

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Master of Technology				Branch/Spec.	Electronics and Communication Engineering – Embedded Systems		
Semester		II				Version	1.0.0.0		
Effective from Academic Year			2026-27			Effective for the Batch admitted in			July 2026
Course Code		3ES2104	Course Name			Embedded Linux & Device Driver Development			
Teaching Scheme						Examination Scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	-	4	Theory	50	50	100
Hours	3	0	2	-	5	Practical	25	25	50
Pre-requisites									
C Programming, Operating System Fundamentals, Computer Architecture, Embedded System Design, and Basic Linux Commands.									
Course Outcomes									
On successful completion of the course, the students will be able to:									
CO1	Develop Embedded Linux applications.								
CO2	Design and debug Linux device drivers.								
CO3	Interface hardware devices using Linux and Implement industrial embedded Linux solutions.								
CO4	Build industry-ready embedded software systems.								
Theory Syllabus									
Unit	Content								Hrs.
1	Introduction to Embedded Linux: Basics of Linux Operating System, Linux Kernel Architecture, Embedded Linux Overview, Linux File System and Shell Commands, Boot Process in Embedded Linux, Linux Build Systems.								9
2	Linux Kernel and System Programming: Kernel Modules and Compilation, Process Management, Memory Management, System Calls and APIs, Inter-Process Communication (IPC), Signals and Threads.								10
3	Device Driver Development: Introduction to Device Drivers, Character Device Drivers, Block and Network Drivers, GPIO Driver Programming, Interrupt Handling, Driver Debugging Techniques.								8
4	Embedded Linux Interfacing: UART, SPI and I2C Communication, Sensor Interfacing in Linux, Device Tree Concepts, Embedded Networking Basics, Serial Communication Programming, Kernel Logging and Debugging.								10
5	Industrial Applications and Security: Embedded Linux in IoT Systems, Industrial Automation Applications, Secure Embedded Linux Systems, OTA Updates and System Maintenance, Case Studies on Embedded Linux Products.								8
Practical Content									

Practical, assignments and tutorials are based on above syllabus.

Text Books

1	Embedded Linux Primer – Christopher Hallinan
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Reference Books

1	Embedded Systems – Raj Kamal
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1	Linux Device Drivers – Jonathan Corbet
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2	Linux Kernel Development – Robert Love
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ICT/MOOCs Reference

1	https://www.youtube.com/watch?v=YW0f-4zIN7o&list=PL7WFbgpeASD09i9SeMPteAjGPmGdv3jaw&index=5
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2	https://youtu.be/2qBzHwR1NFQ?si=gzYMcSaEkjLIm8Su
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Mapping of CO with PO and PSO :

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	3	3	2	3	2	2	2	3	1	1	1	2
CO2	2	2	2	2	2	3	2	3	3	3	2	2	2	2	1
CO3	3	3	3	3	3	2	2	3	3	2	2	1	1	1	2
CO4	3	1	3	3	2	2	3	1	3	2	2	3	3	3	2