

## ANALOG AND DIGITAL ELECTRONICS LABORATORY

<b>III Semester: EEE</b>								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
<b>AECB04</b>	<b>Core</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>Total</b>
		-	-	3	1.5	30	70	100
<b>Contact Classes: Nil</b>	<b>Tutorial Classes: Nil</b>	<b>Practical Classes: 36</b>			<b>Total Classes: 36</b>			
<p><b>OBJECTIVES:</b></p> <p><b>The course should enable the students to:</b></p> <ol style="list-style-type: none"> <li>I. Implement and study the characteristics of diodes and transistors.</li> <li>II. Illustrate the concept of rectification using half wave and full wave rectifiers.</li> <li>III. Design and construct different amplifier circuits.</li> <li>IV. Build the concept of digital and binary system.</li> <li>V. Design and analyze the combinational logic circuits.</li> </ol> <p><b>COURSE LEARNING OUTCOMES:</b></p> <ol style="list-style-type: none"> <li>1. Understand the pn junction diode characteristics.</li> <li>2. Understand the zener diode characteristics and voltage regulator.</li> <li>3. Understand half wave and full wave rectifier with and without filter.</li> <li>4. Analyze input and output CE characteristics</li> <li>5. Analyze input and output CB characteristics</li> <li>6. Understand the frequency response of CE amplifier.</li> <li>7. Understand Boolean expressions using gates.</li> <li>8. Understand universal gates</li> <li>9. Understand nand / nor gates</li> <li>10. Understand adder/ subtractor</li> <li>11. Understand binary to gray conversion</li> <li>12. Verify truth tables and excitation tables</li> <li>13. Realize shift register</li> <li>14. Realize 8x1 multiplexer</li> <li>15. Realize 2 bit comparator</li> </ol>								
<b>LIST OF EXPERIMENTS</b>								
<b>Expt. 1</b>	<b>PN JUNCTION DIODE CHARACTERISTICS</b>							
Verification of V-I characteristics of PN diode and calculate static and dynamic resistance using Hardware.								
<b>Expt. 2</b>	<b>ZENER DIODE CHARACTERISTICS AND VOLTAGE REGULATOR</b>							
Verification of V-I characteristics of Zener diode and perform Zener diode as a Voltage regulator using Hardware.								
<b>Expt. 3</b>	<b>HALF WAVE AND FULL WAVE RECTIFIER</b>							
Verification of Half wave rectifier and Full wave rectifier without and with filters using hardware.								

<b>Expt. 4</b>	<b>TRANSISTOR CE CHARACTERISTICS</b>
Verification of Input and Output characteristics of CE configuration using hardware	
<b>Expt. 5</b>	<b>TRANSISTOR CB CHARACTERISTICS</b>
Verification of Input and Output characteristics of CB configuration using hardware	
<b>Expt. 6</b>	<b>FREQUENCY RESPONSE OF CE AMPLIFIER</b>
Determine the Gain and Bandwidth of CE amplifier using hardware.	
<b>Expt. 7</b>	<b>BOOLEAN EXPRESSIONS USING GATES</b>
Realization of Boolean Expressions using Gates	
<b>Expt. 8</b>	<b>UNIVERSAL GATES</b>
Design and realization of logic gates using universal gates	
<b>Expt. 9</b>	<b>NAND / NOR GATES</b>
Generation of clock using NAND / NOR gates	
<b>Expt. 10</b>	<b>ADDER/ SUBTRACTOR</b>
Design a 4 – bit Adder / Subtractor	
<b>Expt. 11</b>	<b>BINARY TO GRAY CONVERTER</b>
Design and realization of a 4 – bit gray to Binary and Binary to Gray Converter	
<b>Expt. 12</b>	<b>TRUTH TABLES AND EXCITATION TABLES</b>
Verification of truth tables and excitation tables	
<b>Expt. 13</b>	<b>SHIFT REGISTER</b>
Design and realization of an 8 bit parallel load and serial out shift register using flip-flops	
<b>Expt. 14</b>	<b>MULTIPLEXER</b>
Design and realization of 8x1 using 2x1 MUX	
<b>Expt. 15</b>	<b>2 BIT COMPARATOR</b>
Design and realization of 2 bit comparator	

**Reference Books:**

1. Jacob Millman, Herbert Taub, Mothiki S PrakashRao, -Pulse Digital and Switching Waveforms, Tata McGraw-Hill, 3<sup>rd</sup> Edition, 2008.
2. David A. Bell, —Solid State Pulse Circuits, PHI, 4<sup>th</sup> Edition, 2002.
3. D Roy Chowdhury, —Linear Integrated Circuits, New Age International (p) Ltd, 2<sup>nd</sup> Edition, 2003.
4. Ramakanth A. Gayakwad, -Op-Amps & linear ICs, PHI, 3<sup>rd</sup> Edition, 2003.

**Web References:**

1. <http://www.tedpavlic.com/teaching/osu/ece327/>
2. <http://www.ee.iitkgp.ac.in>
3. <http://www.citchennai.edu.in>
4. <http://american.cs.ucdavis.edu/academic/ecs154a.sum14/postscript/cosc205.pdf>
5. <http://www.ece.rutgers.edu/~marsic/Teaching/DLD/slides/lec-1.pdf>

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