



BALASORE SCHOOL OF ENGINEERING, BALASORE  
 Department of Electronics & Telecommunication Engineering  
 LESSON PLAN FOR 5TH SEMESTER, ELECTRONICS & TELECOMMUNICATION ENGG.  
 SUBJECT- **VLSI & EMBEDDED SYSTEM (TH-02)**  
 NAME OF THE FACULTY- ER. GOUR GOPAL DAS

| SL NO      | MONTH  | DATE       | CH. NO                              | TOPICS TO BE COVERED  | NO. OF PERIODS REQUIRED AS PER SYLLABUS | NO OF PERIODS AVAILABLE AS PER PLAN |    |    |
|------------|--|------------|-------------------------------------|---|---|-------------------------------------|----|----|
| 01         | SEPT'22  | 15/09/2022 | Ch-01                               | <b>UNIT-1: Introduction to VLSI &amp; MOS Transistor</b>  | 12                                      | 11                                  |    |    |
|            |  | 16/09/2022 |                                     | 1.1: Historical perspective-Introduction  |   |                                     |    |    |
|            |  | 19/09/2022 |                                     | 1.2: Classification of CMOS digital circuit types   |   |                                     |    |    |
|            |  | 20/09/2022 |                                     | 1.3: Introduction to MOS Transistor & Basic operation of MOSFET   |   |                                     |    |    |
|            |  | 21/09/2022 |                                     | 1.4: Structure & Operation of MOSFET (n-MOS enhancement type) & CMOS  |   |                                     |    |    |
|            |  | 22/09/2022 |                                     | 1.5: MOSFET V-I Characteristic  |   |                                     |    |    |
|            |  | 23/09/2022 |                                     | 1.6: Working of MOSFET Capacitance  |   |                                     |    |    |
|            |  | 26/09/2022 |                                     | 1.7: Modelling of MOS Transistor including Basic concept the SPICE Level-1 model, the level-2 & level-3 model |   |                                     |    |    |
|            |  | 27/09/2022 |                                     | 1.8: Flow Circuit design procedure  |   |                                     |    |    |
|            |  | 28/09/2022 |                                     | 1.9: VLSI Design Flow & Y-chart   |   |                                     |    |    |
|            |  | 29/09/2022 |                                     | 1.10: Design Hierarchy  |   |                                     |    |    |
|            |  | 30/09/2022 |                                     | 1.11: VLSI design styles- FPGA, Gate Array Design, Standard cells based, Full custom                          |   |                                     |    |    |
| 02         | OCT'22   | 10/10/2022 | Ch-02                               | <b>Unit-2: Fabrication of MOSFET</b>  | 10                                      | 08                                  |    |    |
|            |  | 11/10/2022 |                                     | 2.1 Simplified process sequence for fabrication   |   |                                     |    |    |
|            |  | 12/10/2022 |                                     | 2.2 Basic steps in Fabrication processes Flow   |   |                                     |    |    |
|            |  | 13/10/2022 |                                     | 2.3 Fabrication process of nMOS Transistor  |   |                                     |    |    |
|            |  | 14/10/2022 |                                     | 2.4 CMOS n-well Fabrication Process Flow  |   |                                     |    |    |
|            |  | 17/10/2022 |                                     | 2.5 MOS Fabrication process by n-well on p-substrate  |   |                                     |    |    |
|            |  | 18/10/2022 |                                     | 2.6 CMOS Fabrication process by P-well on n-substrate   |   |                                     |    |    |
|            |  | 19/10/2022 |                                     | 2.7 Layout Design rules   |   |                                     |    |    |
|            |  | 20/10/2022 | 2.8 Stick Diagrams of CMOS inverter |   |   |                                     |    |    |
|            |  | 21/10/2022 | Ch-03                               | <b>Unit-3: MOS Inverter</b>   |   |                                     | 09 | 08 |
|            |  | 25/10/2022 |                                     | 3.1 Basic nMOS inverters  |   |                                     |    |    |
|            |  | 26/10/2022 |                                     | 3.2 Working of Resistive-load Inverter  |   |                                     |    |    |
| 27/10/2022 | 3.3 Inverter with n-Type MOSFET Load - Enhancement Load, Depletion n-MOS inverter                          |            |                                     |   |   |                                     |    |    |
| 28/10/2022 | 3.4 CMOS inverter - circuit operation and characteristics and interconnect effects: Delay time definitions |            |                                     |   |   |                                     |    |    |
| 31/10/2022 | 3.5 CMOS Inventor design with delay constraints - Two sample mask lay out for p-type substrate             |            |                                     |   |   |                                     |    |    |
|            |  | 01/11/2022 |                                     |   |   |                                     |    |    |

