



# **ANNAMACHARYA UNIVERSITY**

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY  
(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)  
Rajampet, Annamāyya District, A.P – 516126, INDIA

**DEPARTMENT OF  
ELECTRICAL & ELECTRONICS ENGINEERING**

## **MINUTES of 2<sup>nd</sup> BOS MEETING**

**Date & Time  
09/06/2025 & 10.30 am**



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**Academic Year 2025-2026**

## 2<sup>nd</sup> BoS Minutes of Meeting

The 2<sup>nd</sup> meeting of the Board of Studies (BoS) for the Department of Electrical and Electronics Engineering was held in hybrid mode on 09<sup>th</sup> June 2025 in EEE Smart Class Room of the PG Block at 10:30 AM, with the following members of the board present.

### Members Present:

| Sl.No | Name                  | Affiliation                                                                                                                        | Role in BoS                    |
|-------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| 1.    | Dr.M Padma Lalitha    | Professor & Head, Dept. of EEE,<br>Annamacharya University, Rajampet<br>Ph:9989998643<br>Email:mpl@aitsrajampet.ac.in              | Chairman                       |
| 2.    | Dr.P.B. Chennaiah     | Associate Professor, Dept. of EEE,<br>Annamacharya University, Rajampet<br>Ph:9441112015<br>Email:pbcsushma@gmail.com              | Senior Faculty-Member          |
| 3.    | Dr.P. Bhaskara Prasad | Assistant Professor, Dept. of EEE,<br>Annamacharya University, Rajampet<br>Ph:8185945663<br>Email:bhaskara.papugari@gmail.com      | Senior Faculty-Member          |
| 4.    | Mr. R. Madhan Mohan   | Assistant Professor, Dept. of EEE,<br>Annamacharya University, Rajampet<br>Ph:8096671432<br>Email:madhanmohanmadhu@gmail.com       | Course Coordinator-Member      |
| 5.    | Dr. B. Ravi Kumar     | Professor, Dept., of EEE, IIT Hyderabad,<br>Telangana, Ph:94488848013.<br>Email:ravikumar@iith.ac.in                               | Subject Expert-Member          |
| 6.    | Dr. K. Udhaya Kumar   | Professor, Dept., of EEE, College of<br>Engineering Guindy, Anna University,<br>Chennai, Ph:8702462210<br>Email: k.udhay@gmail.com | Subject Expert-Member          |
| 7.    | Dr. Srikanth N V      | Professor & HOD, Department of EEE, NIT<br>Warangal-506004.                                                                        | University Nominee-Member      |
| 8.    | Dr. Suresh MVJJ       | Engineering Manager-GE Gas Power<br>Bengaluru-560048, Karnataka.<br>Ph: 9611239988<br>Email:sureshmvjj@gmail.com                   | Industry Representative-Member |
| 9.    | Mr. B. Sai Kumar      | Hardware Specialist, Valeo India Private<br>Limited, Chennai-600130<br>Ph: 09573021078,<br>Saikumar183@gmail.com                   | Alumni Representative-Member   |

Members of Absence: NIL

*Dr. M. Padma Lalitha*  
(Dr. M. PADMA LALITHA)

*P. B. Chennaiah*  
(Dr. P. Balachenniah)

*R. Madhan Mohan*  
(R. Madhan Mohan)

*P. Bhaskara Prasad*  
(P. Bhaskara Prasad)





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## Agenda of the Meeting:

| Item No           | Particulars                                                                                                                               |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| BoS/2024/EEE/2.1  | Welcome and Introduction.                                                                                                                 |
| BoS/2024/EEE/2.2  | Ratification of the Minutes of the 1 <sup>st</sup> Board of Studies Meeting.                                                              |
| BoS/2024/EEE/2.3  | Ratification of 1 <sup>st</sup> BoS meeting action taken report                                                                           |
| BoS/2024/EEE/2.4  | To discuss and finalize the course structure and syllabus for II.B.Tech., under the AU-24 Regulations                                     |
| BoS/2024/EEE/2.5  | Discussion on detailed syllabus for II B. Tech, AU 24 Regulation                                                                          |
| BoS/2024/EEE/2.6  | To discuss and finalize the course structure and syllabus for I & II. M.Tech. under the AU-24 Regulations                                 |
| BoS/2024/EEE/2.7  | To review and address any discrepancies observed in the first-year B.Tech., & M.Tech., under the AU-24 Regulations                        |
| BoS/2024/EEE/2.8  | To discuss and approve the syllabus for the Annamacharya University Research Admission Test (AURAT) - 2025 for the respective departments |
| BoS/2024/EEE/2.9  | To discuss and approve the syllabus for the Pre-Ph.D. courses.                                                                            |
| BoS/2024/EEE/2.10 | To discuss the introduction of new programmes and/or proposals for increase in intake, if applicable.                                     |
| BoS/2024/EEE/2.11 | To discuss and approve the PEOs, PSOs, and COs of the department.                                                                         |
| BoS/2024/EEE/2.12 | Discussion on the inclusion of the courses alligned with SDG's , cross cutting issues and IKS in the curriculum of the department         |
| BoS/2024/EEE/2.13 | To approve the list of examiners for second year courses/subjects                                                                         |
| BoS/2024/EEE/2.14 | Any other item with permission of the Chair                                                                                               |

*Halitha*  
(Dr M. Padma Halitha)

*P.B. L P*  
(Dr. P. Balachoumaly)

*DR*  
(Dr. M. Padma Halitha)

*P. Bhaskara Prasad*





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## MINUTES OF THE MEETING

### Agenda Item No. BoS/2024/EEE/2.1: Welcome and Introduction

#### Welcome:

Dr. M Padma Lalitha, Head, Department of Electrical and Electronics Engineering has extended warm welcome to all the members.

#### Introduction:

At the outset, Dr M Padma Lalitha, Head, Department of Electrical and Electronics Engineering introduced all the members of the Board of Studies and thanked them for accepting the invitation to the 2<sup>nd</sup> BoS meeting.

The Chairman has presented the Vision, Mission, Program Educational Objectives, Program outcomes and Program Specific Outcomes of the B. Tech Electrical and Electronics Engineering. After the discussion the members resolved to approve the Vision, Mission, PEOs, POs & PSOs.

### Agenda Item No. BoS/2024/EEE/2.2: Confirmation of the Minutes of the 1st Board of Studies Meeting.

The external BoS members have ratified the points discussed in the 1<sup>st</sup> Board of Studies meeting held on 23/08/2024.

### Agenda Item No. BoS/2024/EEE/2.3: Ratification of 1<sup>st</sup> BoS meeting action taken report

The BoS chairperson presented the action taken report on changes made in the syllabus as per the suggestions given by the external BoS members and is enclosed in ANNEXURE-I. The BoS members approved the same.

### Agenda Item No. BoS/2024/EEE/2.4: Discussion on course structure for II B. Tech, AU 24 Regulations.

The BoS members approved the same. The BoS chairperson discussed the course structure for II B. Tech, AU 24 Regulation and the BoS members approved the course structure and the copy of course structure is enclosed in ANNEXURE-II.

### Agenda Item No. BoS/2024/EEE/2.5: Discussion on detailed syllabus for II B. Tech, AU 24 Regulation

The BoS chairperson discussed the syllabus for II B. Tech., AU 24 Regulation, and the BoS members approved the syllabus and is enclosed in ANNEXURE-III. Also, the following recommendations are given.

#### Dr. Srikanth:

- Suggested to Use descriptive course titles instead of generic labels.
- Retain tutorial hours in numerically intensive subjects.
- Rename Electrical Measurements and Electronics Instrumentation to Electrical and Electronics measurements and Instrumentation; update lab name and add new experiments.
- Ensure consistency in theory/lab coding, Update Physics and Chemistry titles to reflect engineering context.

*Handwritten signature of Dr. M. Padma Lalitha*  
(Dr. M. Padma Lalitha)

*Handwritten signature of Dr. P. Balachandran*  
(Dr. P. Balachandran)

*Handwritten signature of Dr. Madhan Mohan*  
Dr. Madhan Mohan

*Handwritten signature of P. Bhaskar Prasad*  
P. Bhaskar Prasad





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- Align COs with all levels of Bloom's Taxonomy.
- Restrict to one main textbook and include quality references/web links.
- Use open educational resources (OERs) with clear links.
- Revise Electrical Circuits-II content: add synthesis.
- Strengthen CO-PO mapping across all courses.
- Update names of Electrical Circuits Lab experiments.
- Add single-phase and special machines in Electrical Machines course.
- To discuss and approve the PEOs, PSOs, and COs of the department.
- Allocate 10% marks for attendance.
- Assign 5% syllabus as self-learning component.

