

MASSIVETRONICS PVT LTD BENGALURU

We aim to redefine the boundaries of what's possible, creating intelligent environments through collaboration and tailored strategies. By harnessing the power of AI, machine learning, and IoT, we are dedicated to building a smarter, more connected world that benefits everyone.



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1586, GRG Complex , Above Beijing Bites , Kenchenahalli Main Road , Rajarajeshwari Nagar , Bangalore - 98

Respected Sir/Madam,

We are pleased to present our offers for various workshops and skill development programs for the graduating stakeholders of your esteemed institutions. These sessions are designed to provide students with a brief overview of real-world information, live demonstrations, and, whenever feasible, hands-on learning experiences.

We bring in experienced instructors from the business to talk and help the students develop an industry-ready mentality. All of these programs are designed with the AICTE and UGC's definitions of educational requirements and criteria in mind. These programs not only give students the opportunity to learn new things, but they also help them feel more motivated to learn on their own. Motivation and advice on how to prepare for interviews and land desired jobs that fit their skills and interests will also be part of these sessions.

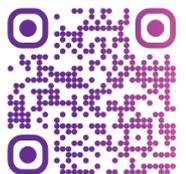
We look forward to collaborating with your esteemed institute to lend our services in building a brighter professional life for the young graduates.

Sincerely,
Mr. Manjuprasad N S
Director



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One-Day Workshops:

AI & Robotics: Fundamentals to Implementation

Objective: To equip participants with theoretical knowledge and hands-on experience in AI-powered robotics, focusing on hardware, software, and real-world applications.

Target Audience: 2nd Year and 3rd Year Engineering students.

Session 1: Fundamentals of AI & Robotics (2 Hrs)

- Overview of AI, ML, and Robotics
- Understanding intelligent systems
- Introduction to robot kinematics, sensors, actuators, and perception systems

Session 2: Machine Learning for Robotics (1.5 Hrs + 30 Mins)

- Introduction to ML models
- Exploring the concepts of Supervised/Unsupervised learning
- Introduction to decision trees, regression, and neural networks
- Discussions exploring Use cases in robotics

Demo 1: AI Model Building with Python (30 Mins)

- Students build and train a simple ML model (e.g., object classification using scikit-learn or TensorFlow).

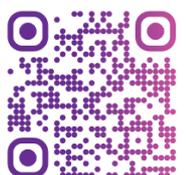
Break: 45 Mins

Session 3: Robotic Systems – Sensors & Control (1.5 Hrs + 30 Mins)

- Introduction to Hardware components: motors, sensors (IR, ultrasonic, IMU)
- Brief of microcontrollers (Arduino, ESP32)
- Importance of communication (Bluetooth/Wi-Fi) systems and protocols.

Demo 2: Robot Building & AI Integration (30 Mins)

- Demo of the Design and configuration of Arduino/ESP32 to build a basic robot.



- Integrate the AI model for a task like obstacle avoidance or colour/object detection.

Demo 3: Teams showcase what they built (30 Mins) and Open Q&A, career scope discussions.



Embedded Systems: Fundamentals and Industry Requirements

Objective: To introduce the fundamentals of Embedded Systems to engineering students. To bridge the gap between theoretical learning and practical application. To encourage project-based thinking and a product innovation mindset.

Target Audience: 2nd Year and 3rd Year Engineering students.

Session 1: Introduction to Embedded Systems (2 Hrs)

- Understanding embedded systems
- Overview of real-life applications, market trends, career paths
- Introduction to sensors, actuators, and other I/O devices

Session 2: Microcontroller Programming Basics (1.5 Hrs + 30 Mins)

- Introduction to Arduino/ESP32 architecture
- Exposure to the IDE setup
- Understanding of digital I/O, and LED controls
- Discussions exploring Use cases in embedded systems

Demo 1: AI Model Building with Python (30 Mins)

- Demo of interfacing a sensor and verifying the output using a simple IO board with Arduino/ESP32.

