Discrete Mathematics II – MATH 4328.001
Department of Mathematics and Statistics
Spring 2020

A. COURSE INFORMATION

Course number/section: MATH 4328.001
Class meeting time: TR 12:30 pm – 1:45 pm
Class location: BH-103
Course Website: https://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Dr. Kelum Gajamannage
Office location: CI-352
Office hours: WF 9 am – 11:00 am and W 1:00 pm – 2:00 pm or by appointment
Telephone: (361) 825-2479
E-mail: kelum.gajamannage@tamucc.edu
Appointments: E-mail me to make appointments outside the announced office hours

C. COURSE DESCRIPTION

Catalog course description
A continued study of topics from Discrete Mathematics-I with topics that have strong applications to Computer Science and Mathematics. Additional topics include recurrence relations, formal languages and finite-state machines.

D. PREREQUISITES AND COREQUISITES

Prerequisites
MATH 2305, COSC 2437.

Corequisites
None.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required textbook(s)
Susanna Epp, Discrete Mathematics with Applications, 5th Edition, Cengage Learning. Please buy the access to WebAssign along with the eBook (I think, this option is cheap) as we will do homework on WebAssign.

Optional textbook(s) or other references
None.

Supplies
The homework is in WebAssign, accessed by logging into BlackBoard https://bb9.tamucc.edu/. Clicking the WebAssign button on the top left should take you directly into WebAssign. You will need the access code that comes with the book or you can buy an
access code online. There is an initial grace period where you can use the system without an access code, so you will be able to do the homework right away. An outline of the class notes and test solutions will be available on BlackBoard.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.
By the end of this course, students should be able to:

1. Apply regular and strong mathematical induction. Demonstrate knowledge of the well-ordering of the integers and its equivalence with mathematical induction.

2. Use the characteristic polynomial to synthesize closed-form solutions for selected recursively-defined sequences.

3. Comprehend selected properties of graphs, their spanning trees, and their representations as matrices.

4. Demonstrate the ability to explain finite-state automata, regular expressions, regular languages and their equivalence.

5. Exhibit knowledge of other topics to include (as time permits) the halting problem, the use of cardinality in demonstrating non-computability, and public-key cryptography.

G. INSTRUCTIONAL METHODS AND ACTIVITIES
Instructional method: Lectures.
Activities: Homework, mini-projects

H. MAJOR COURSE REQUIREMENTS AND GRADING
The methods of evaluation and the criteria for grade assignments are:

- Homework through WebAssign will be assigned after each section and will be due after one week from the assigned date. You can access the WebAssign page of this section using the Class Key tamucc 9039 5961. All the homework will contribute 25% to the final grade. Office hours are a great opportunity to ask questions about homework. On-campus free tutoring in CASA is another way of getting help with the homework.
• There will be one computational mini-project after each chapter. Preferred coding language is Python. Each mini-project contributes 15% to the final grade.
• The Final exam is comprehensive and contributes 30% to the final grade which is scheduled on TBA from TBA to TBA.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Contribution to the final grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>25%</td>
</tr>
<tr>
<td>Mini-projects (three)</td>
<td>45%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
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</tbody>
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Grading scale

Consider that, first I will round up your final score to the nearest integer. Then,
A = 90.00 – 100%,
B = 80.00 – 89%,
C = 70.00 – 79%,
D = 60.00 – 69%,
F = below 60%.

I. COURSE CONTENT/SCHEDULE

Ch. 0: General Introduction (1 meeting)

Ch. 10: Graphs and Trees (12 meetings)
  Sec. 10.1: Trails, Paths, and Circuits
  Sec. 10.2: Matrix representation of graphs
  Sec. 10.3: Isomorphism of graphs
  Sec. 10.4: Trees
  Sec. 10.5: Rooted trees
  Sec. 10.6: Spanning trees

Ch. 11: Analysis of algorithm efficiency. (10 meetings)
  Sec. 11.1: Real-valued functions of a real variable and their graphs
  Sec. 11.2: Big-O, Big-Omega, and Big-Theta notations
  Sec. 11.3: Application: Analysis of algorithm efficiency I
  Sec. 11.4: Exponential and logarithmic functions: graphs and orders
  Sec. 11.5: Application: Analysis of algorithm efficiency I

Ch. 12: Regular expressions and finite-state Automata (6 meetings)
  Sec. 12.1: Formal language and regular expressions
  Sec. 12.2: Finite-state Automata
  Sec. 12.3: Simplifying finite state Automata

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.
J. **COURSE POLICIES**

All questions concerning grades must be resolved within one week.

**Attendance**

Attendance is not assessed towards the final grade. However, attending class is a fast way of learning the material than trying to catch up on missed material solely from the book.

**Late homework/projects**

10% of penalty per day will be imposed on late homework/projects.

**Missed Exams**

If you have to miss (or have missed) an exam, it is your responsibility to contact me no later than the day of the exam. A valid written excuse is required in order to make up a missed Test. For missed final exam, due to an acceptable excuse, the university rules about I (Incomplete) grades will apply and the make-up is at the instructor's convenience early in the next long semester.

K. **COLLEGE AND UNIVERSITY POLICIES**

- **Academic Integrity (University)**
  
  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 a failing grade.

- **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**
  
  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.

- **Deadline for Dropping a Course with a Grade of W (University)**
  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 your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.* 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. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  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](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](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.

- **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 (361) 825-5816 or visit Disability Services 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.

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

- **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.

L. OTHER INFORMATION

• Academic Advising
  The College of Science & Engineering 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. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

GENERAL DISCLAIMER

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.