Department of Electronics and Communication Engineering

Faculty Readiness Programme Report On

Electromagnetic Fields, Waves and Transmission Lines

FACULTY READINESS PROGRAMME REPORT

ON

ELECTROMAGNETIC FIELDS, WAVES AND TRANSMISSION LINES

Organized by

Department of Electronics and Communication Engineering (ECE)

Department of Electrical and Electronics Engineering (EEE)

NARSIMHA REDDY ENGINEERING COLLEGE,

Maisammaguda (V), Kompally,

Secundrabad - 500100,

Telangana State, India

Date of Conduct:

01 June 2026 – 02 June 2026

Resource Person:

Dr V. Purandhar Reddy
Head of the Department,
Electronics and Communication Engineering

1. INTRODUCTION

Faculty development is a critical component of quality enhancement in engineering education. Rapid advancements in science and technology demand continuous upgradation of faculty knowledge, teaching methodologies, and technical competencies. In alignment with Outcome Based Education (OBE) practices, the Department of Electronics and Communication Engineering and the Department of Electrical and

Electronics Engineering jointly organized a two-day Faculty Readiness Programme (FRP) on "Electromagnetic Fields, Waves and Transmission Lines" on 1st and 2nd June 2026.

Electromagnetic Field Theory forms the foundation for numerous engineering applications including wireless communication, microwave engineering, antenna systems, satellite communication, radar systems, optical communication, power systems, and modern electronic devices. Understanding the mathematical and physical principles governing electromagnetic phenomena is essential for faculty members involved in teaching undergraduate engineering courses.

The programme was designed to strengthen the conceptual understanding of faculty members and equip them with effective pedagogical approaches for teaching Electromagnetic Fields and Transmission Lines. The sessions covered fundamental mathematical tools, electrostatic and magnetostatic field theories, Maxwell's equations, electromagnetic wave propagation, transmission line analysis, and impedance matching techniques.

The programme provided a platform for faculty members to revisit core concepts, clarify advanced topics, discuss practical applications, and exchange teaching strategies. The sessions were highly interactive and focused on both theoretical foundations and application-oriented learning.

2. OBJECTIVES OF THE PROGRAMME

The Faculty Readiness Programme was organized with the following objectives:

1. To strengthen the theoretical foundations of Electromagnetic Field Theory among faculty members.
2. To enhance understanding of vector analysis and coordinate systems used in electromagnetic field computations.
3. To provide a comprehensive review of electrostatic and magnetostatic principles.
4. To explain Maxwell's equations and their significance in electromagnetic wave propagation.

5. To familiarize faculty members with reflection, refraction, and propagation characteristics of electromagnetic waves.
6. To provide in-depth knowledge of transmission line theory and practical engineering applications.
7. To improve faculty competency in handling advanced undergraduate courses related to electromagnetics.
8. To facilitate effective classroom delivery using outcome-based educational practices.
9. To support curriculum implementation and continuous improvement initiatives.
10. To encourage analytical thinking and application-oriented teaching methodologies.

3. NEED FOR THE PROGRAMME

Electromagnetic Fields and Waves is considered one of the most mathematically intensive and conceptually challenging subjects in engineering curricula. Students often encounter difficulties in understanding vector calculus, field interactions, wave propagation mechanisms, and transmission line concepts.

To address these challenges effectively, faculty members must possess strong subject expertise and adopt innovative instructional methodologies. The Faculty Readiness Programme was therefore organized to:

- Improve conceptual clarity.
- Enhance classroom effectiveness.
- Promote active learning strategies.
- Align teaching practices with OBE standards.
- Improve student learning outcomes.
- Encourage interdisciplinary understanding of electromagnetic applications.

The programme also aimed to bridge the gap between theoretical formulations and practical engineering implementations.

