

<b>University of Basrah</b>	
<b>College of Information Technology</b>	
<b>Year:</b>	2014/2015
<b>Semester:</b>	Second

<b>Course Information</b>	
<b>Course Title</b>	Logic Design
<b>Course Number</b>	I S103
<b>Prerequisites</b>	None
<b>Credits</b>	3 Hours
<b>Teaching Method</b>	2 Hour of Lecture + 2 Hours Lab

<b>Assessment Policy</b>		
<b>Assessment Type</b>	<b>Expected Due Date</b>	<b>Weight</b>
First Exam	To be announced by the dept.	10%
Second Exam	To be announced by the dept.	10%
Student activities (Quizzes)	To be announced later	5%
Lab	To be announced later	15%
Lab (final semester)	To be announced later	10%
Final Semester Exam	To be announced later	50%

<b>Learning Outcomes</b>
<p>Upon successful completion of this course students will be able to:</p> <p>This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of combinational logic: logic gates, minimization techniques, arithmetic circuits, and modern logic devices such as field programmable logic gates. The second part of the course deals with sequential circuits: flip-flops, synthesis of sequential circuits, and case studies, including counters, registers, and random access memories. State machines will then be discussed and illustrated through case studies of more complex systems using programmable logic devices. Different representations including truth table, logic gate, timing diagram, switch representation, and state diagram will be discussed.</p>

<b>Week</b>	<b>Topics</b>
	<p><b>BINARY SYSTEMS:</b> Digital systems – Binary numbers – Number base conversion – Octal and Hexadecimal numbers – Complements – Binary codes</p> <p><b>BOOLEAN ALGEBRA AND LOGIC GATES:</b> Basic Theorems and properties of Boolean algebra – Boolean functions – Canonical and Standard forms – Digital logic gates.</p> <p><b>SIMPLIFICATION OF BOOLEAN FUNCTIONS:</b> k-map representation – Simplification using k-maps – Don't care conditions.</p> <p><b>DIGITAL LOGIC FAMILIES:</b> Characteristics of digital IC's – TTL — CMOS – ECL and their properties – Comparison of performance.</p>

**COMBINATIONAL LOGIC:** Adders – Subtractors – Code conversion – Decoders – Multiplexers – Demultiplexers

**SEQUENTIAL LOGIC:** Flipflops – Triggering of flipflops – RS, JK, JK master – slave, D and T flipflops – Flipflop excitation table – Design of sequential logic circuits – Registers – Shift register – Ripple counters – Synchronous counter.

**PROGRAMMABLE LOGIC DEVICES:** ROMs, PLAs and PALs – Designing with Read Only Memory – Designing with Programmable Logic Arrays – Designing with Programmable Array Logic.

### **Textbook**

- Morris Mano M, "Digital Logic and Computer Design", Prentice Hall, New Delhi, 2006.
- Tokhiem, "Digital Electronics – Principles and Applications", Tata McGraw Hill, New Delhi, 2004.

### **Reference**