

**Code No.: ETIT 409**

**Paper: VLSI Design**

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<b>3</b>	<b>1</b>	<b>4</b>

**INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

### **UNIT – I**

MOS Transistor Theory: nMOS Enhancement Transistor, pMOS Enhancement transistor, Threshold voltage, Fabrication of MOSFET: Silicon Semiconductor technology, Wafer processing, Oxidation, Epitaxy, Deposition, Ion-implanation and diffusion, The silicon gate Process, CMOS Technology, basic n-well cmos process, p-well process, twin tub process CMOS process enhancement: metal interconnect, Polysilicon / Refractory metal interconnect, Circuit element: Resistor, Capacitor.

**[No. of Hrs.: 11]**

### **UNIT – II**

Operation of MOS transistor as a switch, Design and analysis of nMOS, pMOS and CMOS circuits, CMOS Logic, The Inverter, NAND gate, NOR Gate, Compound Gate.

**[No. of Hrs.: 11]**

### **UNIT – III**

Modeling of MOS transistors using SPICE, MOS Inverters: Static Characteristics, MOS Inverters: Switching Characteristics and Interconnect Effects, Combinational MOS Logic Circuits: MUX, DMUX, Transmission gate, Differential Inverter, Tristate Inverter.

**[No. of Hrs.: 11]**

### **UNIT – IV**

Sequential MOS Logic Circuits, Dynamic Logic Circuits, Semiconductor Memories.

**[No. of Hrs.: 11]**

### **TEXT BOOK:**

1. Sung-Mo Kang and Yusuf Leblebici, “CMOS – Digital Integrated Circuits Analysis and Design”, TMH, 2004.

### **REFERENCE BOOKS:**

1. Douglas A. Pucknell, “Basic VLSI Design, 3<sup>rd</sup> Edition, 2004.
2. Neil H. E. Weste & K. Eshraghian, “Principles of CMOS VLSI design”, 2<sup>nd</sup> Edition, Addison Wesley, 2003.
3. S. M. Sze, “VLSI Technology, Wiley, 2000.
4. Demassa & Ciccone, “Digital Integrated Circuits”, Wiley Publications, 2003.
5. Jacob Millman and Arvin Grabel, “Microelectronics”, TMH, 2004.