## Dr. Suresh MVJJ:

- Incorporate smart transformers, condition monitoring, and IoT-based fault diagnostics.
- Expand syllabus to high-efficiency motors and renewable energy-driven electric machines.
- Integrate simulation-based analysis using MATLAB/Simulink for fault detection and harmonic analysis.
- Introduce real-world applications like power quality monitoring and optimization.
- Shift focus to advanced semiconductor devices such as SiC and GaN.
- Include RF circuit design for 5G applications and sensor-based electronics.
- Implement AI-assisted fault detection and variable frequency drive (VFD) control.
- Upgrade to multi-layer PCB design, RF circuits, and IoT-based hardware security.
- Expand syllabus to include FPGA programming and hardware description languages (HDL)
- Introduce AI-powered edge computing fundamentals
- Add topics on Permanent Magnet Synchronous Motors (PMSMs) used in Electric Vehicles (EVs).
- Cover advanced motor control techniques, such as vector control and direct torque control (DTC).
- Strengthen applications in wireless power transfer, antenna design, and EMI/EMC mitigation.
- Introduce computational electromagnetics using FEM-based solvers.
- Include IoT-based condition monitoring and energy-efficient motor experiments
- Integrate digital sensors, smart meters, and AI-based predictive diagnostics.
- Upgrade to FPGA implementations, AI-driven signal processing, and high-speed

**Agenda Item No. BoS/2024/ECE/2.6: To discuss and finalize the course structure and syllabus for I & II M.Tech. under the AU-24 Regulations**

The BoS chairperson discussed the syllabus for I & II M. Tech., AU 24 Regulation, and the BoS members approved the syllabus and enclosed in ANNEXURE-IV.

**Agenda Item No. BoS/2024/EEE/2.7: To review and address any discrepancies observed in the first-year B.Tech., & M.Tech., under the AU-24 Regulations**

- The topic of Three-Phase Induction Motor has been removed from Unit II of the BEEE theory syllabus, as it was found to be difficult for I B.Tech students.

*Lalitha*

(Dr. Padma Lalitha)

*P. B. V. P.*

(Dr. P. S. Lakshmi)

*Dr. R. K. S. Prasad*

(Dr. R. K. S. Prasad)

*P. Bhaskara Prasad*

(P. Bhaskara Prasad)





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- In the I B.Tech BEEE lab, the Magnetization Characteristics experiment has not been included, as this concept is not part of the theory syllabus. Instead, it has been replaced with the Speed Control of DC Motor experiment. The revised syllabus for BEEE theory and lab is enclosed in ANNEXURE-V.
- Upon review, no discrepancies have been identified in the I M.Tech syllabus.

**Agenda Item No. BoS/2024/ECE/2.8:** To discuss and approve the syllabus for the Annamacharya University Research Admission Test (AURAT) - 2025 for the respective departments.

The BoS chairperson discussed the syllabus for the Annamacharya University Research Admission Test (AURAT) - 2025 and the BoS members approved the same and the copy of the syllabus is enclosed in ANNEXURE-VI

**Agenda Item No. BoS/2024/EEE/2.9:** To discuss and approve the syllabus for the Pre-Ph.D. courses.

The BoS chairperson discussed the syllabus for the Pre PhD course and the BoS members approved the same and the copy of the syllabus is enclosed in ANNEXURE-VII

**Agenda Item No. BoS/2024/EEE/2.10:** To discuss the introduction of new programmes and/or proposals for increase in intake, if applicable.

The BoS chairperson discussed on the introduction of new M Tech courses and the experts suggested the following:

Dr. Srikanth:

- New M.Tech Specializations: EV & Smart Grid.
- Integrate internships with M.Tech project work.

**Agenda Item No. BoS/2024/EEE/2.11:** To discuss and approve the PEOs, PSOs, and COs of the department.

The BoS chairperson and other members discussed the COs, POs, PSOs and CO-PO-PSO mapping with the external BoS members. The BoS members approved the CO-PO-PSO mapping.

**Agenda Item No. BoS/2024/EEE/2.12:** To Discuss the inclusion of the courses aligned with SDG's , cross cutting issues and IKS in the curriculum of the department.

The BOS chairperson discussed the courses aligned with SDG's , cross cutting issues and IKS and the BoS members approved the same. The list is enclosed in ANNEXURE-VIII.

**Agenda Item No. BoS/2024/EEE/2.13:** To approve the list of examiners for second year courses/subjects.

The BOS chairperson listed out the external examiners from reputed Universities and the BoS members approved the same. The list of examiners is presented in ANNEXURE-IX.

P.B. V  
(Dr. P.B. Chennabas)

CR. Madhan Mohan

P. Bhaskar Prasad

Dr. M. Padma Lalitha

Chair Person  
HEAD OF THE DEPARTMENT  
ELECTRICAL AND ELECTRONICS ENGINEERING  
ANNAMACHARYA UNIVERSITY  
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## BoS Members:

| Sl.No | Name                  | Affiliation                                                                                                                        | Role in BoS                           | Mode    |
|-------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------|
| 1.    | Dr.M Padma Lalitha    | Professor & Head, Dept. of EEE,<br>Annamacharya University, Rajampet<br>Ph:9989998643                                              | Chairman                              | Offline |
| 2.    | Dr.P.B. Chennaiah     | Associate Professor, Dept. of EEE,<br>Annamacharya University, Rajampet<br>Ph:9441112015<br>Email:pbcsushma@gmail.com              | Senior<br>Faculty-<br>Member          | Offline |
| 3.    | Dr.P. Bhaskara Prasad | Assistant Professor, Dept. of EEE,<br>Annamacharya University, Rajampet<br>Ph:8185945663<br>Email:bhaskara.papugari@gmail.com      | Senior<br>Faculty-<br>Member          | Offline |
| 4.    | Mr.R. Madhan Mohan    | Assistant Professor, Dept. of EEE,<br>Annamacharya University, Rajampet<br>Ph:8096671432<br>Email:madhanmohanmadhu@gmail.com       | Course<br>Coordinator-<br>Member      | Offline |
| 5.    | Dr.B.Ravi Kumar       | Professor,Dept., of EEE, IIT<br>Hyderabad, Telangana,<br>Ph:94488848013.<br>Email:ravikumar@iith.ac.in                             | Subject<br>Expert-<br>Member          | Online  |
| 6.    | Dr.K.Udhaya Kumar     | Professor, Dept., of EEE, College of<br>Engineering Guindy, Anna University,<br>Chennai, Ph:8702462210<br>Email: k.udhay@gmail.com | Subject<br>Expert-<br>Member          | Offline |
| 7.    | Dr.Srikanth N V       | Professor & HOD, Department of EEE,<br>NIT Warangal-506004.                                                                        | University<br>Nominee-<br>Member      | Offline |
| 8.    | Dr. Suresh MVJJ       | Engineering Manager-GE Gas Power<br>Bengaluru-560048, Karnataka.<br>Ph: 9611239988<br>Email:sureshmvj@gmail.com                    | Industry<br>Representative<br>-Member | Online  |
| 9.    | Mr.B.Sai Kumar        | Hardware Specialist, Valeo India<br>Private Limited,Chennai-600130<br>Ph: 09573021078,<br>Saikumar183@gmail.com                    | Alumni<br>Representative<br>-Member   | Offline |

*Lalitha*  
(Dr. M. PADMA LALITHA)

*P.B. Chennaiah*

(Dr. P. Balachenniah)

*SR*

(R. MADHAN MOHAN)

*BK*

(P. Bhaskara Prasad)



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## ANNEXURE-I

### Action Taken Report of 1<sup>st</sup> BoS Meeting:

- ❖ In B.Tech I year Course structure and BEEE theory and Lab no modifications are suggested.
- ❖ In response to the suggestions made in the previous Board of Studies meeting, the following modifications have been incorporated into the M.Tech course structure:
  - Advanced Power System Protection has been shifted from the M.Tech 2<sup>nd</sup> semester to the M.Tech 1<sup>st</sup> semester.
  - Power System Stability and Control has been moved from the M.Tech 1<sup>st</sup> semester to the M.Tech 2<sup>nd</sup> semester and the title is changed as 'Power System Control and Stability'.
  - The topic Numerical Integration Methods has been removed from Unit 5 of Advanced Power System Analysis and included in Unit 1 of the same course.
  - The topic State Estimation has been removed from Unit 1 of Advanced Power System Analysis and included in Unit 5 of the same course.

