TEXAS A&M UNIVERSITY-CORPUS CHRISTI
MATHEMATICS PROGRAM
MATH 2305 .003
Spring (August 27-Dec. 2, 2014)

I. COURSE INFORMATION
Meeting	Section 001 TR 8:00-9:15 CI 126
Professor: Dr. Jose H. Giraldo
Office Phone 825-5827
Office Address CI 317
E-mail address: jose.giraldo@tamucc.edu
Office Hours:

II. COURSE DESCRIPTION
The main topics to cover in this course include: sets, relations, functions (including Big – O or theta), introduction to Boolean algebra, counting techniques, elementary graph theory, trees, matrices, proof techniques, induction, recursive relations and elementary propositional and predicate logic. There will emphasis on mathematical and computer science applications for these concepts.

III. PREREQUISITES
MATH 1316 (Trigonometry), MATH 2312, or placement beyond MATH 2312

IV. TEXT AND OTHER SUPPLIES REQUIRED
The recommended textbook for this class is *Discrete Mathematics with Applications, Susanna Epp, 4th Edition. Thomson Brooks/Cole*

V. OBJECTIVES AND STUDENT LEARNING OUTCOMES
A. GENERAL OBJECTIVES
The student will
1. link mathematical concepts to real world situations;
2. strengthen his general academic skills in critical thinking and writing;
3. improve his ability to translate a word problem into a math statement, and back again to words;
4. improve the ability to form reasonable descriptions and judgments based on quantitative information;
5. develop a broad-base of discrete mathematics concepts knowledge including concepts, basic skills, mathematical senses (quantitative, symbolic), and thinking process (problem-solving, predicting, generalizing)

B. STUDENT LEARNING OUTCOMES
At the end of the course the student should be able to:
1. Write the inverse, contrapositive, and negation of implications.
2. Use the basic rules of logic to justify arguments. These include arguments by negation, contrapositive, direct, contradiction, and counter examples.
3. Use graph theoretical arguments in the solutions of problems.
4. Distinguish and use properly the different counting techniques learned in class.
5. Define sequences recursively and determine their closed form.
6. Solve problems using the concept of relations and functions combined with counting techniques.
7. Interpret situations using strings together with the counting techniques.
8. Do counting based on graphs.

VI. INSTRUCTIONAL METHODS AND ACTIVITIES.
The class instruction will be based on lecturing and class discussions. In addition to the book, the students will have access to some class notes. I do expect the students to read the class material before coming to class. Throughout the course the student will be participating actively in the learning process.

Keep in mind that you **CAN ONLY REMEMBER:**
- 10% of what you read
- 20% of what you hear
- 30% of what you see
- 50% of what you see and hear
- 70% of what you discuss with others
- 90% of what you teach someone else

With the class and group discussions I expect you to reach the level where you are able to discuss with or teach the concepts to someone else. Writing and explaining are important component of this approach. For this reason, numerical answers without an accompanying explanation or interpretation are meaningless for me.

VII. EVALUATIONS AND GRADE ASSIGNMENTS
Your final grade will be obtained from quizzes, term interview, midterm exams (including test on basics), and final exam (with basics). The table below shows the weight of each of these items (out of 100 points) toward your grade.

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Weight</th>
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<tbody>
<tr>
<td>End of the semester interview</td>
<td>15%</td>
</tr>
<tr>
<td>Class Participation/ Homework discussion</td>
<td>5%</td>
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<tr>
<td>Tests (two midterms)</td>
<td>50%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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**End of the term interview**
This is a 10-minute interview covering the key topics discussed in the course. To prepare for the interview you will receive, by the 12th week of the semester a set of problems, which will cover the main topics discussed in this course. To qualify for the interview you MUST present the solution to each of the problems. The interviews will happen during the last two weeks of classes. You need to make an appointment for the interview. More details about the interview will be posted in the web page of the class.

**Class Participation**
You should be an active participant in your learning process. You will receive from 0-4 points each day for your participation in class. In case you are absent you will receive 0 points.
These are the items influencing the grade in participation:
1. You are willing to help others
2. You ask questions to challenge others
3. You answer questions asked by others.
4. You are ready to discuss or present homework problems

Each day students will be called to present the solution to homework problems on the board or through the DocCam. I will announce through Black Board the problems that are eligible for presentation. I expect students to present solution to problems every two –three weeks.

