

<b>SEMESTER</b> <i>Fourth</i>	<b>DEPARTMENT</b> <i>General Engineering</i>	<b>COURSE TITLE</b> <i>Digital Electronics I Lab</i>
<b>COURSE CODE</b> <i>ET 407</i>	<b>HOURS: 3</b> <b>UNITS: 1</b>	<b>COURSE SPECIFICATIONS</b> <i>Practical Contents</i>
<b>1. Binary and Decimal Numbers:</b> <ul style="list-style-type: none"> <li>➤ Perform conversion between different number systems.</li> <li>➤ Explain arithmetic operations in different numbering systems.</li> </ul>		
<b>2. Digital Logic Gates:</b> <ul style="list-style-type: none"> <li>➤ Construct and test the operation of AND, OR and NOT functions using switches.</li> <li>➤ Construct and test the operation of NAND, NOR and XOR functions using switches.</li> <li>➤ Verify the logic behavior of some typical IC gates: inverter, 2-input AND gate, 2-input OR gate (e.g.: 7404,7400,7432).</li> <li>➤ Verify the logic behavior of further typical IC gates: 3-input NAND gate, 2-input NOR, XOR gate.</li> </ul>		
<b>3. Simplification of Boolean Functions:</b> <ul style="list-style-type: none"> <li>➤ Use basic theorems of Boolean Algebra, and minimize functions using a Karnaugh map.</li> <li>➤ Implement a typical logic function using NAND gates only.</li> <li>➤ Implement a typical logic function using NOR gates only.</li> </ul>		
<b>4. Combinational Circuits:</b> <ul style="list-style-type: none"> <li>➤ Build and test a half adder and a full adder.</li> <li>➤ Build and test a half subtractor and a full subtractor.</li> <li>➤ Design and construct combinational circuit converter ( code converter ).</li> </ul>		
<b>5. Flip-flops:</b> <ul style="list-style-type: none"> <li>➤ Verify the function of various types of flip-flop (SR, JK, D, and T types).</li> </ul>		
<b>6. Sequential Circuits:</b> <ul style="list-style-type: none"> <li>➤ Use and test a 4-bit binary ripple counter.</li> <li>➤ Explain how to use a typical MSI register chip to demonstrate shift and load functions.</li> </ul>		

**References:**

1. Thomas P. Sitterlen and Vartan Vartanian, *Digital Electronics with Engineering Applications*, Prentice Hall.
2. Fred Hilsenrath and Bill Pierce, *Digital Logic Circuits and Systems*, Delmar Publishers Inc.
3. M. Morris Mano, *Digital Design*, Prentice Hall, 1991.
4. Ronald J. Tocci and Lester P. Laskowski, *Microprocessor and Microcomputers, Hardware and Software*, Prentice Hall.