**The revised structure of M.Tech 1<sup>st</sup> and 2<sup>nd</sup> semesters, along with the syllabus for Advanced Power System and Advanced Power System Analysis.**

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### **M.Tech - ELECTRICAL POWER SYSTEMS**

#### **I Semester**

| S.No | Category | Course Code | Course Title                     | Hours / week |   |   | Credits |
|------|----------|-------------|----------------------------------|--------------|---|---|---------|
|      |          |             |                                  | L            | T | P |         |
| 1.   | PC       | 24DEPS11T   | Advanced Power System Protection | 3            | - | - | 3       |
| 2.   | PC       | 24DEPS12T   | Advanced Power System Analysis   | 3            | - | - | 3       |
| 3    | PE       |             | MOOC                             | -            | - | - | 3       |

*Salithes*  
Cpr on / Radma Salithes

*P.B.V.*  
(Cpr on / P.B.V.)

*DR. R. G. Kollamthota*

HEAD OF THE DEPARTMENT  
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*P. Bhaskar Prasad*





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|             |    |           |                                    |    |   |   |    |
|-------------|----|-----------|------------------------------------|----|---|---|----|
| 4           | PE | MOOC      |                                    | -  | - | - | 3  |
| 5.          | MC | 24DMBA11T | Research Methodology and IPR       | 2  | - | - | 2  |
| 6.          | AU | 24DAUD1AT | English for Research Paper Writing | -  | - | - | -  |
|             |    | 24DAUD1BT | Disaster Management                |    |   |   |    |
|             |    | 24DAUD1CT | Sanskrit for Technical Knowledge   |    |   |   |    |
|             |    | 24DAUD1DT | Value Education                    |    |   |   |    |
| Lab courses |    |           |                                    |    |   |   |    |
| 7.          | PL | 24DEPS11L | Power System lab                   | -  | - | 4 | 2  |
| 8.          | PL | 24DEPS12L | Power system Simulation lab-1      | -  | - | 4 | 2  |
|             |    |           |                                    | 14 |   | 8 | 18 |

## II Semester

| S.No        | Category | Course Code | Course Title                                              | Hours / week |   |   | Credits |
|-------------|----------|-------------|-----------------------------------------------------------|--------------|---|---|---------|
|             |          |             |                                                           | L            | T | P |         |
| 1.          | PC       | 24DEPS21T   | Power System Stability and Control                        | 3            | - | - | 3       |
| 2.          | PC       | 24DEPS22T   | Power Electronics Applications in Power Systems           | 3            | - | - | 3       |
| 3           | PE       | MOOC        |                                                           |              | - | - | 3       |
| 4           | PE       | MOOC        |                                                           |              | - | - | 3       |
| 5           | AU       | 24DAUD2AT   | Constitution of India                                     | -            | - | - | -       |
|             |          | 24DAUD2BT   | Pedagogy Studies                                          | -            | - | - | -       |
|             |          | 24DAUD2CT   | Stress Management by Yoga                                 |              |   |   |         |
|             |          | 24DAUD2DT   | Personality development through life enlightenment skills |              |   |   |         |
| Lab Courses |          |             |                                                           |              |   |   |         |
| 6           | PL       | 24DEPS23L   | Power System Simulation Lab II                            | -            | - | 4 | 2       |

*Halithu*  
Corr. Radma Lalitha

*P.B. d P*  
Cor. P.B. Chennel

*CR. Madhan Ashan*

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*P.B. Bhaskara Prasad*



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|   |    |           |                                           |    |   |    |    |
|---|----|-----------|-------------------------------------------|----|---|----|----|
| 7 | PL | 24DEPS24L | Renewable Energy and Green Technology Lab | -  | - | 4  | 2  |
| 8 | PS | 24DEPS21P | Mini Project with Seminar                 | -  | - | 4  | 2  |
|   |    |           |                                           | 12 |   | 12 | 18 |

## Advanced Power system protection syllabus:

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Title of the Course: **ADVANCED POWER SYSTEMS PROTECTION**  
Category: PC  
Course Code: 24DEPS11T  
Semester: I

Lecture Hours  
3

Tutorial Hours  
-

Practice Hours  
-

Credits  
3

**Course Objectives:** Students will be able to:

- Study of numerical relays & static relays.
- Developing mathematical approach towards protection.
- Study of algorithms for numerical protection.

**Course Outcomes:** At the end of the course, the student will be able to

1. Learn the importance of Digital Relays & static relays.
2. Apply Mathematical approach towards protection.
3. Learn to develop various Protection algorithms.

#### UNIT-I

**Static Relays:** Advantages of static relays-Basic construction of static relays-Replica impedance –Mixing circuits-General equation for two input phase and amplitude comparators Duality between amplitude and phase comparators.

**Amplitude comparators:** Circulating current type and opposed voltage type- rectifier bridge comparators, Direct and Instantaneous comparators.

#### UNIT-II

**Phase Comparators:** Coincidence circuit type- block spike phase comparator, techniques to measure the period of coincidence-Integrating type-Rectifier and Vector product type- Phase comparators.

**Static over current relays:** Instantaneous over-current relay-Time over-current relays basic principles –definite time and Inverse definite time over-current relays.

#### UNIT-III

**Static differential relays:** Analysis of Static Differential Relays –Static Relay schemes –Duo bias transformer differential protection –Harmonic restraint relay.

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P. S. V. P.  
(Co-ordinator)

Bhaskara Prasanna

GR. P. K. S. N. S. R.





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**Static distance relays:** Static impedance reactance–MHO and angle impedance relay sampling comparator – realization of reactance and MHO relay using sampling comparator.

## UNIT-IV

### Transformer protection:

Types of Differential Protection – High Impedance – External fault with one CT saturation –Need for high impedance - Percentage Differential Bias Characteristics – Inrush phenomenon – Zero Sequence filtering – High resistance Ground Faults in Transformers – Restricted Earth fault Protection - Inter-turn faults in transformers – Incipient faults in transformers –DGA for transformer monitoring

## UNIT-V

### Protection of Alternators:

Protection against Stator fault (Phase to Phase and Phase to Ground), Balanced earth fault protection, Stator inter turn protection, Unbalanced loading of Alternator, Prime Mover failure, Overvoltage protection, Overloading Protection, Restricted Earth fault and standby earth fault protection, Rotor Fault Protection.

### Text Books:

1. Paithankar.Y.G and Bhide.S.R, “Fundamentals of Power System Protection”, Prentice-Hall of India, Second Edition, PHILearningPvt.Ltd, 2013.
2. Badri Ram and Vishwakarma.D.N, “Power System Protection and Switchgear”, Tata McGraw- Hill Publishing Company, 2002.
3. Arun K. Phadke, James. S. Thorp, “Computer relaying for Power system”, John Wiley and sons, New York, Second edition, 2012.
4. A.T. Johns and S. K. Salman, “Digital Protection for Power Systems”, IEEE Press, Second edition, 2022.

### REFERENCES:

1. GerhardZeigler, “Numerical Distance Protection”, Siemens Publicis Corporate Publishing, 2006.
2. S.R. Bhide “Digital Power System Protection” PHI Learning Pvt. Ltd. 2014.

### Advanced Power system Analysis Syllabus:

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(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Title of the Course: **ADVANCED POWER SYSTEM ANALYSIS**  
Category: PC  
Course Code: 24DEPS12T  
Semester: I

Lecture Hours  
3

Tutorial Hours  
-

Practice Hours

Credits  
3

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ELECTRICAL AND ELECTRONICS ENGINEERING  
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P. Bhaskara Prasad

P. R. Chidambaram

P. R. Chidambaram





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## Course Objectives

- To introduce different techniques of dealing with sparse matrix for large scale power systems.
- To impart in-depth knowledge on different methods of power flow solutions.
- To perform optimal power flow solutions in detail
- To perform short circuit fault analysis and understand the consequence of different type of faults.
- To Illustrate different numerical integration methods and factors influencing transient stability

**Course Outcomes:** At the end of the course, the student will be able to

1. Understand different techniques dealing with sparse matrix for large scale power systems
2. Analyse different methods of power flow solutions.
3. Analyse various types of short circuit faults.
4. Understand to solve optimal power flow problem
5. Demonstrate different numerical integration methods and factors influencing transient stability

## UNIT I

**Solution technique:** Sparse Matrix techniques for large scale power systems: Optimal ordering schemes for preserving sparsity. Flexible packed storage scheme for storing matrix as compact arrays –Gauss elimination methods, II- representation of off-nominal tap transformers. **Numerical integration methods:** Introduction, Numerical Integration Methods: Euler and fourth order Runge-Kutta methods, Algorithm for simulation of SMIB and Multi-machine system with classical synchronous machine model; Factors influencing transient stability.

