VEL TECH HIGH TECH

Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE
An Autonomous Institution
Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

REPORT ON EVENT-3

THREE DAYS IDEATION WORKSHOP ON MATLAB & SIMULINK FOR ENGINEERING APPLICATIONS (17.11.2025 - 19.11.2025)

VEL TECH HIGH TECH - AICTE-IDEA LAB

VEL TECH HIGH TECH

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Prof. Dr. E. KAMALANABAN	**Prof. Dr. V.R. RAVI**	**Prof. Dr. R. SURESH**
AICTE IDEA LAB – CHIEF MENTOR	**AICTE IDEA LAB – COORDINATOR**	**AICTE IDEA LAB – CO-COORDINATOR**

Dr. S .SIVASARAVANA BABU	**Dr. S. RAJAMANICKAM**	**Dr. G. MAHALAKSHMI**	**Mr. M. PARTHIBAN**
Tech Guru	**Tech Guru**	**Tech Guru**	**Tech Guru**

EVENT APPROVAL

DIVH/NOV/2025/4456

P.No: 1051

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AICTE IDEA LAB

Proposal for Skill Development Program on MATLAB & Simulink for Engineering Applications (AY2025-2026) Odd Semester

1	Name of the event	:	"Skill Development Program on MATLAB & Simulink for Engineering Applications"
2	Event scheduled date	:	17.11.2025 To 18.11.2025
3	Name of the resource person	:	Dr. V. R. Ravi
4	Details of the guest speaker	:	Dean Academics, VTHT
5	Resource person profile attached	:	Yes
6	Acceptance letter from the resource person	:	Yes
7	Faculty in-charge for the event	:	Dr.S.Rajamanikam, Assistant Professor/Mech HTS 723, 8056036899 A/C: 75330100032890 BOB –VELTECH Branch, IFSC: BARB0VJVELT
8	No. of students	:	60 Students
9	Refreshment and Hospitality	:	65 Tea and Refreshment
10	Objective of the event	:	• To introduce the fundamentals and advanced features of MATLAB and Simulink for engineering problem-solving. • To enable students to model, simulate, and analyze dynamic systems across multiple engineering domains.
11	Outcome of the event	:	Participants will be able to: • Apply MATLAB and Simulink for modeling, simulation, and analysis of engineering systems. • Develop practical problem-solving skills through hands-on computational exercises.
12	Budget	:	Expenses Budget Certificate, Banner & Report — Rs.1800.00 Participant kit(50 No's) — Rs.1800.00 Miscellaneous — Rs.1000.00 Total — Rs.4600.00
13	Website updation	:	Sha
14	Photography & Video Required	:	Yes
15	Event No	:	VTHT IDEA LAB /2025-26/03
	GIT Events organized BUDGET ENTERED Page No. VH- 1099 Signature		6.11.25 AICTE Idea Lab Coordinator 10/11/2025 AICTE Idea Lab Co-Coordinator
16	Approval from principal	:	

NOTE TO ACCOUT SECTION

Kindly debit this amount from ICTE IDEA LAB A/C: 92501001242811

08/11/2025

WORKSHOP BROCHURE

Vel Tech High Tech

Dr. Rangarajan Dr. Sakunthala Engineering College

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Workshop on MATLAB & Simulink for Engineering Applications

MATLAB®

November 17th - 19th 2025

Venue : L201 Computer Lab

Organized by

VEL TECH HIGH TECH
AICTE IDEA LAB

FOR REGISTRATION SCAN ME

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01 | ABOUT INSTITUTION

Vel Tech High Tech Dr. Rangarajan Dr. Sakunthala Engineering College (An Autonomous Institution) was established in 2002 by Col. Prof. Vel. Dr. R. Rangarajan and Dr. Sagunthala Rangarajan, who have been devoted to the field of education for over three decades. The institution is approved by AICTE, New Delhi, and affiliated with Anna University, Chennai, Tamil Nadu. The college has been accredited with an 'A' Grade and a CGPA of 3.27 by NAAC and by NBA for its Biotechnology, Chemical, ECE, and IT programs. The college boasts state-of-the-art infrastructure that provides students with practical, hands-on learning experiences, enabling them to develop essential employability skills and secure placements in top MNCs. The institution has been sanctioned an AICTE IDEA Lab with a grant of ₹90 lakhs under the AICTE's national initiative to promote Innovation, Design Thinking, and Entrepreneurship among students and faculty members. Vel Tech High Tech offers nine undergraduate programs (B.E./B.Tech) — AIDS, CSE (AIML), CSE, ECE, IT, Chemical, Biotechnology, Mechanical, and Civil Engineering — along with postgraduate programs in M.E. Structural Engineering and MBA.

02 | ABOUT WORKSHOP

This Skill Development Program is designed to provide hands-on training in MATLAB programming and Simulink -based modeling, enabling students to understand, simulate, and analyze real-time engineering systems. The program aims to strengthen computational thinking, problem-solving skills, and model-based design approaches widely used in engineering research, industrial automation, signal processing, control systems, and simulation-based analysis.

03 | WORKSHOP HIGHLIGHTS

- Hands-on practice sessions in MATLAB and Simulink
- Real-time demonstration of engineering system simulations
- Step-by-step guidance from experienced faculty
- Application-focused learning with practical examples
- Exposure to model-based design and simulation workflows

04 | WHO CAN PARTICIPATE

- UG and PG Students of Engineering and Technology
- Innovators and Enthusiasts passionate about IoT, Automation, and Smart Systems

05 | OBJECTIVES

- To familiarize students with the MATLAB environment and basic programming concepts.
- To introduce Simulink and model-based system design techniques.
- To develop analytical and computational skills for solving engineering problems.
- To enable students to simulate dynamic systems and interpret results effectively.
- To enhance readiness for research, industrial projects, and technical competitions.

06 | KEY TOPICS COVERED

- Introduction to MATLAB Interface, Commands, and Script Writing
- Vectors, Matrices, Data Handling, and Computational Operations
- Plotting and Visualization of Engineering Data
- Introduction to Simulink Blocks and Simulation Environment
- Modeling and Simulation of Dynamic Systems
- Basics of Control System Design using MATLAB & Simulink
- Real-time Case Studies and Mini Project Demonstrations

07 | Expected Outcomes

Participants will be able to:

- Ability to write MATLAB scripts and functions for engineering calculations
- Competence in building Simulink models for system simulation
- Improved analytical and simulation-based problem-solving skills
- Understanding of data visualization and result interpretation
- Confidence to apply MATLAB & Simulink tools in coursework, projects, and internships

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CHIEF PATRONS

Col. Prof. Vel. Shri. Dr. R. Rangarajan
Founder President & Chairman

Dr. Sakunthala Rangarajan
Foundress President & Vice Chairman

AICTE-IDEALAB CHIEF MENTOR

Prof. Dr. E. Kamalanaban
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AICTE-IDEALAB COORDINATOR

Prof. Dr. V. R. Ravi Dean Academics

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VEL TECH HIGH TECH -AICTE IDEA LAB

08 | OBJECTIVE

The AICTE-IDEA Lab is dedicated to fostering a dynamic ecosystem that promotes innovation, nurtures creativity, and advances technological progress in both education and society. Recently, VTHT has been sanctioned with fund of ₹90 lakhs by AICTE, New Delhi, to establish this state-of-the-art facility. The primary objective of the IDEA Lab is to transform innovative ideas into functional prototypes, which can subsequently be developed into market-ready products through startup ventures.

09 | KEY FEATURES

- **Common Facility:**
  IDEA Lab is designed as common facility within our institute, accessible to all students, faculty, and nearby Industries.
- **24/7 Availability:**
  The IDEA lab is intended to be available 24/7 for students to use.
- **Equipped with Resources:**
  IDEA Lab provides a range of sophisticated equipment and tools, including 3D printers, 3D scanners, Drones, AR/VR equipments, Embedded Edge devices with varieties of sensors, AI Edge devices, IoT kits, CNC laser cutters, and computer workstations.
- **Industry Collaboration:**
  IDEA Lab collaborates with nearby industries to leverage their resources and expertise, fostering a symbiotic relationship between academia and industry.

