# Math 570-WWP     Syllabus     Summer 2015

MATHEMATICAL MODELING
AND
PROBLEM SOLVING

**Instructor:  Dr. Ianna West**
**Office:** Peltier 106-B
**Online Office Hours:**
*For immediate online consultation student may reach me via email or on live chat within Nicholls email environment between 10:00AM – 11:30AM, Monday through Friday* (If for some reason I will not be available during my scheduled online office hours, I will be informed via email and it will be posted as an announcement on the Moodle Course Homepage).   Also, I will call a student at the student's request.  Additionally, I will be available online throughout the day and will answer most emails within hours or even minutes.  Outside of my scheduled online office hours, I will reply to  all emails within 24 hours Monday through Friday unless unusual circumstances arise.   In addition, I will be available to answer questions on some weekends and holidays.  Furthermore, a student may make an appointment to speak with me by phone or meet me in an online setting using Skype or Adobe Connect.

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

**Section:** WWP  (Online)
*Recommended Text:* **A First Course in Mathematical Modeling, 4th Edition by**  *Frank R. Giordano, William P. Fox, Steven B. Horton, Maurice D. Weir;*  Published by Cengage Learning. ISBN10:0495011592 .   The purchase of the textbook is highly recommended.  However, in this course, material from only a few chapters of the textbook will be used.  Students have the option to purchase the book or purchase eChapters from the publisher for $12.49.

Click Here to View Book Order Options

*Other Course Materials:*  Access to a computer with internet is required. Maple Software, Excel or another Computer Algebra System (CAS) is required.  Maple purchase information will be given by the instructor upon request by the student.  Word processing software such as Microsoft Word is highly recommended.

**Prerequisites**:  MATH 355 (Differential Equations) and MATH 402 OR MATH 407 (Mathematical Statistics).

**Catalog Description**:  **MATH 570. Mathematical Modeling and Problem Solving.** 3-3-0. Prerequisite: MATH 355, and either  MATH 402 or MATH 407. Use of previous course work to construct models for various problems in the sciences, managerial sciences, or other related areas.

**Student Outcome Objectives:**

1. Given a real world scenario, the student will be able to identify a problem, collect data and make assumptions, propose a model, test the assumption, and refine the model as necessary.
2. Given a model, the student will be able to work backward to uncover the implicit underlying assumptions, assess critically how well those assumptions fit the scenario, and estimate the sensitivity of the conclusions when the assumptions are not precisely met.
3. Student will be able to apply the fundamental laws of nature to given situations that will aid in the construction of models.
4. Student will be able to develop models of phenomenon that change over time, both over discrete time periods and when the behavior is taking place continuously.
5. Student will be able to develop and solve dynamical systems.
6. Student will examine how to produce descriptions of systems, and then develop the tools for extracting information, make predictions from these descriptions and analyze the effects various situations have on it.
7. Student will be able to develop solutions using a range of analytical techniques applying calculus, linear algebra, differential equations, and/or probability.
8. Use a computer algebra system (CAS) to create graphs, construct a table of data, fine

**Course Requirements, Course Content, and Methods of Evaluation**

*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.

Students will be required to type answers to exercise assignments and create graphs using a CAS (Computer Algebra System) or Excel. 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. Students must make sure of the accuracy of the mathematical symbols after conversion of the document.

For students typing the assignments using Microsoft Word, I highly recommend *Mathtype*, a powerful interactive equation editor for Windows that enables creation of mathematical notation for word processing. *Mathtype* works in conjunction with Microsoft Word. There is also a Macintosh version of *Mathtype*. *Mathtype* may be purchased at a cost of $57 online at the website
                    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 follow the given criteria or the instructor will reject the email. 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.

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 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. There is a link to the Proctor Approval Form in the headerblock section of the Moodle Course Homepage.

*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 with a proctor must complete a Proctor Approval Form using Microsoft Word by the deadline given below, upload it on Moodle, and inform the instructor via email. The form may be found in the headerblock section of the Moodle Course Homepage. The completed Proctor Approval Form must be unloaded on Moodle using the link provided in the headerblock section of the Course Homepage. A list of approved testing centers and proctors is given on the Proctor Approval Form.
*****Completed Proctor Approval Form Deadline July 1, 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 two weeks prior to the test date. I will send a Test Administration Procedure Form to the approved testing center or proctor approximately two weeks 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 and inform the instructor.

