Logic and Foundations of Mathematics for Teachers

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 generally in my Nicholls’ on-site office on Tuesday and Thursday from 9:00 AM – 1:30 PM and 3:30 PM – 4:00 PM. You may reach me during these hours by phone or email. I will be available periodically for consultation via email outside of my regularly scheduled online hours and on-site office hours. I will reply to emails within 48 hours Monday through Friday. In addition, I will be available to answer questions on some weekends and holidays. A student may make an appointment to speak with me by telephone, Skype or Adobe Connect.

Email: ianna.west@nicholls.edu
Office Phone: 985-448-4394
Moodle: http://moodle2.nicholls.edu/moodle/

Section: WWP (Online)

Required Textbook or eChapters
Either the textbook or eChapters of A Transition to Advanced Mathematics 7th Edition by Douglas Smith, Maurice Eggen, and Richard St. Andre, published by Brooks/Cole or Cengage is required. The purchase of the textbook is highly recommended. It is a great book to own because it can be used as a reference in other courses. However, in this course, material from only a few chapters, Chapters 1, 2 & 5, of the textbook will be used. Students have the option to purchase the book or purchase eChapters from the publisher for $28 at the following website
http://www.cengagebrain.com/shop/isbn/9780495562023


Prerequisites: MATH 265 (Calculus III) and MATH 358 (Foundations of Mathematics).

Catalog Course Description: MATH 509. Logic and Foundations of Mathematics. 3-3-0. Prerequisites: MATH 265 and 358. Cornerstone course normally taken in first semester of graduate study. Developing and evaluating arguments and proofs, the use of various types of reasoning, methods of proof, making and investigating conjectures. (27.0101).
Extended Course Description: This course is designed to teach the components of proving mathematical statements which will help prepare students for other advanced mathematics courses. In this course you will gain the necessary skills to formally prove statements written as theorems, lemmas and/or propositions by applying established methods, definitions, properties and theorems.

Learning Objectives:
Student will be able to:
1. Apply standard mathematical language;
2. Formulate definitions of given mathematical terms;
3. Form conjectures;
4. Discuss the plausibility of a conjecture without a formal proof;
5. Use counterexamples to disprove false conjectures;
6. Apply set theory in p;
7. Develop assertions as theorems;
8. Apply the terms reflexive, symmetric and transitive.
9. Prove theorems involving sets that are finite or infinite.
10. Determine if sets are countable or uncountable.
11. Apply the rules of logic to construct formal proofs;
12. Apply assumptions, axioms, previously proved theorems and definitions in proofs.
13. Apply various methods of proof including direct proof, proof by contrapositive, proof by contradiction, and mathematical induction.

Minimal Technical Skills, Hardware and Software Requirements:
Access to a computer with internet is required. Students must be able to use different components of Moodle, the LMS (learning management system) used by Nicholls, and students must gain access to their Nicholls’ email. I will post all information needed to take this course on Moodle.

A word processor such as Microsoft Word or a scanner is required. If a word processor other than Microsoft Word is used, the student must convert the file to PDF format. I highly recommend Mathtype, a powerful interactive equation editor for Windows and Macintosh that enables creation of mathematical notation for word processing. Mathtype works in conjunction with Microsoft Word. Mathtype may be purchased at a cost of $57 online at http://www.dessci.com/en/products/mathtype/.

Students must know how to receive and send emails properly, as well as reply to an email using their Nicholls’ email account. Students must be able to attach a file to an email, upload a file on Moodle, etc. I will provide requirements on how you must properly label and use emails in communication. These requirements must be followed. Student must be able to open a PDF document using Acrobat Reader or some other PDF reader which may be downloaded free from the internet. If the students are not familiar with one or more of the software and/or web-based tools mentioned, students must have the ability to familiarize themselves with these necessary web-based tools and/or software either by exploration or tutorials. The links to 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 students 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/.
Attendance Requirements, Course Content, Methods of Evaluation and Point Distribution

On-Campus Meeting or Proctor Requirements: Students will meet on-campus to take the final exam if they live within a reasonable driving distance of the campus. Distance learners must locate an approved testing facility near their home. A list of approved testing centers is given on the Proctor Approval form. There is a link to the Proctor Approval form in the header block section of the Course Homepage on Moodle.