## UNIT-II

**Power flow studies:** Introduction to load flow analysis, formation of  $Y_{bus}$ . Classification of buses, Load flow solution methods – Gauss-Seidal method, Newton Raphson method, Decoupled and fast decoupled load flow, Comparison of load flow methods.

## UNIT-III

**Short circuit analysis:** Formation of bus impedance matrix with & without mutual coupling (single phase basis) - Computer method for fault analysis using ZBUS and sequence components. Derivation of equations for bus voltages, fault current and line currents, both in sequence and phase.

## UNIT IV

**Optimal power flow:** Problem statement; Solution of Optimal Power Flow (OPF) – The gradient method, Newton's method, Linear Sensitivity Analysis.

## UNIT-V

**State estimation:** Introduction to state estimation, least squares estimation and weighted least squares estimation, State estimation algorithm for AC network, Detection and identification of bad measurements, Network observability and pseudo-measurements, State estimation and bad data detection using MATLAB Programming (simulation exercise).

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*P. Bhasakar Prasad*

*P. K. V. P.*  
*(Dr. P. K. V. P.)*  
*pr. p. s. cheuvani*

*CRP/edhanthony*





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## TEXT BOOKS:

1. J.J. Grainger & W.D. Stevenson, "Power system analysis", McGraw Hill, 2003.
2. R. Bergen & Vijay Vittal, "Power System Analysis", Pearson, 2000.
3. Pai, M.A., "Computer Techniques in Power System Analysis", Tata McGraw hill, New Delhi, 2006

## REFERENCES:

1. L.P. Singh, "Advanced Power System Analysis and Dynamics", New Age International, 2006.
2. Rama Swamy Natarajan, "Computer aided power system analysis", Marcel Dekkar, Newyork, 2002.
3. A.J. Wood, "Power generation, operation and control", John Wiley, Third Edition, 1994.
4. Nasser Tlies, "Power Systems Modelling and Fault Analysis", Second Edition, 2019

*Halit*

P.B. V P  
(DR. P.B. Chennaraj)

*De*  
(R. Madhan Mohan)

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*Br*  
P. Bhaskara Pragasal



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## ANNEXURE-II

### B.Tech EEE Course Structure

ANNAMACHARYA UNIVERSITY  
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING  
B.Tech-R24- Regulation  
Semester III (Second year)

| Sl. No.            | Category | Course Code | Course Title                              | Hours per week |   |   | Credits |
|--------------------|----------|-------------|-------------------------------------------|----------------|---|---|---------|
|                    |          |             |                                           | L              | T | P |         |
| 1                  | PCC      | 24AEEE31T   | DC Machines and Transformers              | 3              | 0 | 0 | 3       |
| 2                  | PCC      | 24AEEE32T   | Network Analysis and Synthesis            | 2              | 1 | 0 | 3       |
| 3                  | PCC      | 24AEEE33T   | Analog Electronics                        | 3              | 0 | 0 | 3       |
| 4                  | HSMC     | 24AUHV31T   | Universal Human Values-II                 | 3              | 0 | 0 | 3       |
| 5                  | HSMC     | 24AMBA31T   | Managerial Economics & Financial Analysis | 3              | 0 | 0 | 3       |
| 6                  | MC       | 24AENS31T   | Environmental Science                     | 2              | 0 | 0 | 0       |
| <b>Lab Courses</b> |          |             |                                           |                |   |   |         |
| 7                  | PCC      | 24AEEE31L   | DC Machines and Transformers Lab          | 0              | 0 | 3 | 1.5     |
| 8                  | PCC      | 24AEEE32L   | Electrical Circuits Lab                   | 0              | 0 | 3 | 1.5     |
| 9                  | PCC      | 24AEEE33L   | Electrical and Electronics Simulation Lab | 0              | 0 | 3 | 1.5     |
| 10                 | SC       | 24AEEE34L   | PCB Design and Fabrication                | 1              | 0 | 2 | 2       |
| Total credits      |          |             |                                           |                |   |   | 21.5    |

| Category                                                     | Credits     |
|--------------------------------------------------------------|-------------|
| Basic Science Courses (BSC)                                  | 0           |
| Program Core Courses (PCC)                                   | 13.5        |
| Engineering Science Courses (ESC)                            | 0           |
| Humanities and Social Sciences and Management Courses (HSMC) | 6           |
| Skill Oriented Course (SC)                                   | 2           |
| <b>Total Credits</b>                                         | <b>21.5</b> |

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P. H. V.  
C. Dr. P. S. Chennu

P. Bhaskara Prasad

CR. P. Jagan Mohan





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## Semester IV (Second year)

| Sl. No.       | Category | Course Code | Course Title                                                | Hours per week |   |   | Credits |
|---------------|----------|-------------|-------------------------------------------------------------|----------------|---|---|---------|
|               |          |             |                                                             | L              | T | P |         |
| 1             | BSC      | 24AMAT42T   | Numerical Methods                                           | 3              | 0 | 0 | 3       |
| 2             | PCC      | 24AEEE41T   | Digital Electronics                                         | 3              | 0 | 0 | 3       |
| 3             | PCC      | 24AEEE42T   | Induction and Synchronous Machines                          | 3              | 0 | 0 | 3       |
| 4             | PCC      | 24AEEE43T   | Electrical and Electronics Measurements and Instrumentation | 3              | 0 | 0 | 3       |
| 5             | PCC      | 24AEEE44T   | Electromagnetic Field Theory                                | 2              | 1 | 0 | 3       |
| Lab Courses   |          |             |                                                             |                |   |   |         |
| 6             | PCC      | 24AEEE41L   | Analog and Digital Electronics Lab                          | 0              | 0 | 3 | 1.5     |
| 7             | PCC      | 24AEEE42L   | Induction and Synchronous Machines Lab                      | 0              | 0 | 3 | 1.5     |
| 8             | PCC      | 24AEEE43L   | Measurements and Instrumentation Lab                        | 0              | 0 | 3 | 1.5     |
| 9             | SC       | 24ACSE45L   | JAVA Programming                                            | 1              | 0 | 2 | 2       |
| Total credits |          |             |                                                             |                |   |   | 21.5    |

| Category                                                     | Credits     |
|--------------------------------------------------------------|-------------|
| Basic Science Courses (BSC)                                  | 3           |
| Program Core Courses (PCC)                                   | 16.5        |
| Engineering Science Courses (ESC)                            | 0           |
| Humanities and Social Sciences and Management Courses (HSMC) | 0           |
| Skill Oriented Course (SC)                                   | 2           |
| <b>Total Credits</b>                                         | <b>21.5</b> |

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*P.B.V. P*  
(Dr. P. S. Choudhary)  
*R. P. Mohan*  
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## ANNEXURE-III

### B.Tech EEE Detailed Syllabus

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EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

**Title of the Course:** DC Machines and Transformers  
**Category:** PCC  
**Semester:** III  
**Course Code:** 24AEEE31T  
**Branch/es:** EEE

**Lecture Hours**

3

**Tutorial Hours**

0

**Practice Hours**

0

**Credits**

3

#### *Course Objectives:*

1. To discuss the construction, operation, and performance characteristics of DC generators and motors.
2. To describe the starting methods, speed control techniques, and performance testing of DC machines.
3. To explain the operation and derive performance parameters of single-phase transformers under various conditions.
4. To conduct standard tests and compare the performance of two-winding and autotransformers.
5. To interpret poly-phase transformer connections and explain the operation of special configurations like Scott connections and tap changers.

