Technology and Communication in Mathematics Education

Instructor: Dr. Ianna West

Office: Peltier 106-B

Office Hours: For immediate online consultation: Monday & Wednesday 9:00 AM – 11:00 AM and Friday 9:00 AM – 10:00 AM unless otherwise specified. To fulfill the University requirement, I am also generally in my Nicholls on-site office on Tuesday and Thursday from 9:00 AM – 1:30 PM and 3:30 PM – 4:30 PM. If you wish, you may reach me by phone or by email during those hours.

The instructor will also be available for consultation via email outside of regularly scheduled office hours. The instructor will reply to emails within 24 hours Monday through Friday. In addition, instructor will be available to answer questions on some weekends and holidays. Student may make an appointment to speak with the instructor by phone or online by Skype or Adobe Connect.

Email: ianna.west@nicholls.edu
Office Phone: 985-448-4394
Moodle: http://moodle.nicholls.edu/moodle/

Section: WWW
Location: Online
Texts: Writing Math Research Papers: A Guide for Students and Instructors by Robert Gerver and Handbook of Writing for the Mathematical Sciences by Nicholas J. Higham and (books may be purchased online).

Prerequisites: MATH 509

Catalog Description: MATH 584. Technology and Communication in Mathematics Education. Capstone course normally taken in final semester of graduate study. Application of a variety of strategies and use of multiple sources of information and technology to solve problems. Students draw on previous course work as they conduct investigations and present mathematical ideas orally, in writing, and by demonstration. Includes formal and informal presentations in groups or individually. Presentations may occur at off-campus sites.

Student Outcome Objectives:
Students will be able to:

1. Create and deliver technology-based presentation using current technology in the investigation of problems and the presentation of results: gathering and plotting data, performing calculations, creating documents, creating graphics and/or diagrams.
2. Draw upon previous course work to model and investigate problems.
3. Investigate unexplored problems, and write a research paper on a topic from previous coursework.
4. Construct and apply structures in one or more of the areas of algebra, number theory, analysis, geometry, probability, statistics, mathematical modeling or discrete mathematics or any other area that he or she has taken while in the graduate program.
5. Create and give various representations and models to organize, record, and communicate mathematical ideas by consolidating their mathematical thinking through communication, analyze and evaluate the mathematical strategies of others.

Course Background

Students should coordinate their activities according to their fields of study in the graduate program. The following outline summarizes what is taught in the core mathematics curriculum of the graduate program.

I. Numbers and Operations
   A. Systems of Numeration
   B. Base Arithmetic
   C. Congruence Arithmetic
   D. Integers, Rational Numbers, and Real Numbers
II. Algebra and Functions
   A. Representation and Use of Functions
   B. Inverse Operations
   C. Symbolic Manipulations

III. Geometry
   A. Measurement
   B. Geometric Modeling
   C. Recognizing Patterns
   D. Introduction to Fractals

IV. Introduction to Other Mathematical Structures
   A. Algebraic Structures
   B. Discrete Structures
   C. Analytic Structures

V. Probability and Statistical Inference
   A. Probability
   B. Data Analysis
   C. Quantitative Literacy

Course Hardware and Software Requirements

Access to a computer with internet is required. Microsoft Word is required. Students will be required to use software such as MathType or Latex or the equation editor feature of Microsoft Word to write mathematics. Student should have access to PowerPoint or some other presentation program, and a CAS (computer algebra system) such as Maple, Matlab, Mathematica, or the student may use Microsoft Excel. Also, students must have access to texts and materials from their previous course work in the Nicholls’ graduate program.

The course will be conducted via internet using Moodle, Nicholls’ email, and the free web conferencing tool Adobe Connect. Course documents, homework assignments, grades and all other materials pertaining to the course will be delivered through the online course using Moodle.

The student must know how to receive and send emails, as well as reply to an email using their Nicholls’ email account. The instructor will provide instructions on how the student must properly label and use emails in communication. Student must be able to open a pdf file using Acrobat Reader or some other pdf reader which may be downloaded free from the internet. Student must know how to upload a file. If the students are not familiar with one or more of the software and/or web-based tools mentioned, students should have the ability to familiarize themselves with these necessary web-based tools and/or software either by exploration or tutorials. The links to the important tutorials are given below.

The URL for the university’s distance learning website is http://www.nicholls.edu/distance/.

FAQS about internet courses can be viewed at the website http://www.nicholls.edu/distance/faqs/.

The FAQS website will give student insight as to what they should expect from an online course, as well as answer many frequently asked questions.

A Moodle Tutorial can be viewed at the website http://www.nicholls.edu/distance/moodle-tutorial/.

Course Content, Methods of Evaluation and Point Distribution

Module Folders
The instructor will post learning objectives, learning activities and assignments on Moodle using weekly or biweekly Module Folders.

