University of North Texas at Dallas
Summer 2015
SYLLABUS

MATH 5011 (Math Models for Educators) (3Hrs)	

Department of	Mathematics and Information Sciences	**Division of**	Liberal Arts and Sciences

Instructor Name:	Dr. Ali Shaqlaih
Office Location:	Founders' Hall 227
Office Phone:	972-338-1569
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Office Hours:	MTWR:10:00-11:00 am
Classroom Location and Time:	TR: 1:00-3:50PM in Dal2-242

Course Catalog Description:	Algebraic, geometrical and numerical techniques to modelling. Models formulated for problems arising in applications of mathematics such as algebra (coding theory), number theory (private and public key cryptography), difference equations (population models, disease models), stochastic difference equations (stocks), graph theory (GPS), and game theory (economics).

Prerequisites:	Admission to M. Ed. Program or consent of instructor

Texts	- Class notes and handouts will be distributed by the instructor. - Fundamentals of Error-Correcting Codes by Huffman and Pless, ISBN: 0521782805. - Graph Theory, Modeling, Applications and Algorithms by Agnarsson and Greenlaw. ISBN: 0131423843.

Access to Learning Resources:	UNT Dallas Library: phone: (972) 780-3625;
	    web: http://www.unt.edu/unt-dallas/library.htm
	UNT Dallas Bookstore:
	    phone: (972) 780-3652;
	    e-mail: 1012mgr@fheg.follett.com

Course Goals

The goal of this course is to:
- Develop an understanding of methods of math modeling

	• Make connections between the high school Mathematics and the college curriculum through applying math in daily life problems
	• Apply Mathematics in a variety of settings including codes and graphs
	• Acquire nationally acceptable graduate level of mathematical maturity.

Learning Objectives/Outcomes:	
	At the end of this course, the student will be able to:
	• Demonstrate ability to apply math in different areas of life.
	• Demonstrate through written or visual/oral presentations, the ability to present dual credit Mathematics from advanced perspective.
	• Demonstrate comprehension of core mathematical concepts.
	• Execute mathematical procedures accurately, appropriately, and efficiently.
	• Apply principles of logic to develop and analyze conjectures and proofs.
	• Use various mathematical tools, including technology to represent, and solve problems.

Course Outline

Priority will be given to understanding the material in depth rather than covering more topics. This schedule is subject to change by the instructor. Any changes to this schedule will be announced in class. We will try to cover as much as we can from the following topics as time permits.

- Math background in (Linear & Abstract Algebra)
- Math Background (graph theory & game theory)
- Basics of Modeling
- Empirical Modeling
- Continuous Models
- Discrete Models
- Stochastic Models
- Applications (Coding theory, Graph Theory, Cryptography, dynamical systems, Two person games, …)

Meeting date	Read before class	In class
June 9th	None	Introduction to the course Review of pre-requisite materials
June 11th		Coding Theory

June 16th		Coding Theory
June 18th		Coding theory
June 23rd		Coding Theory
June 25th		Coding Theory
June 30th		Coding Theory
July 2nd		Midterm Exam
July 7th		Graph Theory
July 9th		Graph Theory
July 14th		Graph Theory
July 16th		Graph Theory
July 21st		Presentations of projects
July 23rd		Presentations of projects
July 28th		Final Exam

Grading Matrix:

Instrument	Value	Total
Homework & class activities		15%
Project		25%
Midterm		25%
Final exam		35%

The following standard grading scale will be used to determine your final letter grade:
$100\% \geq A \geq 90\% > B \geq 80\% > C \geq 70\% > D \geq 60\% > F \geq 0$.

Course Project

Each group of students (up to 3) will complete a project on <u>mathematical modeling</u> in one of the following areas:
- Coding theory
- Game theory
- Graph theory
- Dynamical systems
- Stochastic processes
- Any other area approved by the instructor

The project must be an application of mathematics and must contain the following parts:
- A Historical brief of the topic and the application
- Explanation of the theoretical background needed for the project
- Statements and proofs of theorems used in the project.
- Explanation of the application and its use and how it works mathematically
- How this project impact your teaching as a high school teacher
- Conclusion

Assessment of the Project:

Each group will complete both of the following:

- A paper (mathematically well written, typed, double space) that describes all parts of the project.
- A 60 minute presentation to the class.