Break: 45 Mins

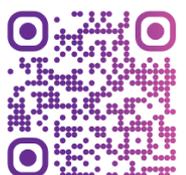
Session 3: Robotic Systems – Sensors & Control (1.5 Hrs + 30 Mins)

- Serial Communication (brief intro to UART)
- Sensor Integration (Temperature, Light, Ultrasonic, etc.)
- Glimpse of wireless communication (Bluetooth/Wi-Fi)

Demo 2: Robot Building & AI Integration (30 Mins)

- Demo of a small working system: Smart Light, Alarm system, LED Control and Motor Control

Discussion: Open Q&A, career scope discussions.



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Internet of Things: Fundamentals and Project Scope

Objective: To understand IoT architecture, workflow, and practical experience with sensors and data communication. Also, to experience the process of building and deploying a basic IoT application along with the awareness of career and startup opportunities in IoT.

Target Audience: 2nd Year and 3rd Year Engineering students.

Session 1: Introduction to Internet of Things (IoT) (2 Hrs)

- Understand the fundamental definitions of IoT
- Applications in Smart Cities, Health, Industry, and Home
- Overview of the Architecture of IoT
- Prime Components of IoT: Sensors, Microcontrollers, Connectivity, etc.

Session 2: Setting Up the IoT Environment (1.5 Hrs + 30 Mins)

- Explore the basics of Arduino/ESP32 boards
- Demo of Setting up Arduino IDE
- Understand the Basics of embedded C
- Demo of Uploading a sample code

Demo 1: AI Model Building with Python (30 Mins)

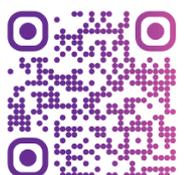
- Demo of connecting and reading data from basic sensors (Temperature – DHT11, LDR, Ultrasonic) and displaying output on Serial Monitor.

Break: 45 Mins

Session 3: Connecting IoT to the Cloud (1.5 Hrs + 30 Mins)

- Overview of IoT Cloud Platforms (ThingSpeak, or Blynk, or Firebase)
- Visualization of the process of sending sensor data to the cloud
- Visualizing data remotely using suitable platforms
- Discussion on IoT trends: Edge Computing, Industrial IoT, AIoT

Demo 2: Robot Building & AI Integration (30 Mins)



- Demo of Code writing, circuit building, testing for the application like: Smart Room, Weather Station, IoT Alert System

Discussion: Open Q&A, career scope discussions.

Fundamentals of Computer Networks & Career Pathways

Objective: To introduce students to the core concepts and protocols of computer networking. To provide practical exposure to network tools and simulations while presenting the real-world applications and the role of networks in modern computing, and to guide students on networking-related career roles, certifications, and trends.

Target Audience: 3rd Year Engineering students of ECE, CSE, ISE and related programs.

Session 1: Introduction to Computer Networks (2 Hrs)

- Understand the definitions of a network?
- Explore the types of a network: LAN, MAN, WAN
- Overview of components of networks.

Session 2: OSI & TCP/IP Model Explained (1.5 Hrs + 30 Mins)

- Know about the backbone of computer networks.
- Layer-by-layer breakdown of OSI and TCP/IP models.
- Explore popular protocols of a computer network: HTTP, FTP, IP, TCP, UDP

Demo 1: Network Simulators (30 Mins)

- Hands-on session on getting started with Simulators: GNS3 and Cisco Packet Tracer.

Break: 45 Mins

Session 3: IP Addressing & Subnetting Basics (1.5 Hrs + 30 Mins)

- Understand and differentiate between IP v4 vs IP v6
- Discuss the concept of Private and Public IP addresses
- Explore the concept of Subnetting with suitable Examples and practical calculations



Demo 2: Robot Building & AI Integration (30 Mins)

- Demo of creating simple topologies and simulating data flow in either of the Simulator.

Discussion: Open Q&A, career scope discussions.



