

## Form no. (12)

### Course Specification

**University/Academy: Benha**

**Faculty/Institute : Computers and Informatics**

**Department : Computer Science**

1-Course Data		
<b>Course Code:</b> CSW 353	<b>Course Title:</b> Assembly Language	<b>Academic Year/Level:</b> 3 <sup>rd</sup> Year / B.Sc
<b>Specialization:</b> Computer Science	<b>No. of Instructional Units:</b>	<b>Lecture</b> 3 hrs <b>Practical</b> 2 hrs

<b>2-Course Aim</b>	<ol style="list-style-type: none"> <li>1. Define principles and theories relevant to computing disciplines and generating tests in assembly language.</li> <li>2. State principles of generating tests which investigate the functionality of computer programs and evaluating their results in assembly language.</li> <li>3. Analyze, propose and evaluate alternative computer processes taking into account limitations, and quality constraints in assembly language.</li> <li>4. Operate computing equipment, recognizing its logical and physical properties, capabilities and limitations for assembly language.</li> <li>5. Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve practical problems using assembly language.</li> <li>6. Work in groups and manage team, time and organizational skills.</li> <li>7. Retrieve the information efficiently in assembly language.</li> <li>8. Use the general computing facilities in assembly language.</li> </ol>
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3-Intended Learning Outcome by the end of this course the student	
<b>a-Knowledge and Understanding</b>	<ol style="list-style-type: none"> <li>a1. Define principles and theories relevant to computer architecture.</li> <li>a2. State principles of processor architecture.</li> <li>a3. Outline theories of memory management.</li> <li>a4. Define tools, and practices needed for designing processor architecture.</li> <li>a5. Identify tools, and practices needed for implementing processor architecture.</li> <li>a6. State principles of generating tests which investigate the functionality of assembly programs.</li> </ol>

	a7. List principles of generating tests of assembly programs for evaluating their results.												
<b>b-Intellectual Skills</b>	<p>b1. Describe the registers of processor specifications and functionality taking into account limitations, and quality constraints.</p> <p>b2. Explain the Data and conditional processing in processor architecture using assembly language.</p> <p>b3. Discuss the arithmetic and string operation occurred in the processor using assembly language.</p>												
<b>c-Professional Skills</b>	<p>c1. Demonstrate the processor equipment, recognizing its logical and physical properties, capabilities and limitations.</p> <p>c2. Illustrate processor architecture by using processor equipment to apply assembly programs.</p> <p>c3. Apply comprehensive computing knowledge and skills in assembly programs.</p> <p>c4. Employ comprehensive knowledge and skills in assembly language to solve practical problems.</p> <p>c5. Operate the processor equipment and tools used for the processor architecture.</p> <p>c6. Demonstrate applying the assembly programs and illustrate the processor architecture using processor equipment and tool.</p>												
<b>d-General Skills</b>	<p>d1. Make use of a wide range of learning resources and manage self-learning for assembly language.</p> <p>d2. Work in groups and manage team, time and organizational skills to apply assembly programs.</p> <p>d3. Use different methodology to retrieve the information efficiently.</p> <p>d4. Use the general computing facilities in computer fundamental and logic circuits.</p> <p>d5. Use the practice facilities of electronics.</p>												
<b>4-Course Content</b>	<table border="1"> <thead> <tr> <th>Topic</th> <th>No. of hours</th> <th>Lecture</th> <th>Tutorial/ Practical</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>• <b>Basic Concepts of Assembly Language</b> <ul style="list-style-type: none"> <li>- Welcome to Assembly Language</li> <li>- Virtual Machine Concept</li> <li>- Data Representation</li> <li>- Boolean Operations</li> </ul> </li> </ul> </td> <td style="text-align: center;">10</td> <td style="text-align: center;">6</td> <td style="text-align: center;">4</td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>• <b>IA-32 Processor Architecture</b> <ul style="list-style-type: none"> <li>- General Concepts</li> <li>- IA-32 Processor Architecture</li> <li>- IA-32 Memory Management</li> <li>- Components of an IA-32 Microcomputer</li> <li>- Input-Output System</li> </ul> </li> </ul> </td> <td style="text-align: center;">10</td> <td style="text-align: center;">6</td> <td style="text-align: center;">4</td> </tr> </tbody> </table>	Topic	No. of hours	Lecture	Tutorial/ Practical	<ul style="list-style-type: none"> <li>• <b>Basic Concepts of Assembly Language</b> <ul style="list-style-type: none"> <li>- Welcome to Assembly Language</li> <li>- Virtual Machine Concept</li> <li>- Data Representation</li> <li>- Boolean Operations</li> </ul> </li> </ul>	10	6	4	<ul style="list-style-type: none"> <li>• <b>IA-32 Processor Architecture</b> <ul style="list-style-type: none"> <li>- General Concepts</li> <li>- IA-32 Processor Architecture</li> <li>- IA-32 Memory Management</li> <li>- Components of an IA-32 Microcomputer</li> <li>- Input-Output System</li> </ul> </li> </ul>	10	6	4
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	<ul style="list-style-type: none"> <li>• <b>Assembly Language Fundamentals</b> <ul style="list-style-type: none"> <li>- Basic Elements of Assembly Language</li> <li>- Example: Adding and Subtracting Integers</li> <li>- Assembling, Linking, and Running Programs</li> <li>- Defining Data</li> <li>- Symbolic Constants</li> <li>- Real-Address Mode Programming</li> </ul> </li> </ul>	10	6	4
	<ul style="list-style-type: none"> <li>• <b>Data Transfers, Addressing, and Arithmetic</b> <ul style="list-style-type: none"> <li>- Data Transfer Instructions</li> <li>- Addition and Subtraction</li> <li>- Data-Related Operators and Directives</li> <li>- Indirect Addressing</li> <li>- JMP and LOOP Instructions</li> </ul> </li> </ul>	15	9	6
	<ul style="list-style-type: none"> <li>• <b>Procedures</b> <ul style="list-style-type: none"> <li>- Linking to an External Library</li> <li>- The Book's Link Library</li> <li>- Stack Operations</li> <li>- Defining and Using Procedures</li> <li>- Program Design Using Procedures</li> </ul> </li> </ul>	5	3	2
	<ul style="list-style-type: none"> <li>• <b>Conditional Processing</b> <ul style="list-style-type: none"> <li>- Conditional Jumps</li> <li>- Conditional Loop Instructions</li> <li>- Conditional Structures</li> </ul> </li> </ul>	10	6	4
	<ul style="list-style-type: none"> <li>• <b>Integer Arithmetic</b> <ul style="list-style-type: none"> <li>- Multiplication Instructions</li> </ul> </li> <li>• <b>Advanced Procedures</b> <ul style="list-style-type: none"> <li>- Recursion</li> </ul> </li> </ul>	5	3	2
	<ul style="list-style-type: none"> <li>• <b>Strings and Arrays</b> <ul style="list-style-type: none"> <li>- String Primitive Instructions</li> </ul> </li> </ul>	5	3	2
<b>5- Teaching and Learning Methods</b>	5.1- Lectures (knowledge and understanding). 5.2- Practical Training / Laboratory (Practical skills). 5.3- Class Activities (assignments)(intellectual skills).			
<b>6- Teaching and Learning Methods for Students with Special Needs</b>	.....			
<b>7-Student Assessment:</b>				
<b>a-Procedures used:</b>	<b>Assignments</b>	<i>to assess progress on students' learning, effectiveness of course materials, and approaches to instruction in assembly language.</i>		
	<b>Mid-Term exam</b>	<i>to assess level of knowledge acquisition and concepts understanding that can be used as a feedback for enhancing the learning process.</i>		