4. DETAILS OF THE PROGRAMME

Particulars	Details
Programme Title	Faculty Readiness Programme on Electromagnetic Fields, Waves and Transmission Lines
Duration	Two Days
Dates	01 June 2026 – 02 June 2026
Venue	Department of ECE Seminar Hall
Organizing Departments	ECE & EEE
Resource Person	Dr. V. Purandhar Reddy
Target Audience	Faculty Members of ECE and EEE
Mode of Conduct	Offline
Sessions	Four Technical Sessions

5. INAUGURAL SESSION

The programme commenced with a formal inaugural session attended by faculty members from ECE and EEE departments. The organizing team welcomed all participants and emphasized the importance of continuous faculty development in maintaining academic excellence.

The significance of Electromagnetic Field Theory in modern engineering education was highlighted. Faculty members were encouraged to actively participate in discussions, raise conceptual questions, and share classroom experiences.

The resource person, Dr. V. Purandhar Reddy, provided an overview of the programme structure and outlined the learning outcomes expected from each session.

6. SESSION-WISE REPORT

DAY – 1

01 June 2026

SESSION I

Vector Analysis

Forenoon Session

The first technical session focused on Vector Analysis, which serves as the mathematical language of electromagnetics.

The resource person explained the necessity of vector calculus in understanding electromagnetic phenomena. Different coordinate systems were discussed in detail, emphasizing their applicability in solving engineering problems with varying geometrical symmetries.

The following topics were covered:

Coordinate Systems

- Cartesian Coordinate System
- Cylindrical Coordinate System
- Spherical Coordinate System

The transformation relationships among coordinate systems were explained with illustrative examples.

Vector Calculus

Detailed discussion was carried out on:

- Differential Length Elements

- Differential Surface Elements
- Differential Volume Elements
- Del Operator
- Gradient
- Divergence
- Curl

The physical significance of each vector operator was explained using practical examples.

Integral Theorems

The resource person elaborated on:

- Divergence Theorem
- Stokes' Theorem

Several engineering applications were demonstrated to show how these theorems simplify electromagnetic field analysis.

The session concluded with numerical examples and interactive problem-solving exercises.

SESSION II

Electromagnetic Fields

Afternoon Session

The second session focused on Electrostatics and Magnetostatics.

The concepts of electric charge, electric field intensity, and electric flux were introduced. The relationship between charges and fields was discussed using Coulomb's law.

Electrostatics

Topics covered included:

- Coulomb's Law

- Electric Field Intensity
- Electric Flux Density
- Gauss's Law
- Electric Potential
- Potential Difference

The resource person demonstrated field distributions for various charge configurations.

Magnetostatics

The session then transitioned to magnetic field theory covering:

- Biot-Savart Law
- Magnetic Flux Density
- Ampere's Circuital Law
- Magnetic Field Intensity

Practical examples involving current carrying conductors and magnetic circuits were discussed.

Boundary Conditions

Special emphasis was given to electromagnetic boundary conditions involving:

- Dielectric-Dielectric Interfaces
- Dielectric-Conductor Interfaces

The significance of boundary conditions in wave propagation and antenna design was explained.

The session concluded with a discussion on real-world applications in communication systems and electrical engineering.

DAY – 2

02 June 2026

SESSION III

Electromagnetic Waves

Forenoon Session

The third session dealt with Electromagnetic Wave Theory.

The session began with the derivation and interpretation of Maxwell's Equations.

Maxwell's Equations

The following equations were discussed:

- Gauss Law for Electric Fields
- Gauss Law for Magnetic Fields
- Faraday's Law
- Ampere-Maxwell Law

The physical interpretation of each equation was explained thoroughly.

Wave Equations

The resource person derived the electromagnetic wave equation from Maxwell's equations and demonstrated how electric and magnetic fields propagate through space.

Topics included:

- Uniform Plane Waves
- Wave Velocity
- Intrinsic Impedance
- Polarization

Poynting Vector

The concept of electromagnetic power flow was introduced through:

- Poynting Vector
- Power Density
- Energy Transport

Reflection and Refraction

The propagation of waves across media interfaces was explained through:

- Reflection Coefficients
- Refraction Mechanisms
- Oblique Incidence

Practical examples related to wireless communication and radar systems were discussed.

SESSION IV

Transmission Lines

Afternoon Session

The final session focused on Transmission Line Theory.

The importance of transmission lines in communication and power systems was emphasized.

