

Mississippi Valley State University
Mathematics, Computer & Information Science
Itta Bena, Mississippi 38941
CS 341-1, Discrete Structure
FALL 2025

Course #	Department	Credits
CS341	MCIS	3
Instructor	Class Meetings-Location/Time:	Office Location:
Dr. Xiaoqin Wu	CRB 205, MWF 9:00 – 9:50am	CRB 214F
Office Phone:	E-mail Address:	Office Hours:
254 – 3402	xpwu@mvsu.edu	MWF 10:00-11:00 am
254 – 3422 (main office)		TH 9:30 – 12:30 am

Course Description: This course provides an introduction to the fundamental ideas of discrete mathematics, basic computer-related concepts, and lays the foundation for the development of more advanced mathematical and computational concepts.

Course Prerequisite: CS204 Data Structures

Text Book:

Discrete Mathematics
 Gary Chartrand & Ping Zhang
 Edition: 1
 Publisher: Waveland Pr Inc
 ISBN-13: 978-1577667308
 ISBN-10: 1577667301

Program Objectives and Outcomes:

1. Students will be successful in computer science related fields.
By the time of graduation, students will have:
 - 1.1 An ability to use current techniques, skills, and tools necessary for computing practice.
 - 1.2 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.
 - 1.3 An ability to apply design and development principles in the construction of software systems of varying complexity.
2. Students will apply knowledge in computer science and related fields to solve problems.
By the time of graduation, students will have:
 - 2.1 An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline.

- 2.2 An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- 2.3 An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

Course Outcomes:

Students will be able to:

1. To develop students' mathematical reasoning, including formal logic and proofs.
2. To provide students with the basic tools to compare relative efficiency of algorithms.
3. To develop students' ability to manipulate abstract structures such as sets, graphs and trees, relations and functions, and finite automata.
4. To demonstrate their understanding of concepts via programming assignments.

Course outline:

- Fundamental structures: Functions (surjections, injections, inverses, composition); relations (reflexivity, symmetry, transitivity, equivalence relations); sets (Venn diagrams, complements, Cartesian products, power sets); pigeonhole principle; cardinality and countability
- Proof techniques: Notions of implication, converse, inverse, contrapositive, negation, and contradiction; the structure of formal proofs; direct proofs; proof by counterexample; proof by contraposition; proof by contradiction; mathematical induction; strong induction; recursive mathematical definitions; well orderings
- Basic logic: Propositional logic; logical connectives; truth tables; normal forms (conjunctive and disjunctive); validity; predicate logic; limitations of predicate logic; universal and existential quantification; modus ponens and modus tokens
- Basics of counting: Counting arguments; pigeonhole principle; permutations and combinations; recurrence relations
- Graphs and trees: Fundamental definitions; simple algorithms; traversal strategies; proof techniques; spanning trees; applications
- Matrices: Basic properties; applications

Units covered:

Functions, relations, and sets	6 core hours
Proof techniques	9 core hours (of 12)
Basic logic	10 core hours
Basics of counting	5 core hours
Graphs and trees	6 core hours
Matrices	3 core hours (of 6)
Elective topics	1 hour

Oral and Written Communications

None

Social and Ethical Issues

None

Theoretical Content

Introduction to Algorithms and Time complexity

Problem Analysis and Design

Students have to analyze, design and implements solutions to problems

Teaching Methods

The method used to accomplish the goals and objectives of this course include a combination of lectures, demonstrations, class discussions, use of technology and group activities.

Course Requirements

- \$ Students are expected to attend class, take notes, and carefully complete all homework assignments and submit them when due. **Incomplete or late assignments will not be accepted.**
- \$ Students are strongly encouraged to participate in all class activities.
- \$ Failure to make up an exam will result in a grade of zero.
- Students are expected to pass written examinations based on classroom lectures and homework assignments.
- \$ Any individualized problems should be discussed in the office and not in the classroom.
- \$ **DO NOT** wait until the end of the semester to ask for help. Use my office hours, as well as tutors, if and when you may need extra practice.

Evaluation Criteria

The evaluation methods, with exception to the homework and final exam, may vary with instructors. (See Homework and Final Exam below)

Grading Scale

Score (Average)	Grade
90-100	A
80-89	B
70-79	C
60-69	D
Below 60	F

Classroom Activities, Quizzes.....	10%
Homework, Compute Projects.....	40%
Midterm.....	15%
Final Exams.....	35%

Missed Homework/Quizzes, Exams

All students can make up a missed exam with an approved absence. **No make-up on missed quizzes/homework.**

Final Exam

The final exam is a comprehensive examination consisting of all topics covered.

Attendance Policy

It is necessary for students to attend every class meeting. Any student who misses more than the allowed number **(3)** of absences will be subject to a decrease in their final grade.

ADA/STUDENTS WITH SPECIAL NEEDS:

Mississippi Valley State University is committed to providing reasonable accommodations for students with a documented disability. If you feel you are eligible to receive accommodations for a covered disability (medical, physical, psychiatric, learning, vision, hearing, etc.) and would like to request it for this course, you must be registered with the Services for Students with Disabilities (SSD) program administered by University College. It is recommended that you visit the Disabilities Office located in the Social Science Building Office 105 to register for the program at the beginning of each semester. For more information or to schedule an appointment, please contact Mrs. Kathy Brownlow, via phone or email at 662-254-3443 or kbrownlow@mvsu.edu.

Telephones

The volume of telephones must be turned **off/vibrate** if you have these items with you in class. The noise is distracting not only to the instructor but to your classmates as well.

NOTE: **Failure to adhere to any of the preceding statements could cause a decrease in the FINAL GRADE!!!!!!**

This document does not constitute a contract with the university. It contains guidelines and I reserve the right to make changes on this syllabus as needed.