CSCI 3080: Discrete Structures

3 Credit Hours

INSTRUCTOR INFORMATION

Instructor: **Dr. Xin Yang** Email: **Xin.Yang@mtsu.edu** Office Phone: **615-898-2129**

URL: **https://www.cs.mtsu.edu/~xyang/3080**

Virtual office hours: **By appointment with email**

COURSE INFORMATION

Description

This course is a fundamental mathematics course for computer scientists. Topics include set theory, formal logic, proof techniques, matrices, graphs, finite state machines, Turing machines, and binary encoding schemes. This course includes Lectures, Live Coding Exercises, Quizzes, and Assignments.

Objectives

The primary goal of this course is to introduce students to the theoretical concepts, data structures and algorithms in discrete mathematics in order to establish a theoretical basis for future study in computing applications and algorithms. Upon successful completion of this course, the students should be able to demonstrate the following learning outcomes:

- An understanding of set notation, and how that notation is used to perform operations via symbol manipulation
- An understanding of concepts of formal logic such as statements, symbolic representation, tautologies, propositional logic, and validity.
- An understanding of proof techniques, induction, recursive definitions, and recurrence relations.
- An understanding of matrix operations.
- An understanding of graphs and trees and their representations.

- An understanding of various graphs algorithms.
- An understanding of finite state machines, Turing machines, and formal languages.
- An understanding of various encoding schemes.

Topics Covered

Key topics covered include:

- Selected portions of Chapters 1, 2, 3, 4, 5, 6, 7, and 9 in the book, and the Handout on Encoding Schemes located on the course website will be covered during the semester.

Prerequisites and Co-requisites

Since the course covers approximately one new mathematics concept each class meeting, it is imperative that students have the mathematical experience to learn new concepts quickly. To that end, students must have completed MATH 1910 or equivalent with a grade of C (2.0) or better prior to taking this course. Additionally, since there will be several programming assignments, students will need a fundamental knowledge of functional programming. To that end, students must have completed CSCI 1170 or equivalent with a grade of C (2.0) or better prior to taking this course.

COURSE MATERIALS

Required Textbooks

Judith L. Gersting, ***Mathematical Structures for Computer Science (Seventh Edition)***, 2014

ISBN-13: 978-1-4292-1510-7

ISBN-10: 1-4292-1510-0

Purchase options:

1. The textbook may be ordered online at Phillips Bookstore. (New: $273.15, Used: $204.85)
2. An eTextbook option is available from VitalSource. (180 Days: $68.99 Lifetime: $173.99)
3. If you have a used book, don't worry if the silver wax strip on the inside cover has been scratched off---we will provide the textbook's digital resources.

Chapters covered: Ch1, Ch2, Ch3, Ch4, Ch5, Ch6, Ch7, Ch9

Supplementary Materials

Another course material can be found Course Calendar: **https://www.cs.mtsu.edu/~xyang/3080** To successfully complete this course, it is your responsibility to read all the course material in Course Calendar each week.

Free Online Resource: Discrete Structures

ASSESSMENT AND GRADING

Grading Procedure

Your grade in this class will be calculated based on: Open Lab Assignments (OLA), Tests and Final Exam.

- **Open Lab Assignments (OLA)**
  Open assignments are designed for the students to solve problems without teacher supervision. Programs are graded based upon design, correctness, documentation, style, efficiency, and compliance with requirements.
- **Tests**
  Two in-class tests will be given. The tests will include questions related to handout materials, textbook materials, and open lab assignments. Each test will contain a programming problem that you need to solve by coding and debugging the programs during the test time.
- **Final Exam**
  The final exam is comprehensive. The final exam will include questions related to handout materials, textbook materials, closed lab assignments, and open lab assignments. It will contain a programming problem that you need to solve by coding and debugging the programs during the test time.

Grading Scale

Assignment	**Points/Percentage**
Open Lab Assignments (OLA)	40%
Tests (2)	40%
Final Exam	20%
Total	100%

Letter Grade	**Range**
A	90 ~ 100
B	80 ~ 89
C	70 ~ 79
D	60 ~ 69
F	Below 60

Advice for succeeding in this course:

- Attend every class.
- Don’t wait until the test time to ask questions. Instead, ask questions in class, or immediately after the lecture to clear any misunderstandings.

- Start working on the open lab assignments as soon as possible, and seek help as soon as needed.