Primary Constants

The following parameters were discussed:

- Resistance (R)
- Inductance (L)
- Conductance (G)
- Capacitance (C)

Secondary Constants

Derivations and significance of:

- Attenuation Constant
- Phase Constant
- Characteristic Impedance

were explained in detail.

Lossless Transmission Lines

The resource person presented mathematical models and engineering applications.

Input Impedance

Concepts covered included:

- Input Impedance Calculation
- Reflection Coefficient
- Standing Waves

VSWR

The derivation and significance of Voltage Standing Wave Ratio (VSWR) were discussed.

Smith Chart

Faculty members were trained on:

- Smith Chart Construction
- Impedance Matching
- Admittance Calculations

The session included practical examples commonly encountered in microwave engineering and RF communication systems.

The programme concluded with a comprehensive discussion and question-answer session.

7. TEACHING METHODOLOGY ADOPTED

The programme adopted multiple teaching strategies to maximize learning effectiveness:

- Expert Lectures
- Conceptual Discussions
- Mathematical Derivations
- Demonstrative Illustrations
- Numerical Problem Solving
- Interactive Question and Answer Sessions
- Application-Oriented Explanations
- Peer Learning Discussions

The blended methodology ensured active participation and deeper conceptual understanding.

8. LEARNING OUTCOMES

At the end of the programme, participants were able to:

1. Apply vector calculus concepts to electromagnetic field problems.
2. Analyze electrostatic and magnetostatic field distributions.
3. Explain Maxwell's equations and their engineering significance.
4. Derive and interpret electromagnetic wave equations.
5. Analyze electromagnetic wave propagation in different media.
6. Understand reflection and refraction phenomena.
7. Evaluate transmission line parameters and performance.
8. Calculate characteristic impedance and reflection coefficients.

9. Use Smith Charts for impedance matching applications.
10. Deliver course content more effectively using outcome-based approaches.

9. IMPACT OF THE PROGRAMME

The Faculty Readiness Programme significantly enhanced faculty preparedness for teaching electromagnetics-related subjects.

The programme resulted in:

- Improved subject competency.
- Better curriculum delivery.
- Enhanced confidence in handling advanced topics.
- Increased faculty engagement.
- Stronger alignment with OBE requirements.
- Better preparedness for laboratory and project guidance.

Faculty members appreciated the structured progression from mathematical foundations to advanced transmission line applications.

10. RELEVANCE TO OUTCOME BASED EDUCATION

The programme contributes directly to OBE

Faculty Information and Contributions

- Faculty competency enhancement.
- Subject knowledge upgradation.
- Professional development.

Facilities and Technical Support

- Effective utilization of laboratories.
- Enhanced practical instruction.

Continuous Improvement

- Faculty skill development.
- Curriculum enrichment initiatives.

First Year Academics / Programme Criteria

- Improved teaching effectiveness.
- Better attainment of Course Outcomes.

Student Support Systems

- Indirect improvement in student learning experiences.

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11. FEEDBACK ANALYSIS

Feedback collected from participants indicated high levels of satisfaction.

Major observations included:

- Excellent content organisation.
- Strong conceptual clarity.
- Effective teaching methodology.
- Practical relevance of examples.
- Interactive and engaging sessions.
- Useful discussions on transmission line applications.

Overall participant feedback indicated that the programme successfully met its objectives.

Overall Rating:

Excellent

12. RECOMMENDATIONS

Based on participant feedback, the following recommendations were made:

1. Conduct advanced FRPs on Microwave Engineering.
2. Organize simulation-based workshops using HFSS and CST.
3. Introduce antenna design sessions.
4. Include laboratory demonstrations.
5. Conduct interdisciplinary faculty development programmes.
6. Organize periodic refresher programmes for core subjects.

13. CONCLUSION

The Faculty Readiness Programme on "Electromagnetic Fields, Waves and Transmission Lines" successfully achieved its intended objectives by strengthening faculty knowledge and enhancing instructional capabilities. The programme provided a comprehensive understanding of fundamental electromagnetic concepts, wave propagation mechanisms, and transmission line analysis techniques.

