

**CMPS 200  
DISCRETE STRUCTURES  
FALL 2021**

**2017 - 2020 Catalog Data: CMPS 200 DISCRETE STRUCTURES**

(Credit, 3 hour) (Lecture, 3 hours). Mathematical foundations of Computer Science, including fundamentals of logic, set theory, Boolean algebra, graph theory and finite state machines. Topics to be covered in this course include concept of logic and proofs, sets, functions, relations, sequences and sums, algorithms and computational complexities, matrices, induction and recursion, trees and graphs, Boolean algebra, grammars, languages, and finite state machines.

**Prerequisite:** Sophomore standing in Computer Science, MATH 1351<sup>1</sup>.

**I. COURSE INFORMATION**

**Course Information:**

|                |                    |
|----------------|--------------------|
| CRN            | 19358              |
| Rubric No      | CMPS 200           |
| Section        | 1                  |
| Title          | Discrete Structure |
| Credit Hours   | 3                  |
| Delivery Type: | In-person          |

**Lectures:**

Day and Time: 9 – 10:20 TR  
Class Location: Thurman Hall  
Room 204

**II. TEXTBOOK AND MATERIALS**

**Main Textbook:** Kenneth H. Rosen, *Discrete Mathematics and Its Applications*, Seventh Edition, McGraw Hill, 2012.

**Reference Textbooks** Richard Johnsonbaugh, *Discrete Mathematics*, Seventh Edition, Pearson, 2007.  
Sarah-Marie Belcastro, *Discrete Mathematics with Ducks*, Taylor and Francis Group, LLC 2012.

**III. INSTRUCTOR INFORMATION**

**Instructor(s):** Name: Yaser Banadaki, Ph.D.  
Office Location: 114E Henry Thurman Jr. Hall, Southern University Baton Rouge  
Office Phone: 225-771-3941  
Office Hours:  
MWF 11:00 PM – 12:00PM  
or by appointment and contact  
E-mail: yaser\_banadaki@subr.edu

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<sup>1</sup> Contents of MATH 135 as described in the course catalog are: PRE-CALCULUS I: COLLEGE ALGEBRA (Credit, 3 Hours). Topics include a review of the real numbers and their properties; operations with complex numbers; equations and inequalities; polynomial, rational, exponential and logarithmic functions and their graphs; and systems of equations and inequalities. Modeling is introduced and applications are emphasized. Designed for students in the business, scientific or engineering programs. Graphing calculators are required. Prerequisite: Placement examination.

## IV. COURSE LEARNING OUTCOMES

### Course Objectives:

The objectives of this course are to cover:

1. Students should understand the major mathematical concepts that form the basis of computer science.
2. Students should understand the main structures (sets, relations, functions, graphs, trees), and be adept at solving problems and proving theorems related to them.
3. Students should have a sound understanding of logic systems, including propositional and predicate calculus, and be able to apply sound proof techniques.
4. Students should develop an appreciation for the complexity of various computational problems and be able to classify and quantify them.

### Course Learning Outcomes:

Students will demonstrate the ability to analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solution. (ABET Outcome-1),

### Course Educational Strategies:

1. Provide clear lectures and discussions of appropriate programming language concepts.
2. Provide students with the opportunity to learn course material through reading and homework assignments.
3. Allow students to demonstrate mastery of the course concepts through submitted exercises such as exams, quizzes, and homework problems.
4. Provide students with the opportunity to learn more about various types of programming languages through their applications to real world problems.

## V. COURSE OUTLINE

### Course Topics:

This course will cover the elementary discrete mathematics for computer science and engineering. It emphasizes mathematical definitions and proofs as well as applicable methods as follows:

1. Introduction and proofs
2. Induction
3. Number theory
4. Graph theory and coloring
5. Matching problems
6. Relations, partial orders, and scheduling
7. Sums and asymptotics
8. Divide and conquer recurrences
9. Linear recurrences
10. Counting rules
11. Probability introduction
12. Conditional probability
13. Independence
14. Random variables
15. Expectation
16. Large deviations
17. Random walks

## VI. EVALUATION AND GRADING

### Grading Distribution

A student's grade at the end of the semester will be determined by following percentages:

|                        |     |
|------------------------|-----|
| Class Participation    | 10% |
| Assignments/Tests/Quiz | 30% |
| Midterm Exam           | 30% |
| Final Exam             | 30% |

Students will demonstrate knowledge of the subject through 3 tests, 5 assignments, and the final exam.

### Grading Scale

Course grades at the end of the semester will be given based upon performance using the standard grading scale:

|           |   |
|-----------|---|
| 90– 100%  | A |
| 80 – 89%  | B |
| 70 – 79%  | C |
| 60 – 69%  | D |
| Below 60% | F |

Grades may be curved at the end of session at the instructor's discretion.

