University of Gujrat

Faculty of C & IT

Department of Computer Science

Title	**Computer Organization and Assembly Language**
Code	**CS-252**
Course Coordinator	M Abo Bakar Aslam
Credit Hours	3.0 **Theory/week:** Weight 3 Cr. Hrs. Contact Hours 3 Hrs. Lectures: 2
Prerequisite	Digital Logic Design
Aims and Objectives	• Understanding about low level language and High level language • Understanding about Intel 8086 architecture. • Understanding about Intel processor family • Understanding about MASM (Microsoft assembler) • Writing code in assembly language using MASM • Understanding about File Operations
Course Description	A one semester course that provides Computer Science and Information Technology students with material fundamental to the design and analysis of digital circuits. This course introduces the Assembly Language to lay the framework for strengthening the understanding of computer building blocks. Computer fundamentals, computer organization and different components of computer are studied along with their constituent elements comprising CPU organization, memory managements and RISC CISC architecture. The course provides necessary information to the students for future study of computer Architecture, Organization, and Assembly language.

Text Books	- Irvine, Assembly Language for Intel-based Computers, 6th ed, Prentice Hall. - W.Stallings, "Computer Organization & Architecture", 8th ed, Prentice HALL, 2007. - Barry B. Brey, “The Intel Microprocessors” 8th ed, Pearson, 2009.
Reference Material	- Irvine, Assembly Language for Intel-based Computers, 6th ed, Prentice Hall. - Barry B. Brey, “The Intel Microprocessors” 8th ed, Pearson, 2009.
Assessment Criteria	

Sessional 25%	**Mid 25%**	**Final 50%**	**Total 100%**
Quizzes and Tests			
Assignment and Presentations		Paper 50	
Attendance and Class Participations	Paper 25		

Grading System	**HELP**
Grading Policy	

Marks in Percentage	**Letter Grade**	**Numeric Value of Grade**	**Description**
85 and above	**A+**	**4.00**	**Exceptional**
80-84	**A**	**3.70**	**Outstanding**
75-79	**B+**	**3.40**	**Excellent**
70-74	**B**	**3.00**	**Very Good**
65-69	**B-**	**2.50**	**Good**
60-64	**C+**	**2.00**	**Average**
55-59	**C**	**1.50**	**Satisfactory**
50-54	**D**	**1.00**	**Pass**
49 and below	**F**	**0.0**	**Fail**
	W		**Withdrawal**
	I		**Incomplete**

Week	**Lecture**	**Topic**	**Recommendations for Learning Activities** (Mention Assignments, Test, Quizzes, Practical, Case Study, Projects, Lab Work or Reading Assignments)

1	1	• Introduction about computer Organization • Introduction about assembly language • Comparison of low level and high level languages.	Distribution of course outline
	2	• Registers types (General) (16-bit) ○ General purpose register ○ Special purpose register • Introduction and usage of RAM, Processor, Registers, System Bus • Instruction Execution Cycle	
2	3	• Assembly and Machine Language • Why Learn Assembly Language? • Assembler • Linker and Link Libraries • Programmer's View of a Computer System • Physical address calculation	
	4	• Basic Elements of Assembly Language • Integer Constants • Integer Expressions • Real Number Constants • Character Constants • String Constants	
3	5	• Basic Memory Organization • CPU organization	Assignment # 1 Quiz 1
	6	• Reserved Words • Identifiers • Directives • Instructions • The NOP (No Operation) Instruction	

4	7	Top Level View of Computer Function and Interconnection • Instruction Cycle • Execute Cycle • Interrupts • Interrupt Cycle Connecting • Memory Connection • Input / Output Connection	
	8	• CPU Connection Adding and Subtracting Integers INC and DEC Instructions NEG Instruction	
5	9	• Introduction about Assembler • MASM • NASM • MIPS • Basic about MASM • Working on MASM • A sample Hello World Program	
	10	• Defining Data in MASM Assembler • Practical implementation of Add Commands • Practical implementation of Subtract Commands	Assignment #2
6	11	• How to move integer number in register? • Adding and subtracting numbers in registers • Declaration and initialization of variables • Moving data from variable to register	Quiz 2

	12	• Data Definition Statement • BYTE and SBYTE Data • WORD and SWORD Data • Defining DWORD and SDWORD Data	
7	13	• Knowledge about different data types • Getting input from user • Printing string on screen • Working on character	
	14	• Getting character value form user • Displaying character value • Operand Types • Direct Memory Operands	
8	15	Some code examples • Practice on MASM in class	
	16	• Practice on MASM in class	
9	17	Division and Multiplication in Assembly Jumps Based on Specific Flags Jumps Based on Equality	
	18	Practicing the jump statements in MASM	
10	19	Jumps based on specific condition Array • Byte Array • Word Array • DWORD Array	
	20	Practicing of above in MASM	

11	21	LOOP in MASM Simple LOOP LOOPZ LOOPE LOOPNZ LOOPNE	Quiz 3
	22	Practicing of above in MASM	Assignment #3
12	23	Procedures • Labels in procedures Stack • Push • Pop Runtime Stack	
	24	Practicing of above in MASM	
13	25	Conditional Control Flow Directives Compound Expressions Data Representation & Conversion	
	26	Practicing of above in MASM	Quiz 4
14	27	File operations • Opening a file • Closing a file • Reading a file • Writing a file • Seeking a file	Assignment 4
	28	Practicing of above in MASM	
15	29	RISC and CISC	
	30	Discussion about Application and future of different processors	
16	31	Project/presentation	
	32	Project/presentation	