CSCI 3310-01
Mathematical Foundations of Computer Science

Course Information

<table>
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<tr>
<th>Instructor</th>
<th>Dr. Tim Wylie</th>
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| Contact         | Office: ENGR 3.287  
Phone: 956-665-2577  
Email: timothy.wylie@utrgv.edu |
| Office Hours    | TR 9:00 a.m. - 11:00 a.m. |
| Schedule        | Lecture: MW, 9:25 a.m. - 10:40 a.m., MAGC 1.202 |
| Final Exam      | May 9, 2018, 8:00 a.m. - 9:45 a.m., MAGC 1.202 |
URL: http://discrete.openmathbooks.org/ |
| (free)          | Building Blocks for Theoretical Computer Science (v1.3). Fleck, M., 2013. URL: http://mfleck.cs.illinois.edu/building-blocks/ |
| (optional)      | How to Prove It: A Structured Approach. 2nd edition  
| Course Website  | http://academic.timwylie.com/18CSCI3310 |

Course Description

**CSCI 3310 - Mathematical Foundations of Computer Science.** An introduction to some of the more important concepts, techniques, and structures of discrete mathematics. It provides a bridge between computer science and mathematics. Topics include functions and relations, sets, countability, groups, graphs, propositional and predicate calculus, and permutations and combinations. Students will be expected to develop simple proofs for problems drawn primarily from computer science and applied mathematics. Prerequisites: MATH 2413 with grade of ‘C’ or better; and CSCI/CMPE 1370 (or CSCI/CMPE 1378).

Course Topics

This course provides an introduction and overview of the history and basics of discrete mathematics with an emphasis on the methods of reasoning used in computer science. Students will learn and use areas of logic and formal methods of proof, as well as becoming more literate in mathematical notation and abstract concepts. Foundational areas such as logic, sets, sequences, relations, combinatorics, and graph theory will be covered with other topics discussed based on need and motivation.

Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Apply formal methods of symbolic propositional and predicate logic.
2. Describe how formal tools of symbolic logic are used to model algorithms and real-life situations.
3. Know how to use formal logic proofs and logical reasoning to solve problems.
4. Understand various proof techniques and determine which type of proof is best for a given problem.
5. Understand basics of number theory and matrices and their application to algorithms.
6. Relate the ideas of mathematical induction to recursion.
7. Understand the basic terminology of and perform basic operations associated with functions, relations, and sets.
8. Relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
9. Understand basic counting principles, such as the pigeonhole principle, and their applications.
10. Compute permutations and combinations of a set and interpret the meaning in application problems.
11. Calculate probabilities of events and expectations of random variables, and be able to differentiate between dependent and independent events.
12. Differentiate between types of structures used in models of computations and their applications.

**ABET Outcomes**
(a) An ability to apply knowledge of computing and mathematics appropriate to the discipline.
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
(k) An ability to apply design and development principles in the construction of software systems of varying complexity.

**Course Overview**

**Quizzes.** There will be weekly in-class quizzes during this course. They will be completed during class time and turned in at the end of class. There is no make-up quiz if you miss one. You are expected to attend every lecture.

**Assignments.** Students are expected to have assignments completed at the beginning of class (or when specified) on the due date. This may include selected readings from the textbook.

**Exams.** The material in this course is naturally cumulative, with each week’s topics building on all the prior material. Therefore, each exam will focus on the material covered since the previous exam, however, the student is expected to understand and apply all previous course material.

**Scoring and Grading.** The purpose of the labs are to increase your hands-on experience with the material, and to provide you with another avenue to demonstrate what you have learned.

**Grade Breakdown**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Quizzes</td>
<td>20%</td>
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<tr>
<td>Assignments</td>
<td>30%</td>
</tr>
<tr>
<td>Exams</td>
<td>50%</td>
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Total possible score (max): 100%

**Final Grade**

<table>
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<tr>
<th>Percentage Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90%-100%</td>
<td>A</td>
</tr>
<tr>
<td>80%-89%</td>
<td>B</td>
</tr>
<tr>
<td>70%-79%</td>
<td>C</td>
</tr>
<tr>
<td>60%-69%</td>
<td>D</td>
</tr>
<tr>
<td>0%-59%</td>
<td>F</td>
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**Note:** Grades may be curved to reflect the overall performance of the class.

**Course Schedule** This is a rough course schedule to give you an idea of topics and pacing. The actual course schedule is likely to change and will be kept up to date on the course website.

Week 1-2: Introduction, mathematical notation
Week 3-5: Logic, sets, sequences
Week 6-8: Proofs, relations, functions
Week 9-13: Combinatorics, graph theory, trees
Week 14-15: Topics of interest
Late Work Policy. Labs and exercises will not be accepted late. Assignments must be turned in at the specified time on the given due date. Afterwards, the penalties are as follows:

- Within 24 hours late will lose 10%.
- Within 48 hours late will lose 20%.
- More than 48 hours late will receive 50% credit.

Assignments turned in early will receive an additional 10%.

Make-up Policy. No make-up exams will be given except for university sanctioned excused absences. If you need to miss an exam, it is your responsibility to contact me before the exam, or as soon after the exam as possible. Missing an exam without an approved (by the university or me) excuse will result in a zero.

UTRGV Course Policies

Attendance. Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGVs attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

Drop Class Policy. According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the 3-peat rule and the 6-drop rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time. The census date is January 31st, which is the last day to drop the class without it appearing on your transcript, and the last date to drop is April 12th.

Computer Use Policy. Please read and be aware of University policies for computer use and data security, which can be found at: http://www.utrgv.edu/is/_files/documents/utrgv-aup.pdf

Scholastic Integrity Policy. As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

Course Evaluation. Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available:

Spring 2018 (full semester) April 11 – May 2

Sexual Harassment, discrimination, and violence. In accordance with UT System regulations, your instructor is a “responsible employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a students time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including
confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.

Students with Disabilities. Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive academic accommodations should contact Student Accessibility Services (SAS) as soon as possible to schedule an appointment to initiate services. Accommodations can be arranged through SAS at any time, but are not retroactive. Students who suffer a broken bone, severe injury or undergo surgery during the semester are eligible for temporary services.

• Brownsville Campus: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at ability@utrgv.edu.

• Edinburg Campus: Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at ability@utrgv.edu.