The sessions effectively combined theoretical foundations, mathematical rigor, engineering applications, and pedagogical insights. Faculty members gained valuable knowledge that will contribute to improved classroom instruction, better student outcomes, and enhanced academic quality.

The programme also reinforced the institution's commitment to continuous faculty development, and Outcome-Based Education. The active participation and positive feedback from faculty members reflected the success and relevance of the initiative.

The Department of ECE and EEE express sincere gratitude to Dr. V. Purandhar Reddy for his expert guidance and valuable contributions in making the Faculty Readiness Programme a grand success.

ANNEXURES

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Annexure-III : Faculty Attendance Sheets

Annexure-IV : Participant Feedback Forms

Annexure-V : Session-wise Photographs

Annexure-VI : Resource Person Profile

Annexure-VII : Outcome Assessment Summary

Coordinator
Faculty Readiness Programme
Department of ECE & EEE

Dr. V. Purandhar Reddy
Head, Department of ECE

Principal
Narsimha Reddy Engineering College
Hyderabad

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NARSIMHA REDDY ENGINEERING COLLEGE
UGC AUTONOMOUS
Sy.No. 518, Maisammaguda (V), Dhulapally (P)
Medchal (M & Dist.), Hyderabad-500100. T.

Annexure-I : Programme Brochure

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING (ECE)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING (EEE)

CIRCULAR

Date: 28-05-2026

Faculty Readiness Programme (FRP)

All the faculty members of the Departments of Electronics and Communication Engineering (ECE) and Electrical and Electronics Engineering (EEE) are hereby informed that a **Faculty Readiness Programme (FRP)** on **"Electromagnetic Fields, Waves and Transmission Lines"** is being organized to enhance subject knowledge, strengthen teaching effectiveness, and facilitate effective curriculum delivery for the upcoming semester.

The programme will focus on fundamental and advanced concepts of Electromagnetic Field Theory, Electromagnetic Wave Propagation, and Transmission Line Analysis, which are essential for faculty handling courses related to communication systems, microwave engineering, antennas, and related domains.

Programme Details

Particulars	**Details**
Programme Title	Faculty Readiness Programme on Electromagnetic Fields, Waves and Transmission Lines
Dates	01 June 2026 – 02 June 2026
Time	09:30 AM – 04:30 PM
Venue	ECE Seminar Hall
Resource Person	**Dr. V. Purandhar Reddy**
Designation	Head of the Department, ECE
Participants	Faculty Members of ECE & EEE

Schedule

Day – 1 (01 June 2026)

Forenoon Session

- Vector Analysis
- Coordinate Systems
- Vector Calculus
- Divergence and Stokes' Theorems

Afternoon Session

- Electrostatics
- Magnetostatics
- Boundary Conditions

Day – 2 (02 June 2026)

Forenoon Session

- Maxwell's Equations
- Electromagnetic Waves
- Poynting Theorem
- Reflection and Refraction

Afternoon Session

- Transmission Line Parameters
- Input Impedance
- Reflection Coefficient
- VSWR
- Smith Chart Applications

Instructions

1. All faculty members of ECE and EEE Departments are requested to attend the programme without fail.
2. Participants are advised to be present at the venue 15 minutes before the commencement of each session.
3. Attendance will be recorded for all sessions.
4. Active participation in discussions and technical interactions is encouraged.
5. Certificates of participation will be issued to all attendees.

The programme aims to strengthen faculty preparedness and promote excellence in teaching-learning practices in accordance with Outcome Based Education (OBE) and NBA accreditation requirements.

Coordinator
Faculty Readiness Programme
Department of ECE & EEE

Dr. V. Puranadhar Reddy
Head, Department of ECE
ELECTRONICS & COMMUNICATION ENGINEERING
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Principal
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NARSIMHA REDDY ENGINEERING COLLEGE
An Autonomous Institution| Affiliated to JNTUH | Approved by AICTE
Accredited by NBA & NAAC with 'A' Grade