5-Day Workshop / Student Development Programs

Antenna Design and Simulation: From Fundamentals to Advanced Applications

Overview:

This 5-day hands-on workshop is designed to provide in-depth knowledge of antenna design, simulation, and optimization techniques. Participants will explore theoretical concepts, practical calculations, and hands-on simulations using industry-standard tools. The workshop covers a wide range of antennas, including microstrip patch antennas, antenna arrays, and MIMO antennas.

Objectives:

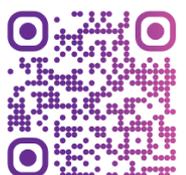
- Gain a strong foundation in antenna theory and design principles.
- Understand the applications of Maxwell's equations in electromagnetics.
- Learn essential antenna parameters and their impact on performance.
- Perform calculations for microstrip patch antenna design and validation.
- Get hands-on experience with antenna simulation tools.
- Design, simulate, and optimize antenna arrays and MIMO antennas.
- Analyze electromagnetic field distributions and apply optimization techniques.

Target Audience: 3rd Year (6th Sem) Electronics and Communication Engineering students.

Day 1: Fundamentals of Antenna Design (Total 7 hours)

Session 1: Introduction to Antennas

- Overview of antenna, types and its parameters
- Importance of antennas in modern communication systems



- Real-world applications of antennas

Session 2: Antenna Theory and Design Concepts

- Fundamental antenna parameters: gain, directivity, efficiency, and polarization
- Antenna radiation patterns and beamforming

Session 3: Understanding Maxwell's Equations in Antenna Design

- Basics of electromagnetic wave propagation
- Maxwell's equations and their significance in antenna theory

Day 2: Essential Antenna Parameters & Design Principles (Total 7 hours)

Session 1: Key Antenna Parameters & Performance Metrics

- Maxwell's equations and their significance in antenna theory (Continued)
- Return loss, VSWR, radiation efficiency, and impedance matching
- Beamwidth, sidelobe levels, and front-to-back ratio
- Design equations for microstrip patch antennas

Session 2: Practical Calculations for Microstrip Patch Antennas

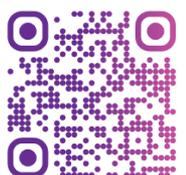
- Effect of substrate material and ground plane
- Feeding techniques: microstrip line, coaxial probe, and aperture coupling
- Introduction to industry-standard simulation software

Session 3: Overview of Antenna Simulation Tools

- Setting up an antenna model in simulation tools
- Understanding the solver types and meshing strategies

Day 3: Antenna Simulation & Practical Hands-on Sessions (Total 7 hours)

Session 1: Hands-on Session – Exploring Simulation Tools



- Substrate selection and its impact on antenna performance
- Case studies and manual calculations for patch antennas
- Practical insights on debugging design issues

Session 2: Hands-on Session – Antenna Array Design

- Basics of array theory and beamforming
- Simulating and optimizing an antenna array

Session 3: Analysing Simulation Results & Electromagnetic Field Distributions

- Creating a basic microstrip patch antenna in simulation software
- Running simulations and analyzing key performance metrics

Day 4: Advanced Topics & Performance Analysis (Total 7 hours)

Session 1: Optimization & Performance Metrics in Antenna Design

- Case study: Microstrip patch antenna for wireless communication
- Design considerations for IoT, 5G, and satellite applications
- Comparison of different antenna configurations

Session 2:

- Visualizing antenna radiation patterns and near-field distributions
- Understanding the impact of design parameters on performance

Session 3:

- Evaluating far-field characteristics and impedance matching through simulation.
- Design and analysis of Meta Material applications through simulation.

