

#	Module Name	Topics Covered	Tools/Software Used	Duration (hrs)	Instructor		
1	AUTOSAR Basics	Classic vs Adaptive AUTOSAR, AUTOSAR Architecture, RTE, BSW	PPTs, AUTOSAR Builder, DaVinci Developer	6			
2	AUTOSAR Advanced	Complex Drivers, Integration, SW-C Implementation, Memory Mapping	Vector DaVinci, EB Tresos, Simulink	8			
3	AUTOSAR vs Non-AUTOSAR	Real-life applications, Migration strategies, Pros & Cons	Side-by-side code examples	4			
4	UDS (ISO-14229)	Diagnostic Services, Request/Response Formats, Session Control	CANoe, UDS Stack Simulators	6	Arkadeep	Pranamya	
5	Bootloader Concepts	Memory layout, Flashing, Secure Bootloader	CANoe, Flash tools, Simulators	4	Arkadeep		
6	U-Boot Fundamentals	Boot Sequence, Boot Scripts, Device Tree	QEMU, Linux VMs, Embedded Linux Boards	4			
7	Programming Language: C Basics	Data types, Pointers, Loops, Memory	CodeBlocks, GCC, Wokwi	6	Arkadeep	Pranamya	Prathiksha Jain
8	Programming Language: C Advanced	File Handling, Structures, Bit Manipulation, Dynamic Memory	GCC, Valgrind, GDB	6	Arkadeep	Pranamya	
9	Embedded C	Register-level Programming, ISR, Header Files	Keil µVision, STM32CubeIDE, MPLAB	6	Arkadeep	Pranamya	
10	Python for Embedded & Automation	Scripting for testing, file parsing, CAN logs, automation, OOP, PySerial	Python, PyCharm, CANlib, Serial, Pandas	6			
11	Embedded Systems Theory	Microcontroller Architecture, Timers, ADC, Interrupts	PPTs, ARM Cortex-M datasheets	4		Amey	
12	Embedded Systems Practical	Hands-on Projects (LED, Buzzer, Motor, Sensors)	Arduino, STM32, Wokwi, Proteus	10		Amey	
13	SDLC Basics	complete sdlc steps starting from planning to maintainance		2	Arkadeep		
14	Software Dev LifeCycle: V-Model	Requirements to Validation Cycle, V-model overview	Lucidchart, Diagrams.net	3	Arkadeep		
15	Software Dev LifeCycle: Agile	Scrum, Sprints, Jira-based issue tracking	Jira, Notion, Trello	3	Arkadeep		
16	Software Dev LifeCycle: DevOps	CI/CD basics, Git, Jenkins, Containerization (Intro)	GitHub, GitLab, Jenkins	4	Prathiksha Jain		
17	Communication Protocol: CAN	Arbitration, Message Frames, Bit Stuffing, CAN FD	CANoe, Arduino with MCP2515	6		Pranamya	
18	Communication Protocol: LIN	LIN Scheduling, Master/Slave nodes	CANoe, Arduino LIN setup	4			Prathiksha Jain
19	Communication Protocol: I2C	Master-Slave Comms, Acknowledgement, Registers	Arduino IDE, STM32, I2C modules	4		Amey	(Theory part)
20	Communication Protocol: UART	Baud Rate, Stop Bits, TX/RX	Serial Monitors, Tera Term, RealTerm	4		Amey	
21	Communication Protocol: SPI	Clock Phase/Polarity, MISO/MOSI, Full-Duplex	Oscilloscope + SPI devices + Wokwi	4		Amey	
22	Android HMI - Infotainment	Android Application developemtn for automotive use cases	Kotlin, XML , Compose , Android SDK	10	Rishabh		
23	SDV - Overview	SDV concepts , origins and trends	PPTs, case study	2	Rishabh		
24	Automotive Hypervisors & Mixed criticality OS Systems	Automotive Grade OS, HW/SW , hypervisors	PPTs, Case study	2	Rishabh		
25	Basic of Linux	Linux Architecture, Linux commands, Shell Scripting, Linux Networking and Debugging	Linux OS/Terminal, PPT's	10	Pramod	Prathiksha Jain	Amey
26	Advanced of Linux	Boot process, File system, Linux Kernel and Kernel Modules	Linux OS/Terminal, PPT's	6	Pramod		
27	Yocto Build	- Yocto poky reference build system. - Building a system image. - Writing a minimal recipe, Adding dependencies. - Development workflow with bitbake. - Adding the custom application. - Adding the custom library dependent application. - Adding custom kernel module. - Change the kernel version and apply kernel patches	VmLinux, Linux OS/Terminal, PPT's	8	Pramod		