#### **Course Outcomes:**

At the end of the course, the student will be able to

1. Understand the construction, operation, characteristics, and applications of DC generators and DC motors.
2. Analyze starting methods, speed control techniques, and testing procedures to evaluate the performance and efficiency of DC machines.
3. Explain the principle, operation, equivalent circuit, and performance characteristics of single-phase transformers.
4. Interpret various tests on transformers and auto transformers to determine their parameters and operational characteristics.
5. Understand poly-phase transformer connections, vector groups, three-winding transformers, tap changers, and their practical applications.

#### **Unit 1 DC Generators and DC Motors**

10

Construction of DC machines and principle of operation of DC generator – EMF equation – excitation techniques – classification of DC generators – armature reaction and commutation – characteristics of DC generators – applications of DC generators – principle of operation of DC motor – classification of DC motors – significance of back-emf – torque equation of DC motor – characteristics of DC motors – applications of DC motors.

#### **Unit 2 Starting, Speed Control and Testing of DC Machines:**

10

Losses and efficiency, necessity of a starter – starting by 3-point starter – speed control by armature voltage and field current control – testing of DC machines – Brake test, Swinburne's test – Hopkinson's test – Field's Test.

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## Unit 3 Single-phase Transformers:

10

Construction – principle of operation of single-phase transformer – classification – emf equation – operation on no-load and on load – equivalent circuit – regulation – losses and efficiency – effect of variation of frequency and supply voltage on losses – applications.

## Unit 4 Testing of Transformers and Auto Transformer:

10

Open circuit test – short circuit test – Sumpner's test – separation of core losses— Parallel operation with equal and unequal voltage ratios – auto transformer – equivalent circuit – comparison with two winding transformers.

## Unit 5 Three-Phase Transformers:

10

Polyphase connections- Y/Y, Y/ $\Delta$ ,  $\Delta$ /Y,  $\Delta$ / $\Delta$ , open  $\Delta$  and Vector groups – third harmonics in phase voltages – three winding transformers – transients in switching – off load and on load tap changers – Scott connection.

### Prescribed Textbooks:

1. Electrical Machinery by Dr. P S Bimbhra, 7th edition, Khanna Publishers, New Delhi, 1995.
2. Performance and analysis of AC machines by M.G. Say, CBS, 2002.

### Reference Books:

1. Electrical Machines by D. Kothari, I .J .Nagarth, McGraw Hill Publications, 5th edition
2. Electrical Machinery Fundamentals by Stephen J Chapman McGraw Hill education 2011.
3. Generalized Theory of Electrical Machines by Dr. P S Bimbhra, 7<sup>th</sup> Edition, Khanna Publishers, 2021
4. Theory & Performance of Electrical Machines by J.B.Gupta, S.K.Kataria & Sons, 2007.
5. Electric Machinery by A. E. Fitzgerald, Charles Kingsley, and Stephen D. Umans, 7th edition, McGraw-Hill Education, 2014.

### CO-PO-PSO Mapping:

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|-------------------|--------------------------|--------------------------------|--------|--------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE31T .1    | 3                     | 2                | -                               | -                                          | -                 | -                        | -                              | -      | -                        | -             | -                              | -                  | 3    | -    |
| 24AEEE31T .2    | 3                     | 2                | -                               | 2                                          | 2                 | -                        | -                              | -      | -                        | -             | -                              | -                  | 3    | 3    |
| 24AEEE31T .3    | 3                     | 2                | -                               | -                                          | -                 | -                        | -                              | -      | -                        | -             | -                              | -                  | 3    | -    |
| 24AEEE31T .4    | 3                     | 2                | -                               | 2                                          | 2                 | -                        | -                              | -      | -                        | -             | -                              | -                  | 3    | 3    |
| 24AEEE31T .5    | 3                     | 2                | -                               | -                                          | -                 | -                        | -                              | -      | -                        | -             | -                              | -                  | 3    | -    |

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(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Title of the Course: Network Analysis and Synthesis

Category: PCC

Semester: III

Course Code: 24AEEE32T

Branch/es: EEE

Lecture Hours  
2

Tutorial Hours  
1

Practice Hours  
0

Credits  
3

### Course Objectives:

1. To introduce the principles of three-phase circuits and power measurement techniques.
2. To explain the fundamentals and applications of Laplace transforms in circuit analysis.
3. To familiarize students with the transient behavior of electrical circuits under DC and AC excitations.
4. To provide a foundation in Fourier series and Fourier transforms for analyzing periodic and aperiodic signals.
5. To develop an understanding of network functions and the synthesis of RL, RC, and LC networks.

### Course Outcomes:

At the end of the course, the student will be able to ...

1. Analyze three-phase circuits and measure real and reactive power using two-wattmeter method.
2. Apply Laplace transform techniques to solve electrical circuits and interpret initial and final conditions of system responses.
3. Determine the transient response of RL, RC, and RLC circuits for both DC and AC excitations using time-domain analysis.
4. Compute the Fourier series and transforms of electrical signals and analyze their frequency-domain characteristics.
5. Evaluate network functions and synthesize RL, RC, and LC one-port networks satisfying positive real function criteria.

### Unit 1 Analysis of three phase circuits

9

Phase sequence, star and delta connection of sources and loads, relation between line and phase quantities, analysis of balanced three phase circuits, analysis of unbalanced delta, Analysis of unbalanced 3-wire star using millman's theorem, analysis of 4-wire star, measurement of active and reactive power using two-wattmeter method for measurement of three phase power.

### Unit 2 Laplace Transforms

9

Definition of Laplace transform – advantages - Laplace transform of important functions and signals – inverse Laplace transform - application of Laplace transform to electrical circuits – initial and final value theorem.

### Unit 3 Transient Analysis (DC & AC)

9

Introduction- Initial Conditions -DC Transient response of RL, RC and RLC series circuits -Response of RL, RC and RLC series circuits with AC excitation.

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P. Bhargava Prasad

Dr. K. S. Chandra  
Dr. K. S. Chandra





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## Unit 4 Fourier Series & Fourier Transform

9

Introduction- trigonometric Fourier series - waveform symmetry, exponential form of Fourier series, effective value, application to electrical circuits. Fourier transforms & Properties, Fourier transform of important signals and periodic signals.

## Unit 5 Network Functions and Synthesis

9

Network functions- necessary conditions for driving point function-necessary conditions for transfer function – Hurwitz polynomials – positive Real functions - definitions and properties - synthesis of single port networks (RL, RC and LC networks).

### Prescribed Textbooks:

1. A. Chakrabarti. Circuit theory (Analysis and Synthesis) 7th Revised edition 2020.

### Reference Books:

1. M.E. Van Valkenberg. Network Analysis. 3rd edition, Pearson Publications, New Delhi 2019.
2. A. Sudhakar, Shyammoan S Palli. Circuits and Networks. (Analysis and Synthesis), 5th edition, Tata McGrawHill Publishing company Ltd, 2017.
3. Umesh Sinha. Network Analysis and Synthesis. 5th edition, Satyaprakashan, New Delhi, 2018.
4. D. Roy Choudhury. Networks and Systems. 3rd edition, New Age international publishers 2023.

### Web Resources

1. <https://www.youtube.com/watch?v=eUOFLraM0G8>
2. <https://www.youtube.com/watch?v=JIFwqRn0LQk>
3. <https://archive.nptel.ac.in/courses/108/105/108105159/>
4. <https://www.youtube.com/watch?v=l4Fr3qG0xVY>
5. <https://www.youtube.com/watch?v=CykSP552LU5>

### CO-PO-PSO Mapping:

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering Tool Usage | The Engineer and The World | Ethics | Individual and Collaborative Team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE32T.1     | 3                     | 3                | 2                               | 2                                          | 3                      | 2                          | 1      | 2                                      | 2             | 2                              | 2                  | 3    | 2    |
| 24AEEE32T.2     | 3                     | 3                | 2                               | 2                                          | 2                      | 1                          | –      | 2                                      | 2             | 1                              | 2                  | 3    | 2    |
| 24AEEE32T.3     | 3                     | 2                | 2                               | 3                                          | 3                      | 1                          | –      | 2                                      | 2             | 2                              | 3                  | 3    | 3    |
| 24AEEE32T.4     | 3                     | 3                | 2                               | 3                                          | 3                      | 2                          | –      | 2                                      | 2             | 2                              | 3                  | 3    | 3    |
| 24AEEE32T.5     | 3                     | 3                | 3                               | 3                                          | 3                      | 2                          | 1      | 2                                      | 2             | 3                              | 3                  | 3    | 3    |

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Title of the course: Analog Electronics  
Category: PCC  
Semester: III  
Course Code: 24AEEE33T

Branch/es EEE

| Lecture Hours | Tutorial Hours | Practice Hours | Credits |
|---------------|----------------|----------------|---------|
| 3             | 0              | 0              | 3       |

#### Course Objectives:

1. To discuss the concept of Feedback Amplifier and oscillators.
2. To discuss signal analysis using Op-amp based circuits
3. To provide basic knowledge on special ICs like Timers, PLL circuits and its applications.
4. To analyze A/D and D/A Converter.