	<p><b>Oral exam</b> to assess the level of understanding for the concepts behind assembly language and associated technologies.</p> <p><b>Practical exam</b> to assess application of skills and experience gained in developing assembly language application.</p> <p><b>Final exam</b> to assess the overall level of understanding of concepts, algorithms, and problem solving techniques learned throughout the course.</p>												
<b>b-Schedule:</b>	<table border="1"> <tr> <td>Assessment 1</td> <td>Assignments</td> <td>Weekly starting from 2<sup>nd</sup> week</td> </tr> <tr> <td>Assessment 2</td> <td>Mid-Term exam</td> <td>Week 7</td> </tr> <tr> <td>Assessment 3</td> <td>Practical exam</td> <td>Week 15</td> </tr> <tr> <td>Assessment 4</td> <td>Final Exam</td> <td>Week 16</td> </tr> </table>	Assessment 1	Assignments	Weekly starting from 2 <sup>nd</sup> week	Assessment 2	Mid-Term exam	Week 7	Assessment 3	Practical exam	Week 15	Assessment 4	Final Exam	Week 16
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<b>8- List of Text books and References:</b>													
<b>a-Course Notes</b>	None												
<b>b-Required Books(Textbooks)</b>	Assembly Language for x86 Processors, 7th edition, by Kip Irvine.												
<b>c-Recommended Books</b>	Assembly Language for x86 Processors, 7th edition, by Kip Irvine.												
<b>d-Periodicals, Web Sites, ...,etc.</b>	<a href="http://www.dailyfreecode.com/Tutorial_Page2/Assembly_Language-49.aspx">http://www.dailyfreecode.com/Tutorial_Page2/Assembly_Language-49.aspx</a> <a href="http://assembly.happycodings.com/">http://assembly.happycodings.com/</a> <a href="http://muruganad.com/8086/">http://muruganad.com/8086/</a> <a href="http://www.codeproject.com/Articles/3778/Introduction-to-IL-Assembly-Language">http://www.codeproject.com/Articles/3778/Introduction-to-IL-Assembly-Language</a>												

**Course Instructor: Dr. Khaled M. Fouad**

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**Head of Department: Ass. Prof. Mazen Silem**

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