Research Paper
Students will choose a topic from previous course work, investigate unexplored (may be unexplored to the student, but does not have to be original) areas of the topic and write a five to eight page research paper. The student must use Microsoft Word to write the paper. The student must utilize technology within the paper such as graphics, tables, diagrams, hyperlinks, etc. The student may use software, such as Microsoft Excel, or a CAS such as Maple, Matlab, or Mathematica. Details, format and grading rubric will be posted on Moodle.

Presentation
Students will be required to present their research paper to the instructor and several members of the class using Adobe Connect utilizing a presentation program such as PowerPoint. The presentation must also contain graphics, tables, and/or diagrams. Details and grading rubric will be posted on Moodle.
**Presentation Participations**

Students will be required to participate in three of their fellow classmate’s presentations. Each participant will be required to ask at least one question during the presentation. The instructor will send the students a schedule of dates and times at the beginning of November from which to choose, and the instructor will make a schedule for everyone in the class according to the responses. The presentations will be conducted during the week of final exams beginning on Wednesday, December 5, 2012 and ending on Tuesday, December 10, 2012.

**Article Summaries**

The students will be required to write two journal article summaries. The summaries must be two to three double-spaced pages. The topics of the journal articles must come from courses taken in the graduate program. Students must choose articles containing information that will be used in their research papers. The students must show an understanding of their readings by summarizing the article, and if applicable, the students must explain in their own words how to solve the problem(s) in the article. Students must use APA formatting style to write the summaries. A good resource to use is [http://owl.english.purdue.edu/owl/section/2/10/](http://owl.english.purdue.edu/owl/section/2/10/).

**Journal Entries from the Book Chapter Readings**

The students will read chapters from the required books. The students will keep a journal making entries from their book readings of important aspects that may be used in their research papers. The journal entries should be keep brief, three to ten sentences. As the students read the assigned chapters in the books, the journal will help the students keep track of the main components of writing a research paper and creating a presentation that may be used as a quick reference to help guide them through their research and presentation. The journal entry instructions will be posted on the Course Homepage of Moodle.

**Chapter Summaries**

For each chapter, the student will write a summary on what they learned from the chapter and how the information can be applied to their research paper. The summaries must be two to four double-spaced paragraphs. Instructions are posted on the Course Homepage on Moodle.

*Writing Math Research Papers; A Guide for Students and Instructors* is an easy to read book that can be used by both students and instructors. Many of you are high school teachers, and you will find that these ideas may be used in your class to help teach your students how to prepare for a math research paper. *Handbook of Writing for the Mathematical Sciences* is intended for graduate students. Both books are good guidebooks, but from different perspectives.

**Discussion Board Forums**

Students will be required to answer questions pertaining to the readings from select chapters in discussion forums. The first forum will be for the students to introduce themselves to the class, and the last forum will be a survey of the course.

**Point Distribution for Semester Grade**

Grade will be calculated on a ten point grading scale 90-100 A, 80-89 B, 70-79 C, 60-69 D, below 60 F.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Research paper</td>
<td>200</td>
</tr>
<tr>
<td>Presentation</td>
<td>100</td>
</tr>
<tr>
<td>Participations (three @ 20 points each)</td>
<td>60</td>
</tr>
<tr>
<td>Article Summaries (two @ 50 points each)</td>
<td>100</td>
</tr>
<tr>
<td>Journal</td>
<td>100</td>
</tr>
<tr>
<td>Chapter Summaries (sixteen @ 10 points each)</td>
<td>160</td>
</tr>
<tr>
<td>Discussion Forums (10 @ 10 points each)</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total points</strong></td>
<td><strong>820</strong></td>
</tr>
</tbody>
</table>

**Policies and Procedures**

**Attendance Policy**

Participation in activities is required where an electronic record which clearly indicates time and date activity was submitted. For financial aid purposes, student must complete at least one activity, which is equivalent to having attended at least one class.

**Behavioral Policy**

Students must **at no time** be disrespectful toward the instructor. Students must always respect the rights of classmates. Students must behave in a professional manner at all times. Failure to act in an appropriate manner will not be tolerated.
Academic Dishonesty Policy
Cheating will not be tolerated. Sanctions for academic cheating, plagiarism, and forgery of academic documents including signing another's name (Sec 1.9) are those outlined in the *Code of Student Conduct* handbook. You may access a copy of the handbook by clicking on the following link:  

Academic Grievances
The proper procedure for filing grade appeals or grievances related to academic matters is listed in Section 5 of the *Code of Student Conduct* handbook.

