

KIIT POLYTECHNIC

Department of Electronics and Telecommunication Engineering

LESSON PLAN

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| Session | :: | Winter – 2022 |
| Course Type | :: | Theory |
| Semester/Branch | :: | 5 th Semester, Electronics and Telecommunication Engineering |
| Subject (with code) | :: | VLSI & Embedded System (Th2) |
| Contact hours/week | :: | 04 hours |
| Name of Faculty | :: | Dr. Gangadhara Mishra |

| Sl. No. | Class id. | Course content | Mode of Delivery | Exhibit/Reference |
|---------|-----------|---|--------------------------|---------------------------------|
| 1 | 1st | Unit-1: Introduction to VLSI & MOS Transistor, Historical perspective-Introduction | Lecture, Video | Study Material, Video NPTEL(1) |
| 2 | 2nd | Classification of CMOS digital circuit types | Lecture | Study Material |
| 3 | 3rd | Introduction to MOS Transistor & Basic operation of MOSFET | Lecture | Study Material Video Youtube(2) |
| 4 | 4th | Structure and operation of MOSFET (n-MOS enhancement type) & COMS | Lecture, Video | Study Material Video NPTEL(3) |
| 5 | 5th | MOSFET V-I characteristics, Working of MOSFET capacitances | Lecture | Study Material |
| 6 | 6th | Modeling of MOS Transistors including Basic concept the SPICE level-1 models, the level-2 and level-3 model | Lecture | Study Material |
| 7 | 7th | Flow Circuit design procedures, VLSI Design Flow & Y chart | Lecture | Study Material |
| 8 | 8th | Design Hierarchy, VLSI design styles-FPGA. | Lecture | Study Material |
| 9 | 9th | Gate Array Design, Standard cells based design, Full custom Design. | Lecture | Study Material |
| 10 | 10th | Revision/ Quiz | | |
| 11 | 11th | Unit-2: Fabrication of MOSFET, Simplified process sequence for fabrication | Lecture | Study Material |
| 12 | 12th | Basic steps in Fabrication processes Flow | Lecture | Study Material |
| 13 | 13th | Fabrication process of nMOS Transistor | Guest Lecture | Video |
| 14 | 14th | CMOS n-well Fabrication Process Flow | Lecture | Study Material |
| 15 | 15th | MOS Fabrication process by n-well on p-substrate | Lecture, Video | Study Material Video Youtube(4) |
| 16 | 16th | CMOS Fabrication process by P-well on n-substrate | Lecture, Guided Thinking | Study Material |

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|---------|------------------|--|--------------------------|------------------------------------|
| 17 | 17th | Layout Design rules, Stick Diagrams of CMOS inverter | Lecture | Study Material Video Youtube(5) |
| 18 | 18th | Revision/ Quiz | | |
| 19 | 19th | MOS Inverter, Basic nMOS inverters. | Lecture | Study Material |
| 20 | 20th | Working of Resistive-load Inverter | Lecture | Study Material |
| 21 | 21st | Inverter with n-Type MOSFET Load Enhancement Load, Depletion n-MOS inverter | Lecture | Study Material |
| 22 | 22nd | CMOS inverter circuit operation and characteristics | Lecture, Video | Study Material Video NPTEL(6) |
| 23 | 23rd | Interconnect effects Delay time definitions, CMOS Inverter design with delay constraints Two sample mask layout for p-type substrate. | Lecture | Study Material |
| 24 | 24th | Revision/ Quiz | | |
| 25 | 25 th | Static Combinational, Sequential, Dynamics logic circuits & Memories, Define Static Combinational logic ,working of Static CMOS, logic circuits (Two-input NAND Gate) | Faculty Panel Discussion | Study Material |
| 26 | 26th | CMOS logic circuits (NAND2 Gate), CMOS Transmission Gates(Pass gate) | Lecture, Flipped Class | Study Material |
| 27 | 27th | Complex Logic Circuits - Basics | Lecture | Study Material |
| 28 | 28th | Classification of Logic circuits based on their temporal behavior | Lecture | Study Material |
| 29 | 29th | SR Flip latch Circuit, Clocked SR latch only | Lecture | Study Material |
| 30 | 30th | CMOS D latch | Lecture | Study Material |
| 31 | 31st | Basic principles of Dynamic Pass Transistor Circuits | Lecture | Study Material |
| 32 | 32nd | Dynamic RAM, SRAM | Lecture | Study Material |
| 33 | 33rd | Flash memory | Lecture | Study Material |
| 34 | 34th | Revision/ Quiz | | |
| 35 | 35th | System Design method & synthesis, Design Language (SPL & HDL)& HDL & EDA tools | Lecture | Study Material, Video NPTEL(7) |
| 36 | 36th | VHDL and packages Xilinx | Lecture | Study Material |
| 37 | 37th | Design strategies & concept of FPGA with standard cell based design | Lecture | Study Material |
| 38 | 38th | VHDL for design synthesis using CPLD or FPGA | Lecture | Study Material |
| 39 | 39th | Raspberry Pi - Basic idea | Student Presentation | Study Material |
| 40 | 40th | Introduction to Embedded Systems, Embedded Systems Overview, list of embedded systems, characteristics | Lecture, Video | Study Material Video NPTEL(8) |
| 41 | 41st | A Digital Camera | Lecture, Video | Study Material Video NPTEL(9) |

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|----------------|------------------|--|-------------------------|--------------------------|
| 42 | 42nd | Embedded Systems Technologies-- Technology Definition - Technology for Embedded Systems -Processor Technology - IC Technology | Lecture | Study Material |
| 43 | 43rd | Design Technology-Processor Technology, General Purpose Processors Software, Basic Architecture of Single Purpose Processors Hardware | Lecture | Study Material |
| 44 | 44th | Application Specific Processors, Digital Signal Processors(DSP), Microcontrollers | Lecture | Study Material |
| 45 | 45th | IC Technology- Full Custom | Lecture | Study Material |
| 46 | 46th | VLSI, Semi-Custom ASIC (Gate Array & Standard Cell) | Lecture | Study Material |
| 47 | 47th | PLD (Programmable Logic Device), Basic idea of Arduino micro controller | Lecture | Study Material |
| 48 | 48th | Exam Preparation | | |

Signature of Concern Teacher