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STATE-OF-THE-ART LABORATORIES

- Internet of Things (IoT) Lab
- Arduino Lab
- Artificial Intelligence Lab
- Advance Manufacturing Lab
- Additive Manufacturing Lab
- Design Thinking Lab
- Reverse Engineering Lab
- AR and VR Lab
- Laser Technology Lab
- Robotics Lab
- PCB Design Lab
- Drone Lab

STATE-OF-THE-ART EQUIPMENT

WIPRO 3D PRINTER

WEGSTR PCB MILLING MACHINE

LASER CUTTING MACHINE

Industrial 3D Scanner

DRONE

ROBOT

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THREE DAYS IDEATION WORKSHOP ON
MATLAB & SIMULINK FOR ENGINEERING APPLICATIONS

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3-Day Agenda: IDEATION WORKSHOP ON
MATLAB & SIMULINK FOR ENGINEERING APPLICATIONS

DATE	TIME	AGENDA
17.11.25	08.30 -09:00	Registration
	09.00-09.30	Inaugural Session
	09.30-10.30	Introduction to MATLAB
	10.30-10.45	Tea Break
	10.45 – 12.45	MATLAB Programming Basics
	12.45 – 01.15	Lunch Break
	01.15 – 02.45	Vectors and Matrices
	02.45 – 03.30	Data Visualization
18.11.25	08.15–09.00	Recap Session
	09.00–10.30	Introduction to Simulink
	10.30 – 10.45	Tea Break
	10.45 – 12.45	Model-Based Design
	12.45 – 01.15	Lunch Break
	01.15 – 02.45	Dynamic System Modelling
	02.45 – 03.30	Modelling of PID controllers and response analysis
19.11.25	08.15–09.00	Recap Session
	09.00–10.30	Real-Time System Simulation
	10.30 – 10.45	Tea Break
	10.45 – 12.45	Mini Project Development
	12.45 – 01.15	Lunch Break
	01.15 – 02.45	Project Demonstration
	02.45 – 03.30	Assessment & Feedback
	03.30 – 04.00	Valedictory Session

CHIEF GUEST PROFILE

Dr. V. R. Ravi is a distinguished academician and researcher with over **three decades of combined academic and industrial experience**. He earned his **Bachelor's Degree in Instrumentation and Control Engineering** from **Bharathiar University** in 1988, followed by a **Master's Degree in Applied Electronics** from the prestigious **PSG College of Technology** in 1995. He obtained his **Doctorate in Process Control** from **MIT CAMPUS-Anna University, Chennai**, in 2013.

With **28 years of teaching** and **8 years of industry experience**, Dr.V.R. Ravi currently serves as a **DEAN ACADEMICS** at **Vel Tech High Tech Dr. Rangarajan Dr. Sakunthala Engineering College, Chennai**. His career reflects a deep commitment to academic excellence, research innovation, and industry–institute collaboration.

Dr.V. R. Ravi has successfully executed **Six Funded projects** worth of **Rs 1.25 Crores** sponsored by the **All India Council for Technical Education (AICTE)** and **seven industry-sponsored consultancy projects**, demonstrating his ability to translate academic research into industrial applications. In addition, he has completed **four innovative projects** worth of **Rs 8.0 Lakhs** funded by the **Department of Science and Technology (DST)** under the **Innovation and Entrepreneurship Development Centre (IEDC)** scheme.

He has made notable scholarly contributions with **11 research papers published in international journals** and **34 papers presented at international and national conferences**. His industrial exposure includes specialized training at reputed organizations such as **South India Viscose - Coimbatore**, **SPIC - Tuticorin**, **Seshasayee Paper & Boards Limited - Erode, Madras Refinery Limited – Chennai** and **National Instruments -Bangalore**.

Dr.V. R. Ravi's **areas of expertise** encompass **Process Control, Robotics and Automation, Embedded System Design, Soft Computing, Machine Learning, Internet of Things (IoT),** and **Image Processing**. His research interests focus on the integration of intelligent systems with real-time control and automation solutions.

He has been instrumental in organizing numerous **national-level workshops, seminars, short-term training programs (STTPs), and faculty development programs (FDPs)** sponsored by premier agencies such as **AICTE, DRDO, ICMR,** and **BRNS**. He has also delivered more than **24 invited lectures** at various engineering institutions across **Tamil Nadu, Karnataka,** and **Andhra Pradesh**, sharing his expertise with the academic community.

In addition to academic initiatives, Dr.V.R.Ravi has designed and conducted **value-added courses** and hands-on training programs in **LabVIEW (Core I & II)**, **MATLAB programming**, **Arduino-based applications**, and **Raspberry Pi-based embedded systems**, fostering skill development among students and faculty.

His excellence has been recognized through several prestigious honors, including the **National Merit Scholarship** from the **Ministry of Education and Social Welfare, Government of India**, and the **First Prize in the State-Level Best Project Award** from the **Directorate of Technical Education (DOTE), Tamil Nadu**, in 1988. He was also conferred with a **Gold Medal** and inducted as a **Premier Member of the "India LabVIEW Developer League"** by **National Instruments, Bangalore**, in 2010.

Dr. V. R Ravi's sustained contributions to bridging academia and industry earned him special appreciation from **DST–Texas Instruments** for fostering an ecosystem of **innovation, collaboration, and entrepreneurship** through the **India Innovation Challenge Design Contest (IICDC)** in 2018.

THREE DAYS IDEATION WORKSHOP ON
MATLAB & SIMULINK FOR ENGINEERING APPLICATIONS

DETAILED REPORT

1. Introduction

Engineering design, numerical computation, and system simulation have become crucial components of modern engineering education and industrial practice. The rapid shift toward automation, data-driven decision-making, and model-based engineering demands that students and professionals be proficient with advanced computational tools. MATLAB and Simulink, developed by MathWorks, are among the most widely used platforms for mathematical modelling, control system design, real-time simulation, signal processing, and embedded system development.

To enhance the computational capabilities and practical modelling skills of students, a **Three-Day Ideation Workshop on MATLAB & Simulink for Engineering Applications** was organized from **17th to 19th November 2025**. The workshop aimed to:

- Familiarize participants with MATLAB programming fundamentals.
- Provide hands-on training on matrix manipulation, data visualization, and numerical computation.
- Introduce the principles of dynamic system modelling using Simulink.
- Enable learners to design and analyze engineering systems, including PID controllers.
- Provide real-time simulation exposure using industry-standard workflows.
- Strengthen innovation through project-based and team-based mini-projects.

This report presents a comprehensive overview of the sessions, activities, learning outcomes, and participant feedback. It serves as a documentation of the workshop's structure, delivery, impact, and recommendations for future enhancements.

Day 1: 17 November 2025 — MATLAB Foundations

2. Registration (08:30 – 09:00)

The workshop began with participant registration at 8:30 AM. Students, scholars, and faculty members registered and received workshop materials including:

- Workshop schedule and agenda

- MATLAB reference sheets
- Notebook and pen
- Access details for MATLAB Online (if needed)

The organizing committee briefed attendees on the laboratory rules, software availability, and participation guidelines.

3. Inaugural Session (09:00 – 09:30)

The inaugural ceremony marked the official beginning of the workshop. Key events included:

3.1 Welcome Address

The program coordinator welcomed the participants and highlighted the growing relevance of computational tools in engineering design, simulation, and research.

3.2 Introduction to Workshop Objectives

Resource persons introduced the agenda, expected outcomes, and structure of the training program. Participants were encouraged to interact actively, clarify doubts, and use the opportunity to explore the full potential of MATLAB & Simulink.

3.3 Expert Remarks

Experts from the fields of mechanical, electrical, and electronics engineering briefly addressed the importance of:

- Data-driven engineering
- Model-Based Design (MBD)
- Real-time simulation and control
- Use of MATLAB in industries such as robotics, AI, power systems, and automotive engineering

The session concluded with a formal vote of thanks.

4. Introduction to MATLAB (09:30 – 10:30)

The first technical session provided a foundation for MATLAB usage.

4.1 MATLAB Environment Overview

Participants were introduced to:

- MATLAB desktop interface
- Command Window and Workspace
- Current Folder navigation
- Editor for writing scripts and functions
- Basic syntax rules

4.2 Basic Operations

The trainer demonstrated simple numerical operations and variable handling techniques. Examples included:

- Arithmetic operations
- Creating and modifying variables
- Using semicolon to suppress output
- Generating sequences using colon operator

4.3 Importance of MATLAB in Engineering

Illustrative examples included applications such as:

- Solving linear differential equations
- Simulating control systems
- Analysing experimental datasets
- Plotting sensor data
- Implementing algorithms for machine learning

This session provided basic familiarity with MATLAB as a computational tool.

5. Tea Break (10:30 – 10:45)

6. MATLAB Programming Basics (10:45 – 12:45)

This extended session focused on strengthening participants' programming skills.

6.1 Data Types and Variables

- Numeric data types
- Logical and character arrays

- Cell arrays and structures
- Variable naming conventions

6.2 Programming Constructs

Participants learned:

- Conditional statements (if, else, elseif)
- Loops (for, while)
- break and continue statements
- Writing function files
- User input functions

6.3 File Management

- Creating scripts using .m extension
- Organizing files
- Running and debugging scripts

6.4 Hands-On Activities

Exercises included:

- A program to check even/odd numbers
- A script for summing matrix elements
- Generating multiplication tables
- File I/O operations using fopen and fprintf

The hands-on methodology ensured participants learned by doing.

