



## Calculus & Analytic Structures

**Instructor: Dr. Ianna West**

**Office:** Peltier 106-B

**Office Hours:** *For immediate online consultation:* Monday & Wednesday 9:00AM – 11:00AM and Friday 9:00AM – 10:00AM unless otherwise specified.

To fulfill the University requirement, I am generally in my Nicholls' on-site office on Tuesday and Thursday from 10:00AM – 3:00PM. You may reach me during these hours by phone or email. I am also available most of the time 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. You may make an appointment to speak with me by telephone, Skype or Adobe Connect.

**Email:** [ianna.west@nicholls.edu](mailto:ianna.west@nicholls.edu)

**Office Phone:** 985-448-4394

**Moodle:** <http://moodle2.nicholls.edu/moodle/>

**Section:** WWP (Online)

**Required Text :** No required textbook.

**Suggested References:** *Real Analysis, A First Course* by Russell A. Gordon; *Elementary Real Analysis* by Brian S. Thomson, Judith B. Bruckner, and Andrew M. Bruckner; *Foundations of Analysis* by David F. Belding and Kevin J. Mitchell; *Introduction to Analysis* by Edward D. Gaughan; *Advanced Calculus* 2<sup>nd</sup> Edition by Patrick M. Fitzpatrick; *Advanced Calculus* by Gerald B. Folland; *Advanced Calculus* 5<sup>th</sup> Edition by Wilfred Kaplan, *Advanced Calculus, A Courses in Mathematical Analysis* by Patrick M. Fitzpatrick.

**Prerequisites or co-requisite:** MATH 509

**Catalog Description:** **MATH 511. Calculus and Analytic Structures.** 3-3-0. Prerequisite or co-requisite: MATH 509. Formal exploration of continuity, limits, derivatives, integrals, sequences, series, basic differential equations, and introductory numerical analysis. Applications of concepts. (27.0101)

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**Course Learning Objectives:**

*Student will be able to:*

1. Apply the essential properties of real numbers, including algebraic structures of real numbers, mappings and functions;
2. Define and apply the definition of bounds of real numbers including the notions of supremum and infimum and the completeness axiom;

3. Apply the properties of inequalities and identities, countable and uncountable sets and real valued functions;
4. Formally prove and apply important theorems from calculus.
5. Define the properties and concepts and prove theorems involving convergent sequences, monotone sequences, Cauchy sequence, subsequences and series;
6. Formally prove theorems and/or apply concepts involving the limits of functions, intermediate and extreme values, continuity and uniform continuity of functions, differentiation of functions, convergence and pointwise convergence of functions, integration of functions, and monotonicity of functions.
7. Formally prove basic theorems involving error bounds from numerical methods.
8. Formally prove basic theorems involving the existence and uniqueness of differential equations.

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***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 learning management system (LMS) 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 is highly recommended or a scanner is required to scan and upload written assignments. Scanned assignments must be saved and uploaded to Moodle as one document. I will not accept an assignment unless it is uploaded as a single document. Furthermore, uploaded scanned, handwritten assignments must be legible. If the handwritten assignments are not legible, the student will be required to use Microsoft Word or some other word processor to type the assignment. If a word processor other than Microsoft Word is used, the assignment must be submitted in PDF format, and the mathematical equations, expressions, symbols, etc. must be legible. If the students use a computer to complete their assignments, they must know how to use an equation editor.

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. Criteria for email communication may be found on the Moodle Course Homepage. Students must be able to attach a file to an email, upload a file on Moodle, etc. 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.

***Links to important websites and/or tutorials:***

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/> .

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## Attendance Requirements, Course Content, Methods of Evaluation and Point Distribution

***On-Campus Meetings 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 Moodle Course Homepage.

***Proctor Requirements for Distance Learners:*** Distance learners are those students who will 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 complete a Proctor Approval Form using Microsoft Word by the deadline given below. The form may be found on the Moodle Course Homepage. The completed Proctor Approval Form must be unloaded on Moodle using the link provided on the Moodle Course Homepage. A list of approved testing centers and proctors is given on the Proctor Approval Form.

***\*\*Completed Proctor Approval Form Deadline April 6, 2015\*\****

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 administrator*** will be required to complete the Test Administration Form and return it to me before the day of the test. Therefore, if a student plans to take his or her final exam off-campus, it is vital that the student complete and upload the Proctor Approval Form by the deadline.

### ***Modules***

Modules are subsections posted on Moodle containing several folders and links. The modules contain learning objectives, learning activities, assignments, and all pertinent information pertaining to the section(s) being covered during a given time period. The instructor will post a new module every 7 to 10 days on Moodle.

A module 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 modules will be posted according to the dates listed in the Course Calendar, the last page of this syllabus. A link to the Course Calendar is also posted in the headerblock section of the Moodle Course Homepage. It is important that students read all documents contained within the modules since they contain instructions on how to meet the requirements each week.

#### ***Instruction Sheets***

An Instruction Sheet will be posted in each module 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 along with the due dates.

