



SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

Narsapur, West Godavari District, A.P. 534280

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Period/Week	Academic Year	Course Commencement Date
23EC6E07	Embedded Systems	VI	ECE	4	2025-26	10-12-2025

COURSE OUTCOMES:

At the end of the Embedded Systems Course, student can able to

1.	Apply the basic concepts of embedded systems to identify suitable components for real-world applications. [K3]
2.	Differentiate and analyze communication devices and peripheral devices based on performance, speed, and application needs.[K4]
3.	Implement simple programs using C and Embedded C for embedded hardware platforms. [K3]
4.	Select and justify an appropriate operating system and development methodology for designing and developing an embedded system. [K4]

Unit No.	OutComes/ Bloom's Level	Topics No	Topics/Activity	Number Of periods	Text Book/ Reference	Delivery Method	
1	CO1: Apply the basic concepts of embedded systems to identify suitable components for real-world applications. [K3]	UNIT-1: Introduction				T1,R1	Chalk and Talk, PPT and E-Learning
		1.1	Embedded System-Definition, History	1			
		1.2	Classification, and application areas	1			
		1.3	Purpose of embedded systems	1			
		1.4	The typical embedded system	1			
		1.5	Core of the embedded system, Memory	1			
		1.6	Sensors and Actuators, Communication Interface	1			
		1.7	Embedded firmware	1			
		1.8	PCB and passive components	1			
		1.9	Characteristics of an ES	1			
		1.10	Quality attributes of an Embedded systems	1			
		1.11	Application-specific and Domain-Specific examples	1			
		1.12	Main processing elements of embedded system	1			
		1.13.1	Hardware partitions	1			
	1.13.2	software partitions	1				
	Class Test-1	1					
	Content Beyond Syllabus	Embedded Systems in different fields- Industrial, Automotive, Bio Medical, IOT etc.	1				
			16				
2	CO2: Differentiate and analyze communication devices and peripheral devices based on performance,	UNIT-2: Embedded Hardware Design				T1, R1	Chalk and Talk, PPT and E-Learning
		2.1.1	Analog electronic components	1			
		2.1.2	digital electronic components	1			
		2.2.1	I/O types	1			
		2.2.2	I/O Devices examples	1			
		2.3	Serial communication devices	1			
		2.4	Parallel device ports	1			
		2.5	Wireless devices	1			
		2.6.1	Timers and counting devices	1			
		2.6.2	Watchdog timer	1			
		2.7	Real time clock	1			
			Class Test-2	1			



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	speed, and application needs.[K4]	2.8	Class Test-2	1			
	Content Beyond Syllabus	2.9	Hardware design Considerations- Electronic Considerations, Power, Memory requirements	1			
				12			
Unit No.	Out Comes/ Bloom's Level	Topics No	Topics/Activity	Number of periods	Text Book/ Reference	Delivery Method	
3	CO3: Implement simple programs using C and Embedded C for embedded hardware platforms. [K3]	UNIT-3: Embedded Firmware Design				T1, R1, R2	Chalk and Talk, PPT and E-Learning
		3.1.1	Embedded Firmware design approach	1			
		3.2.1	Embedded Firmware languages.	1			
		3.3	ISR concept	1			
		3.4.1	Interrupt sources – H/W & SW /interrupts	1			
		3.5	Interrupt servicing mechanism	1			
		3.6	Multiple interrupts	1			
		3.7	DMA	1			
	3.8	Class Test-3	1				
	Content Beyond Syllabus	3.9	Levels of Firmware, Firmware in Embedded systems applications	1			
				09			
4	CO4: Choose an operating system, and learn how to develop an Embedded System. [K4]	UNIT-4: Real Time Operating System & Hardware Software Co-Design				T1, R1, R2	Chalk and Talk, PPT and E-Learning
		4.1	Operating system basics	1			
		4.2	Types of operating systems	1			
		4.3.1	Tasks, Process and Threads,	1			
		4.3.2	Task Scheduling	1			
		4.4	Tasks – Communication & Synchronization	1			
		4.5	How to choose an RTOS	1			
		4.6	Fundamental Issues in H/W – S/W Co-Design	1			
		4.7	Computational models in embedded design	1			
		4.8	Hardware software Trade-offs	1			
		4.9	Integration of Hardware and Firmware	1			
	4.10	ICE (In Circuit Emulator)	1				
4.11	Class Test-4	1					
	Content Beyond Syllabus	4.12	GPOS & RTOS, RTOS Features, Low power RT Embedded Systems	1			
				13			
5	CO4: Select and justify an appropriate operating system and development methodology for designing and developing an embedded system. [K4]	UNIT-5: Embedded System Development, Implementation And Testing				T1, R2	Chalk and Talk, PPT and E-Learning
		5.1	The integrated development environment	1			
		5.2	Types of files generated on cross-compilation	1			
		5.3	Disassembler/De-compiler	1			
		5.4	Simulators, and Debugging	1			
		5.5	Target hardware debugging	1			
		5.6	Boundary Scan Test	1			
		5.7	The main software utility tool	1			
		5.8.1	Translation tools-Pre-processors, Interpreters	1			
		5.8.2	Translation tools-Compilers and Linkers	1			
		5.9	Debugging tools	1			
		5.10	Quality assurance and testing of the design	1			
	5.11	Testing on host machine	1				
5.12	Class Test-5	1					



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and developing an embedded system. [K4]	5.10	Quality assurance and testing of the design	1		
	5.11	Testing on host machine	1		
	5.12	Simulators, Laboratory Tools	1		
	5.13	Test and evolution of an embedded systems	1		
	5.14	Case study – typical embedded system design flow with an example	1		
		Class Test-5	1		
Content Beyond Syllabus		Test Types, Test Driven Development, Static Tests, Dynamic Tests	1		
			14		
CUMULATIVE PROPOSED CLASSES			66		

Text Books:

S.No AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION

1	KV Shibu, Introduction to Embedded Systems, 2 nd Edition, MC Graw-Hill Publications, New Delhi, 2017.
2	Tammy Noergaard, Embedded Systems Architecture, 2 nd Edition, Elsevier Publications, 2013.

Reference Books:

1	Raj Kamal, Embedded systems: Architecture, Programming, and Design, 3 rd Edition, MC Graw-Hill Publications, 2015.
2	Jean Labrosse, Embedded systems building blocks, 2 nd Edition, CRC Press Publications, 2020.
3	Santanu Chattopadhyay, Embedded system design, 3 rd Edition, PHI Learning Pvt. Ltd., 2021.
4	Elcia white, Making Embedded systems: Design Patterns for Great Software, 2 nd Edition, Shroff Publishers, 2024.

Web Details:

S.No	
1	https://www.embedded.com/category/tutorials
2	https://embeddedartistry.com/libraries/
3	https://mu.microchip.com/microchip-try-basics-of-developing-microcontroller-applications
4	https://embedsys.com/sample-projects/

		Name	Signature with Date
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