7. Lunch Break (12:45 – 01:15)

8. Vectors and Matrices (01:15 – 02:45)

This session emphasized MATLAB's strength as a matrix-oriented language.

8.1 Creating Matrices

- Row and column vectors
- Multi-dimensional matrices

- Matrix concatenation
- Indexing and slicing

8.2 Matrix Operations

Participants learned to perform:

- Transposition
- Determinant calculation
- Eigenvalue and eigenvector extraction
- Matrix factorization
- Solving systems of linear equations

8.3 Engineering Applications

Examples included solving:

- Circuit analysis equations
- Structural analysis matrices
- Mechanical system equations

9. Data Visualization (02:45 – 03:30)

This visual-intensive session explored MATLAB's plotting capabilities.

9.1 Basic Plots

- 2D line plots
- Scatter plots
- Bar and histogram charts

9.2 Advanced Plots

- Multi-curve plotting
- 3D surface and mesh plots
- Parametric plots

9.3 Customization

Participants practiced:

- Adding labels, legends, and titles
- Changing line styles and colors
- Saving plots in HD formats

Day 2: 18 November 2025 — Introduction to Simulink

10. Recap Session (08:15 – 09:00)

Participants reviewed the previous day's concepts. A quick quiz and interactive exercise helped consolidate:

- Matrix manipulation
- Script writing
- Plot development
- Debugging common errors

11. Introduction to Simulink (09:00 – 10:30)

This session introduced Simulink, a block-diagram environment for system modelling.

11.1 Simulink Interface

Participants learned about:

- Simulink Library Browser
- Model Editor
- Solver settings
- Simulation controls

11.2 Fundamental Blocks

Hands-on creation of models using:

- Source blocks
- Mathematical operations
- Sinks such as Scope
- Gain and integrator blocks

11.3 Creating a First Model

Participants built a simple:

- First-order system
- Step response simulation
- Signal visualization using Scope

12. Tea Break (10:30 – 10:45)

13. Model-Based Design (10:45 – 12:45)

This was an important session focusing on engineering design methodology.

13.1 Core Principles

Participants learned:

- System-level modelling
- Simulation-driven design
- Automatic verification
- Iterative refinement

13.2 Subsystems and Hierarchical Models

Resource persons demonstrated:

- Building subsystems
- Masking blocks
- Parameterizing subsystems
- Reusing components

13.3 Introduction to Stateflow

Participants were introduced to:

- Finite state machines
- State-transition diagrams
- Control logic modelling

13.4 Practical Activities

Teams developed:

- A two-tank liquid level control model
- An event-driven system using Stateflow

14. Lunch Break (12:45 – 01:15)

15. Dynamic System Modelling (01:15 – 02:45)

This advanced session explored dynamic modelling of engineering systems.

15.1 Modelling Techniques

Participants examined:

- Mechanical systems (mass-spring-damper)
- Electrical models (RLC circuits)
- Transfer function models
- State-space systems

15.2 Response Analysis

Participants learned to analyse:

- Time-domain responses
- Frequency response plots
- Step and impulse responses

16. Modelling of PID Controllers and Response Analysis (02:45 – 03:30)

16.1 PID Concepts

A detailed explanation of:

- Proportional
- Integral
- Derivative components

16.2 PID Implementation

Participants used:

- Simulink PID Controller block
- Manual and auto-tuning

- Performance metrics such as rise time, overshoot, and settling time

16.3 Real-World Applications

Examples included:

- Motor speed control
- Temperature control
- Cruise control systems

Day 3: 19 November 2025 — Simulation, Projects & Assessment

17. Recap Session (08:15 – 09:00)

The final day began with a revision of Simulink concepts. Participants corrected sample block diagrams, analyzed model errors, and reviewed tuning methods.

---

18. Real-Time System Simulation (09:00 – 10:30)

This session introduced practical real-time simulation techniques.

18.1 Concepts Covered

- Hardware-in-the-loop (HIL) simulation
- Real-time solvers
- Sample times and real-time pacing
- Simulink Desktop Real-Time

18.2 Demonstration

Participants observed how real-time constraints influence simulation fidelity and system performance in practical systems such as automotive testing and robotic control.

19. Tea Break (10:30 – 10:45)

20. Mini-Project Development (10:45 – 12:45)

Participants formed teams to develop innovative engineering models using MATLAB and Simulink.

20.1 Project Workflow

1. **Problem Identification**
2. **Model Development**
3. **Simulation Execution**
4. **Result Interpretation**
5. **Presentation Preparation**

20.2 Sample Projects

- DC motor speed control
- Projectile motion simulation
- RLC circuit transient analysis
- Cruise control system
- Solar PV model simulation
- Thermal system control
- Hydraulic system modelling

Mentors provided technical assistance to refine the logic, debugging, and documentation.

21. Lunch Break (12:45 – 01:15)

22. Project Demonstration (01:15 – 02:45)

Each team presented their projects to the panel.

22.1 Evaluation Criteria

- Innovation and creativity
- Technical accuracy
- Quality of MATLAB/Simulink implementation
- Presentation skills
- Output interpretation

Participants showcased a variety of intelligent, well-structured system models.

23. Assessment & Feedback (02:45 – 03:30)

23.1 Assessment

Participants completed:

- A written test
- A hands-on simulation task
- A coding/debugging challenge

23.2 Feedback

Participants praised:

- Practical orientation
- Problem-solving emphasis
- Quality of demonstrations
- Accessibility of resource persons

They suggested future workshops on:

- Advanced control systems
- Machine learning using MATLAB
- Simulink with embedded hardware

24. Valedictory Session (03:30 – 04:00)

The workshop concluded with a formal ceremony.

24.1 Certificate Distribution

Participants received certificates of completion.

24.2 Remarks by Faculty

Faculty congratulated participants for their enthusiasm and encouraged continuous learning.

24.3 Vote of Thanks

The session ended with appreciation for resource persons, organizers, and attendees.

25. Overall Outcomes

The workshop achieved its intended objectives effectively.

25.1 Participant Skill Development

Participants gained:

- MATLAB programming proficiency
- Knowledge of simulation workflows
- Ability to model engineering systems
- Hands-on experience with PID control
- Real-time simulation understanding
- Team-based problem-solving skills

25.2 Academic and Research Benefits

Students can now confidently apply MATLAB/Simulink for:

- Coursework and laboratory experiments
- Final year projects
- Research modelling and algorithm development

25.3 Industrial Relevance

The workshop prepared students for careers in:

- Automotive engineering
- Control systems
- Robotics
- Power systems
- Embedded systems

26. Conclusion

The **Three-Day Ideation Workshop on MATLAB & Simulink for Engineering Applications** proved to be an enriching and transformative experience for all participants. The carefully planned sessions—from MATLAB basics to advanced Simulink modelling and mini-project development—enabled learners to understand the full potential of computational engineering tools.

The workshop successfully combined theory, demonstrations, and hands-on practice, thereby equipping participants with critical skills for academic excellence and industrial readiness.

The enthusiasm displayed during project demonstrations and feedback reflects the effectiveness of the workshop structure.

The organizing committee expresses its gratitude to the experts, participants, and supporters who contributed to the success of this event. Future workshops will explore advanced domains such as optimization, machine learning using MATLAB, and real-time embedded simulation.

PARTICIPANT ATTENDANCE DETAILS

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Skill Development Program on MATLAB & Simulink for Engineering Applications

Attendance Sheet

S.No	VH Number	Student Name	Semester	Branch	17.11.2025		18.11.2025		19.11.2025	
					FN	AN	FN	AN	FN	AN
1	15341	AATHIKESAVAN J	1	ECE						
2	15358	ABDULLAH A	1	ECE						
3	15284	ABINAYA SREE V	1	ECE						
4	15309	ABISHEK E	1	ECE						
5	15359	AKASH M S	1	ECE						
6	15360	AKASH V	1	ECE						
7	15307	AKSHAYA SUJI S	1	ECE						
8	15262	ANBU SELVAN A	1	ECE						
9	15267	ANISH ADHITHYAN K B	1	ECE						
10	15340	ANTO SAM S	1	ECE						
11	15337	BABYSRI N	1	ECE						
12	15347	BALAJI S	1	ECE						
13	15271	BALAKRISHNAN R	1	ECE						
14	15301	BHARATH KAILASH V	1	ECE						
15	15369	BHAVATHARINI A	1	ECE						