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMME ON ELECTROMAGNETIC FIELDS, WAVES, AND TRANSMISSION LINES

ATTENDANCE SHEET

S.NO	Name of the Faculty	1/6/2026		2/6/2026	
		FN	AN	FN	AN
1	Dr. C. Sasikala				
2	A. Lakshmi Devi				
3	CH. Prasanna				
4	M. Mounika				
5	M. Nataraj				
6	V. Pradeep Kumar				
7	P. Lalitha Madhuri				
8	Dr N Adithya Valli				
9	Dr G Naga Jyothi Sree				
10	Dileep Alluri				
11	G Joy Sangeet Raj				
12	N Pavithra				
13	B. Raju				
14	B. Sunny Manohar				
15	M. Sudhakar				
16	K. Anuradha				
17	M. Sreedhar Reddy				
18	G Sujana				
19	K V Siva Nagalakshmi				
20	P. Bhagyalakshmi				

21	M. Saisree				
22	P Roja				
23	Y. Mary Manikya Veena				
24	K Karthik				
25	P. Siva Kalyani				
26	Dr. m. shoban				
27	V. Nagaraju				
28	Dr. B. Sambaiah				
29					
30					

HEAD OF THE DEPARTMENT
ECE

HEAD OF THE DEPARTMENT
ELECTRONICS & COMMUNICATION ENGINEERING
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NARSIMHA REDDY ENGINEERING COLLEGE

Department of ECE & EEE

FACULTY READINESS PROGRAMME (FRP)

FEEDBACK & OUTCOME ASSESSMENT FORM

Programme Title: EMTL And IOT (FRP)

Name of Participant: Dr. C. Sasikala	Date: 02/06/26
Department: EEE	Designation: Associate professor

PART A: PROGRAMME FEEDBACK

Rating Scale: 5-Excellent 4-Very Good 3-Good 2-Fair 1-Poor

S.No	Parameter	Rating (1–5)
1	Relevance of the Programme	5
2	Quality of Content	5
3	Effectiveness of Resource Person	5
4	Clarity of Explanations	5
5	Interaction and Discussions	5
6	Usefulness for Teaching	5
7	Organization of the Programme	5
8	Overall Satisfaction	5

PART B: SELF-ASSESSMENT

Confidence Level After Attending the Programme

Learning Outcome	High	Moderate	Low
Understanding Electromagnetic Fields	✓		
Understanding Maxwell's Equations	✓		
Understanding Wave Propagation	✓		
Understanding Transmission Lines	✓		
Teaching the Subject Effectively	✓		
Applying OBE Concepts	✓		

Overall Preparedness

Highly Prepared Moderately Prepared Need Further Training

1

PART C: PROGRAMME EVALUATION

1. Did the programme meet its objectives?
Fully Achieved ✓ Partially Achieved Not Achieved

2. Was the programme useful for curriculum delivery?
Strongly Agree ✓ Agree Neutral Disagree

3. Would you recommend similar programmes in future?
Yes ✓ No

4. Overall Evaluation
Excellent ✓ Very Good Good Fair

PART D: REFLECTIONS & SUGGESTIONS

Key Learnings from the Programme

Fields, Electrostatics

Suggestions for Improvement / Future Programmes

—

Topics Suggested for Future FRPs

Verilog

Participant Signature: Cdn

Date: 02/06/26

Thank You for Your Valuable [illegible]

[redacted] NRCM ENGINEERING COLLEGE

NARSIMHA REDDY ENGINEERING COLLEGE

Department of ECE & EEE

FACULTY READINESS PROGRAMME (FRP)

FEEDBACK & OUTCOME ASSESSMENT FORM

Programme Title: Electromagnetic waves & Transmission line

Name of Participant: A. Lakshmidevi	Date: 02/06/26
Department: EEE	Designation: Asst. prof.