### ***Exercise Assignments***

Exercise assignment 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 within the corresponding module on Moodle. A document on how to format the page numbers and heading of the assignments is available on the Moodle Course Homepage.

#### 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 may 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. All information on exercise assignments and how they will be graded may be found in the Instruction Sheets.

#### **Discussion Forums**

Discussion Forums for select sections will be posted on Moodle within the modules. 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 headerblock section on the Course Homepage on Moodle. The subsequent forums will correspond to the learning objectives and will be posted within the modules. You will be required to post your answer to the question on the forum and 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 and will be **worth 5% 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> .

#### **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 receive a zero. Additionally, once the answer key has been posted on Moodle for a self-assessed or peer-assessed assignment, a student who has not submitted his or her assignment will receive a zero. Furthermore, if the student has not posted on the Discussion Forum by the time it has been graded, 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 45% 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 11, 2015 @ 11:00AM \*\***

**\*\*Off-campus Final Exam— either May 11th or May 12th\*\***

### ***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.

<i>Exercise Assignments</i>	<b>50%</b>	<b><i>**Distribution of points may change during the semester**</i></b>
<i>Discussion Forums</i>	<b>5%</b>	
<i>Final Exam</i>	<b>45%</b>	

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## **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:

[http://www.nicholls.edu/documents/student\\_life/code\\_of\\_conduct.pdf](http://www.nicholls.edu/documents/student_life/code_of_conduct.pdf) .

### ***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.

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## **Assistance with Studying and Assignments**

- **The Tutoring Center** at 143 Peltier Hall. Call [985-448-4100](tel:985-448-4100), email: [tutoring@nicholls.edu](mailto:tutoring@nicholls.edu), or visit <http://www.nicholls.edu/academic-enhancement/>
- **The Writing Center** at 144 Peltier Hall. Call [985-448-4100](tel:985-448-4100), email: [tutoring@nicholls.edu](mailto:tutoring@nicholls.edu), or visit <http://www.nicholls.edu/academic-enhancement/>
- **Online Tutoring through Moodle.** Look for the Brainfuse log-in link on the home page, <http://moodle2.nicholls.edu/moodle/>

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## **Disabilities Services and Compliance**

***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/> .

Moodle is designed to meet a variety of world accessibility requirements, including Section 508, Section 504 and W3C. Moodle supports the use of assistive technologies such as screen readers, text magnifiers and speech-to-text solutions. Additionally, all functionality in joule is designed to be keyboard accessible.

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### **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.

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### **Holidays and Important Dates**

Mardi Gras Break: February 16th – 18th

Final day to Drop to receive W: March 27th

Advising Begins: March 12th

Early Registration Begins: April 16th

Easter and Spring Break: April 3rd – April 10th

Last Day of Classes: May 6th

Final Exams: May 7<sup>th</sup> – May 13th

**\*\*The last day to drop this course with a “W” is Friday, March 27, 2015\*\***

**MATH 511****Course Calendar****Spring 2015****\*\* Tentative Outline (dates may change due to student needs or delays) \*\***

<b>MODULE FOLDERS</b>	<b>TOPICS</b>	<b>Tentative Post Date</b>	<b>Assignments are due by 11:59 PM on the following date.</b>
<i>Module 1</i>	Properties of Real Numbers and Tools Used in Analysis	01/23/2015	02/06/2015
<i>Module 2</i>	The Archimedean Property and the Distribution of Integers and Rational Numbers Among Real Numbers	02/06/2015	02/13/2015
<i>Module 3</i>	The Convergence of Sequences of Real Numbers	02/13/2015	02/27/2015
<i>Holiday</i>	<b>Mardi Gras and Ash Wednesday</b>	<i>02/16/2015</i>	<i>02/18/2015</i>
<i>Module 4</i>	The Monotone Convergence Theorem	02/27/2015	03/09/2015
<i>Module 5</i>	The Bolzano-Weierstrass Theorems	03/09/2015	03/17/2015
<i>Module 6</i>	Continuity of Functions	03/17/2015	03/25/2015
<i>Module 7</i>	Theory of Differentiation and the Mean Value Theorem	03/25/2015	04/02/2015
<i>Module 8</i>	Theory of Integration	04/02/2015	04/17/2015
<i>Holiday</i>	<b>Easter/Spring Break</b>	<i>04/03/2015</i>	<i>04/10/2015</i>
<i>Module 9</i>	Series	04/17/2015	04/24/2015
<i>Module 10</i>	Basic Theory of Differential Equations and Numerical Analysis	04/24/2015	05/04/2015
<b>FINAL EXAM</b>	<b>ON-CAMPUS</b> <i>Comprehensive final exam is scheduled on Monday, May 11, 2015 at 11:00AM (Classroom to be announced).</i> <b>OFF-CAMPUS</b> <i>If exam will be taken by a proctor, student must schedule the final exam either on May 11<sup>th</sup> or May 12<sup>th</sup>.</i>		

**\*\*The last day to drop this course with a “W” is Friday, March 27, 2015\*\***