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

Each module will include an Instruction Sheet with module-level learning objectives and learning activities on how to achieve the module-level learning objectives along with due dates. The module will also include a link to lecture notes, assignments, discussion forums and all other pertinent information pertaining to activities required to complete the assessments that correspond to the topics 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. For your convenience, there is also a link to the Course Calendar on 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.

*Exercise Assignments*

Problems from 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. Since the semester is short, students will have only one week to complete the assignment for each module. The final grade for the exercise assignments will be based on the average of all exercise assignments and will be worth *45% of the semester grade*. The students will be required to upload all completed assignments within the corresponding module on Moodle using the link provided in the module. A document containing assignment formatting instructions is available on the Moodle Course homepage.

> *Exercise Assignment Grading and Feedback*
> The students should expect to receive feedback on exercise assignments within one week 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 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 available in the headerblock section on the Moodle Course Homepage. The subsequent forums will correspond to the learning objectives and will be posted within the modules. Due dates will be given when the forum is posted. The due date of each forum will typically be three days after the corresponding assignment due date. You will be required to post your answer to the question on the forum 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 5% of the semester grade*. The criterion for grading the forums is on the Moodle Course Homepage.

> *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 50%*. If a student submits an exercise assignment after the assignment has been graded, the student will receive a zero. Furthermore, once an 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.

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 *50% 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.

<p style="text-align:center; color:red;">**On-campus Final Exam— Wednesday,  July 29th at 10:00 AM****<br>
**Off-campus Final Exam— either July 28th or July 29th ****</p>

### 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.

| | | |
|---|---|---|
| *Exercise Assignments* | **45%** | ***Distribution of points may change during the semester*** |
| *Discussion Forums* | **5%** | |
| *Final Exam* | **50%** | |

## 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 .

### 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.

## Assistance with Studying and Assignments
- **The Tutoring Center at** 143 Peltier Hall.  Call 985-448-4100, email: tutoring@nicholls.edu, or visit http://www.nicholls.edu/academic-enhancement/
- **The Writing Center at** 144 Peltier Hall.  Call 985-448-4100, email: 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/

## 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.

## 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.

## Holidays and Important Dates

Independence Day:  July 4th
Final day to Drop to receive W:  July 9th
Last Day of Class: July 27th


**\*\*The last day to drop this course with a "W" is July 9, 2015\*\***

# Math 570           Course Calendar           Summer 2015

**\*\* Tentative Outline (dates may change due to student needs or delays) \*\***

| MODULE FOLDERS | SECTIONS | Date Posted | Due by 11:59 PM on the given date |
|---|---|---|---|
| *Module 1* | *Section 1 Introduction to Modeling* | 06/01/2015 | 06/08/2015 |
| *Module 2* | *Section 2 Approximating Change with Difference Equations Using Proportionality* | 06/08/2015 | 06/15/2015 |
| *Module 3* | *Section 3 Solutions to Dynamical Systems Explored and Analyzed* | 06/15/2015 | 06/22/2015 |
| *Module 4* | *Section 4  Systems of Difference Equations* | 06/22/2015 | 06/29/2015 |
| *Module 5* | *Section 5 Modeling Population Growth with Differential Equations*<br><br>*Completed Proctor Approval Form Deadline July 1, 2015 for Distance Learners who Plan to Take Final Exam Off-Campus* | 06/29/2015 | 07/06/2015 |
| *Module 6* | *Section 6 Graphical Solutions to Autonomous Differential Equations* | 07/06/2015 | 07/13/2015 |
| *Module 7* | *Section 7 Probabilistic Modeling with Discrete Systems* | 07/13/2015 | 07/20/2015 |
| *Module 8* | *Section 8 To be Announced* | 07/20/2015 | 07/27/2015 |
| **FINAL EXAM** | **ON-CAMPUS**<br>**Comprehensive final exam is scheduled for Wednesday, July 29, 2015  @ 10:00 AM in Peltier 149.**<br><br>***OFF-CAMPUS***<br>***Comprehensive final exam for distance learners may be scheduled with proctor on either July 28th or July 29th*** | | |

**\*\*The last day to drop this course with a "W" is July 9, 2015\*\***