#### Course Outcomes:

At the end of the course, the student will be able to

1. Discuss and gain knowledge on Feedback Amplifier and oscillators.
2. Describe the importance of Signal analysis using Op-amp based circuits
3. Analysis and acquire knowledge on the Non-linear Applications of Op-amp.
4. Discuss the functional blocks and the applications of special ICs like Timers, PLL circuits.
5. Design and analysis of A/D and D/A Converter

#### Unit 1 Feedback Amplifiers and Oscillators

9

Advantages of negative feedback – voltage / current, series, Shunt feedback – positive feedback – Condition for oscillations, phase shift – Wien Bridge, Hartley, Colpitts and Crystal oscillators.

#### Unit 2 Operational Amplifier and its Linear Applications:

9

Ideal OP-AMP characteristics, Internal Block diagram of op-amp, DC characteristics, AC characteristics, Basic op-amp applications, Instrumentation Amplifier, AC amplifier V/I & I/V converters, Differentiator, Integrator, Log and Antilog Amplifiers.

#### Unit 3 Non-Linear Applications of op-amp:

9

Comparator and its applications, Multivibrators: Astable and Monostable operation, Schmitt Trigger, Triangle and Sawtooth Waveform Generator, Op-amp circuits using Diodes: Half-wave Rectifier, Full-wave Rectifier, Peak-value detector, Clipper, Clamper, Sample and Hold circuits, RC Active Filters.

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## Unit 4 555 Timer and PLL

9

IC 555 Timer and applications: Monostable operation, Applications in Monostable mode, Astable operation, Applications in Astable mode, Phase Locked Loop- Phase Detector, VCO, Monolithic PLL, Applications of PLL.

## Unit 5 D/A and A/D Converters

9

Introduction to DAC/ADC, Basic DAC Techniques: Weighted Resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Monolithic DAC, A/D Converters: Flash AC, Counter Type ADC, Servo Tracking ADC, Successive Approximation ADC, Dual Slope ADC, DAC/ADC specifications

### Prescribed Text Books:

1. David A. Bell, "Electronic devices and circuits", Oxford University higher education, 5th edition 2008

### Reference Books:

1. Ramakant A. Gayakwad, 'Op-amps and Linear Integrated Circuits', IV edition, Pearson Education, 2003
2. S.Salivaganan, L.S.Kanchana, "Linear Integrated Circuits", III edition, Mc. Graw Hill, 2018.
3. D. Roy Choudhary, Sheil B. Jani, 'Linear Integrated Circuits', New Age, edition, 2018.
4. Sedra and smith, "Microelectronic circuits", 7th Ed., Oxford University Press

### CO-PO-PSO Mapping:

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering Tool Usage | The Engineer and The World | Ethics | Individual and Collaborative Team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE33T .1    | 3                     | 2                | 2                               | -                                          | 1                      | -                          | -      | -                                      | -             | -                              | -                  | 1    | 2    |
| 24AEEE33T .2    | 3                     | 2                | 2                               | 1                                          | 1                      | -                          | -      | -                                      | -             | -                              | -                  | 1    | 2    |
| 24AEEE33T .3    | 3                     | 2                | 2                               | 1                                          | 1                      | -                          | -      | -                                      | -             | -                              | -                  | 1    | 2    |
| 24AEEE33T .4    | 2                     | 3                | 3                               | 1                                          | 1                      | -                          | -      | -                                      | -             | -                              | -                  | 2    | 2    |
| 24AEEE33T .5    | 2                     | 3                | 3                               | 1                                          | 1                      | -                          | -      | -                                      | -             | -                              | -                  | 2    | 2    |

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P.S.V. (Dr. P.S. Chouvanur)

CRP (Dr. Chouvanur)



# ANNAMACHARYA UNIVERSITY

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RAJAMPET, Annamayya District, AP-516126, INDIA



## Department of Humanities & Sciences

Date: 28-06-2025

To  
The Head of the Department  
Electrical and Electronics Engineering (EEE)  
Annamacharya University  
Rajampet

Dear Sir/Madam,

Subject: Submission of H&S Courses Offered to EEE Department for 2nd Year (III & IV Semesters) - Reg.

I am writing to bring to your kind attention that the Department of Humanities and Sciences (H&S) will be offering the following courses to the EEE department in the 2nd year, for both the III and IV semesters. These courses have been discussed and approved in the 2nd Board of Studies (BOS) meeting. The list of approved courses is as follows:

### B.Tech. III Semester

| Sl. No. | Category | Course Code | Course Title              | Hours per Week |   |   | Credits |
|---------|----------|-------------|---------------------------|----------------|---|---|---------|
|         |          |             |                           | L              | T | P |         |
| 1       | MC       | 24AENS31T   | Environmental Science     | 2              | 0 | 0 | 0       |
| 2       | HSM      | 24AUHV31T   | Universal Human Values-II | 3              | 0 | 0 | 3       |

### B.Tech. IV Semester

| Sl. No. | Category | Course Code | Course Title      | Hours per Week |   |   | Credits |
|---------|----------|-------------|-------------------|----------------|---|---|---------|
|         |          |             |                   | L              | T | P |         |
| 1       | BS       | 24AMAT42T   | Numerical Methods | 3              | 0 | 0 | 3       |

We request you to kindly consider these courses in the curriculum structure of the EEE department for the academic year 2025-2026.

Thank you for your attention and cooperation. Please feel free to contact me for any further clarifications.

With Regards,

Dr. L. Obulapathi  
Head of the Humanities and Science  
Annamacharya University  
Rajampet

### Enclosure:

1. Syllabus copy of Environmental Science
2. Syllabus copy of Universal Human Values-II (UHV-II)
3. Syllabus copy of Numerical Methods

HEAD OF THE DEPARTMENT  
ELECTRICAL AND ELECTRONICS ENGINEERING  
ANNAMACHARYA UNIVERSITY  
RAJAMPET, ANNAMAYYA DIST, A.P.



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EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY  
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**Title of the Course:** Universal Human Values-II  
**Category:** Humanities  
**Course Code:** 24AUHV31T/24AUHV41T  
**Branches:**  
**Semester:** I Semester

| Lecture Hours | Tutorial Hours | Practice Hours | Credits |
|---------------|----------------|----------------|---------|
| 3             | 0              | 0              | 3       |

**Course Objectives:** The course aims to help students recognize the vital interplay between values and skills, promoting sustained happiness and prosperity. It seeks to foster a holistic perspective on life and profession, encouraging value-based living through a clear understanding of human reality and existence. Additionally, the course emphasizes the ethical implications of such an understanding, fostering trustful behaviour, fulfilling human interactions, and a harmonious relationship with nature.

**Course Outcomes:**

At the end of the course, the student will be able to

1. comprehend the terms like Natural Acceptance, Happiness and Prosperity
2. analyze one's self, and one's surroundings (family, society, nature)
3. apply human values in enriching human relationships and human society.
4. analyze the need for universal human values and harmonious existence.
5. evaluate themselves as socially and ecologically responsible engineers.

**Unit 1 Introduction to Value Education**

12

Lecture1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)

Lecture2: Understanding Value Education

Tutorial 1: Practice Session1: Sharing about oneself

Lecture 3: Self-Exploration as the Process for Value Education

Lecture4: Continuous Happiness and Prosperity – The Basic Human Aspirations

Tutorial 2: Practice Session2: Exploring Human Consciousness

Lecture 5: Happiness and Prosperity – Current Scenario

Lecture 6: Method to Fulfill the Basic Human Aspirations

Tutorial 3: Practice Session3: Exploring Natural Acceptance

**Unit 2 Harmony in the Human Being**

8

Lecture 7: Understanding Human being as the co-existence of the self and the body.

Lecture 8: Distinguishing between the needs of the self and the body

Tutorial 4; Practice Session4: Exploring the difference of needs of self and body.