PART A: PROGRAMME FEEDBACK

Rating Scale: 5-Excellent 4-Very Good 3-Good 2-Fair 1-Poor

S.No	Parameter	Rating (1–5)
1	Relevance of the Programme	5
2	Quality of Content	5
3	Effectiveness of Resource Person	5
4	Clarity of Explanations	5
5	Interaction and Discussions	4
6	Usefulness for Teaching	5
7	Organization of the Programme	5
8	Overall Satisfaction	5

PART B: SELF-ASSESSMENT

Confidence Level After Attending the Programme

Learning Outcome	High	Moderate	Low
Understanding Electromagnetic Fields	✓		
Understanding Maxwell's Equations	—		
Understanding Wave Propagation		—	
Understanding Transmission Lines		—	
Teaching the Subject Effectively	—		
Applying OBE Concepts	✓		

Overall Preparedness

Highly Prepared ✓ Moderately Prepared Need Further Training

PART C: PROGRAMME EVALUATION

1. Did the programme meet its objectives?
Fully Achieved Partially Achieved Not Achieved

2. Was the programme useful for curriculum delivery?
Strongly Agree Agree Neutral Disagree

3. Would you recommend similar programmes in future?
Yes No

4. Overall Evaluation
Excellent Very Good Good Fair

PART D: REFLECTIONS & SUGGESTIONS

Key Learnings from the Programme

Complex topics and Calculations

Suggestions for Improvement / Future Programmes

No

Topics Suggested for Future FRPs

Image processing & VLSI

Participant Signature: [signature]

Date: 02/06/26

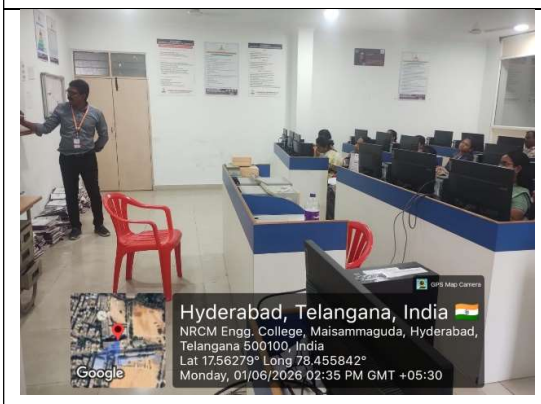
Thank You for Your Valuable Feedback

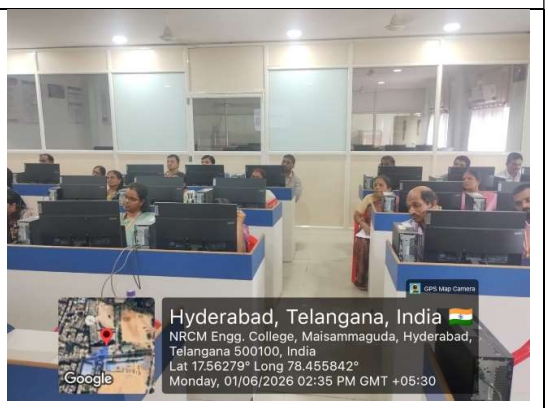
2

Annexure-V : Session-wise Photographs

SESSION-1

SESSION-2





SESSION-3

SESSION-4

Head of the Department

HEAD OF THE DEPARTMENT
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Faculty Readiness Programme (FRP) – Resource Person Profile

Dr. V. Purandhar Reddy

Professor & Head, Department of Electronics and Communication Engineering (ECE)
Narsimha Reddy Engineering College, Hyderabad

Dr. V. Purandhar Reddy is a distinguished academician, researcher, and administrator with more than **20 years of teaching, research, and academic leadership experience** in the field of Electronics and Communication Engineering. He currently serves as the **Head of the Department, ECE**, at Narsimha Reddy Engineering College, where he actively contributes to academic excellence, outcome-based education, research promotion, and institutional development.

He obtained his **Doctor of Philosophy (Ph.D.) from Vellore Institute of Technology (VIT), Vellore**, specializing in **Visual Object Tracking, Computer Vision, and Artificial Intelligence**. His doctoral research focused on developing advanced image processing and deep learning techniques for robust object tracking applications.

Throughout his academic career, Dr. Purandhar Reddy has successfully held several leadership positions, including **Head of the Department** and **Controller of Examinations**, demonstrating exceptional capabilities in academic administration, curriculum planning, accreditation activities, and quality assurance processes. His commitment to academic excellence was recognized with the **University Topper Award from Anna University**, and he was later honored with the **Innovative Researcher Award by the Computer Society of India (CSI)** for his outstanding research contributions.