Day 5: Advanced Topics & Performance Analysis (Total 7 hours)

Session 1: Optimization & Performance Metrics in Antenna Design



- Introduction to Envelope Correlation Coefficient (ECC) in MIMO antennas
- Antenna optimization techniques
- Introduction to reconfigurable techniques for polarization control in antenna design

Session 2:

- Hands-on antenna design example: Implementing a PiN diode for RHCP and LHCP requirements

Computer Networks: From Basics to Career Building

Overview:

This 5-day hands-on workshop is designed to provide in-depth knowledge of computer networks. Participants will explore theoretical concepts, network components, practical calculations, and hands-on simulations using suitable simulation tools. The workshop covers a wide range of protocols, including network topologies.

Objectives:

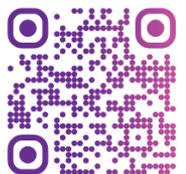
- Build a strong foundation in computer networking concepts.
- Offer hands-on experience with simulation tools and networking configurations.
- Introduce modern trends like Network Security and SDN.
- Help students explore career paths, certifications, and skill requirements.

Target Audience: 3rd Year (6th Sem) Electronics and Communication Engineering students.

Day 1: Foundations of Networking (Total 7 hours)

Session 1: Introduction to Computer Networks

- Definition of a network?
- Explore the types of networks: LAN, WAN, MAN, PAN
- Understand the concepts of Client-server vs peer-to-peer communication.



Session 2: Network Devices & Topologies

- Understand the working of Network devices: Hubs, switches, routers, firewalls
- Understand different types of network topologies: Star, Bus, Ring, and Mesh

Session 3: OSI Model – Layer-wise Deep Dive

- Describe all 7 layers along with real-world analogies
- Discuss respective protocols and functions of each layer

Day 2: IP Addressing and Protocols (Total 7 hours)

Session 1: TCP/IP Stack & Common Protocols

- Understand the types of network operations: TCP vs UDP
- Explore major application protocols: HTTP, FTP, SMTP, DNS

Session 2: IP Addressing & Subnetting

- Understand the formats and needs of IPv4/IPv6
- Explore the concept of private and public IP addresses
- Understand the concept of subnet mask, CIDR and their use

Session 3: Subnetting Workshop

- Hands-on calculation of subnets

Day 3: Hands-On with Network Tools (Total 7 hours)

Session 1: Introduction to Cisco Packet Tracer

- Installation and interface
- Creating network topologies

Session 2: Device Configuration (Basic)

- PC to PC connections
- Switch and router setup

Session 3: Packet Flow Simulation



- Simulate ping, traceroute
- Observe data transfer using simulation mode

Day 4: Routing, NAT, and Security (Total 7 hours)

Session 1: Introduction to Routing

- Understand the concepts of Static and dynamic routing
- Explore the basic routing protocols: RIP, OSPF (conceptual) and EIGRP (conceptual)

Session 2: NAT, DHCP, DNS (Concept + Demo)

- Understand the concept and needs of Address translation
- Explore how dynamic IP assignments happen in real-time
- Overview of domain name resolution and its applications

Session 3:

- Evaluating far-field characteristics and impedance matching through simulation.

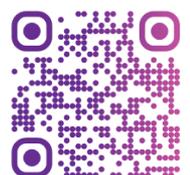
Day 5: Advanced Topics & Performance Analysis (Total 7 hours)

Session 1: Introduction to Network Security

- Understand what threats are: sniffing, spoofing, DDoS, etc.
- Explore the concept of Firewalls, IDS/IPS basics.

Session 2: Modern Networking Trends and Career Paths in Networking

- SDN, SD-WAN, Cloud Networking, Zero Trust
- Dive into some Real-life use cases
- Career Roles: Network Admin, Security Analyst, Cloud Engineer
- Certifications: CCNA, Network+, AWS, CEH



Full Stack Web Development

Overview:

This 5-day hands-on workshop is designed to provide in-depth knowledge of Full Stack development. Participants will explore concepts of webpage building, and hands-on experience of building a few. The workshop covers a wide range of options available in building a webpage and web applications.

