DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Lesson Plan & Work-done Diary for AY: 2025-26-Even Semester

Course with Code: Embedded System Design (BEC601)				Faculty Name : Mr. Pradeep Kumar Y and Mr Mythir R			Semester: 6th Sem A and B section	
Class No.	**Date planned (DD/MM)**	**Topics to be covered**	**TLP Planned**	**Class No.**	**Date of Conduction (DD/MM)**	**Topics Covered**	**TLP Executed**	**Remarks if any deviation**
Bridge Course								
1		Basics of Microcontroller and Microprocessor	Chalk & Talk	1				
2		Basics of Microcontroller and Microprocessor	Chalk & Talk	2				
3		Basics of Microcontroller and Microprocessor	Chalk & Talk	3				
Module 1: Introduction to Embedded System								
4		Introduction to Embedded System: What is an Embedded Systems? Embedded systems Vs General computing systems, History of Embedded Systems	Chalk & Talk & PPT	4				
5		Classification of Embedded systems, Major Application Areas of Embedded Systems. Purpose of Embedded Systems	Chalk & Talk & PPT	5				

6		The Typical Embedded System, Microprocessor Vs Microcontroller, Differences between RISC and CISC, Harvard V/s Von-Neumann Processor/Controller Architecture, Big-endian V/s Little-endian processors	Chalk & Talk & PPT	6				
7		MEMORY: ROM- MROM, PROM, EPROM, EEPROM, FLASH, NVRAM. RAM-SRAM,DRAM	PPT	7				
8		Sensors & Actuators, The I/O Subsystem – I/O Devices, Light Emitting Diode (LED), 7- Segment LED Display, Optocoupler, Relay, Piezo buzzer, Push button switch	PPT	8				
9		Communication Interfaces: On-board Communication Interface	PPT	9				
10		Communication Interfaces: External Communication Interface	PPT	10				
11		Embedded Firmware, Other System Components	PPT	11				

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MODULE-2: Embedded System Design Concepts								
12		Embedded System Design Concepts: Characteristics and Quality Attributes of Embedded Systems, Operational and non-operational quality attributes	PPT	12				
13		Embedded Systems-Application and Domain specific	PPT	13				
14		Fundamental issues in hardware software co-design	PPT	14				
15		Computational models in embedded design	PPT	15				
16		Embedded firmware design and development	PPT	16				
17		Embedded firmware design and development & VTU QP discussion	PPT	17				

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MODULE-3: RTOS and IDE for Embedded System Design								
18		RTOS and IDE for Embedded System Design: Operating System basics	PPT	18				
19		Types of operating systems, Task, process and threads (Only POSIX Threads with an example program), Thread preemption, Preemptive Task scheduling techniques	Chalk & Talk & PPT	19				
20		Preemptive Task scheduling techniques examples	Chalk & Talk & PPT	20				
21		Task Communication, Task synchronization issues – Racing and Deadlock	Chalk & Talk & PPT	21				

22		How to choose an RTOS, Integration and testing of Embedded hardware and firmware, Embedded system Development Environment – Block diagram	PPT	22				
23		IDE , VTU QP discussion	PPT	23				

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MODULE-4: ARM Embedded Systems								
24		ARM Embedded Systems: Introduction, RISC design philosophy, ARM design philosophy, Embedded system hardware – AMBA bus protocol	PPT	24				
25		ARM bus technology, Memory, Peripherals	PPT	25				
26		Embedded system software – Initialization (BOOT) code, Operating System, Applications	PPT	26				

27		ARM Processor Fundamentals, ARM core dataflow model, Registers	Chalk & Talk & PPT	27				
28		Current Program Status Register- Processor Modes, Banked Registers	Chalk & Talk & PPT	28				
29		State and Instruction Sets, Interrupt Masks, Condition Flags, Conditional Execution	Chalk & Talk & PPT	29				
30		Pipeline- Pipeline Executing Characteristics	Chalk & Talk & PPT	30				
31		Exceptions, Interrupts, and the Vector Table	Chalk & Talk & PPT	31				
32		Core Extensions- Cache and Tightly Coupled Memory, Memory Management, Coprocessors	Chalk & Talk & PPT	32				
33		VTU QP discussion	PPT	33				

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MODULE-5: Introduction to the ARM Instruction set								
34		Introduction to the ARM Instruction set: Introduction, Data processing instructions- Move Instructions, Barrel Shifter, Arithmetic Instructions	Chalk & Talk & PPT	34				
35		Data processing instructions- Using the Barrel Shifter with Arithmetic Instructions, Logical Instructions, Comparison Instructions , Multiply Instructions	Chalk & Talk & PPT	35				
36		Branch Instructions, Load-Store Instructions- Single-Register Transfer, Single-Register Load-Store Addressing Modes, Multiple-Register Transfer, Swap Instruction	Chalk & Talk & PPT	36				

37		Software Interrupt Instruction, Program Status Register Instructions- Coprocessor Instructions	Chalk & Talk & PPT	37				
38		Loading Constants, ARMv5E Extensions- Count Leading Zeros Instruction	Chalk & Talk & PPT	38				
39		Saturated Arithmetic, ARMv5E Multiply Instructions	Chalk & Talk & PPT	39				
40		Conditional Execution & VTU QP discussion	PPT	40				
41		Final revision of VTU QP	Chalk & Talk	41				
42		Final revision of VTU QP	Chalk & Talk	42				

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	Activity	Planned	Actual	Remarks
1	Theory Classes	42		
2	Assignments/ Quizzes/ Self-study	2		
3	Tutorials/ Extra classes	NIL		
4	Internal Assessments	3		
5	ICT based Teaching (% of usage in Curriculum)	95%		
Planning			**Execution**	
Faculty Signature:			**Faculty Signature:**	
HoD Signature:			**HoD Signature:**	