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					FN	AN	FN	AN	FN	AN
16	15306	BHAVESH M	1	ECE	Bhavesh	Bhavesh	Bhavesh	Bhavesh	Bhavesh	Bhavesh
17	15294	BINO V	1	ECE	Bino.V.	Bino.V.	Bino.V.	Bino.V.	Bino.V.	Bino.V.
18	15342	CHANDRU S	1	ECE	S.Chandru	S.Chandru	S.Chandru	S.Chandru	S.Chandru	S.Chandru
19	15303	CHARLES PETER S	1	ECE	Charles Peter	Charles Peter	Charles Peter	Charles Peter	Charles Peters	Charles Peters
20	15323	DANUSH D	1	ECE	D Dnh	D Dnh	D Dnh	D Dnh	D Dnh	D Dnh
21	15361	DEEPAK K	1	ECE	Deepak K	Deepak K	Deepak	Deepak K	Deepak K	Deepak K
22	15345	DHANUSH G	1	ECE	G.Dhanush	G.Dhanush	G.Dhanush	G.Dhanush	G.Dhanush	G.Dhanush
23	15266	DHARANI E	1	ECE	E.Dharani	E.Dharani	E.Dharani	E.Dharani	E.Dharani	F.Dharani
24	15326	DHARSHINI A	1	ECE	A.dharshini	A.dharshini	A.dharshini	A.dharshini	A.dharshini	A.Dharshini
25	15322	DHINESH K	1	ECE	Dhinesh.K	Dhinesh.K	Dhinesh K	Dhinesh K	Dhinesh K	Dhinesh K.
26	15258	DIVAGAR K S	1	ECE	K.Sf	K.Sf	K.Sf	K.Sf	K.Sf	K.Sf
27	15348	EVANJALIN S	1	ECE	S.Evanjalin	S.Evanjalin	S.Evanjalin	S.Evanjalin	S.Evanjalin	S Evanjalin.
28	15251	GEO FRANKLIN S	1	ECE	S.Geofranklin	S.Geofranklin	S.Geofranklin	S.Geofranklin	S.Geofranklin	S.Geofranklin
29	15300	GIRISH K	1	ECE	Girish K	Girish K	Girish K	Girish K	Girish K	Girish K
30	15335	GOWTHAM G M	1	ECE	G.M Gowth	G.M Gowth	G.M Gowth	G.M Gowth	G.M Gowth	G.M Gowth

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					FN	AN	FN	AN	FN	AN
31	15264	GUNAL K	1	ECE						
32	15311	HARE KRISHNA P	1	ECE						
33	15292	HARIHARAN A	1	ECE						
34	15339	HARINI PRIYA T	1	ECE						
35	15265	HARISH KUMAR B	1	ECE						
36	15334	HARISH R	1	ECE						
37	15343	HARISH SRIRAM B	1	ECE						
38	15279	HARSHITHA S	1	ECE						
39	15344	HASINA M	1	ECE						
40	15277	ILHAM BEGUM N	1	ECE						
41	15288	INDRESH RAGHAV G	1	ECE						
42	15353	INIYAN RAJ I P	1	ECE						
43	15362	JAMES IGNATIUS S	1	ECE						
44	15280	JANANI R	1	ECE						
45	15290	JANARTHAN P	1	ECE						

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46	15318	JEFFRIN J	1	ECE						
47	15255	JESWANTH K	1	ECE						
48	15283	KARTHICK S	1	ECE						
49	15313	KARTHIK VEDANTH S	1	ECE						
50	15268	KARTHIKEYAN R	1	ECE						
51	15305	KAVIRAJ D	1	ECE						
52	15289	KAVIYA M	1	ECE						
53	15308	KENNETH RAJKUMAR R	1	ECE						
54	15275	KEVIN J	1	ECE						
55	15312	KIRUBANANDHAM M	1	ECE						
56	15261	KIRUTHIKA D	1	ECE						
57	15286	LATHA P K	1	ECE						
58	15256	LOKESHWARAN M K	1	ECE						
59	15257	MADHUMITHA S	1	ECE						
60	15298	MOHAN DASS S	1	ECE						

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61	15274	MOKESH P	1	ECE						
62	15278	MONISHA J	1	ECE						
63	15260	NANDHINI S	1	ECE						
64	15259	NAVEEN P	1	ECE						
65	15321	NIRANJAN S	1	ECE						
66	15330	NIRMAL P	1	ECE						

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SAMPLE CERTIFICATES

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Course Completion Certificate

Vedhigha sree K G

has successfully completed **100%** of the self-paced training course

MATLAB Onramp

DIRECTOR, TRAINING SERVICES

20 November 2025

MathWorks | Training Services

Course Completion Certificate

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Calculations with Vectors and Matrices

DIRECTOR, TRAINING SERVICES

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Simulink Onramp

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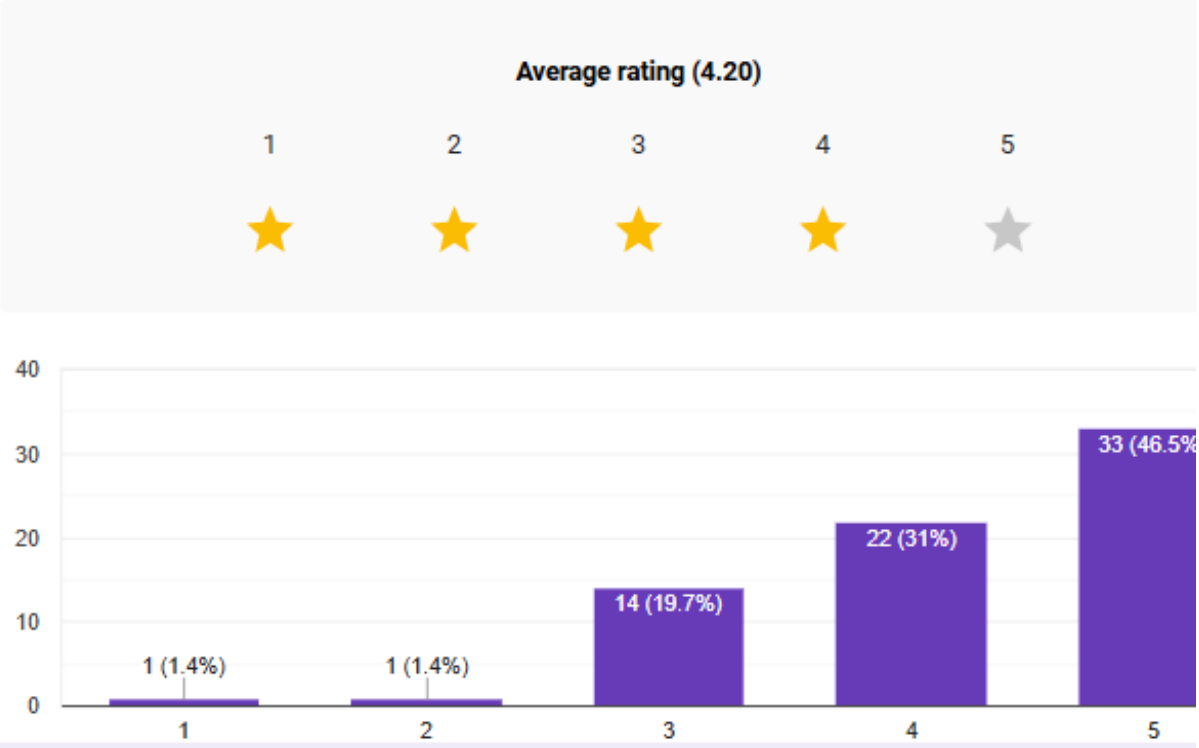
23 November 2025

