Institute of Computer Science/Information Technology (ICS&IT)
Faculty of Management Sciences & Computer Sciences (FMCS)
The University of Agricultural Peshawar

Program:	BS(CS)-III
Course Name:	Computer Organization & Assembly Language
Course Code:	CSC-404
Credit hours:	03
Total Hours:	48
Total Weeks:	16

Week-1

- Microprocessor Based PC System
- Block Diagram of PC
  - -The memory
  - -I/O devices
  - -The Microprocessor
  - -Buses
- -Language Processors
  - - Compiler, Interpreter and Assembler
- -Language Processing System (Pre-processors, Compiler, Assembler, linker Loader)

Week-2

- Introduction to Computer architecture
  - Von-Neumann Architecture
  - Interrupts, System calls
- Computer Architecture vs Computer Organization
- Data Representation in computer System

Week-3

- Introduction to Emulator 8086/Debugger.
  - Writing/executing the assembly program
  - -Assembly Instructions and writing rules.
  - - Syntax and basic components of assembly instructions.
  - -Program Description / Program Template

Week- 4

CPU Registers

- General Purpose
- Segment Registers
- Instruction Pointers
- CPU flags

Week-5

-Basic Elements of Assembly Language

- -Integer Constants
- -Integer Expressions

-Real Number Constants
-Character Constants
-String Constants
-Reserved Words
-Identifiers
-Comments

- Pros and cons of assembly programming.

Week 6

-Defining Data/Data Types
-Intrinsic Data Types
-Data Definition Statement
-Defining BYTE and SBYTE Data
-Defining WORD and SWORD Data
-Defining DWORD and SDWORD Data
-Defining QWORD Data
-Defining TBYTE Data
-Defining Real Number Data

Week-7

-Data Transfer Instructions
-Introduction
-Operand Types
-MOV Instruction
-XCHG Instruction
-Example Program (Moves)
-Addition and Subtraction
-INC and DEC Instructions
-ADD Instruction
-SUB Instruction
-Flags Affected by Arithmetic
-Example Programs

Week-8

Unconditional Jumps

- JMP Instruction
- CMP
- XCHG INstruction

Conditional Jumps

- JE Instruction for signed/unsigned
- JNE Instruction
- JG instruction, JGE Instruction, JNG, JNGE
- JL, JLE, JNL, JNLE
- Conditional Jumps with flags
- Jumps with overflow/not flow

Week-9

- Introduction to Stack
-Stack Operations
-PUSH and POP Instructions
-Program Examples

-ROL and ROR Instructions

Week-10

- Loops in Assembly language.
-implementing conditional loop in assembly
-examples

Week-11

-Introduction
-Boolean and Comparison Instructions
    -The CPU Flags
    -AND Instruction
    -OR Instruction
    -XOR Instruction
    -NOT Instruction
    -TEST Instruction
    -CMP Instruction
-Conditional Jumps
    -J*cond* Instruction

Week-12

-Conditional Structures
    -Block-Structured IF Statements
-Application: Finite-State Machines
    -Validating an Input String
    -Validating a Signed Integer

Week-13

-Shift and Rotate Instructions
    -Logical Shifts and Arithmetic Shifts
    -SHL Instruction
    -SHR Instruction
    -SAL and SAR Instructions
    -ROL Instruction
    -ROR Instruction
    -RCL and RCR Instructions
    -SHLD/SHRD Instructions

-Multiplication and Division Operations
    -MUL Instruction
    -IMUL Instruction
    -DIV Instruction

Week-14

-General Concepts
    -Basic Microcomputer Design

-Instruction Execution Cycle
-IA-32 Processor Architecture
-Modes of Operation

Week-15

-IA-32 Memory Management
-Real-Address Mode
-Protected Mode
-Components of an IA-32 Microcomputer
-Motherboard
-Video Output
-Memory
-Input-Output Ports
-Input-Output System
-How It All Works

Week-16

-Standard MS-DOS File I/O Services
-Create or Open File (716Ch)
-Close File Handle (3Eh)
-Move File Pointer (42h)
-Get File Creation Date and Time
-Example: Read and Copy a Text File
-Example: Creating a Binary File

Total Marks: **100**

Recommended Books:

ASSEMBLY LANGUAGE FOR INTEL-BASED COMPUTERS 4TH Edition, Kip R. Irvine Prentice Hall International edition

Reference Books:

1. Assembly Language Programming & Organization of the IBM PC 1st Edition, Ytha Yu and Charles Marut McGraw Hill International Edition

2. ASSEMBLY LANGUAGE FOR PRIMER FOR THE IBM PC & XT 1st Edition, Robert Lafore Wait Group International Edition