Continued Learning Following an Extreme Emergency:
In order to make continued learning possible following an extreme emergency;

**Students are responsible for:**
- reading regular emergency notifications on the NSU website;
- knowing how to use and access Moodle (or university designated electronic delivery system);
- being familiar with emergency guidelines;
- evacuating textbooks and other course materials;
- knowing their Moodle (or designated system) student login and password;
- contacting faculty regarding their intentions for completing the course.

**Faculty are responsible for:**
- their development in the use of the Moodle (or designated) software;
- having a plan for continuing their courses using only Moodle and email;
- continuing their course in whatever way suits the completion of the course best, and being creative in the continuation of these courses;
- making adjustments or compensations to a student’s progress in special programs with labs, clinical sequences or the like, only in the immediate semester following the emergency.

Americans with Disabilities Act:  Students with a documented disability are entitled to classroom accommodations under the ADA. To receive accommodations, contact the Office of Disability Services at (985) 448-4430 or 158-A Shaver Gym. Additional information can be obtained at the following website [http://www.nicholls.edu/disability/](http://www.nicholls.edu/disability/).

**The last day to drop this course with a “W” is Wednesday, November 7, 2012**
Tentative Course Calendar
In the tentative schedule below, the instructor gives the posting dates of the Module Folders containing the due dates. There are also suggested dates that you should start your research for the article summaries which will help in preparation for your research paper. Students may choose to read the chapters in the books and write the journal entries and summaries ahead of the scheduled due dates, but the student will not be able to submit the assignment on Moodle until the corresponding Module Folder has been posted. The instructor may post the Module Folders sooner than listed; so the post-dates that are given are the latest dates in which they will be posted.

In the following outline, Book 1 WMRP refers to Writing Math Research Papers; A Guide for Students and Instructors and Book 2 HWMS refers to Handbook of Writing for the Mathematical Sciences.

<table>
<thead>
<tr>
<th>Module Folders</th>
<th>Sections</th>
<th>Post Date</th>
<th>Due by 11:59 PM on the given date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>Book 1 WMRP Chapters 1 &amp; 2</td>
<td>8/22/12</td>
<td>9/7/12</td>
</tr>
<tr>
<td></td>
<td>Book 1 WMRP Chapter 3</td>
<td>9/5/12</td>
<td>9/12/12</td>
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<tr>
<td></td>
<td>Book 2 HWMS Chapter 3</td>
<td>9/12/12</td>
<td>9/19/12</td>
</tr>
<tr>
<td></td>
<td>Book 1 WMRP Chapter 4</td>
<td>9/19/12</td>
<td>9/26/12</td>
</tr>
<tr>
<td></td>
<td>Book 2 HWMS Chapter 4</td>
<td>9/26/12</td>
<td>10/3/12</td>
</tr>
<tr>
<td></td>
<td>Article Summary 1 Due</td>
<td>10/3/12</td>
<td></td>
</tr>
<tr>
<td>Module 2</td>
<td>Book 1 WMRP Chapter 7 &amp; 8</td>
<td>10/3/12</td>
<td>10/10/12</td>
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<tr>
<td></td>
<td>Book 2 HWMS Chapter 6 &amp; 7</td>
<td>10/26/12</td>
<td></td>
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<tr>
<td></td>
<td>Article Summary 2 Due</td>
<td>10/8/12</td>
<td></td>
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<tr>
<td>Module 3</td>
<td>Book 1 WMRP Chapter 9</td>
<td>10/10/12</td>
<td>10/26/12</td>
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<td></td>
<td>Book 2 HWMS Chapters 10 &amp; 11</td>
<td>10/12/12</td>
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<tr>
<td></td>
<td>Deadline to submit Research Topic (You may submit your Research Topic earlier for approval and begin working on your paper at any point after your topic has been approved)</td>
<td>10/16/12</td>
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</tr>
<tr>
<td></td>
<td>Instructor will have approved your research topic, so this should be the latest date you should begin to work on your research paper</td>
<td>10/22/12</td>
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<tr>
<td></td>
<td>Journal Due</td>
<td>10/31/12</td>
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<tr>
<td></td>
<td>Choose presentation and participation dates and times</td>
<td>11/5/12</td>
<td>11/12/12</td>
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<tr>
<td></td>
<td>Research Paper Due</td>
<td>11/26/12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose presentation and participation dates and times. The professor will send you a link with time slots from which to choose.</td>
<td>11/5/12</td>
<td>11/12/12</td>
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<tr>
<td></td>
<td>Preview the Web-conferencing Site, Adobe Connect (students will login to the site along with the professor for a demonstration)</td>
<td>Date to be announced</td>
<td></td>
</tr>
<tr>
<td>Final Presentation and Participation</td>
<td>Oral Presentations using Adobe Connect</td>
<td>Date to be announced</td>
<td>12/5 – 12/11/12</td>
</tr>
</tbody>
</table>

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