



# UTKAL INSTITUTE OF ENGINEERING & TECHNOLOGY

<b>DISCIPLINE:</b> Electronics & Telecommunication Engg.	<b>SEMESTER:</b> 5th Sem	<b>NAME OF THE TEACHING FACULTY:</b> Er.Jyoti Prakash Swain		
<b>SUBJECT:</b>  VLSI & EMBEDDED SYSTEM	No of Days/Per week class allotted: 4 Class P/W(60)	Semester From Date:15/09/2022  To Date:22/12/2022  No. Of Weeks: 15		
<b>WEEK</b>	<b>CLASS DAY</b>	<b>THEORY TOPICS</b>	<b>REMARKS</b>	
1 <sup>st</sup>	1 <sup>st</sup>	Introduction to VLSI & MOS Transistor, Historical perspective- Introduction	Date	Dean/Principal
	2 <sup>nd</sup>	Classification of CMOS digital circuit types . Introduction to MOS Transistor& Basic operation of MOSFET.		
	3 <sup>rd</sup>	Structure and operation of MOSFET (n-MOS enhancement type) & COMS		
	4 <sup>th</sup>	MOSFET V-I characteristics,, Working of MOSFET capacitances.		
2 <sup>nd</sup>	1 <sup>st</sup>	Doubt clear class		
	2 <sup>nd</sup>	Modelling of MOS Transistors including Basic concept the SPICE level-1 models, the level-2 and level-3 model.		
	3 <sup>rd</sup>	Flow Circuit design procedures		
	4 <sup>th</sup>	Assignment		
	1 <sup>st</sup>	Assignment question Discussion		

3 <sup>rd</sup>	2 <sup>nd</sup>	VLSI Design Flow & Y chart		
	3 <sup>rd</sup>	Design Hierarchy		
	4 <sup>th</sup>	VLSI design styles-FPGA, Gate Array Design, Standard cells based, Full custom		
4 <sup>th</sup>	1 <sup>st</sup>	Simplified process sequence for fabrication		
	2 <sup>nd</sup>	Basic steps in Fabrication processes Flow		
	3 <sup>rd</sup>	Fabrication process of nMOS Transistor		
	4 <sup>th</sup>	CMOS n-well Fabrication Process Flow		
5 <sup>th</sup>	1 <sup>st</sup>	Class Test		
	2 <sup>nd</sup>	MOS Fabrication process by n-well on p-substrate		
	3 <sup>rd</sup>	Doubt clear class		
	4 <sup>th</sup>	CMOS Fabrication process by P-well on n-substrate		
6 <sup>th</sup>	1 <sup>st</sup>	<b>Revision of Last Class</b>		
	2 <sup>nd</sup>	Assignment		
	3 <sup>rd</sup>	Layout Design rules		
	4 <sup>th</sup>	Stick Diagrams of CMOS inverter		
7 <sup>th</sup>	1 <sup>st</sup>	Basic nMOS inverters,		
	2 <sup>nd</sup>	Doubt Clear Class		
	3 <sup>rd</sup>	Working of Resistive-load Inverter		
	4 <sup>th</sup>	Inverter with n-Type MOSFET Load – Enhancement Load, Depletion n-MOS inverter		
8 <sup>th</sup>	1 <sup>st</sup>	Assignment question Discussion		
	2 <sup>nd</sup>	CMOS inverter – circuit operation and characteristics and interconnect effects: Delay time definitions		
	3 <sup>rd</sup>	CMOS Inverter design with delay constraints – Two sample mask lay out for p-type substrate.		

	4 <sup>th</sup>	Define Static Combinational logic ,working of Static CMOS logic circuits (Two-input NAND Gate)		
9 <sup>th</sup>	1 <sup>st</sup>	CMOS logic circuits ( NAND2 Gate)		
	2 <sup>nd</sup>	CMOS Transmission Gates(Pass gate)		
	3 <sup>rd</sup>	Revision Class		
	4 <sup>th</sup>	Complex Logic Circuits - Basics		
10 <sup>th</sup>	1 <sup>st</sup>	Classification of Logic circuits based on their temporal behaviour		
	2 <sup>nd</sup>	Internal Question Discussion		
	3 <sup>rd</sup>	Doubt clear class		
	4 <sup>th</sup>	SR Flip latch Circuit,		
11 <sup>th</sup>	1 <sup>st</sup>	Doubt Clear Class		
	2 <sup>nd</sup>	Revision		
	3 <sup>rd</sup>	Clocked SR latch only.		
	4 <sup>th</sup>	Class Test		
12 <sup>th</sup>	1 <sup>st</sup>	CMOS D latch. Basic principles of Dynamic Pass Transistor Circuits		
	2 <sup>nd</sup>	Revision Class		
	3 <sup>rd</sup>	Dynamic RAM, SRAM, Flash memory		
	4 <sup>th</sup>	Design Language (SPL & HDL)& HDL & EDA tools & VHDL and packages Xlinx		
12 <sup>th</sup>	1 <sup>st</sup>	Design strategies & concept of FPGA with standard cell based design		
	2 <sup>nd</sup>	VHDL for design synthesis using CPLD or FPGA		
	3 <sup>rd</sup>	Raspberry Pi - Basic idea		

13	4 <sup>th</sup>	Embedded Systems Overview, list of embedded systems, characteristics, example – A Digital Camera		
14 <sup>th</sup>	1 <sup>st</sup>	Embedded Systems Technologies--Technology – Definition -Technology for Embedded Systems		
	2 <sup>nd</sup>	-Processor Technology -IC Technology		
	3 <sup>rd</sup>	question discussion for semester exam		
	4 <sup>th</sup>	Design Technology-Processor Technology, General Purpose Processors – Software, Basic Architecture of Single Purpose Processors – Hardware		
15 <sup>th</sup>	1 <sup>st</sup>	Application – Specific Processors, Microcontrollers, Digital Signal Processors (DSP)		
	2 <sup>nd</sup>	IC Technology- Full Custom / VLSI, Semi-Custom ASIC (Gate Array & Standard Cell), PLD (Programmable Logic Device)		
	3 <sup>rd</sup>	Basic idea of Arduino micro controller		
	4 <sup>th</sup>	Sample paper question discussion		

*Jyotiprakash Swain*

**HOD**

*Chittaranjan Panda*

**DEAN**

*[Signature]*

**PRINCIPAL**