Lecture 9: The body as an instrument of the self

Lecture 10: Understanding harmony in the self

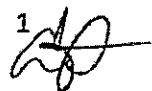
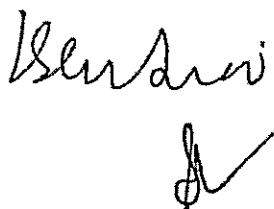
Tutorial 5: Practice Session5: Exploring sources of imagination in the self

Lecture 11: Harmony of the self with the body

Lecture 12: Programme to ensure self-regulation and health

Tutorial 6: Practice Session 6: Exploring harmony of self with the body



**Unit 3 Harmony in the Family and Society**

8

Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction

Lecture 14: 'Trust' – the Foundational Value in Relationship

Tutorial 7: Practice Session7: Exploring the Feeling of Trust

Lecture 15: 'Respect' – as the Right Evaluation

Tutorial 8: Practice Session 8: Exploring the Feeling of Respect

Lecture 16: Other Feelings, Justice in Human-to-Human Relationship

Lecture 17: Understanding Harmony in the Society

Lecture 18: Vision for the Universal Human Order

Tutorial 9: Practice Session9: Exploring systems to fulfil human goal

**Unit 4 Harmony in the Nature/Existence**

10

Lecture 19: Understanding Harmony in the Nature

Lecture 20: Interconnectedness, Self-Regulation and Mutual Fulfilment among the Four Orders of Nature

Tutorial 10: Practice Session 10: Exploring the Four Orders of Nature

Lecture 21: Realizing Existence as Co-existence at All Levels

Lecture 22: The Holistic Perception of Harmony in Existence

Tutorial 11: Practice Session11: Exploring Co-existence in Existence

**Unit 5 Implications of the Holistic Understanding – A Look at Professional Ethics**

10

Lecture 23: Natural Acceptance of Human Values

Lecture 24: Definitiveness of (Ethical) Human Conduct

Tutorial 12: Practice Session 12: Exploring Ethical Human Conduct

Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order

Lecture 26: Competence in Professional Ethics

Tutorial 13: Practice Session13: Exploring Humanistic Models in Education

Lecture 27: Holistic Technologies, Production Systems and Management

Models-Typical Case Studies

Lecture 28: Strategies for Transition towards Value-based Life and Profession

Tutorial 14: Practice Session14: Exploring Steps of Transition towards Universal Human Order

**Practice Sessions for UNIT I – Introduction to Value Education**

PS1 Sharing about Oneself

PS2 Exploring Human Consciousness

PS3 Exploring Natural Acceptance

**Practice Sessions for UNIT II – Harmony in the Human Being**

PS4 Exploring the Difference of Needs of Self and Body

PS5 Exploring Sources of Imagination in the Self

PS6 Exploring Harmony of Self with the Body

**Practice Sessions for UNIT III – Harmony in the Family and Society**

PS7 Exploring the Feeling of Trust

PS8 Exploring the Feeling of Respect

PS9 Exploring Systems to fulfil Human Goal

**Practice Sessions for UNIT IV – Harmony in the Nature (Existence)**

PS10 Exploring the Four Orders of Nature

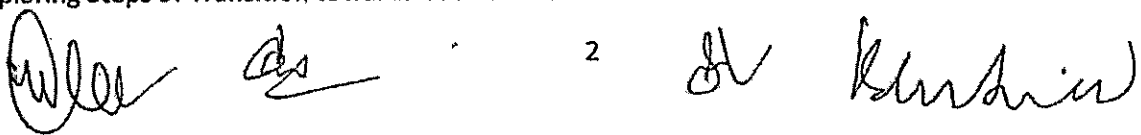
PS11 Exploring Co-existence in Existence

**Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics**

PS12 Exploring Ethical Human Conduct

PS13 Exploring Humanistic Models in Education

PS14 Exploring Steps of Transition towards Universal Human Order







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## SCHOOL OF MANAGEMENT

### MBA DEPARTMENT

To

The Head of the Department,  
Department of Electrical and Electronics Engineering,  
Annamacharya University,  
Rajampet, A.P – 516126.

**Subject:** Submission of Course Structure and Syllabus for Second Year B.Tech. I Sem.-MEFA

The following is the second Year Course Structure and detailed syllabus offered by the Department of Business Administration for the Academic Year 2025-26 to EEE Department.

| S. No. | Category | Course Code | Course Title                                | Hours Per Week |   |   | Credits<br>C |
|--------|----------|-------------|---------------------------------------------|----------------|---|---|--------------|
|        |          |             |                                             | L              | T | P |              |
| 1      | MBA      | 24AMBA21T   | Managerial Economics and Financial Analysis | 3              | 0 | 0 | 3            |

We kindly request you to incorporate this structure into your departmental curriculum and circulate the same among faculty and students as applicable.

Kindly acknowledge the receipt of the letter and thank you for your cooperation and support.

Warm regards,

*(Signature)*  
Head of the Department

## ANNAMACHARYA UNIVERSITY, RAJAMPET

**Title of the Course** : Managerial Economics & Financial Analysis  
**Category** : MBA  
**Course Code** : 24AMBA21T  
**Year** : II B. Tech. I Semester Common to CE, EEE

### Course Objectives:

- To inculcate the basic knowledge of microeconomics and Demand
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- To Know the Various types of market structure and pricing methods and strategy
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

### Course Outcomes:

- Summarize the concepts related to Managerial Economics, financial accounting (L2)
- Comprehend the fundamentals of Economics viz., Production, cost, revenue (L2)
- To examine the different forms of business & market structures (L2)
- Analyze how to invest their capital and maximize returns (L4)
- Develop the accounting statements and evaluate the financial performance of business entity (L5)

### UNIT - I Managerial Economics

Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

### UNIT - II Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Iso quants and Iso costs, Cost & Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

### UNIT - III Business Organizations and Markets

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies.

### UNIT – IV Capital Budgeting

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems).

### UNIT - V Financial Accounting and Analysis

Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

T. Nallu  
05.7.25



**Textbooks:**

1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
- 2.. Aryasri: Business Economics and Financial Analysis, 4/e, MGH.

**Reference Books:**

1. Ahuja HI Managerial economics Schand.
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

Online Learning Resources: <https://www.slideshare.net/123ps/managerial-economics-ppt>  
<https://www.slideshare.net/rossanz/production-and-cost-45827016> <https://www.slideshare.net/darkyla/business-organizations-19917607> <https://www.slideshare.net/balarajbl/market-and-classification-of-market>  
<https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396> <https://www.slideshare.net/ashu1983>

**CO-PO Mapping:**

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | PSO1 | PSO2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|-------------------|--------------------------|--------------------------------|--------|--------------------------|---------------|--------------------------------|------|------|
| 24AMBA21T.1     | 2                     | 1                | 1                               | -                                          | 1                 | 2                        | -                              | 1      | 1                        | 2             | 1                              | -    | -    |
| 24AMBA21T.2     | 2                     | 1                | 1                               | 1                                          | 1                 | 1                        | 1                              | -      | 1                        | 1             | 1                              | -    | -    |
| 24AMBA21T.3     | 1                     | 1                | -                               | 1                                          | 2                 | 1                        | 1                              | 2      | 1                        | 1             | 1                              | -    | -    |
| 24AMBA21T.4     | 1                     | 1                | -                               | 1                                          | 1                 | -                        | 1                              | 1      | -                        | 1             | 1                              | -    | -    |
| 24AMBA21T.5     | -                     | 2                | 1                               | 1                                          | -                 | 1                        | -                              | 1      | 1                        | -             | 1                              | -    | -    |

T. N. S. S. S.  
05.07.25

# ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

(ESTD, UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Title of the Course: Environmental Science  
Category: BS  
Course Code: 24AENS31T/41T  
Branches: CSE, CSE(AIML), CSE(IOT), EEE, ME / CSE(AI), AIML, CSE(DS), AIDS, CE & ECE  
Semester: III Semester/IV Semester

| Lecture Hours | Tutorial Hours | Practice Hours | Credits |
|---------------|----------------|----------------|---------|
| 2             | -              | -              | -       |

**Course Objectives:** This course aims to raise environmental awareness, promote sustainable practices aligned with the Sustainable Development Goals (SDGs), and highlight the significance of ecosystems and biodiversity. It sensitizes students to major pollution issues and related legislative measures, fosters ethical responsibility and problem-solving skills to tackle environmental challenges, and explains the impact of human population growth on the environment and public health. The course also emphasizes the role of education, information technology, and public policy in promoting environmental sustainability.