As an active researcher, Dr. Purandhar Reddy has published numerous research papers in **SCI, Scopus-indexed, and peer-reviewed international journals**. His research interests include:

- Artificial Intelligence and Machine Learning
- Deep Learning
- Computer Vision

- Image Processing
- Visual Object Tracking
- Pattern Recognition
- Intelligent Signal Processing
- Agricultural AI Applications

He has also made significant contributions to innovation and intellectual property development through several **published patents** focusing on practical AI-driven solutions such as:

- Agricultural Anomaly Detection Systems
- Intelligent Crop Monitoring
- Night-Vision Driver Assistance Systems
- Smart Vision-Based Monitoring Applications
- Deep Learning-Based Automation Systems

To strengthen his expertise in emerging technologies, Dr. Purandhar Reddy has completed multiple professional certifications in advanced machine learning and artificial intelligence domains, including:

- Support Vector Machines (SVM)
- Artificial Neural Networks
- Deep Learning Frameworks
- Keras-Based Image Recognition Systems
- Computer Vision Applications
- Data Analytics and Predictive Modeling

As an educator, he has successfully taught a wide range of undergraduate and postgraduate courses, including:

- Probability Theory and Random Processes
- Digital Signal Processing
- Signals and Systems
- Digital Image Processing
- Machine Learning
- Artificial Intelligence
- Data Communications and Networking
- Electronic Circuits and Systems

Dr. Purandhar Reddy is widely recognized for his student-centric teaching methodology, innovative pedagogical practices, and commitment to research-driven education. He actively mentors faculty members, research scholars, and students in projects, publications, patent development, and industry-oriented research initiatives.

Role in Faculty Readiness Programme (FRP)

As a Resource Person for the Faculty Readiness Programme, Dr. V. Purandhar Reddy brings extensive expertise in **Outcome-Based Education (OBE), NBA Accreditation, AI-driven teaching methodologies, research enhancement, curriculum design, and academic quality improvement**. His sessions focus on empowering faculty members with modern pedagogical approaches, research strategies, digital learning tools, and best practices for effective teaching-learning processes in higher education.

His rich blend of academic leadership, research excellence, innovation, and teaching expertise makes him an ideal mentor and resource person for faculty development initiatives aimed at enhancing educational quality and professional competence.

Resource Person: Dr. V. Purandhar Reddy
Designation: Professor & Head, Department of ECE
Institution: Narsimha Reddy Engineering College, Hyderabad
Experience: 20+ Years
Areas of Expertise: Artificial Intelligence, Machine Learning, Deep Learning, Computer Vision, Image Processing, Digital Signal Processing, Outcome-Based Education, NBA Accreditation, and Research

ANNEXURE – VII

OUTCOME ASSESSMENT SUMMARY
Faculty Readiness Programme (FRP)
Electromagnetic Fields, Waves and Transmission Lines
Conducted on: 01–02 June 2026

1. Programme Outcomes (POs) Assessed

The Faculty Readiness Programme was designed to achieve the following outcomes:

PO No.	Programme Outcome
PO1	Understand the mathematical foundations of electromagnetic field theory.
PO2	Apply vector analysis techniques in solving electromagnetic problems.
PO3	Explain electrostatic and magnetostatic field concepts and applications.
PO4	Analyze Maxwell's equations and electromagnetic wave propagation.
PO5	Evaluate transmission line parameters and characteristics.
PO6	Apply Smith Chart techniques for impedance matching and transmission line analysis.
PO7	Enhance teaching effectiveness and curriculum delivery aligned with OBE and NBA requirements.

2. Assessment Methodology

The effectiveness of the programme was assessed using multiple evaluation methods:

Direct Assessment Tools

- Technical interaction sessions
- Concept-based discussions
- Problem-solving exercises
- Session-wise question and answer activities

Indirect Assessment Tools

- Participant feedback forms
- Faculty self-assessment survey
- Programme evaluation questionnaire
- Participant reflections and suggestions

3. Participation Summary

Particular	Count
Total Faculty Invited	28
Faculty Attended	26
Attendance Percentage	92.86%
Departments Covered	ECE & EEE
Programme Duration	2 Days

4. Outcome Attainment Analysis

Outcome 1
Understand the mathematical foundations of electromagnetic field theory

Assessment Parameter	Attainment
Conceptual Understanding	91%
Problem Solving Ability	88%

Overall Attainment	89.5%

Observation: Faculty members demonstrated strong understanding of coordinate systems, vector operators, and field representations.

