CSCI 3235: Computer System Organization

2022 Fall Session	
Total Class Sessions: 25 **Class Sessions Per Week: 5** **Total Weeks: 5** **Class Session Length (Minutes): 145** **Credit Hours: 4**	**Instructor: Staff** **Classroom: TBA** **Office Hours: TBA** **Language: English**

Course Description:

This course studies the boundary between software and the systems on which software executes. It considers the impact of constraints imposed by operating systems and hardware systems on the design and performance of computer software. Students will learn how to operate within these constraints to build effective systems software. The course studies these issues by looking below the abstractions provided by high-level programming languages. The unit is an introduction to systems programming and related issues. It provides an entry point into more advanced study of computer systems in the following areas: hardware implementation, operating systems, network design and programming, and programming language design and implementation.

Course Materials:

TEXTBOOK:
Bryant, Randal, and O'Hallaron, David. **Computer Systems: A Programmer's Perspective**, 3rd Edition
RECOMMENDED TEXT:
Kernighan, Brian W., and Ritchie, Dennis M. **The C programming language**, Second Edition (abbreviated as KR)

Course Format and Requirements:

The course will take place in a computer lab and the course format including lecture and practical sessions. Lectures are a core learning experience where we will discuss the theoretical underpinnings and concepts that are essential to this unit. Practical sessions provide an opportunity for you to develop your skills in systems programming and your understanding of the key concepts of the unit. The specific topics that will be covered in the classes are listed in the course syllabus. The class period will consist of an active learning environment. During a majority of the class time, students will be actively working on problems under the instructor's guides.

Course Assignments:

Homework Assignment:

5 problem sets will be posted as homework, which will test your comprehension of course materials. You are expected to complete the questions before you come to class. They will serve also as review questions for exams.
Midterm Exams Two in-class, close-book and non-cumulative midterm exams will be given through this course. The midterm exams will be based on the knowledge covered in class. No excuse will be accepted if students do not have legitimate excuses for absence. Physician Statement is required for missing the exam due.
Programming Projects There will be 4 hands-on programming projects based on course need. It will count for 25% of your grade for the course.
Final Exam The final will be in-class, cumulative and close-book. The final exams will be based on concepts covered in class. Note that the final will not be taken during the normal class times. Exact time and location for final will be announced later.

Course Assessment:

Homework Assignment	10%
Programming Projects	25%
Midterm Exams 1	15%
Midterm Exams 2	15%
Final Exam	35%
Total	**100%**

Grading Scale (percentage):

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
98-100	**93-97**	**90-92**	**88-89**	**83-87**	**80-82**	**78-79**	**73-77**	**70-72**	**68-69**	**63-67**	**60-62**	**<60**

Academic Integrity:

Students are encouraged to study together, and to discuss lecture topics with one another, but all other work should be completed independently.
Students are expected to adhere to the standards of academic honesty and integrity that are described in the Chengdu University of Technology's Academic Conduct Code. Any work suspected of violating the standards of the Academic Conduct Code will be reported to the Dean's Office. Penalties for violating the Academic Conduct Code may include dismissal from the program. All students have an individual responsibility to know and understand the provisions of the Academic Conduct Code.

Special Needs or Assistance:

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.

Course Schedule:

Module	Topic
Module 1 Class 1-5	C Programming introduction(procedural way of thinking, Data structure and control, Bitwise operations and Pointer) Bits, ints, float(Signed and unsigned number, two's complement, addition/subtraction of signed and unsigned numbers and floating point presentation) Practical task **Homework and Projects:** - Simple data operation task using C - Pointer challenge
Module 2 Class 6-10	Assembly language (Machine level programs - basics, control, procedures) Machine level programs - data, advanced Practical task **Homework and Projects:** - Bomb lab - Small application using C
Module 3 Class 11-15	Memory hierarchies and caches Linking, exceptions Memory allocation Practical task **Homework and Projects:** - Bomb lab - Assembly challenge

Module 4 Class 16-20	Hardware level I/O and microcontroller concepts Dynamic memory allocation Practical task **Homework and Projects:** - Memory allocation using C and Assembly language
Module 5 Class 21-25	Multithread and synchronisation Concurrent programming Practical task Review