Syllabus of (B. Sc) Undergraduate (2024-2025)
Courses in "Computer Architecture" for third year
Course Instructor: Assist Prof. Dr. Muna Hadi Saleh

Course Weekly Outline		
Topics Covered	**No. of weeks**	**Assignments**
Register Transfer & Computer Organization: Data movement around registers. Data movement from/to memory, arithmetic, and logic micro-operations. Concept of bus and timing in register transfer.	4	**Assignment1** Chapters 2,3,4: Exercises
Basic Computer Organization: Computer Instructions, Timing and Control, Execution of Instructions, Design of Basic Computer.	3	**Assignment2** Chapter 5: problems
Microprogrammed Control Unit: Basic organization of microprogrammed control unit, Microinstruction formats, and Address sequencer.	3	**Assignment3** Chapter 7: problems & exercises
CPU Organization: Addressing Modes, Instruction Format. CPU organization with large registers, stacks, and handling of interrupts & subroutines.	2	**Assignment4** Chapter 8: problems
Pipelining: Parallel Processing, Principle of pipelining, Instruction and arithmetic pipelines, Hazards of pipelining.	3	**Assignment5** Chapter 9: Exercises
Comprehensive exam-1		
Second course		
Vector Processing: Principles of vector processing, vector operation, Matrix multiplication, Memory interleaving, Supercomputers.	3	**Assignment5** Chapter 9: Exercises
I/O Organization: Introduction to Peripherals & their interfacing. Strobe-based and handshake-based communication, DMA-based data transfer, I/O processor.	3	**Assignment6** Chapter 11: Exercises Reading websites articles, journals, and magazines
Memory Organization: Concept of RAM/ROM, basic cell of RAM, Associative memory, Cache memory organization, Virtual memory organization.	3	**Assignment7** Chapter 12: Exercises Reading websites articles, journals, and magazines
Parallel Processing: Characteristics of Multiple Processors, Interconnection structure and arbitration, Inter-process communication and synchronization.	4	**Assignment8** Chapter13: Exercise Reading material will be selected from leading conferences, journals, and magazines All required material will be made available on the course web page.
Comprehensive Exam -2		

References:

1. Morrise Mano, "Computer System architecture", 3rd Edition, Prentice Hall.

2. Mostara Abd-El-Barr, Hesham El-Rewini, "Fundamentals of Computer Organization and Architecture", John Wiley, 2005.

3. David A. Patterson, John L. Hennessy, "Computer Organization and Design", Arm Edition, Elsevier, 2010.

4. Barry B. Brey, "The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, and Pentium Pro processor Architecture, Programming, and Interfacing", 6th Edition, Prentic-Hall Inc., 2003.

5. Reading websites articles, journals, and magazines