Outcome 2
Apply vector analysis techniques in solving electromagnetic problems

Assessment Parameter	Attainment
Gradient, Divergence, Curl Applications	90%
Theorem-Based Analysis	87%
Overall Attainment	88.5%

Observation: Participants effectively applied vector calculus concepts in field analysis problems.

Outcome 3
Explain electrostatic and magnetostatic field concepts and applications

Assessment Parameter	Attainment
Electrostatics Concepts	92%
Magnetostatics Concepts	90%
Overall Attainment	91%

Observation: Faculty gained improved understanding of Coulomb's Law, Gauss's Law, Biot-Savart Law, and Ampere's Law.

Outcome 4
Analyze Maxwell's equations and electromagnetic wave propagation

Assessment Parameter	Attainment
Maxwell's Equations	89%
Wave Propagation Analysis	90%
Overall Attainment	89.5%

Observation: Participants demonstrated enhanced understanding of electromagnetic wave generation and propagation mechanisms.

Outcome 5
Evaluate transmission line parameters and characteristics

Assessment Parameter	Attainment
Primary Constants Analysis	92%
Secondary Constants Analysis	90%
Overall Attainment	91%

Observation: Faculty effectively analyzed transmission line behavior and performance characteristics.

Outcome 6
Apply Smith Chart techniques for impedance matching

Assessment Parameter	Attainment
Smith Chart Interpretation	87%
Impedance Matching Applications	86%
Overall Attainment	86.5%

Observation: Additional advanced sessions may further strengthen practical Smith Chart applications.

Outcome 7
Enhance teaching effectiveness and curriculum delivery aligned with OBE and NBA requirements

Assessment Parameter	Attainment
Subject Delivery Preparedness	94%
OBE Alignment Understanding	92%
Overall Attainment	93%

Observation: Faculty reported increased confidence in handling Electromagnetic Fields and Transmission Lines courses.

5. Overall Programme Outcome Attainment

Outcome	Attainment (%)
PO1	89.5
PO2	88.5
PO3	91.0
PO4	89.5
PO5	91.0
PO6	86.5
PO7	93.0

Average Outcome Attainment
Overall Attainment = 89.86%
Attainment Level

Attainment Percentage	Level
Above 85%	Excellent
75% – 85%	Very Good
60% – 74%	Good
Below 60%	Needs Improvement

Result: The Faculty Readiness Programme achieved an overall attainment of **89.86%**, indicating an **Excellent Level of Achievement**.

6. Feedback Analysis Summary

Parameter	Rating (Out of 5)
Relevance of Content	4.8
Resource Person Effectiveness	4.9
Conceptual Clarity	4.8
Interaction and Engagement	4.7
Practical Applicability	4.6
Overall Satisfaction	4.8

Overall Feedback Rating
4.77 / 5.00 (Excellent)

7. Key Strengths Identified

- Comprehensive coverage of core concepts.
- Effective explanation of Maxwell's equations and wave propagation.
- Strong emphasis on transmission line applications.

- Interactive learning environment.
- Alignment with curriculum requirements and NBA expectations.

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8. Areas for Improvement

- Inclusion of simulation-based demonstrations using HFSS/CST.
- Additional hands-on activities on Smith Chart applications.
- Advanced sessions on Microwave Engineering and Antenna Theory.
- Integration of laboratory demonstrations.

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9. Conclusion

The Outcome Assessment of the Faculty Readiness Programme on **"Electromagnetic Fields, Waves and Transmission Lines"** indicates a high level of attainment across all programme outcomes. Faculty members significantly enhanced their subject knowledge, analytical skills, and teaching preparedness. The programme effectively contributed to continuous professional development, curriculum enrichment, and the institution's commitment to Outcome Based Education (OBE) and NBA accreditation standards.

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