PARTICIPANT FEEDBACK

1. Clarity of workshop objectives and expected learning outcomes.

71 responses



2. How would you rate the overall quality of the program

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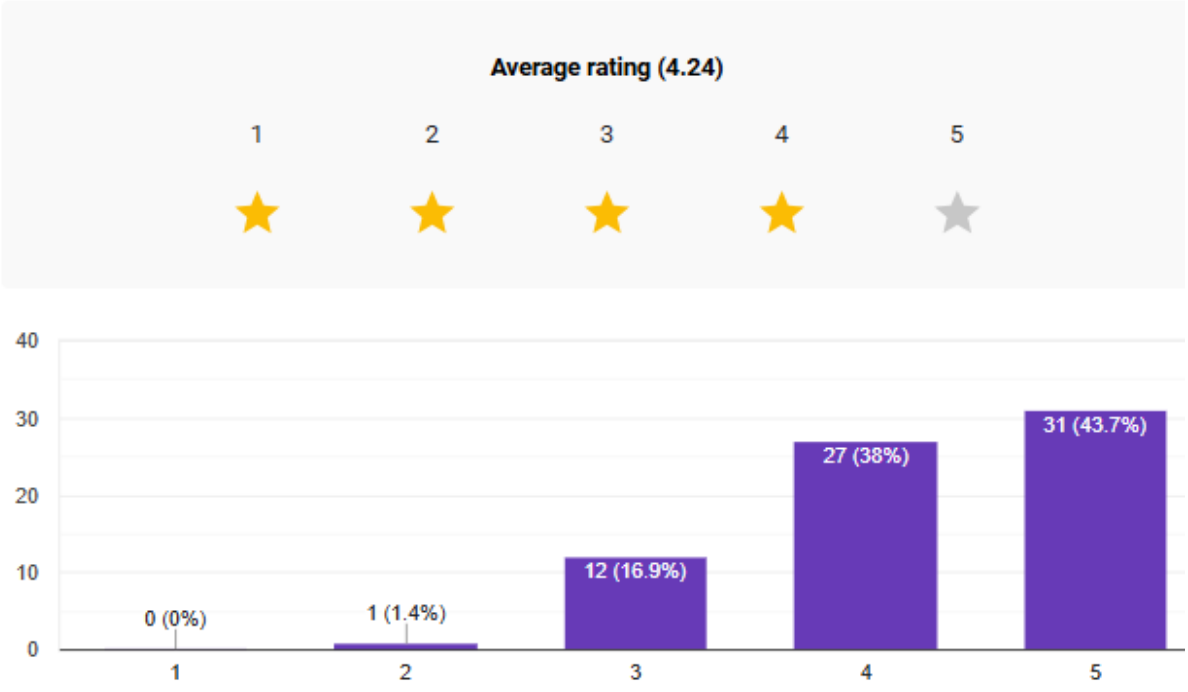
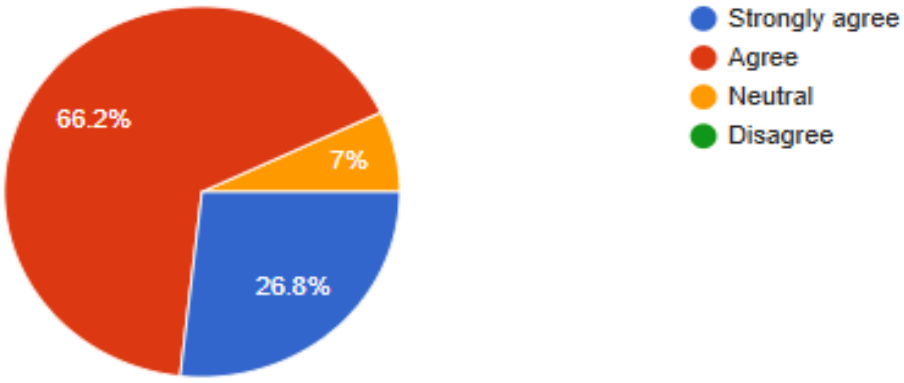
71 responses



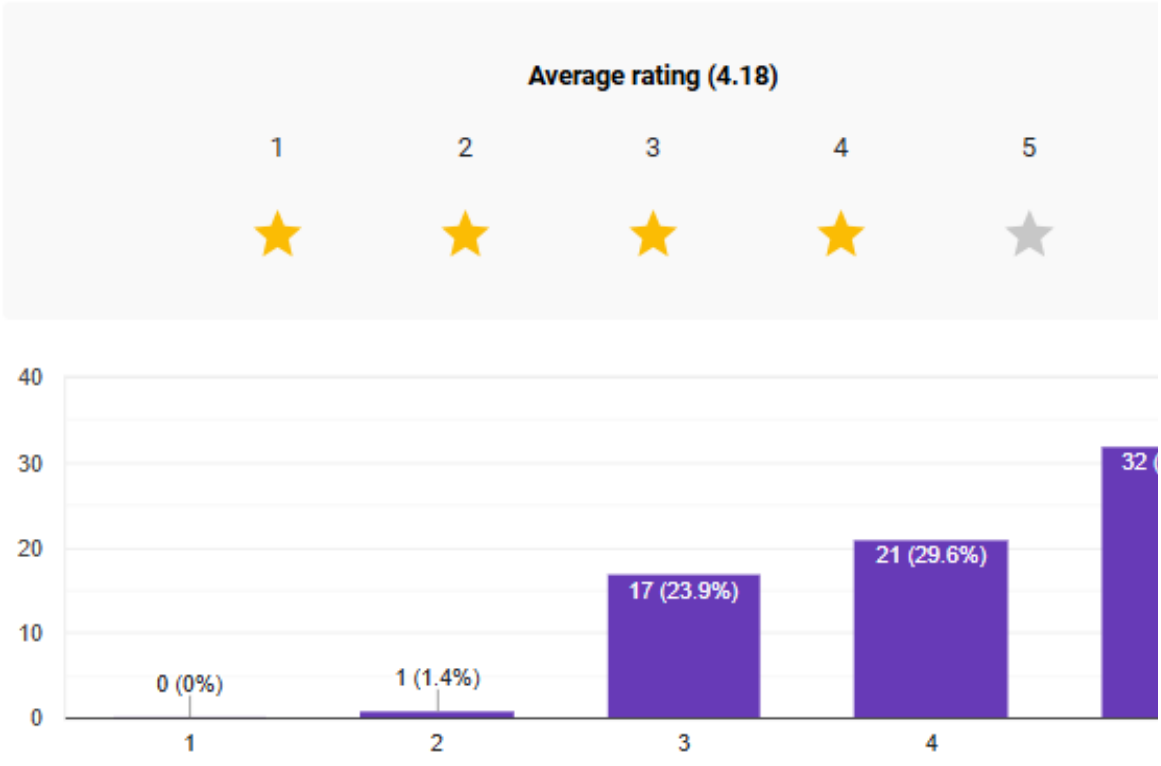
3. The topics covered in MATLAB & Simulink were relevant and useful.

71 responses



4. Rate the clarity and effectiveness of the resource person(s).

71 responses



5. How helpful were the hands-on practice sessions?

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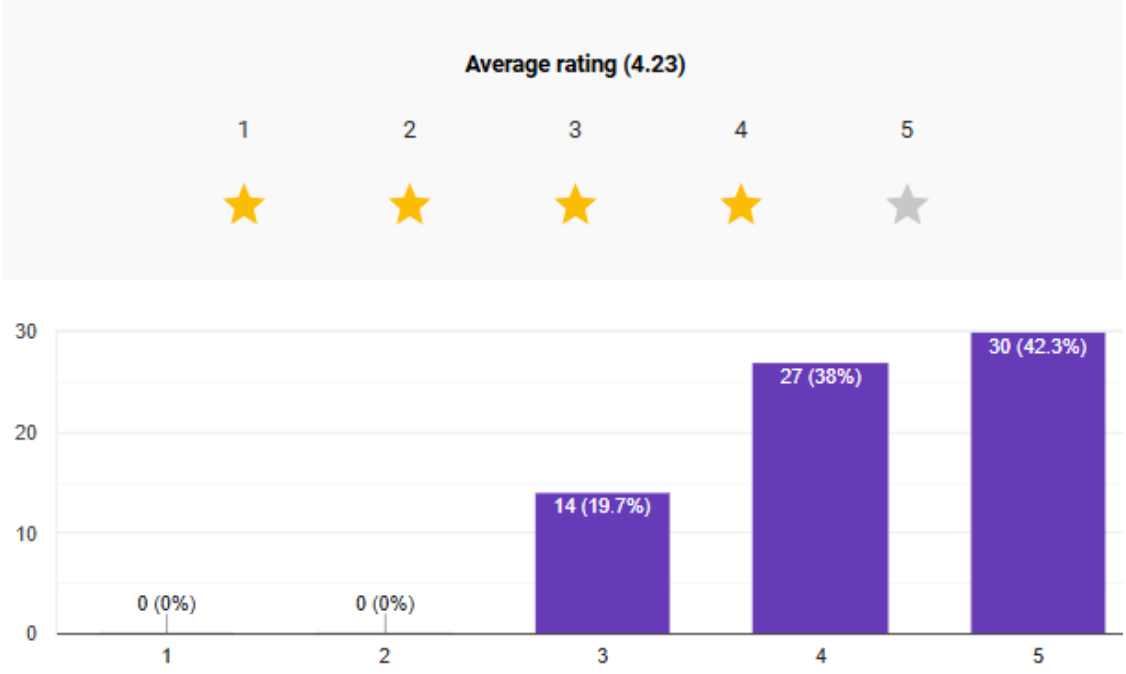
71 responses