Recommendations for New Topics						
1	Python (Basic to Advanced)	Introduction to Python basics (variables, operators, conditions, loops, strings, lists, tuples, sets, dictionaries), working with files, NumPy,		9	Prathiksha Jain	
2	AI/ML (Generative AI for Developers)	Generative AI covering prompt engineering & API usage, basics of NLP and retrieval-augmented generation (RAG), AI agents & multi-agent systems,		—	Prathiksha Jain	
3	PCB Design & Fabrication	Introduction to PCB – Types, materials, applications (Theory)	EasyEDA / KiCad / Eagle (for schematic & PCB design) Hardware Tools & Materials	10	Amey	
		Schematic Design – Draw circuit in software (Practical)				
		PCB Layout – Place components, route traces (Practical)				
			Copper-clad board			
		Design Rules Check (DRC) – Verify track width & spacing (Practical)	Laser printer + glossy paper / OHP sheet			
		Print & Transfer Layout – Print layout and transfer to copper plate (Practical)				
		Etching & Drilling – Etch unwanted copper, drill holes (Practical)	Etching solution (Ferric Chloride – FeCl ₃)			
		Assembly & Testing – Solder components and test circuit (Practical)	PCB drill machine / hand drill			
4	Basics of Electronics	Introduction – Electricity basics (V, I, R, P), Ohm’s Law, AC vs DC.	Breadboard, jumper wires, resistors, capacitors, diodes, LEDs, transistors, ICs (555, logic gates), switches, relays.	18	Amey	
		Components – Resistors, capacitors, inductors, diodes, transistors, ICs, switches, relays.				
		Tools & Skills – Multimeter, breadboard, power supply, soldering & desoldering.	Power supply / batteries, multimeter, oscilloscope (optional).			
		Circuit Building – LED circuits, rectifiers, transistor switch/amplifier, 555 timer.	Soldering kit (iron, solder wire, flux, desoldering pump), basic hand tools (cutter, pliers, tweezers).			
		Analog Electronics – Amplifiers, op-amps, filters, power supplies.	Software: LTspice / Proteus / TinkerCAD Circuits (simulation), Arduino IDE (microcontroller basics).			
		Digital Electronics – Number systems, logic gates, adders, flip-flops, counters, Arduino intro.				
		Troubleshooting & Projects – Fault finding, debugging, mini-projects (LED chaser, amplifier, sensor-based).				
5	Basics of MATLAB	Intro – MATLAB environment & interface.	MATLAB	15	Amey	
		Operations – Variables, arrays, matrices, operators.				
		Scripts & Functions – Simple .m files & functions.				
		Programming – Loops, conditionals.				
		Plotting – 2D plots, labels, legends.				
		Data Handling – Import/export, basic matrix ops.				
		Mini Projects – Sine wave plot, calculator, simple data analysis.				
		Introduction to IoT – What is IoT, applications.	Arduino IDE / PlatformIO			
		Components – Sensors, actuators, microcontrollers.	ESP32 / ESP8266 boards			
		Connectivity – Wi-Fi, Bluetooth, MQTT basics.	Sensors (DHT11, LDR, PIR, etc.)			

6	Internet of Things (IoT) Basics	Hardware Setup – ESP32/ESP8266, Arduino.	Cloud platforms: ThingSpeak, Blynk, Adafruit IO	10	Amey	
		Data Handling – Sending sensor data to cloud (ThingSpeak / Blynk).	Laptop + USB cable			
		Visualization – Mobile app / web dashboard.				
		Mini Projects – Smart home light, temperature logger				
7	Intro to Development Boards, Sensors & Actuators	Introduction – Development boards and their features.	Development Boards: Arduino, ESP32, Raspberry Pi, NVIDIA Jetson (optional)	15	Amey	
		Sensors – Types, analog vs digital, interfacing.	Sensors: DHT11, LDR, PIR, ultrasonic, temperature, motion sensors			
		Actuators – LEDs, motors, servos, relays, buzzers.	Actuators: LEDs, motors (DC/servo/stepper), relays, buzzers			
		Programming Basics – Reading sensors, controlling actuators.	Miscellaneous: Breadboard, jumper wires, resistors, power supply, USB cables, basic hand tools			
		Hands-on Projects – Automatic lights, alarms, simple IoT setups.	Arduino IDE / PlatformIO Python (for Raspberry Pi) Python (for Raspberry Pi)			