

GANPAT UNIVERSITY									
FACULTY OF DIPLOMA ENGINEERING									
Programme		Diploma Engineering				Branch/Spec.		Electronics and Communication Engineering	
Semester		V				Version		1.0.0.0	
Effective from Academic Year			2026-27			Effective for the Batch admitted in			July 2024
Course Code		1EC5103		Course Name		Embedded Systems			
Teaching Scheme						Examination Scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50
Pre-requisites									
Digital Electronics, Microcontroller, Microprocessor									
Course Outcomes									
On successful completion of the course, the students will be able to:									
CO1	Explain the concept, characteristics, and applications of embedded systems.								
CO2	Identify and describe embedded system hardware components and their functions.								
CO3	Develop basic embedded programs using Embedded C.								
CO4	Interface simple input/output devices with microcontrollers.								
CO5	Explain embedded system development tools and real-world applications.								
Theory Syllabus									
Unit	Content								Hrs.
1	Introduction to Embedded Systems Definition of Embedded System, Embedded System vs General Purpose Computer, Characteristics of Embedded Systems, Applications: Consumer, Automotive, Medical, Industrial, Communication, Basic Embedded System Architecture, Classification: Small, Medium, Large embedded systems								6
2	Embedded System Hardware Embedded Processor Types: Microprocessors, Microcontrollers, DSPs (intro only), Typical Microcontroller Architecture (Block diagram explanation), Memory Organization: ROM, RAM, Flash, External vs Internal Memory, Input / Output Devices: Switches, LEDs, Relays, Sensors (Temperature, Light – basic idea), Clock & Reset Circuits, Power Supply Requirements								9
3	Embedded C Programming Overview of Embedded C vs C, Structure of Embedded C Program, Data Types & Variables, Control Statements, Functions & Pointers (basic use), Bitwise Operators, Register Programming Concept, Delay Generation Techniques, Interrupt Concept (basic idea)								10
4	Interfacing & On-Chip Peripherals GPIO Programming (Input/Output), LED Interfacing, Switch / Key Interfacing, Timers & Counters (basic working), ADC (concept & applications), Serial Communication: UART basics, Communication parameters (baud rate, parity)								11
5	Embedded System Software & Applications Embedded System Development Flow, Cross Compiler, IDE, Debugger (conceptual), Introduction to RTOS (only concept, no coding), Embedded System Testing & Debugging, Case Studies: Digital Thermometer, Traffic Light Controller, Home Automation (block-level explanation), Trends in Embedded Systems								9
Practical Content									
Practical assignments and tutorials are based on the above syllabus.									
Text Books									

1	Embedded Systems: An Integrated Approach by Lyla B Das, Pearson Education Publication
Reference Books	
1	Embedded System Architecture, Programming and Design By Rajkamal, TMH Publication.
2	The 8051 Microcontroller and Embedded Systems Using Assembly and C, 2/e by Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin McKinlay, Pearson Education Publication
ICT/MOOCs Reference	
1	https://nptel.ac.in/courses/106105159/
2	https://nptel.ac.in/courses/108102045

Mapping of CO with PO and PSO:															
	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	P S O 1	P S O 2	P S O 3
CO1	2	1	2	2	3	2	2	1	2	3	2	3	2	2	1
CO2	3	2	2	3	3	2	2	2	1	1	2	3	1	2	3
CO3	1	2	3	2	2	1	2	2	3	2	2	3	2	2	2
CO4	2	3	2	1	2	2	1	3	2	1	2	2	1	3	2
CO5	1	2	2	2	3	3	3	2	2	1	2	2	3	1	2