Proctor Requirements for Distance Learners: Distance learners are those students who must take the final exam off-campus because they do not live in driving distance of Nicholls’ campus. Distance learners must locate an approved testing facility near their home. A student wishing to take the exam off-campus must inform me via email and complete a Proctor Approval form using Word. The form may be found on the Course Homepage on Moodle. The completed Proctor Approval form must be uploaded on Moodle using the link provided on the Course Homepage. A list of approved testing centers and proctors is given on the Proctor Approval form.

**Completed Proctor Approval Form Deadline April 1, 2013**

Once I have approved a proctor, the student who plans to take the final exam off-campus must schedule the final exam with the proctor at least three weeks prior to the test date. I will send a Test Administration Procedure form to the approved testing center or proctor approximately one week before the scheduled exam. The Test Administration form must be completed by the test administrator and returned to me before the day of the test. Therefore, it is vital for students, who plan to take their exam off-campus, to complete and upload the Proctor Approval form.

Module Folders
Module folders are a group of files and/or links that are posted on Moodle containing all significant information pertaining to sections being covered during a fixed period of time. A module folder will include module-level learning objectives, learning activities, lecture notes, assignments, discussion forums and all other pertinent information pertaining to activities required to complete the assessments that correspond to the sections being covered during a particular time period. The module folders will be posted weekly according to the dates listed in the Course Outline, the last page of this syllabus, and on the Course Calendar located on the Course Homepage. It is important that students read all documents contained in the module folders since they contain all instructions on how to meet the requirements each week.

Instruction Sheets
An Instruction Sheet will be posted in each module folder which will include the learning objectives, and instructions on how to achieve those objectives. Each Instruction Sheet will contain the reading assignments along with the exercise assignment and discussion forum information, including due dates.

Exercise Assignments
Problems from the textbook and/or supplemental exercises will be assigned for each module. Students are required to complete all exercises. The exercises are used to assess the students’ understanding of the concepts. The students will have one to two weeks to complete each assignment depending on the length and/or complexity of the material. The final grade for the exercise assignments will be based on the average of all exercise assignments and will be worth 50% of the semester grade. The students will be required to upload all completed assignments in the corresponding module folder on Moodle. An instruction sheet on how to format the page number and heading of the assignment is available on Moodle.
**Exercise Assignment Grading and Feedback**
The students should expect to receive feedback on exercise assignments within two weeks of the due dates. Some problems on the exercise assignments will be self-assessed or peer-assessed. For the problems that are peer-assessed, the name of the student will not be included in the assignment.

**Discussion Forums**
Discussion Forums for select sections will be posted on Moodle in the module folders. These assignments are to help facilitate discussions with your fellow classmates. I will make comments only on select posts. The first forum will be for the purpose of introducing yourself to the class. The introduction forum is posted in the header block section on the Course Homepage on Moodle. The subsequent forums will correspond to the learning objectives and readings. Due dates will be given when the forum is posted. You will be required to post your answer to the question and to reply to at least one of your classmate’s post. Each discussion forum will be worth 10 points. The final grade for discussion forums will be based on the average of all forum grades. The discussion activities will be worth 10% of the semester grade. The criterion for grading the forums is on the Course Homepage on Moodle.

**Netiquette**
When posting on forums and writing emails, the students must always follow the rules of netiquette. These rules can be found at [http://www.albion.com/netiquette/corerules.html](http://www.albion.com/netiquette/corerules.html).

**Late Submission of Exercise Assignments and Discussion Forums**
Without prior permission, students who submit an exercise assignment and/or forum late will be penalized. If a student needs more time on a particular assignment he or she must contact me in advance to get permission to avoid a penalty. Without my permission, if a student submits an exercise assignment or posts on a forum after the deadline, but before the assignment has been graded, the student will be penalized 25%. If a student submits an exercise assignment after the assignment has been graded, the student will be penalized 50%. If the student has not posted on the Discussion Forum by the time I grade it, the student will receive a zero. I am aware that many of you have jobs and families, and unexpected things may occur during the semester. Therefore, it is very important to stay in contact with me if you will be late on an assignment. Do not wait until after the assignment is due to ask for an extension.