**Midterms**
There will be two midterms. Each midterm has two parts: Basics, and Essay. The part on Basics will assess the basic concepts you are expected to master in this class, including definitions. This part of the test is closed notes, closed book. It counts as 70% of the test grade. For the Essay part you will have to include full explanation of your work to receive credit. It counts as 30% of the test grade.

For the essay part of each test you will be allowed to use a standard sheet of paper with information you consider necessary, excluding examples. DO NOT INCLUDE SOLUTIONS TO PROBLEMS.

To see what is to be assessed in each midterm and the corresponding dates for them visit the calendar for the course. Review questions for each of the test will be available to the students and I DO EXPECT YOU TO WORK ON THE REVIEW. About 40% of the questions in the test will be similar to the review questions for the test. In each test you are expected to show you know definitions and examples showing when the conditions are met and they are not met.

**Homework**
There will be homework sets assigned in class. The main point of the homework sets is to make sure you understand the key concepts discussed in the course.

**Final Exam**
The final exam will also have the basic and essay parts. The part on basics will cover all the topics included in the midterms. The essay part will be on particular topics I will announce.

The final grade will be based on the scale below.
- **A** 90%-100%
- **B** 80%-89%
- **C** 70%-79%
- **D** 60%-69%
- **F** 0%-59%

**VIII. POLICIES AND OTHER INFORMATION**
- Use the resources you have available: your classmates, your professor and the Tutoring and Learning Center. All of this will lead to our main objective: YOUR LEARNING.
- The course requires a solid and continuous effort. Since this is a three-credit course, you are expected to devote for each hour of class between two and three
hours outside the class working on the subject (some people need more time than others)

- I do expect that you come to each class prepared to talk about any assigned work and readings. One of the best ways to learn any subject and specially mathematics is by talking to other people about it after you have tried the problems. Listening to a solution without trying to solve the problem and struggling through it will not benefit you very much. **Be aware that reading the solutions and be able to follow the explanation do not mean that you know how to do the problem and understand all what is involved there**

- At the beginning of each class you have the opportunity to ask questions about the homework. **Use it wisely.** Remember that making a serious attempt to solve a problem and later discuss it to clarify some aspects of it, is key in your learning process.

- Feel absolutely free to ask any questions. Your question will help you and most likely others around you. One of the driving forces of mathematics is the questioning part.

- Do not hesitate to contact me in case you want to discuss your performance in the class. I am here to lead your learning but you are the one responsible for it. **I AM YOUR COACH, YOU ARE THE PLAYER.**

- After you receive your grades (published on the web) you have up to the next class meeting to dispute it. I am the only person you can dispute your grade with. After the two days I assume that you accepted your grade. **NO EXCEPTIONS.** After that time I will not discuss any changes in your grades.

- Keep all paper work for the class until after you receive your final grades.

- You are expected to be on time for class. Arriving late or leaving the classroom before the end of the period will be considered impolite, and rude to your classmates and professor. **BE ON TIME FOR EACH MEETING.** Your attendance will be monitored.

- If at any point in the semester you consider dropping the class, I advise you to talk to me before you do it. I am here to help you in your learning experience and to help you to succeed in your college career.

- Do not be late in the work you have to turn in. For any work to be collected this is the policy on tardiness. For your late work to be accepted you need to present an excuse to the professor. If the professor accepts to take the work, it will be graded over 80% of the initial grade. Work ahead of schedule. Do not wait for last minute surprises.

**THERE ARE NOT EXCEPTIONS TO THE POLICY.**

PLEASE TURN YOUR CELLULAR PHONES OFF. **DO NOT DISTURB THE CLASS WITH THEM.**

**LIABILITY STATEMENT**

A student is responsible and has to abide by any information given in class and through the web page of the course. It may include changes on dates for tests, format of the test, and so on. Hence, if you miss class, make sure you get the information from somebody else or from the web page.