Objectives:

- Build a strong foundation in full-stack development.
- Offer hands-on experience with a suitable programming language.
- Introduce modern and trending programming concepts.
- Help students explore career paths, project opportunities, and skill requirements.

Target Audience: 2nd and 3rd Year Engineering Students.

Day 1: Introduction to Web Development & Front-End Basics (Total 7 Hours)

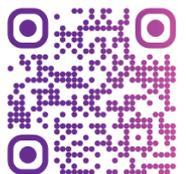
Session 1: Introduction to Web Development

- Overview of Web Development
- Client-Side vs Server-Side Development
- Full Stack Development: Technologies and Workflow

Session 2: HTML & CSS Fundamentals

- Structure of Web Pages with HTML
- Basic HTML Elements (headings, paragraphs, links, images, forms)
- Introduction to CSS (styling web pages)
- Box Model, Flexbox, and Grid Layouts

Session 3: Practical – HTML & CSS



- Build a webpage using HTML
- Apply styling with CSS (use Box Model, Flexbox, Grid)
- Create a responsive layout with media queries

Day 2: JavaScript Basics & Front-End Frameworks (Total 7 Hours)

Session 1: JavaScript Basics

- Introduction to JavaScript
- Variables, Data Types, Operators, Functions
- Loops, Conditionals, and Basic DOM Manipulation
- Event Handling in JavaScript

Session 2: JavaScript Advanced Topics

- Introduction to ES6 (Arrow Functions, Template Literals, Destructuring)
- Working with Arrays and Objects
- Asynchronous JavaScript (Callbacks, Promises, async/await)

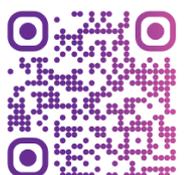
Session 3: Practical – JavaScript

- Build an interactive web page using JavaScript (e.g., Todo List)
- Practice DOM manipulation and event handling
- Implement asynchronous functionality using Promises or async/await

Day 3: Introduction to React & Back-End Development with Node.js (Total 7 Hours)

Session 1: Introduction to React

- What is React? (Overview of the React ecosystem)
- Setting up a React Project
- React Components, Props, and State



- JSX Syntax
- Basic React Application Structure

Session 2: Introduction to Node.js & Express.js

- What is Node.js and why use it?
- Introduction to Express.js framework
- Setting up a Node.js server with Express
- Basic Routing in Express.js

Session 3: Practical – React & Node.js

- Build a simple React app with components and state
- Set up a basic Node.js and Express app
- Connect React front-end with Node.js back-end for a simple project

Day 4: Database, REST APIs & Full Stack Integration (Total 7 Hours)

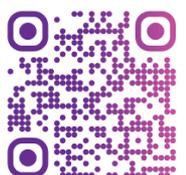
Session 1: Introduction to MongoDB

- Overview of NoSQL Databases
- CRUD Operations in MongoDB
- Connecting Node.js with MongoDB using Mongoose
- Implementing MongoDB for data persistence

Session 2: Introduction to RESTful APIs

- What is a RESTful API?
- HTTP Methods (GET, POST, PUT, DELETE)
- API Design Principles
- Implementing RESTful Routes in Express.js

Session 3: Full Stack Integration



- Integrating React Front-End with Node.js Back-End
- Making API calls from React to Node.js using Axios or Fetch
- Connecting MongoDB for Data Storage in the Full Stack Application

Day 4: Database, REST APIs & Full Stack Integration (Total 7 Hours)

Session 1 & 2: Practical – Full Stack Web Application

- Build a Full Stack Application (e.g., a simple login system, or task management app)
- Connect React front-end to Node.js back-end and MongoDB for data persistence
- Implement Authentication using JWT (JSON Web Tokens)

AI Robotics: Fundamentals to Implementation Training Program

Overview:

This 5-day hands-on workshop is designed to provide in-depth knowledge of computer networks. Participants will explore theoretical concepts, network components, practical calculations, and hands-on simulations using suitable simulation tools. The workshop covers a wide range of protocols, including network topologies.