Incomplete Grades

Incomplete grades are given rarely and only in extenuating circumstances. Page 56 of the MTSU Undergraduate Catalog states: "The grade I indicates that the student has not completed all course requirements because of illness or other uncontrollable circumstances, especially those which occur toward the end of the term. Mere failure to make up work or turn in required work on time does not provide the basis for the grade of "I" unless extenuating circumstances noted above are present for reasons acceptable to the instructor." Please refer to the Undergraduate catalog for the complete Incomplete Grade Policy.

Feedback

- The grades and assignment feedback will be provided within one week of the assignment submission.
- Email responses will be provided within 24 hours.
- All **OLA assignments** must be submitted through **handin** and **will not be accepted via email**.
- All assignment deadlines are listed on the course calendar: https://www.cs.mtsu.edu/~xyang/3080/

PARTICIPATION

Course Ground Rules

The following are expected of all students in this course:

- learn how to navigate in the learning management system; refer to your D2L resources within the course for help.
- address technical problems immediately; and
- be respectful to your instructor and peers; refrain from derogatory statements.

Class Participation

Student participation is required in all aspects of the course. Please adhere to the following:

- participation is required; you are expected to log into the course a *minimum* of 3 times per week.
- communication with other students in team projects is expected on a regular basis.
- adhere to all due dates and deadlines as listed in your course calendar.
- utilize the ask the class discussion board when you have questions about course content
- communicate with the instructor as a learning resource.
- check the course homepage for important announcements from the instructor.

Academic Integrity/Misconduct

Please review the information on Academic Integrity and Misconduct. The instructor will be submitting materials to an online service (Turnitin.com) which will review the work for plagiarism. Students should also review the report generated for each assignment and self-check for plagiarism. Information on how

to cite work correctly is provided within the course modules or through the University Writing Center. You may read more about how to avoid plagiarism from the Office of the University Provost.

Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Such conduct includes, but is not limited to:

- Submitting as one's own work, themes, reports, drawings, laboratory notes, computer programs, or other projects prepared by another person
- Knowingly assisting another student in obtaining or using unauthorized materials
- Submitting assignments previously used in other courses where you received credit for the work
- Improperly crediting or lack of crediting an original author's work

Students guilty of academic misconduct are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions (including expulsion from the university), which may be imposed through the regular institutional procedures as a result of academic misconduct, the instructor has the authority to assign an "F" or zero for an activity or to assign an "F" for the course. Students guilty of plagiarism will be immediately reported to the Vice Provost for Academic Affairs.

I am True Blue

As a member of this diverse community, I am a valuable contributor to its progress and success. I am engaged in the life of this community. I am a recipient and a giver. I am a listener and a speaker. I am honest in word and deed. I am committed to reason, not violence. I am a learner now and forever. I am a BLUE RAIDER. True Blue!

Attendance Reporting

MTSU Administration requires that instructors complete an attendance report for each course each semester. Regular class attendance is required and will be monitored by: the D2L system report; participation in the discussion board; and timely submission of course assignments. If several class assignment submissions are missing, student attendance will be reported as "no longer attending."

Email

Per the Family Educational Rights and Privacy Act (FERPA), all course communication will be conducted using an **MTMAIL** account; in turn, **you are required to use your MTMAIL account** when communicating with the instructor (Note: The instructor does not send or receive correspondence via D2L; please do not try to contact the instructor through D2L email). Faculty will not respond to student emails via a non-institutional assigned email.

STUDENT RESOURCES

Technical Support

D2L Resources are available to MTSU Online Students. You can also find help for the basic D2L functions used most often directly in your D2L course under the D2L Help for Students module.

Students with Disabilities

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any

student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website and/or contact the DAC for assistance at 615-898-2783 or DAC Email

Tutoring

MTSU Online supports multiple Online Student Services.

Grade Appeals

University Policy 313, Student Grade Appeals, provides an avenue for MTSU students to appeal a final course grade in cases in which the student alleges that unethical or unprofessional actions by the instructor and/or grading inequities improperly impacted the final grade.

Title IX

Students who believe they have been harassed, discriminated against or been the victim of sexual assault, dating violence, domestic violence or stalking should contact a Title IX/Deputy Coordinator at 615-898- 2185 or 615-898-2750 for assistance or review MTSU's Title IX website for resources.

MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX website or contact information and details.

Hope (Lottery) Scholarship Information

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship

eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you may not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form or contact your MT One Stop Enrollment Counselor.