|            |        |            |       |   |    |    |
|------------|--------|------------|-------|---|----|----|
| 03         | NOV'22 | 02/11/2022 | Ch-04 | <b>Unit-4: Static Combinational, Sequential, Dynamics logic circuits &amp; Memories</b><br>4.1 Define Static Combinational logic ,working of Static CMOS logic circuits (Two-input NAND Gate) | 15 | 12 |
|            |        | 03/11/2022 |       | 4.2 CMOS logic circuits ( NAND2 Gate)   |    |    |
|            |        | 04/11/2022 |       | 4.3 CMOS Transmission Gates(Pass gate)  |    |    |
|            |        | 08/11/2022 |       | 4.4 Complex Logic Circuits - Basics   |    |    |
|            |        | 09/11/2022 |       | 4.5 Classification of Logic circuits based on their temporal behaviour  |    |    |
|            |        | 10/11/2022 |       | 4.6 SR Flip latch Circuit   |    |    |
|            |        | 11/11/2022 |       | 4.7 Clocked SR latch only   |    |    |
|            |        | 21/11/2022 |       | 4.8 CMOS D latch.   |    |    |
|            |        | 22/11/2022 |       | 4.9 Basic principles of Dynamic Pass Transistor Circuits  |    |    |
|            |        | 23/11/2022 |       | 4.10 Dynamic RAM, SRAM  |    |    |
|            |        | 24/11/2022 |       | 4.11 Flash memory   |    |    |
|            |        | 25/11/2022 | Ch-05 | <b>Unit-5: System Design method &amp; synthesis</b><br>5.1 Design Language (SPL & HDL)& HDL & EDA tools & VHDL and packages Xilinx  | 04 | 03 |
|            |        | 28/11/2022 |       | 5.2 Design strategies & concept of FPGA with standard cell based design   |    |    |
|            |        | 29/11/2022 |       | 5.3 VHDL for design synthesis using CPLD or FPGA  |    |    |
|            |        | 30/11/2022 |       | 5.4 Raspberry Pi - Basic idea   |    |    |
| 04         | DEC'22 | 01/12/2022 | Ch-06 | <b>Unit-6: Introduction to Embedded Systems</b><br>6.1 Embedded Systems Overview,list of embedded systems,characteristics ,Ex - A Digital Camera  | 10 | 08 |
|            |        | 02/12/2022 |       | 6.2 Embedded Systems Technologies--Technology - Definition  |    |    |
|            |        | 05/12/2022 |       | Technology for Embedded Systems   |    |    |
|            |        | 06/12/2022 |       | Processor Technology  |    |    |
|            |        | 07/12/2022 |       | IC Technology   |    |    |
|            |        | 08/12/2022 |       | 6.3 Design Technology-Processor Technology,General Purpose Processors - Software, Basic Architecture of Single Purpose Processors - Hardware  |    |    |
|            |        | 09/12/2022 |       | 6.4 Application - Specific Processors,Microcontrollers,Digital Signal Processors(DSP)   |    |    |
|            |        | 12/12/2022 |       | 6.5 IC Technology- Full Custom / VLSI,Semi-Custom ASIC (Gate Array & Standard Cell), PLD (Programmable Logic Device)  |    |    |
|            |        | 13/12/2022 |       | 6.6 Basic idea of Arduino micro controller  |    |    |
|            |        | 14/12/2022 |       |   |    |    |
| 15/12/2022 |        |            |       |   |    |    |
| 16/12/2022 |        |            |       |   |    |    |

| SL NO. | MONTH  | CHAPTERS TO BE COMPLETED         | % OF COURSE COMPLETION |
|--------|--------|----------------------------------|------------------------|
| 01     | SEP'22 | Chapter -01                      | 20%                    |
| 02     | OCT'22 | Chapter - 02, Chapter-3 Continue | 30%                    |
| 03     | NOV'22 | Chapter- 03, 04, 05              | 30%                    |
| 04     | DEC'22 | Chapter-06                       | 20%                    |

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