Objectives:

- To equip participants with theoretical knowledge of robotics
- To build a strong foundation on AI and AI-powered robotics
- To give hands-on experience in AI-powered robotics, focusing on hardware, software, and real-world applications.

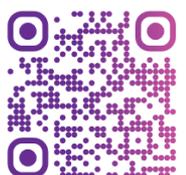
Target Audience: 2nd Year (4th Sem) and 3rd Year Engineering students.

Day 1: Introduction to AI & Robotics (Total 7 hours)

Session 1 and 2: Overview of AI and Robotics

- Evolution and Impact of AI in Robotics
- Applications of AI, Robotics and AI-Robotics together in Industries

Session 3: Demo of components of Robotics



- Introduction to AI-based robotics hardware

Day 2: Basics of Electronics & Hardware Integration (Total 7 hours)

Session 1 and 2: Explore the components of Robotics

- Understanding electronic components: sensors, motors, servos
- Power supply and battery management
- Serial communication: UART, I2C, SPI

Session 3: Hands-on experience of imparting communication protocols

- UART, I2C, SPI data reading.

Day 3: Arduino Coding language for Robotics Programming (Total 7 Hours)

Session 1 and 2: Arduino Programming Basics and Kinematics in Robotics

- Arduino C basics.
- Using Servo and DC Motors with Arduino boards.
- Inverse Kinematics for robots.

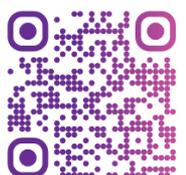
Session 3: Hands-on experience of assembling a robot

- Assembling the Robot chassis
- Working on the Robot to make it function.

Day 4 : Raspberry Pi SoC

Session 1: Introduction to Raspberry Pi

- Introduction and booting of RPi
- Programming of RPi using C and JAVA
- Headless Modes of RPi



Session 2: Practical use of Raspberry Pi and Python Basics

- Familiarization with Raspberry Pi, motors, and sensors
- Python basics (control structures, loops, functions)
- Using Python for ML/AI
- Python for Robotics Programming

Session 3: Hands-on Session on Python Programming

Day 5: Python for AI and Robotics

Session 1 and 2: Introduction to OpenCV in Python

- OpenCV basics for AI Vision
- Writing Python code for Anomaly Detection & Capturing
- Practical demo of processing images from the camera

System Verilog: Fundamentals to Implementation Training Program

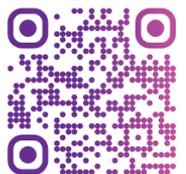
Overview:

This 5-day hands-on workshop is designed to provide in-depth knowledge of System Verilog. Participants will explore theoretical concepts, System Verilog programming components, practical calculations, and hands-on simulations. The workshop covers a wide range of hands-on sessions covering various topics of System Verilog.

Objectives:

- To give students a solid grounding in the core language constructs and highlight the importance of reusable code blocks.
- To introduce modern verification style through OOP features.
- To give hands-on experience that can equip learners to generate meaningful, controllable stimuli and analyse the outcomes with real-world applications.

Target Audience: 3rd & 4th Year Engineering students and Post Graduate Students of Electronics and Communication Engineering.



Day 1: Fundamentals of System Verilog

Session 1 and 2: Fundamentals of System Verilog Programming

- Built-in data types - 2-state vs 4-state types, bit, logic, reg, integers, time.
- User-defined data types - struct and union (packed / unpacked), enum, typedef-based aliases, class.
- Arrays - Fixed-size, dynamic, associative; when to choose each.
- Queues - Unbounded vs bounded queues, push/pop operations, typical use cases

Session 3: Demo and Practical usage

- Understand the trade-offs in terms of memory and simulation speed.
- Demo and practice session to implement the fundamental programming concepts and discuss real-time situations to use suitable functionalities.

