



Department of Electrical and Electronics Engineering		LP EE18702
B.E. B.Tech M.E/M.Tech - B.E., EEE		Rev. No: 00
Regulation 2018		Date: 7/7/2021
PG Specialisation : --		
Sub Code / Sub Name : EE18702 VLSI AND EMBEDDED SYSTEMS		
Unit : I		

**Unit Syllabus: VLSI DESIGN AND ITS ELECTRICAL PROPERTIES**

VLSI design process - Architectural design - Logical design - Physical design - Layout styles - Full custom - Semicustom approaches. MOS transistor - Threshold voltage equations - Basic DC equations - Second order effects - MOS models - small signal AC characteristics - NMOS inverter - Depletion mode and enhancement mode pull ups - CMOS inverter - DC characteristics - Inverter delay - Pass transistor - Transmission gate.

**Objective:** To introduce VLSI design development and its characteristics

Session No *	Topics to be covered	Ref	Teaching Aids
1	VLSI design process - architectural design, logical design and physical design	1,5	PPT
2	Full custom and Semicustom approaches	1,5	PPT
3	MOSFET operation and its characteristics	1,5	PPT
4	Threshold voltage and basic DC equations of MOSFET	1,5	PPT
5	Second order effects in MOSFET	1,5	PPT
6	Small signal AC characteristics of MOSFET	1,5	PPT
7	NMOS Inverter operation and characteristics	1,5	PPT
8	Different types of Pull up resistors used in Inverter	1,6	PPT
9	CMOS Inverter and its characteristics	1,6	PPT
10	Inverter delay, Pass transistor and Transmission gate	1,6	PPT
11	Stick diagram - essentials	1,6	PPT
12	Stick diagram for NMOS and CMOS inverters	1,6	PPT

**Content beyond syllabus covered (if any):**

Stick diagram for NMOS and CMOS inverters

\* Session duration: 50 minutes



Sub. Code / Sub Name: EEI8702 VLSI AND EMBEDDED SYSTEMS

Unit - II

Unit Syllabus: LOGIC DESIGN

Switch logic - Pass transistor and transmission gate-based design - Gate logic - Inverter - Two input NAND gate - NOR gate - Other forms of CMOS logic - Dynamic CMOS logic - Clocked CMOS logic - Precharged domino CMOS logic - Structured design - Simple combinational logic design examples - Parity generator - Multiplexers.

Objective: To educate in VLSI logic design using MOS transistor

Session No *	Topics to be covered	Ref	Teaching Aids
13	Pass transistor and transmission gate-based design	1,5	PPT
14	Two input NAND gate and NOR gate	1,5	PPT
15	Dynamic CMOS logic	1,5	PPT
16	Clocked CMOS logic	1,5	PPT
17	Precharged domino CMOS logic	1,5	PPT
18	Simple combinational logic design examples	1,5	PPT
19	Simple combinational logic design examples	1,5	PPT
20	Parity generator	1,6	PPT
21	8 X 1 Multiplexer	1,6	PPT
22	Stick diagram for Simple combinational logic design	1,6	PPT
23	Stick diagram for Simple combinational logic design	1,6	PPT
24	Stick diagram for Simple combinational logic design	1,6	PPT

Content beyond syllabus covered (if any):

Stick diagram for Simple combinational logic design

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Sub. Code / Sub. Name: EE18702 VLSI AND EMBEDDED SYSTEMS

Unit: III

Unit Syllabus: INTRODUCTION TO EMBEDDED SYSTEMS

The build process for embedded systems- Structural units in Embedded processor, selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging.