Homework Policy:
 This is an outside of class work; you will carefully write a final version of the solution of each of the assigned problems. Homework is essential for your full understanding of the course material. The assigned homework problems are the minimum number of problems required to attain some level of mastery of the material and you should work more problems to achieve full mastery of the material. You should do all homework problems but only selected problems will be graded. Make sure, to say exactly what you mean and to mean what you say. Please be as neat as possible and try to keep the problems in order with enough space between them (it will be a good idea to put each problem in one page). No late homework will be accepted. Math gets harder the more unorganized you work!

Exams Policy:
Exams should be taken as scheduled in the class time. All exams are closed book exams. No makeup examinations will be allowed except for documented emergencies (See Student Handbook). The material that will be covered in the exams will be announced in class and the final exam will be comprehensive.

Make-up exam policy:
All requests for make-up exams MUST be submitted to the instructor in writing, with the supported documents. It is imperative that you contact your instructor as soon as possible (do **NOT** wait until you return to class!) and include a way that you can be reached.

Students with Disabilities (ADA Compliance):
The University of North Texas Dallas faculty is committed to complying with the Americans with Disabilities Act (ADA). Students' with documented disabilities are responsible for informing faculty of their needs for reasonable accommodations and providing written authorized documentation. For more information, you may visit the Office of Disability Accommodation/Student Development Office, Suite 115 or call Laura Smith at 972-780-3632.

Student Evaluation of Teaching Effectiveness Policy:
The Student Evaluation of Teaching Effectiveness (SETE) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider the SETE to be an important part of your participation in this class.

Bad Weather Policy:
On those days that present severe weather and driving conditions, a decision may be made to close the campus. In case of inclement weather, call UNT Dallas Campuses main voicemail number (972) 780-3600 or search postings on the campus website www.unt.edu/dallas. Students are encouraged to update their Eagle Alert contact information, so they will receive this information automatically.

Attendance and Participation Policy:
The University attendance policy is in effect for this course. Class attendance and participation is expected because the class is designed as a shared learning experience and because essential information not in the textbook will be discussed in class. The dynamic and intensive nature of this course makes it impossible for students to make-up or to receive credit for missed classes. Attendance and participation in all class meetings is essential to the integration of course material and your ability to demonstrate proficiency. Coming to class late or leaving it early is considered an absence. Students are responsible to notify the instructor if they are missing class and for what reason. Students are also responsible to make up any work covered in class. It is recommended that each student coordinate with a student colleague to obtain a copy of the class notes, if they are absent. **More than 5 classes of absence may result in being dropped from the course with a WF. A student may NOT get better than a grade of C if he/she misses more than 5 classes.**

Academic Integrity:
Academic integrity is a hallmark of higher education. You are expected to abide by the University's code of Academic Integrity policy. Any person suspected of academic dishonesty (i.e., cheating or plagiarism) will be handled in accordance with the University's policies and procedures. Refer to the Student Code of Academic Integrity at http://www.unt.edu/unt-dallas/policies/Chapter%2007%20Student%20Affairs,%20Education,%20and%20Funding/7.002%20Code%20of%20Academic_Integrity.pdf for complete provisions of this code.
In addition, all academic work submitted for this class, including exams, papers, and written assignments should include the following statement:
On my honor, I have not given, nor received, nor witnessed any unauthorized assistance that violates the UNTD Academic Integrity Policy.

Copyright Policy:
The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this course, which include but are not limited to syllabi, lecture notes, quizzes, exams, in-class materials, review sheets, projects, and problems sets. Because these materials are copyrighted, you do not have the right to copy and distribute the handouts, unless I expressly grant permission.

Student Behavior:
- o Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT.
- o Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Student Life Center to consider whether the student's conduct violated the Code of Student Conduct.
- o The university's expectations for student conduct apply to all instructional forums, including university and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at http://dallas.unt.edu/sites/default/files/page_level2/pdf/policy/7.001%20Code%20 of%20Student%20Rights%20Responsibilities%20and%20Conduct.pdf

Diversity/Tolerance Policy:
Students are encouraged to contribute their perspectives and insights to class discussions. However, offensive & inappropriate language (swearing) and remarks offensive to others of particular nationalities, ethnic groups, sexual preferences, religious groups, genders, or other ascribed statuses will not be tolerated. Disruptions which violate the Code of Student Conduct will be referred to the Center for Student Rights and Responsibilities as the instructor deems appropriate.