6. How do you rate the organization and flow of the training sessions?

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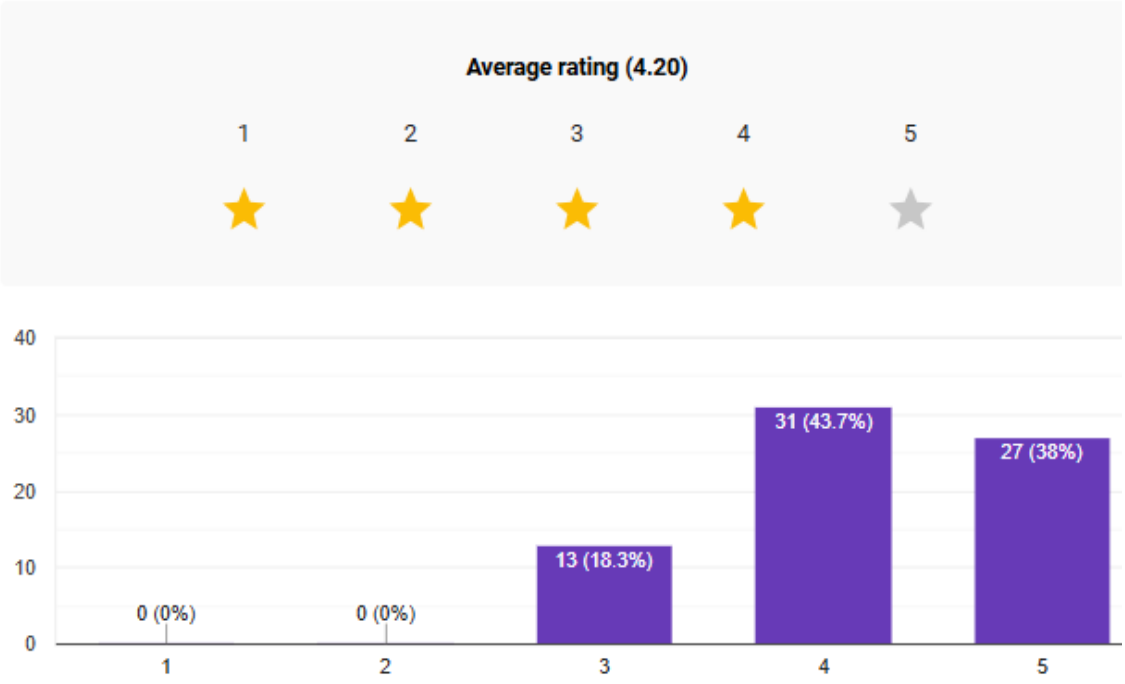
71 responses



7. I am confident in using MATLAB for engineering computations after the program.

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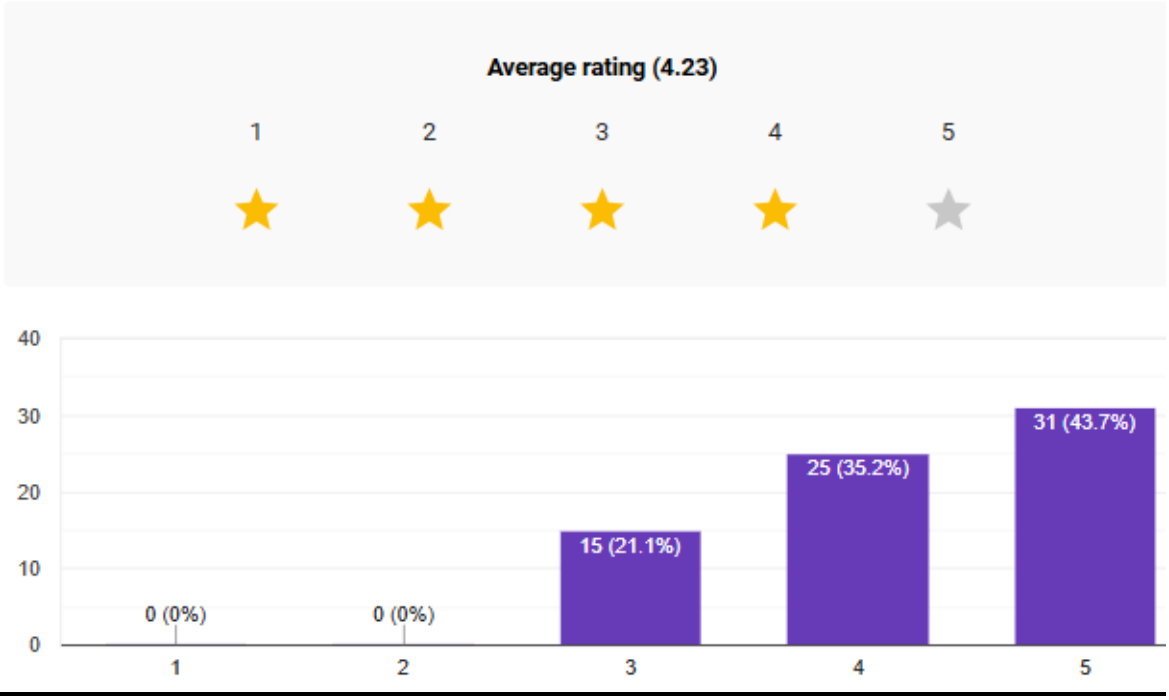
71 responses



8. I am confident in using Simulink for simulation and modeling applications.

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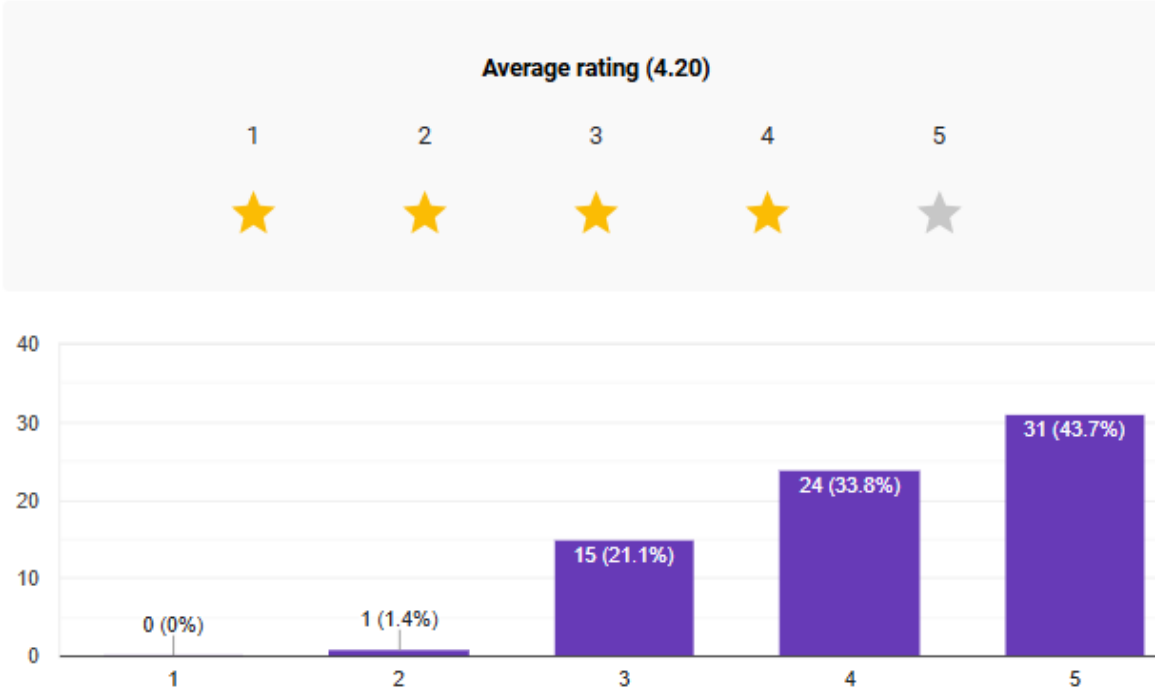
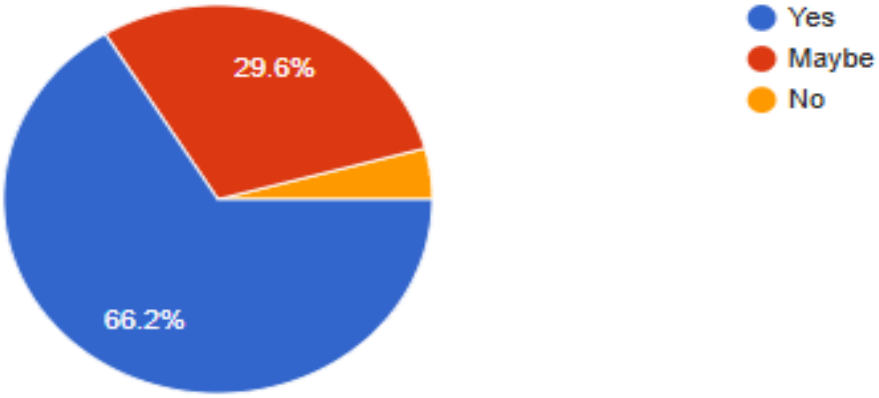
71 responses



