1. **Course Content:** This is an undergraduate course in the design and analysis of algorithms. The course will focus on the design strategies, on the mathematical analysis of the algorithms, and on the correctness proofs.

2. **Course Objectives:**
   - Be able to analyze the time and space complexity of a nontrivial algorithm, using mathematical tools, and prove/justify the correctness.
   - Understand the Divide and Conquer, Greedy, and Dynamic Programming strategies for algorithmic design.
   - Be familiar with the algorithms for Matrix Multiplication (Strassen’s), Activity Selection, Knapsack, Shortest Paths (single source, and all pairs), Minimum Spanning Tree (Prim’s and Kruskal’s), Matrix Chain, and Longest Common Subsequence problems.
   - Be exposed to approximation algorithms for solving NP-hard problems.
   - Be able to determine and measure the efficiency of a given algorithm, in practice, through different possible implementations, and by testing on suitable data sets.
   - Be able to communicate clearly and precisely in writing about the theoretical analysis of an algorithm and its efficiency in practice.

3. **Prerequisites:** Students planning to enroll in this course should have taken course numbers 3110, 2100, 2110. They should have been exposed to the following:
   - Time and space analysis; asymptotic notation
   - Basic sorting algorithms: insertion, merge and heap sort
   - Data structures including trees, heaps, BSTs, union/find data, and graphs
   - Recurrence Relations and Proof techniques
   - Graphs: BFS, DFS, MST (Prim’s and Kruskal’s algorithms)
   - Mathematical structures: Sets, relations
   - Important mathematical manipulations: Sums, combinatorics

4. **Tentative Schedule:**
   - (a) Week 1 Introduction, Review of techniques for proof, Algorithm Analysis
   - (b) Week 2 Algorithm Analysis (continued), Sorting (Heap sort, Quicksort, Linear time Sorting)
   - (c) Week 3 Red-Black Trees and other Data Structures;
   - (d) Week 4 Dynamic Programming (Matrix Chain Multiplication, Longest Common Subsequence)
   - (e) Week 5 Review and Midterm (on everything up to greedy algorithms)
   - (f) Week 6 (Greedy Algorithms (Huffman codes, Task Scheduling)
   - (g) Week 7 Graph Theory (Review of BFS, DFS, Minimum Spanning Trees)
(h) Week 8 Graph Theory (Single Source Shortest Paths, All Pair Shortest Paths)
(i) Week 9 Graph Theory (Maximum Flow)
(j) Week 10 NP Completeness and Reducibility
(k) Week 11 Approximation Algorithms for NP complete Problems


6. Course Announcements and Assignments will be posted on Blackboard.

7. Evaluation:
   - 25% Midterm, 25% Final (to be done individually);
   - 7×5=35% group Exercises;
   - 15%: Project (to be done in groups of 4 or less)
   - Class exercises 1 point each. =8 extra credit points (to be done individually). Class exercises will not be graded, but the answers will be discussed in class.
   - Grading scheme: The highest score will be set to 100, and the scores of the rest of the class will be graded based on that. The highest score one can obtain is 100 (i.e. if the total is 110, it will be counted as 100).

8. Academic Integrity Standards in this course are consistent with UNT policy: STUDENT STANDARDS OF ACADEMIC INTEGRITY (18.1.16), or other related/existing UNT polices. The work that you turn in to be graded, including any underlying ideas, must be your own individual work. Usage of unauthorized material and sources, or depending on any unauthorized assistance, to answer homework problems, test questions, writing reports, or carrying any type of assignment, etc., without the permission of the instructor, or without complete and accurate and complete attribution/citation of the source, when applicable, is viewed as an academic misconduct.
   
   **Cheating policy:**
   - You can use any publicly available resource, including code snippets, so long as you cite the source. You cannot use resources from sites that you or others have to pay to access (such as Chegg etc.)
   - Not citing the source is CHEATING
   - Using information from a homework helper site is CHEATING
   - Duplicating/nearly duplication answers from another student/another groups submission is CHEATING
   - First Offence: 0 for the entire submission
   - Second Offence: F for the course

9. Policy for working in groups:
   When working in groups, you can distribute the work among group members. However, if your name is on the submission you are responsible for the submission. This means
   (i) you should be able to explain the algorithm/code/logic of the solution for all parts of the project even if you were not directly involved in implementing it
   (ii) if any group member cheats, the entire group will be penalized
   With the first few assignments, your group membership will be determined for you. After the first several assignments, you will “self-organize” into groups, changing members at will.
only constraint is that there can be no more than 4 people per group
10. Students can take the make-up for at most three quizzes if they miss the quiz on the original date.
11. Five points will be deducted for each day (Weekends included) of late submission of the homework. No homework will be accepted after one week following the due date.
12. The passing marks in this class is 55 or higher. Anyone getting lower than 55 will get an F. Text Book: Introduction to Algorithms, by Thomas H. Cormen, Charles E. Leiserson, and Ronald L. Rivest.
13. Teaching Assistants:

<table>
<thead>
<tr>
<th>NAME</th>
<th>OFFICE HOURS</th>
<th>EMAIL</th>
<th>ZOOM ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tandra, Archana (CSCE 4110)</td>
<td>Tuesday 1:30-2:30pm Thursday 1:30-2:30pm</td>
<td><a href="mailto:ArchanaTandra@my.unt.edu">ArchanaTandra@my.unt.edu</a></td>
<td><a href="https://unt.zoom.us/j/99695388967">https://unt.zoom.us/j/99695388967</a></td>
</tr>
<tr>
<td>Doan, Tam (CSCE 4110)</td>
<td>Monday 11am-12:00 Wednesday 11am-12:00</td>
<td><a href="mailto:tamdoancong@yahoo.com">tamdoancong@yahoo.com</a></td>
<td><a href="https://unt.zoom.us/j/99710271915">https://unt.zoom.us/j/99710271915</a></td>
</tr>
<tr>
<td>B. Buckles</td>
<td>Tuesday 4:30-5:30pm Friday 3:30-5:00pm</td>
<td><a href="mailto:bill.buckles@unt.edu">bill.buckles@unt.edu</a></td>
<td><a href="https://unt.zoom.us/j/92618242604">https://unt.zoom.us/j/92618242604</a></td>
</tr>
</tbody>
</table>
14. Course Announcements and Assignments will be posted on CANVAS.
15. The passing marks in this class is 55 or lower. Anyone getting lower than 55 will get an F