Course Name: Assembly Language Programming
Course Code: CS318

I. Basic Course Information

Major or minor element of program: Major
Department offering the course: Computer Science Department

Academic level: 300 Level
Semester in which course is offered: Spring
Course pre-requisite(s): CS322

Credit Hours: 3
Contact Hours Through:

Lecture	Tutorial*	Practical*	Total
2.5	0.0	1.5	4.0

* 1.5 hours for **either** Tutorial or Practical

Approval date of course specification: January 2015

II. Overall Aims of Course

This course is intended to teach students how to program a computer or microprocessor based system in processor-specific assembly language. Hardware dependent and direct addressing of at least one specific microprocessor must be covered. The course also teaches the importance and practice of integrating assembly with higher-level languages for computer programming.

III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
K6,K15,K19	I2,I4,I7,I12	P2,P6,P10,P15	G2,G9

IV. Intended Learning Outcomes of Course (ILOs)

a. Knowledge and Understanding

On completing the course, students should be able to:

K.1 List different registers types and their use.
K.2 Describe basic operation modes of processors.
K.3 List basic arithmetic and logical operations of assembly language.
K.4 Explain how memory addressing takes place and sequence of execution of program instructions.

b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

I.1 Design simple applications to set and get data from devices based on serial ports.
I.2 Distinguish between pulling modes and interrupt mode of operation.
I.3 Evaluate the performance of the real-time applications based on assembly language routines with respect to other high level routines.
I.4 Distinguish between embedded systems and PC-based applications.
I.5 Distinguish between real-time applications and off-line application.

c. Practical/Professional Skills

On completing the course, students should be able to:

P.1 Prepare a plan to solve a problem.
P.2 Program Intel-based microprocessor systems in assembly language.
P.3 Integrate assembly language programming with C.
P.4 Build a complete routine for simple embedded driver.

d. General and Transferable Skills

On completing the course, students should be able to:

G.1 Demonstrate how to build a complete system (Analysis, Design, Development, Testing, and Documentation).
G.2 Manage working in a team and how to write down plan to redistribute work load and evaluate results.

V. Course Matrix Contents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	Introduction to Micro Processors and modes of operation	2	K1,K2,K3	[ ]	[ ]	[ ]
2-	Memory Addressing modes	1	K4	[ ]	[ ]	[ ]
3-	Registers and Memory Variables	1	[ ]	I2,I4,I5	[ ]	[ ]
4-	Arithmetic and Logic Operations	2	[ ]	I2,I4,I5	[ ]	[ ]
5-	Control Instructions and Decisions	2	[ ]	I2,I4,I5	[ ]	[ ]
6-	Maskable and non-maskable interrupts	1	[ ]	I2,I4,I5	[ ]	[ ]
7-	Working with Serial Port	1	[ ]	I1	[ ]	[ ]

8-	Debugging techniques	1				
9-	Working with Real Time Routines	1		I3		
10-	Building Embedded applications using Assembly Language	1		I1	All	All
	Net Teaching Weeks	**13**				

VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours*
1	Introduction to Micro Processors	2.5	2.5	
2	Introduction to modes of operation of processors	4	2.5	1.5
3	Memory Addressing modes	4	2.5	1.5
4	Registers and Memory Variables	4	2.5	1.5
5	Arithmetic Operations	4	2.5	1.5
6	Logic Operations	4	2.5	1.5
7	**Midterm Exam**			
8	Control Instructions	4	2.5	1.5
9	Conditional Decisions	4	2.5	1.5
10	Maskable and non-maskable interrupts	4	2.5	1.5
11	Working with Serial Po	4	2.5	1.5
12	Debugging techniques	4	2.5	1.5
13	Working with Real Time Routines	4	2.5	1.5
14	Building Embedded applications using Assembly Language	4	2.5	1.5
15	**Final Exam**			
Total Teaching Hours		**51**	**33**	**18**

* **No Practical/Tutorial during the first week of the semester**

VII. Teaching and Learning Methods

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K & U	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	*	All	All		
Tutorials					
Computer lab Sessions					
Practical lab Work	*		I1	All	All
Reading Materials					
Web-site Searches					
Research & Reporting					
Problem Solving / Problem-based Learning					
Projects	*		I1	All	All
Independent Work					
Group Work					
Case Studies					
Presentations					
Simulation Analysis					
Others (Specify):					

VIII. Assessment Methods, Schedule and Grade Distribution

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K & U	I.S.	P.S.	G.S.		
Midterm Exam	*	K1,K2	I2,I5			20%	7
Final Exam	*	All	I2,I3,I4,I5			60%	15
Quizzes	*	All	I2,I4,I5				
Course Work							
Report Writing							
Case Study Analysis							
Oral Presentations							
Practical	*		I1	All	G1	10%	5,12
Group Project	*		I1	All	All	10%	13
Individual Project							
Others (Specify):							

IX. List of References

Essential Text Books	• The Art of Assembly Language, by Randall Hyde, No Starch Press; Pap/Cdr edition (September 2003), SBN-10: 1886411972.
Course notes	• None
Recommended books	• None
Periodicals, Web sites, etc …	• None

X. Facilities required for teaching and learning

List the facilities required

- Assembly language
- Computer machine

Course coordinator: Dr. Ahmed Shawky

Head of Department: Prof. Abeer El Korany

Date: January 2015