9. Would you recommend this program to others?

71 responses



10. Overall usefulness of the program in enhancing your technical and design skills

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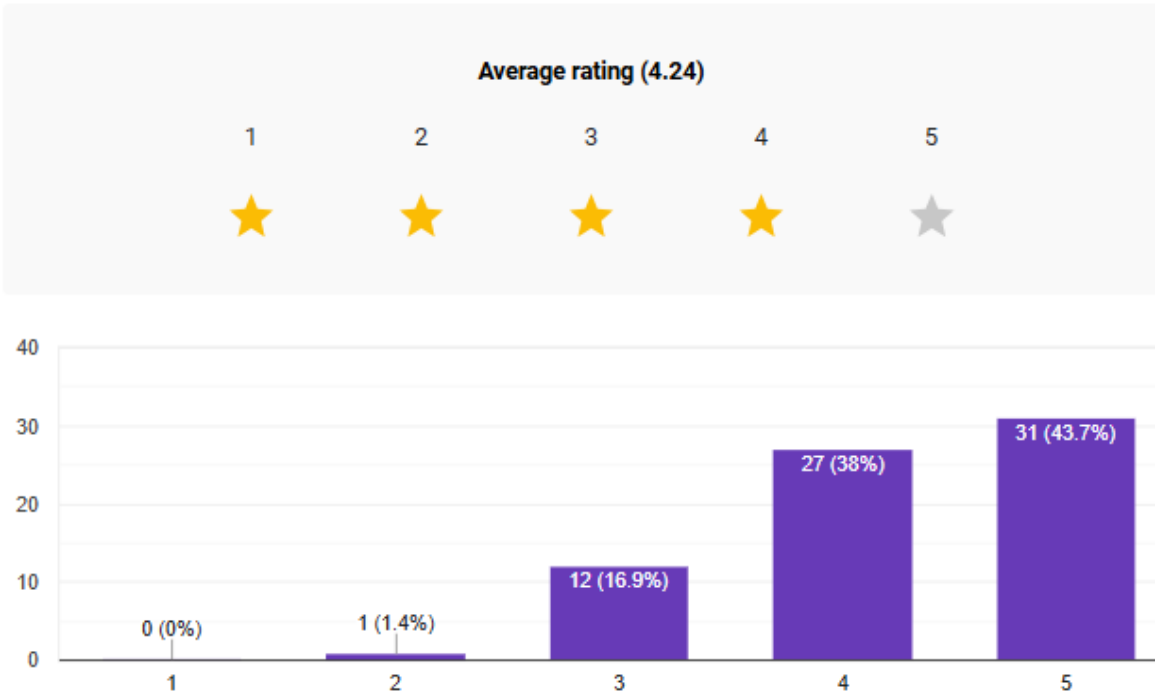
71 responses



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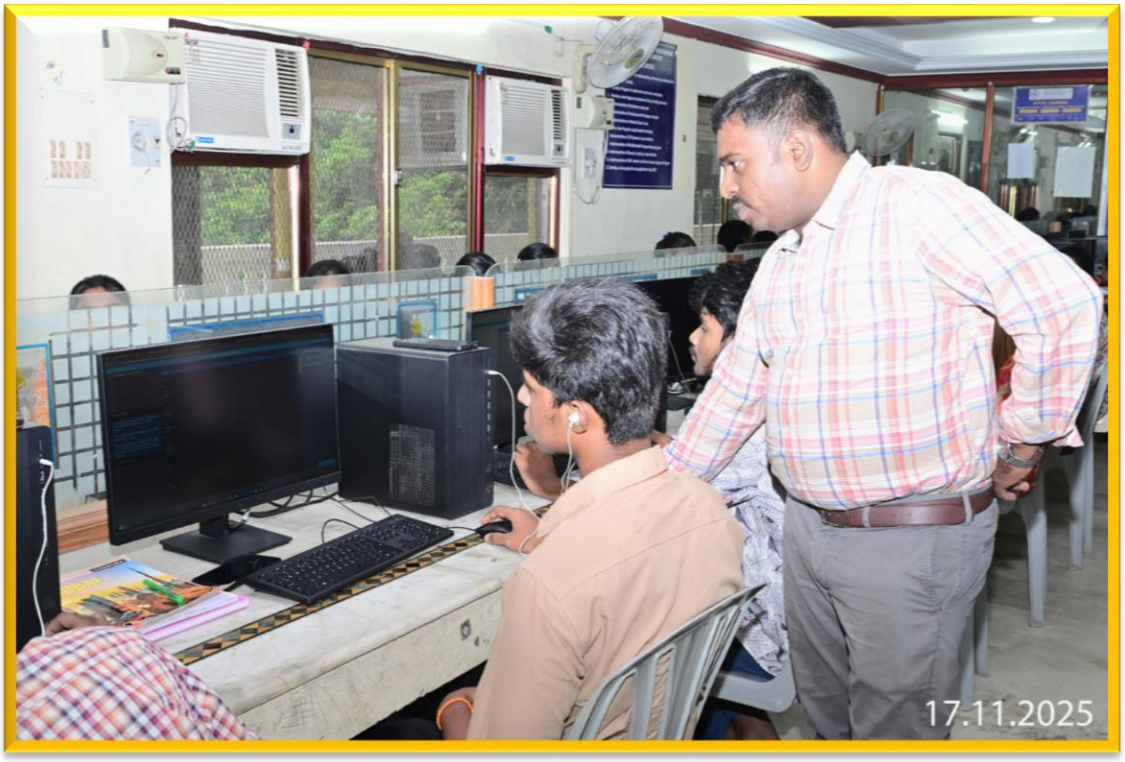


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STUDENT PROJECT

Design and Simulation of a Simple Signal Processing System Using MATLAB

1. Abstract

This project presents the design and simulation of a simple signal processing system using MATLAB. The system generates a sine wave signal, introduces random noise, and then applies a digital low-pass filter to remove unwanted noise. MATLAB is used as the simulation platform because of its powerful mathematical and visualization capabilities. The project provides hands-on experience in signal generation, noise modelling, digital filter design, and result analysis. This work helps students develop a practical understanding of Digital Signal Processing (DSP) concepts.

2. Introduction

MATLAB is a high-level programming environment widely used in engineering, mathematics, and scientific research. It provides built-in functions for matrix operations, data visualization, algorithm development, and simulation. MATLAB has become a standard tool in academia and industry for signal processing, control systems, communication systems, and machine learning.

Signal processing is the analysis, modification, and synthesis of signals such as sound, images, and biological measurements. Removing noise from signals is one of the most important tasks in signal processing. This project focuses on simulating a noise reduction system using MATLAB, which is one of the fundamental applications of DSP.

The project is designed to be simple yet effective for undergraduate students to understand the core principles of DSP using MATLAB.

3. Problem Statement

In real-world applications, signals are often corrupted by noise due to transmission errors, environmental disturbances, or hardware limitations. Noisy signals reduce the quality of communication systems and affect the accuracy of measurements in medical and industrial applications.

The challenge is to design a system that:

- Generates a clean signal
- Adds noise to simulate real-world conditions

- Uses a digital filter to reduce the noise
- Outputs a signal that is close to the original clean signal

4. Objectives

The main objectives of this project are:

- To learn basic MATLAB programming.
- To understand the process of signal generation.
- To simulate random noise.
- To design and implement a digital low-pass filter.
- To visualize and analyse signals before and after filtering.

5. Literature Review

Several researchers have studied the use of MATLAB for teaching signal processing concepts. MATLAB provides a visual learning environment that enhances students' understanding of theoretical concepts.

Digital filters are widely used in communication systems, biomedical engineering, and control systems. Butterworth filters are preferred for their smooth frequency response and ease of implementation. Previous studies have shown that simulation-based learning improves conceptual clarity and problem-solving skills among students.

This project takes inspiration from standard DSP textbooks and MATLAB documentation that emphasize hands-on learning.

6. System Architecture

Block Diagram Description

The system consists of the following functional blocks:

1. Signal Generator
2. Noise Generator
3. Adder (Signal + Noise)
4. Digital Low-Pass Filter
5. Output Display Module

Process Flow:

Clean Signal → Noise Addition → Filtering → Output Signal

7. Methodology

The project was carried out in the following steps:

Step 1: Signal Generation

A sine wave signal was generated using MATLAB with a fixed frequency and sampling rate.

Step 2: Noise Simulation

Gaussian white noise was generated and added to the clean signal.

Step 3: Filter Design

A Butterworth low-pass digital filter was designed using MATLAB functions.

Step 4: Filtering

The noisy signal was passed through the designed filter.

Step 5: Visualization

The original, noisy, and filtered signals were plotted for comparison.

