Course Description:  This course covers the principles of computer design and implementation, Instruction set architecture and register-transfer level execution, storage formats, binary data encoding, bus structure and assembly language programming.

Course Outline:

Introduction:
- Computer architecture/ computer organization
- MIPS architecture
- Computer history
- Hardware vs Software
- From High Level language to Binary Language

Basic Computer Hardware components
- Von Neuman Architecture
- Main computer components
- Uniprocessing vs multiprocessing

Data Representations and conversion
- Fixed point
- Floating point

Boolean Algebra
- Truth Tables
- Function simplification, k-maps

Combinatorial Logic
- Logic Gates
- Small integrated circuits (multiplexers, encoders, decoders)
- Medium and Large Integrated circuits (PLAs, ROMs)
- Adders/Subtractors
- 1-bit ALU/ 32-bits MIPS ALU (Arithmetic Logic Unit)

Basic MIPS assembly language Programming
- MIPS – Instruction format
- Macro instructions/assembler directives
  - Input and Output
    - Reading and printing integers
    - Reading and printing strings
- Instructions for decision making
- Logical operations
- Iteration
- Subroutine call and return mechanisms
- Using the stack
- Recursive functions

Assignments: all assignments must be handed in on time and exactly as instructed. If the assignment is late or not submitted as instructed no credit will be given. Makeups for tests will not be given.