)
You will analyze two case studies representing the teaching and learning of mathematics and in the context of the content and process standards of NCTM.

Website Presentation and Evaluation (10%):
You will need to critically evaluate **three** mathematics-related websites which you might use as a secondary school mathematics teacher.