Day 2: Tasks, Functions & Processes in System Verilog Programming

Session 1 and 2: Orientation towards Looping, and Task-Function pairs

- Loop constructs: for, while, do...while, repeat, forever, foreach
- Tasks vs Functions: timing control, argument passing, automatic vs static.
- Processes: initial, always, fork...join, fork...join_any, fork...join_none

Session 3: Demo and Practical usage

- Best practices: coding style, synthesis vs simulation considerations.
- Demo and practice session to implement the looping and tasks, and coordinate parallel activities with the appropriate process construct.

Day 3: OOPs in System Verilog

Session 1 and 2: Introduction to Object-Oriented Programming in System Verilog



- OOP: Encapsulation, inheritance, polymorphism—illustrated with compact driver/monitor examples
- Keywords & mechanics - this, super, virtual, abstract, static data/methods

Session 3: Demo and Practical usage

- Copy semantics - Shallow vs deep copy, \$cast patterns
- Demo and practice session to implement the concept of OOP in System Verilog with a discussion on how classes enable scalable, reusable testbenches and can extend a base class.

Day 4: Advanced topics of System Verilog

Session 1 and 2: Randomization & Constraints

- Why randomize?
 - Hitting corner cases, improving functional coverage, minimising hand-written vectors
- Randomization styles:
 - Inline (randomize() with {})—quick, ad-hoc tweaks
 - In-class constraint blocks—self-contained, reusable
- Constraint techniques: if/else, implication (->), foreach, distribution (dist, inside), unique, soft, solve...before

Session 3: Demo and Practical usage

- Controlling constraints: constraint_mode(0/1), selective override, random - option knobs
- Inter-process communication: events, semaphores, mailboxes—syncing stimulus and scoreboard.

Day 5: Loop with Self-Checking



Session 1 and 2: Assertions & Coverage

- Interfaces & clocking blocks - Port bundling, timing abstraction, modport visibility
- Compiler directives - include, define, conditional compilation guards
- SystemVerilog Assertions (SVA) - Immediate vs concurrent; properties, sequences, non-overlapping.
- Coverage - Code vs functional; covergroups, coverpoints, bins, crosses; integrating coverage collection into testbench phases.



PCB Design & Manufacturing Awareness

Overview:

This 4-day hands-on workshop is designed to provide in-depth knowledge of CB Design & Manufacturing Awareness. Participants will explore theoretical concepts, and the complete PCB workflow: Circuit design & simulation, Schematic capture, PCB layout design, and Manufacturing process awareness. Students get hands-on exposure to PCB design workflow and give awareness of real-world manufacturing process.

Objectives:

- To familiarize students with the fundamentals of PCB design workflow, from circuit simulation to schematic creation, layout design, and Gerber file generation.
- To provide hands-on experience with free and industry-relevant tools for circuit simulation and PCB design.
- To create awareness of PCB fabrication and assembly processes through demonstrations.
- To enhance students' industry readiness by bridging theoretical knowledge with practical design skills.

Target Audience: 2nd & 3rd Year Engineering students of E&CE, IT&E, EE&E and Embedded System and IoT related streams.

Simulation Tools introduced:

- KiCad EDA (open-source, professional PCB design tool)
- EasyEDA (online) – simple, free, accessible for students
- LTSpice / Falstad – for circuit simulation before PCB design

Day 1: Introduction to PCB Design

- **Session 1: Topic: Fundamentals of PCBs & Applications**
 - Evolution from breadboards → stripboards → PCBs
 - Types of PCBs: single-layer, double-layer, multi-layer
 - Real-life applications (consumer electronics, automotive, medical)
- **Session 2: Topic: Basics of Circuit Simulation before PCB Design**



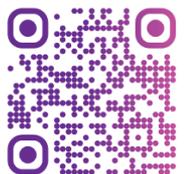
- Why simulate before designing a PCB?
- Overview of free simulation tools (Falstad, LTSpice, EasyEDA)
- Demo: Basic RC filter, rectifier, amplifier circuit simulation
- **Session 3: Activity: Circuit Simulation Practice**
 - Students simulate rectifier & filter circuits in LTSpice / EasyEDA
 - Observe waveforms, verify design parameters