Objective: To introduce the building blocks of embedded system

Session No *	Topics to be covered	Ref	Teaching Aids
25	Introduction to Embedded Systems	2,3	PPT
26	The build process for embedded systems	2,3	PPT
27	Structural units in Embedded processor	2,3	PPT
28	Selection of processor & memory devices	2,3	PPT
29	Direct memory access (DMA)	2,3	PPT
30	Memory management methods	2,3	PPT
31	Timer and Counting devices	2,3	PPT
32	Watchdog Timer	2,3	PPT
33	Real Time Clock	2,3	PPT
34	Emulator	2,3	PPT
35	In circuit emulator	2,3	PPT
36	Target Hardware Debugging	2,3	PPT

Content beyond syllabus covered (if any):

\* Session duration: 50 mins



Sub Code / Sub Name: EE18702 VLSI AND EMBEDDED SYSTEMS

Unit: IV

Unit Syllabus: EMBEDDED NETWORKING

Introduction, I/O Device Ports & Buses – Serial Bus communication protocols -RS232 standard – RS422 – RS485 - CAN Bus -Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C) – need for device drivers.

Objective: To educate in various embedded development strategies

Session No *	Topics to be covered	Ref	Teaching Aids
37	Introduction to Embedded Networking	2,4	PPT
38	I/O Device Ports & Buses	2,4	PPT
39	I/O Device Ports & Buses	2,4	PPT
40	RS232 standard	2,4	PPT
41	RS422, RS423 and RS485 - Comparison	2,4	PPT
42	CAN Bus protocol	2,4	PPT
43	CAN Bus protocol	2,4	PPT
44	Serial Peripheral Interface (SPI) protocol	2,4	PPT
45	Serial Peripheral Interface (SPI) protocol	2,4	PPT
46	Inter Integrated Circuits (I2C) protocol	2,4	PPT
47	Inter Integrated Circuits (I2C) protocol	2,4	PPT
48	Need for device drivers	2,4	PPT

Content beyond syllabus covered (if any):

\* Session duration: 50 mins



Sub Code / Sub. Name. : EE18702 VLSI AND EMBEDDED SYSTEMS  
Unit : V

Unit Syllabus: RTOS BASED EMBEDDED SYSTEM DESIGN

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS, Multiprocessing and Multitasking, Preemptive and non-preemptive scheduling, Task communication shared memory, message passing, Inter process Communication – synchronization between processes-semaphores, Mailbox, pipes, priority inversion, priority inheritance

Objective: To introduce bus communication in processors, Input/output interfacing.

Session No *	Topics to be covered	Ref	Teaching Aids
49	Introduction to basic concepts of RTOS	2,4	PPT
50	Interrupt routines in RTOS	2,4	PPT
51	Multiprocessing and Multitasking	2,4	PPT
52	Preemptive and non-preemptive scheduling	2,4	PPT
53	Task communication shared memory and message passing	2,4	PPT
54	Inter process Communication and synchronization between processes	2,4	PPT
55	Semaphores	2,4	PPT
56	Semaphores	2,4	PPT
57	Mailbox	2,4	PPT
58	Pipes	2,4	PPT
59	Queues	2,4	PPT
60	Priority inversion and priority inheritance	2,4	PPT
<b>Content beyond syllabus covered (if any):</b>			
Queues - IPC			

\* Session duration: 50 mins



SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub Code / Sub Name : EE18702 VLSI AND EMBEDDED SYSTEMS

REFERENCES:

1. Kamran Eshraghian, Douglas A. Pucknell and Sholeh Eshraghian, "Essentials of VLSI Circuits and Systems", Prentice Hall of India, New Delhi, 2013.
2. Rajkamal, 'Embedded System-Architecture, Programming, Design', McGraw Hill, 2013.
3. Wayne Wolf, "Computers as Components: Principles of Embedded Computing System Design", Morgan Kaufman Publishers, 2008.
4. Lyla B Das, "Embedded Systems-An Integrated Approach", Pearson, 2013.
5. Neil H E West and Kamran Eshraghian, "Principles of CMOS VLSI Design: A System Perspective", Addison-Wesley, 2004.
6. Wayne Wolf, "Modern VLSI Design: Systems on Chip Design", Pearson Education Inc., Indian Reprint, 2007.

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Designation	Professor and Assistant Professor	Vice-Principal and HOD
Date	07/07/2021	07/07/2021
Remarks *	Same Lesson plan is followed for the academic year 2022-23 for HOD/EEE	
Remarks *	Same Lesson Plan is followed for the Academic Year 2023-24.	

\* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

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