**Final Exam**
There will be a final exam worth 40% of the semester grade. Students who live out-of-state, or students who do not live within a reasonable driving distance to Nicholls’ campus, may request an alternative location (an approved testing center) to take the exam. Arrangements need to be made by the student in advance. Please see the “Proctor Requirements” section of the syllabus.

**On-campus Final Exam— Monday, May 13, 2013 @ 10:00 AM**

**Off-campus Final Exam— either May 13th or May 14th**

**Semester Grade**
The semester 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>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Assignments</td>
<td>50%</td>
</tr>
<tr>
<td>Discussion Forums</td>
<td>10%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Distribution of points may change during the semester**
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 Professor. 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 are 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/.

**The last day to drop this course with a “W” is Wednesday, April 17, 2013**
**Tentative Outline (notes and dates may change due to student needs or delays)**

<table>
<thead>
<tr>
<th>MODULE FOLDERS</th>
<th>TOPICS</th>
<th>Post by Date</th>
<th>Assignments are due by 11:59 PM on the following date.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>Module 1 Review of Basic Definitions and Properties of Set Theory and Arithmetic</td>
<td>01/25/2013</td>
<td>02/06/2013</td>
</tr>
<tr>
<td>Module 2</td>
<td>Module 2 Set Operations, Extended Set Operations and Indexed Families of Sets</td>
<td>02/06/2013</td>
<td>02/15/2013</td>
</tr>
<tr>
<td>Holiday</td>
<td>Mardi Gras and Ash Wednesday</td>
<td>02/11/2013</td>
<td>02/13/2013</td>
</tr>
<tr>
<td>Module 3</td>
<td>Module 3 Forming and Proving Conjectures</td>
<td>02/15/2013</td>
<td>02/22/2013</td>
</tr>
<tr>
<td>Module 4</td>
<td>Module 4 The Basics of Propositional Logic With an Emphasis on Conditional and Biconditional Statements</td>
<td>02/22/2013</td>
<td>03/01/2013</td>
</tr>
<tr>
<td>Module 5</td>
<td>Module 5 Propositional Consequences; Introduction to Direct Proof</td>
<td>03/01/2013</td>
<td>03/08/2013</td>
</tr>
<tr>
<td>Module 6</td>
<td>Module 6 Predicates and Quantifiers</td>
<td>03/08/2013</td>
<td>03/15/2013</td>
</tr>
<tr>
<td>Module 7</td>
<td>Module 7 Use Propositional Logic in Proofs</td>
<td>03/15/2013</td>
<td>03/22/2013</td>
</tr>
<tr>
<td>Module 8</td>
<td>Module 8 More on Basic Proof Methods</td>
<td>03/22/2013</td>
<td>03/29/2013</td>
</tr>
<tr>
<td>Module 9</td>
<td>Module 9 Biconditional Proofs, Proofs Involving Quantifiers, Complex Proofs and Summary of Proving Techniques</td>
<td>03/29/2013</td>
<td>04/12/2013</td>
</tr>
<tr>
<td>Holiday</td>
<td>Spring Break (Easter)</td>
<td>03/29/2013</td>
<td>04/05/2013</td>
</tr>
<tr>
<td>Module 10</td>
<td>Module 10 Advanced Proofs Involving Set Theory</td>
<td>04/12/2013</td>
<td>04/19/2013</td>
</tr>
<tr>
<td>Module 12</td>
<td>Module 12 To be announced</td>
<td>04/29/2013</td>
<td>05/06/2013</td>
</tr>
<tr>
<td>FINAL EXAM</td>
<td>ON-CAMPUS Comprehensive final exam is scheduled on Monday, May 13, 2013 @ 10:00 AM on-campus.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OFF-CAMPUS If exam will be taken by a proctor, student must schedule the final exam either on May 13th or May 14th.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**The last day to drop this course with a “W” is Wednesday, April 17, 2013**