8. MATLAB Implementation

```
% MATLAB Project: Simple Signal Processing System

clc;
clear all;
close all;

% Sampling parameters
fs = 1000;                % Sampling frequency
t = 0:1/fs:1;             % Time axis
f = 10;                   % Signal frequency

% Generate original signal
x = sin(2*pi*f*t);

% Add noise
noise = 0.5*randn(size(t));
xn = x + noise;

% Design Butterworth low-pass filter
fc = 20;                  % Cutoff frequency
[b,a] = butter(4, fc/(fs/2), 'low');
```

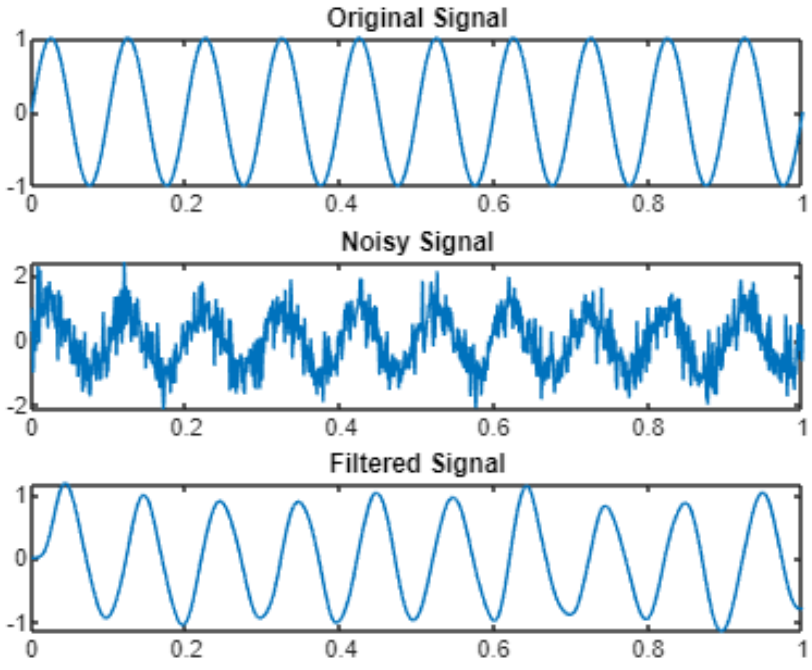
```
% Filter the noisy signal
y = filter(b, a, xn);

% Plot results
figure;

subplot(3,1,1);
plot(t, x);
title('Original Signal');

subplot(3,1,2);
plot(t, xn);
title('Noisy Signal');

subplot(3,1,3);
plot(t, y);
title('Filtered Signal');
```

9. Results

The results show three different waveforms:

- The original signal appears as a smooth sine wave.
- The noisy signal shows random fluctuations over the sine wave.
- The filtered signal is smoother and closely resembles the original signal.

The low-pass filter effectively removes high-frequency noise components while preserving the main signal.



10. Performance Analysis

The system performance was evaluated based on:

- Visual comparison of signals
- Noise reduction effectiveness
- Smoothness of the output signal

The filtering process achieved significant noise reduction without distorting the original signal.

11. Applications

This MATLAB project can be applied in:

- Audio noise reduction systems
- Communication signal clean-up
- Biomedical signal filtering
- Sensor data processing
- Control system signal conditioning

12. Challenges Faced

During the project, the following challenges were encountered:

- Selection of suitable cut-off frequency
- Understanding filter order effects
- Handling array dimension mismatches in MATLAB
- Proper signal visualization

These challenges helped in improving problem-solving and debugging skills.

13. Advantages of the Project

- Simple and easy to understand
- Requires minimal hardware
- Uses widely accepted software
- Provides strong foundation in DSP concepts

14. Limitations

- No real-time hardware implementation
- Performance depends on system resources
- Limited to basic noise and filters

15. Future Enhancements

Possible improvements include:

- Adding adaptive filtering techniques
- Creating a graphical user interface (GUI)
- Real-time processing using audio input
- Simulink-based implementation

16. Conclusion

This project successfully demonstrated the design and simulation of a simple signal processing system using MATLAB. It helped in understanding fundamental DSP concepts such as signal generation, noise modeling, and digital filtering. The project serves as a strong learning tool for students starting with MATLAB and signal processing.

17. References

1. MATLAB User Guide – MathWorks
2. Proakis, J.G., *Digital Signal Processing: Principles, Algorithms, and Applications*
3. Oppenheim, A.V., *Signals and Systems*

EXPENSE STATEMENT

S.NO	ITEM DESCRIPTION	DATE	BILL NO	AMOUNT (Rs)
1	Banner	16.11.2025	19340	250
2	Report	19.11.25		230
	Total			480

Prof. Dr. R. SURESH
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Prof. Dr. V.R. RAVI
AICTE IDEA LAB – COORDINATOR

Prof. Dr. E. KAMALANABAN
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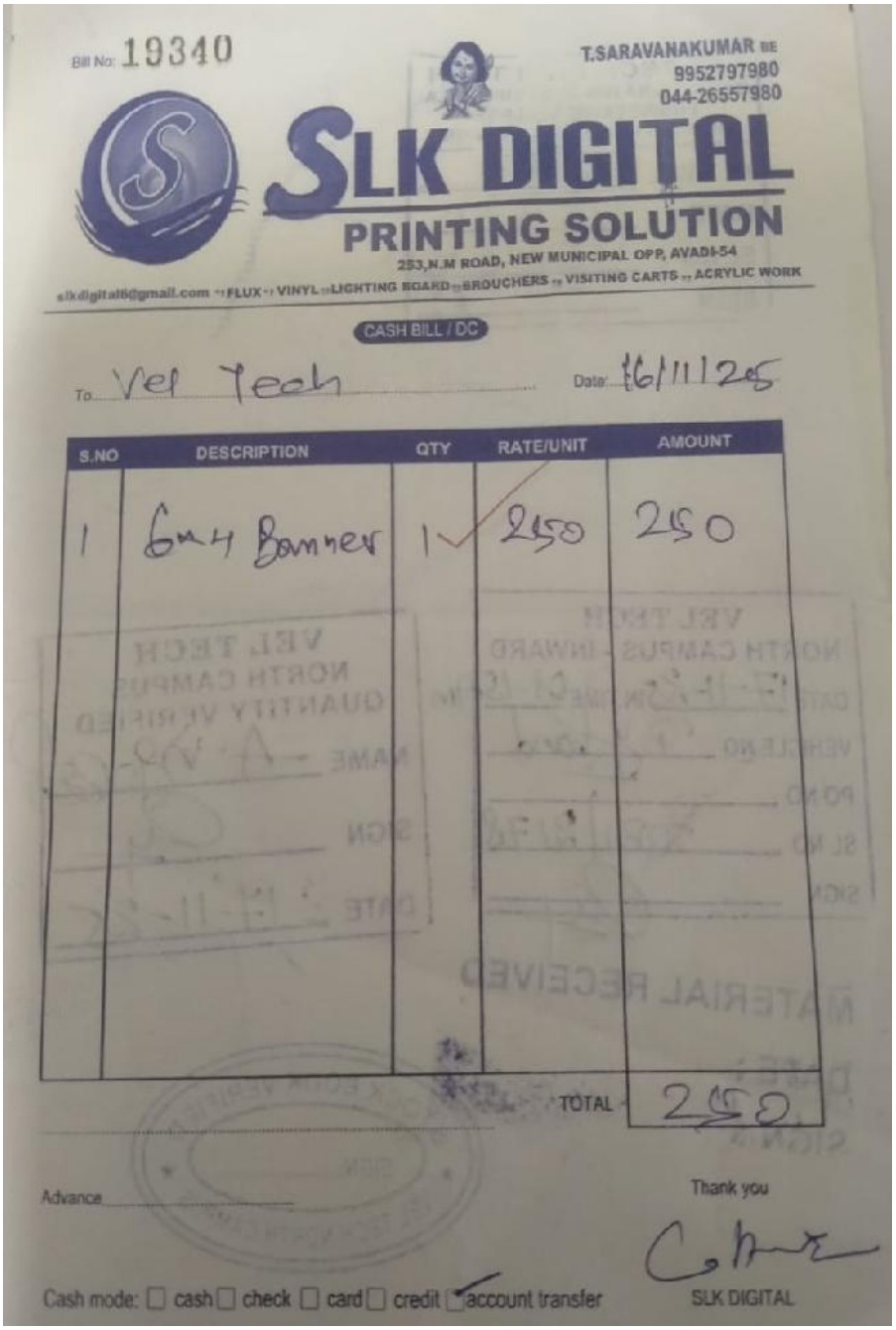

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CASH BILL / DC

To. Vel Tech Date: 16/11/25

S.NO	DESCRIPTION	QTY	RATE/UNIT	AMOUNT
1	6x4 Banner	1	250	250
			TOTAL	250

Advance

Thank you

Cash mode: ☐ cash ☐ check ☐ card ☐ credit ☑ account transfer

SLK DIGITAL