You are on your honor for any work leading to a grade.
IX. TENTATIVE COURSE SCHEDULE

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<td>1</td>
<td>Introduction. The Tower of Hanoi and Strings. Main problems to discuss in the semester.</td>
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<td>1.1 Logical Form and logical Equivalence</td>
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<td>3</td>
<td>1.2 Conditional Statements</td>
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<td>1.3 Valid and Invalid arguments</td>
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<td>1.4 Introduction to Predicates</td>
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<td>2.1-2 Introduction to Predicates and Quantifiers</td>
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<td>3.6 Indirect argument, contradiction and contraposition</td>
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<td>3.8 Applications</td>
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<td>5.1 Basics on sets.</td>
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<td>13</td>
<td>5.2 Properties of sets. Graphs as examples of sets</td>
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<td>5.3 Algebraic proofs</td>
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<td>15</td>
<td>9.1 Introduction to counting and probability</td>
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<td>16</td>
<td>9.2 Multiplication rule</td>
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<td>9.3 Addition rule</td>
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<td>9.4 Pigeon Hole Principle</td>
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<td>19</td>
<td>9.5 ( r )-combinations. Counting graphs of certain types</td>
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<td>9.7 Combinations with repetitions.</td>
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<td>11.1 Graphs: an introduction</td>
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<td>11.2 Paths and circuits</td>
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<td>11.3 Matrix representation of graphs</td>
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<td>11.4 Isomorphism of graphs</td>
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<td>10.1 Relations on sets</td>
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<td>10.2 Properties of relations</td>
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<td>10.3 Equivalence relations</td>
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<td>10.5 Partial ordered relations</td>
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<td>7.1 Functions</td>
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<td>32</td>
<td>7.2 One to one, onto, inverse functions</td>
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<td>33</td>
<td>7.3 The pigeon hole principle</td>
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<td>4.1 Sequences</td>
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<td>35</td>
<td>4.2 Mathematical Induction</td>
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<td>36</td>
<td>8.1 Functions defined recursively</td>
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<td>37</td>
<td>8.2 Solving Recursive relations</td>
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Final exam Thursday, December 4th, 8:00-10:30 am.

X. DROPPING A CLASS

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise.
Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. November 7, 2014 is the last day to drop a class with an automatic grade of “W” this term.

XI. ACADEMIC HONESTY

Academic Honesty: university students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, forgery or plagiarism.

XII. DISABILITY SERVICES

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

XIII. GRADE APPEALS PROCESS

As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage (http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the
grade appeal process, students may contact the chair or director of the appropriate
department or school, the Office of the College of Science and Engineering Dean, or the
Office of the Provost

**ACADEMIC ADVISING**
The College of Science and Technology requires that students meet with an Academic
Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a
degree plan, which must be signed by the student, a faculty mentor, and the department
chair. The College's Academic Advising Center is located in Faculty Center 178, and can
be reached at 825-6094.

MISSING FINAL EXAM. Any student missing the final exam for any reason will get a
score of zero. If you have a reason to miss the final exam, you need to apply for an
Incomplete Grade (I). If the application for an incomplete grade is approved you can then
take the final exam the next semester to complete your work. In those cases a grade of I
will be temporarily assigned

*Academic Integrity/Plagiarism*

University students are expected to conduct themselves in accordance with the
highest standards of academic honesty. Academic misconduct for which a student is
subject to penalty includes all forms of cheating, such as illicit possession of
examinations or examination materials, falsification, forgery, complicity or
plagiarism. (Plagiarism is the presentation of the work of another as one’s own
work.) In this class, academic misconduct or complicity in an act of academic
misconduct on an assignment or test will result in (                 ).

*Classroom/professional behavior**

Texas A&M University-Corpus Christi, as an academic community, requires that each
individual respect the needs of others to study and learn in a peaceful atmosphere. Under
Article III of the Student Code of Conduct, classroom behavior that interferes with either
(a) the instructor’s ability to conduct the class or (b) the ability of other students to profit
from the instructional program may be considered a breach of the peace and is subject to
disciplinary sanction outlined in article VII of the Student Code of Conduct. Students
engaging in unacceptable behavior may be instructed to leave the classroom. This
prohibition applies to all instructional forums, including classrooms, electronic
classrooms, labs, discussion groups, field trips, etc.

*Statement of Civility (can be in place of classroom/professional behavior)**

Texas A&M University-Corpus Christi has a diverse student population that represents
the population of the state. Our goal is to provide you with a high quality educational
experience that is free from repression. You are responsible for following the rules of the
University, city, state and federal government. We expect that you will behave in a
manner that is dignified, respectful and courteous to all people, regardless of sex,
ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

**Statement of Academic Continuity***
In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

**LIABILITY STATEMENT**
A student is responsible and has to abide by any information given in class and through the web page of the course. It may include changes on dates for tests, format of the test, and so on. Hence, if you miss class, make sure you get the information from somebody else or from the web page.