CSC 300
Foundations of Computer Science

Instructor: Bikramjit Banerjee
Email: Bikramjit.Banerjee@usm.edu
Office: TEC 201
Office Phone: 601-266-6287
Meetings: 3:00-4:30, Mondays & Wednesdays, in TEC 328
Office Hours: 11:00-12:00 (Monday & Wednesday) + 1:00-3:00
(Tuesday & Thursday) + by appointment

Overview
This class will introduce students to finite and discrete structures, combinatorics and graph theory, and algorithmic processes with applications in computers, languages and programs.

Course Information
Prerequisites: MAT 167
The class textbook is:

The textbook will be followed very closely. Most of the materials between chapters 1 and 11 will be covered.

Additional course materials may be posted on the class website (CASE SENSITIVE): http://www.cs.usm.edu/~banerjee/CSC300
Various notifications and ungraded weekly reading assignments will also be posted on this web-page, so that you can be prepared for a class. So be sure to check this URL often.

Attendance
You should do your best to attend every class. Material presented in class will be critical for passing the midterm and final. In addition, pop quizzes (at the very beginning of class) based on the week’s readings are always a possibility. If you are late for class, you may miss a quiz, unless prior arrangements are made with the instructor.

Email policy
If you send me any email, you must include your full name in the email, and mention “CSC 300” on the subject line. I may not respond to your email if you fail to do so.
Behavior in Class
You are NOT allowed to use any electronic devices in class, without permission. You must NOT leave while the class is in session without permission. If you have anything to say, it must be addressed to the instructor; you must NOT talk amongst yourselves. Any violation will automatically earn a fail-grade.

This policy is not meant to discourage questions about the class materials. You should ask as many questions about the material as you need to.

Homework and Grading
There will be several assignments, in addition to quizzes, a midterm, and a comprehensive final. The workload will be targeted to roughly 6 to 8 hours per week outside of class. Assignments must be submitted on paper (no emails) and must be stapled. Otherwise they will not be accepted. Try to create your answers digitally (use MS Word or a similar word processing software which supports mathematical symbols) if your handwriting is difficult to read. Please always answer assignment questions in the same order as given in the assignment. Also, try to start working on assignments earlier than you are used to; you may need more time than you anticipate.

Grading breakdown
30% Homework/Assignments
20% Quizzes
20% Midterm
30% Comprehensive Final

Late assignments will be penalized by 20% per calendar day, except for extreme circumstances. If possible, give the instructor advance notice of any problems.

Extra credit may be offered periodically, so take advantage of it when it arises. There will not be any extra credit available toward the end of the course, so plan accordingly.

In order to get a good distribution of grades, it might be necessary to apply a scale or curve.

Topics Covered in the Course
1. Logic and Proofs
   Propositions and logical operators, predicates and quantifiers, different types of proofs and proof- strategies.
2. Sets, Functions, Sequences, and Sums
   Sets and set operations, functions and types of functions, sequences and summations.
3. Algorithms
   Concept of algorithms for problem solving, growth of functions and the complexity of algorithms, primes and prime factorization.
4. Induction and Recursion
   Mathematical induction and proofs, recursive algorithms.
5. **Counting**
   Product rule and sum rule, inclusion-exclusion principle, the pigeonhole principle, permutations and combinations, introduction to discrete probability.

6. **Relations**
   Relations and their properties, n-ary relations and their representations, equivalence relations and equivalence classes, Hasse diagram.

7. **Advanced counting**
   Recurrence relations and solution techniques, the divide and conquer approach, application of the inclusion-exclusion principle.

---

**Academic Integrity**

Students are encouraged to collaborate in preparing for tests/quizzes, and even for homeworks/assignments. However, the final work submitted must be the student's own work. No collaboration will be allowed during quizzes/tests.

All students at the University of Southern Mississippi are expected to demonstrate the highest levels of academic integrity in all that they do. Forms of academic dishonesty include (but are not limited to):

1. Cheating (including copying from others' work)
2. Plagiarism (representing another person's words or ideas as your own; failure to properly cite the source of your information, argument, or concepts)
3. Falsification of documents
4. Disclosure of test or other assignment content to another student
5. Submission of the same paper or other assignment to more than one class without the explicit approval of all faculty members' involved
6. Unauthorized academic collaboration with others
7. Conspiracy to engage in academic misconduct

Engaging in any of these behaviors or supporting others who do so will result in academic penalties and/or other sanctions. If a faculty member determines that a student has violated our Academic Integrity Policy, sanctions ranging from resubmission of work to course failure may occur, including the possibility of receiving a grade of “XF” for the course, which will be on the student's transcript with the notation “Failure due to academic misconduct.” More details can be found here: [https://www.usm.edu/provost/students-guide-academic-integrity](https://www.usm.edu/provost/students-guide-academic-integrity). Note that repeated acts of academic misconduct will lead to expulsion from the University.

---

**Disability Accommodations**

If a student believes that they have a disability which is covered by the Americans with Disabilities Act (ADA) and makes them eligible to receive classroom or housing accommodations, they should contact the Office for Disability Accommodations (ODA) for information regarding the registration process. Disabilities covered by the ADA may include but are not limited to ADHD, learning disabilities, psychiatric disabilities, physical disabilities, chronic health disorders, temporary illnesses or injuries and pregnancies. Students should contact ODA if they are not certain whether their documented medical
condition qualifies for ODA services. Students are only required to disclose their disability to the Office for Disability Accommodations. All information submitted to ODA by the student is held with strict confidentiality.

**Address:**
The University of Southern Mississippi
Office for Disability Accommodations
118 College Drive # 8586
Hattiesburg, MS 39406-0001
**Voice Telephone:** 601.266.5024 or 228.214.3232
**Fax:** 601.266.6035

Individuals with hearing impairments can contact ODA using the **Mississippi Relay Service** at 1.800.582.2233 (TTY) or emailing ODA at oda@usm.edu.