Day 2: From Circuit to Schematic

- **Session 1: Topic: Understanding PCB Design Workflow**
 - Schematic design → PCB layout → Fabrication → Assembly
 - Netlists, footprints, libraries introduction
 - Introduction to KiCad & EasyEDA
- **Session 2: Topic: Schematic Capture & Best Practices**
 - Symbol vs footprint
 - Creating libraries & using standard components
 - Avoiding common errors (floating nodes, wrong pin mapping)
- **Session 3: Activity: Schematic Design Exercise**
 - Students create schematics for a power supply circuit (5V regulator)
 - Assign footprints and generate netlist

Day 3: PCB Layout Design

- **Session 1: Topic: PCB Layout Principles**
 - Board layers, traces, vias, pads, ground plane
 - Design rules (clearance, trace width, current capacity)
 - Single vs double-layer PCB layouts
- **Session 2: Topic: Design for Manufacturability (DFM)**
 - Rules for component placement
 - EMI/Noise considerations
 - Thermal management (heat sinks, copper fills)



- **Session 3: Activity: PCB Layout Practice**

- Students design single-layer PCB for the power supply circuit from Day 2
- Route tracks, add ground plane, and check DRC (Design Rule Check)

Day 4: PCB Manufacturing & Industry Awareness

- **Session 1: Topic: PCB Manufacturing Process**

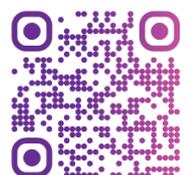
- From design to fabrication: photolithography, etching, drilling, plating
- Solder mask, silkscreen, surface finishing
- Videos: Industrial PCB fabrication process (China/India fabs)

- **Session 2: Topic: PCB Assembly & Testing**

- Through-hole vs Surface Mount Technology (SMT)
- Reflow soldering, wave soldering
- Testing methods (continuity, functional testing, AOI, ICT)
- Career paths: PCB design engineer, hardware developer, testing engineer

- **Session 3: Activity: Gerber File Generation & Industry Link**

- Students export Gerber files from their PCB design
- Demonstration: Upload Gerber files to a PCB fabrication portal (e.g., JLCPCB)
- Show cost estimation & turnaround time
- Conclude with mini-project idea: students can design their own small PCB (LED flasher / sensor board) in future



Pricing Details:

Price estimation for each workshop or development program will be provided upon request, based on:

- Number of participants
- Type of program(s) selected
- Duration and depth of content
- Resource and logistics requirements

Please contact the undersigned directly to receive a customized quote.

Conclusion

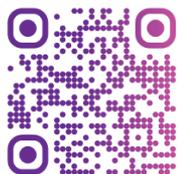
This proposal outlines a series of Student Development Programs and Hands-on Workshops curated to enhance the technical skills, practical exposure, and industry readiness of engineering students. Each program, whether on Embedded Systems, Internet of Things (IoT), or Computer Networks, has been carefully structured to bridge the gap between academic learning and real-world applications.

With a strong focus on hands-on training, project-based learning, and emerging technology trends, these workshops aim to build strong foundational knowledge, foster innovation and problem-solving, and support career development through exposure to certifications and industry practices.

We believe that integrating these programs into your institution's academic calendar will significantly empower students and enrich their learning journey. Our team is committed to delivering high-impact sessions with quality content, experienced trainers, and student-centred outcomes.

~~ Disclaimer ~~

This proposal is subject to modification based on institution-specific requirements, availability of resources, and scheduling constraints. All workshop materials, software tools, and practical sessions will be provided in accordance with academic best practices and may be adjusted to suit the level and



background of participants. The organizing team reserves the right to make minor changes to the agenda to ensure smooth delivery and optimal learning outcomes.