## VII. COURSE RULES AND PROCEDURES

**Exam policy:** Exams will emphasize concepts developed in the course. Exams will be closed book and notes unless stated otherwise (if formulas, tables, etc. are needed, the instructor will supply them). Students will not be able to pause the exams. There must be no sharing of any materials during exams. Communicating to one another is not permitted while taking an exam. If there are questions, they should be directed to the instructor.

**Attendance policy and class participation:** Students are expected to be present and on time and participate in class (whether virtual or in-person attendance) from the beginning throughout the end of the class period. Though attendance is strongly encouraged, merely attending classes does not guarantee a passing grade. It is every student responsibility to make sure that he/she signs the roll during class (Hybrid: you need to login to the Moodle and sign the roll).

**Makeup test or exam:** No makeup test or exam will be given except in the case of emergency such as the student being sick, or he/she is unable to come to class due to some unforeseen event. An official proof **MUST** be presented to the instructor and student is required to take the makeup test/exam as soon he/she returns to class in the following class session. Failure to comply will result in the grade of zero (0) for the test/exam.

**Use of electronic devices while in class:** Students are not allowed to use the computers for other purpose unrelated to the course content during the lectures unless authorized by the instructor of this course for the purpose of the course. Please turn off (or place on silence) your cellular phones before the lecture starts. The Hybrid classes will be through Microsoft Teams. Make sure to mute your microphone during the remote delivery of the lectures.

**Missing or late assignments/quizzes/exams:** At the instructor's discretion, students may be given opportunity for late submission of an assignment or retake of a quiz or exam upon presentation of a valid excuse.

**Academic honesty and plagiarism:** Please review the Southern University – Baton Rouge Student Handbook for information regarding the university's academic conduct policy and what constitutes plagiarism. Academic dishonesty and plagiarism will **NOT** be tolerated. The remote attendees must specially stick to these guidelines.

**Assignment policy:** Students are **NOT** allowed to share their assignments or to communicate during the tests or exam. No late assignment will be accepted and no make up for assignments and quizzes.

**Change to syllabus:** Any aspects of this syllabus may be subject to change. However, any substantive changes affecting distribution of grades for various components of the course will be accompanied with prior notice given to students via class announcement and Blackboard announcement or email.

**Livertext Access:** Each student is required to have access to LiveText. Southern University and A&M College-Baton Rouge has entered into partnership with LiveText, Inc. to provide online academic resources for student collaboration and learning outcomes assessment. Therefore, all students enrolled in this course are required to purchase a subscription from LiveText, Inc. through the Southern University Bookstore. LiveText, Inc. provides students with the electronic tools and services needed to serve them in their courses and in their career or academic pursuits beyond graduation.

**Moodle Access:** Southern University and A&M College at Baton Rouge will use Moodle extensively in this course. Moodle is a learning management system designed to help teachers and students communicate effectively online. The course syllabus, class materials (e.g., handouts, PowerPoint slides, journal articles, assignments, readings, etc.) will be placed on Moodle. The student should check Moodle DAILY for all assignments submitted via Moodle. All course communications will be primarily via SUBR email or Moodle. Students are responsible for regularly checking their emails and Moodle. If the student has problems with his Moodle account, he/she should contact Ms. Chrisena Williams-Brown in the Division of Information Technology via email at [chrisena\\_williams@subr.edu](mailto:chrisena_williams@subr.edu) or via phone at (225) 771-5017.

**Academic Dishonesty:** The University defines academic dishonesty as premeditated and un-premeditated fraudulent behavior. Premeditated fraud is defined as conscious, pre-planned, deliberate cheating with materials prepared in advance. Unpremeditated fraud is defined as cheating without the benefit of materials prepared in advance. See the Southern University and A & M College Catalog for a more detailed definition of academic dishonesty. In addition, administrative regulations governing the conduct of students enrolled at the University are contained in the Code of Student Conduct. A copy of the Code of Student Conduct may be obtained from the Office for Student Affairs.

**ADA Compliance:** Students with documented disabilities who believe that they may need accommodations in this class are encouraged to contact the Disability Services Coordinator in the Office of Disability services, 234 A.C. Blanks Hall, 225-771-3950 (Voice/TTD), 225-771-5652 (Fax), as soon as possible to ensure that such accommodations are implemented in a timely fashion. Students who need accommodations must be registered with the Office of Disability Services. Students are responsible for informing the instructor of any instructional accommodations and/or special learning needs at the beginning of the semester. All discussions will remain confidential.

## VIII. COURSE ASSESSMENT

| Course Objectives   | Course Learning Outcomes   | Methods of Assessment  | Target  | Relationship to Program Learning Outcomes |
|---|--|--|---|---|
| Students will be able to classify the major mathematical concepts and structures (sets, relations, functions, graphs, trees) and logic systems that form the basis of computer science. | Students will demonstrate the ability to analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solution. | Outcome Rubrics a will be assessed through 2 tests, 5 assignments, midterm and final exams | 70% will perform at the level of performance 2, 3 or 4 in achieving Outcomes 1. | Outcome 1                                 |