## Course Outcomes:

At the end of the course, the student will be able to

1. explain how natural resources should be utilised with a focus on sustainability.
2. describe the need to protect ecosystems and biodiversity for future generations.
3. comprehend major pollution problems related to ecosystems.
4. Summarize key environmental issues, sustainable practices, and laws supporting environmental protection in the context of sustainable development goals.
5. explain the effects of population growth on environment and health, and the role of education, IT, and welfare programs in managing them.

## Unit 1 Natural resources

7

Natural Resources: Renewable and non-renewable resources – Forest resources: Uses, deforestation – Water resources: Uses, floods, drought – Mineral resources: Uses, environmental effects of extracting mineral resources– Energy resources: Renewable and non-renewable energy sources (overview only).

## Unit 2 Ecosystems, Biodiversity and its conservation

6

Ecosystems: Producers, consumers and decomposers – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and functions of the following ecosystems: Forest ecosystem and lake ecosystem.

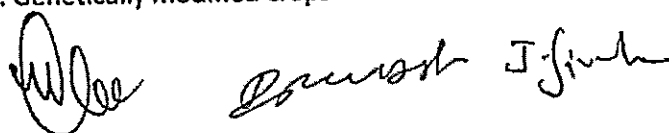
Biodiversity and its conservation: Definition – Values of biodiversity – Hot-spots of biodiversity – Threats to biodiversity – Conservation of biodiversity.

## Unit 3 Environmental pollution

5

Definition, causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards.

Self-learning: Genetically modified crops





**Unit 4 Social issues and the Environment**

6

Sustainable development – Rainwater harvesting – Environmental ethics – Climate change, global warming, acid rain, ozone layer depletion – Air (Prevention and Control of Pollution) Act – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Environment Protection Act.

**Unit 5 Human population and the Environment**

6

Population explosion – Family welfare programmes – Environment and human health – Value education – Role of information technology in environment and human health, Field work – Visit to a local area to document environmental assets.

**Prescribed Textbooks:**

1. Kaushik, Anubha, and C. P. Kaushik. *Perspectives in Environmental Studies*. 6th ed., New Age International Publishers, New Delhi, 2018.
2. Chawla, Shashi. *A Textbook of Environmental Studies*. 1st ed., McGraw Hill Education, New Delhi, 2017.

**Reference Books:**

1. Joseph, Benny. *Environmental Studies*. 3rd ed., McGraw Hill Education (India), New Delhi, 2017.
2. Dhinakaran, A., and B. Sankaran. *A Textbook of Environmental Studies*. 1st ed., Himalaya Publishing House, Mumbai, 2017.
3. Basu, Mahua, and S. Xavier. *Fundamentals of Environmental Studies*. 1st ed., Cambridge University Press, New Delhi, 2017.
4. Bharucha, Erach. *Textbook of Environmental Studies for Undergraduate Courses*. 2nd ed., Universities Press (India) Pvt. Ltd., New Delhi, 2013.
5. Tiwari, Vijay Kumar. *A Textbook of Environmental Studies*. 1st ed., Himalaya Publishing House, Mumbai, 2017.

**CO-PO Mapping:**

| Course outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering tool usage | The engineer and the world | Ethics | Individual and collaborative teamwork | Communication | Project management and finance | Life-long learning |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|---------------------------------------|---------------|--------------------------------|--------------------|
| 24AENS31T/41T.1 | 2                     | 2                | -                               | -                                          | -                      | -                          | 2      | -                                     | -             | -                              | 2                  |
| 24AENS31T/41T.2 | 2                     | 2                | -                               | -                                          | -                      | -                          | 2      | -                                     | -             | -                              | 2                  |
| 24AENS31T/41T.3 | 2                     | 2                | -                               | -                                          | -                      | -                          | 2      | -                                     | -             | -                              | 2                  |
| 24AENS31T/41T.4 | 3                     | 2                | -                               | -                                          | -                      | -                          | 2      | -                                     | -             | -                              | 3                  |
| 24AENS31T/41T.5 | 2                     | 2                | -                               | -                                          | -                      | -                          | 2      | -                                     | -             | -                              | 2                  |

Dr. Anubha Kaushik



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## ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY  
(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

Title of the Course: DC Machines and Transformers Lab  
Category: PCC  
Semester: III  
Course Code: 24AEEE31L  
Branch/es: EEE

Lecture Hours

Tutorial Hours

Practice Hours

Credits

3

1.5

### Course Objectives:

1. To impart hands on experience in Testing of DC and AC Machines, measurement of performance parameters, study of machine characteristics. It also gives practical exposure to the usage of different DC and AC Machines with different conditions.

### Course Outcomes:

At the end of the course, the student will be able to ...

1. Apply theoretical concepts to determine the performance characteristics of DC Machines.
2. Demonstrate starting and speed control methods of DC Machines.
3. Analyze the parallel operation of single-phase transformers
4. Analyze the performance analysis of transformers using various tests
5. Determine the performance parameters of single-phase transformer.

### List of Experiments:

Any 10 of the following experiments are to be conducted:

1. Magnetization characteristics of DC Shunt Generator. Determination of Critical resistance and Critical Speed.
2. Speed control of DC shunt motor by Field Current and Armature Voltage Control.
3. Brake test on DC shunt motor- Determination of performance curves.
4. Swinburne's test - Predetermination of efficiencies as DC Generator and Motor.
5. Load test on DC compound generator-Determination of characteristics.
6. Load test on DC shunt generator-Determination of characteristics.
7. Load test on DC series generator-Determination of characteristics
8. Fields test on DC series machines-Determination of efficiency.
9. Brake test on DC compound motor-Determination of performance curves.
10. Retardation Test on DC Shunt Motor-Determination of Stray Losses.
11. OC & SC tests on single phase transformer.

HEAD OF THE DEPARTMENT  
ELECTRICAL AND ELECTRONICS ENGINEERING  
ANNAMACHARYA UNIVERSITY  
RAJAMPET, ANNAMAYYA DIST, A.P.

P. K. L. P.  
(Dr. P. K. Choudhary)

P. B. Bhaskara Prasad

(Dr. P. K. Choudhary)





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12. Sumner's test on single phase transformers.
13. Scott connection of transformers.
14. Parallel operation of Single-phase Transformers.
15. Separation of core losses of a single-phase transformer.

## Reference Books:

1. Laboratory Manual for Electrical Machines by D. P.Kothari, BS Umre, Dreamtech Press, 2<sup>nd</sup> Edition, 2020 .
2. Electrical Machinery Fundamentals by Stephen J Chapman McGraw Hill education, 4<sup>th</sup> Edition, 2017.
3. Generalized Theory of Electrical Machines by Dr. P S Bimbhra, 7<sup>th</sup> Edition, 2021, Khanna Publishers.

## Web resource

1. <https://ems-iitr.vlabs.ac.in/List%20of%20experiments.html>

## CO-PO-PSO Mapping:

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering tool usage | The engineer and the world | Ethics | Individual and collaborative teamwork | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|---------------------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE31L.1     | 3                     | 2                | 2                               | -                                          | 2                      | -                          | -      | 2                                     | 1             | -                              | 1                  | 3    | 2    |
| 24AEEE31L.2     | 3                     | 3                | 2                               | -                                          | 1                      | -                          | -      | 2                                     | 1             | -                              | 1                  | 3    | 2    |
| 24AEEE31L.3     | 3                     | 2                | 3                               | 1                                          | -                      | -                          | -      | 2                                     | 1             | -                              | 1                  | 3    | 2    |
| 24AEEE31L.4     | 3                     | 3                | 2                               | 1                                          | -                      | -                          | -      | 2                                     | 1             | -                              | 1                  | 3    | 2    |
| 24AEEE31L.5     | 3                     | 3                | 2                               | -                                          | -                      | -                          | -      | 2                                     | 1             | -                              | 1                  | 3    | 2    |

*Halitho*  
HEAD OF THE DEPARTMENT  
ELECTRICAL AND ELECTRONICS ENGINEERING  
ANNAMACHARYA UNIVERSITY  
RAJAMPET, ANNAMAYYA DIST, A.P.

*P. N. U. P.*  
(Dr. P. S. Choudhary) *Dr. P. S. Choudhary*

*P. Bhaskara Prasad*



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Title of the Course: Electrical Circuits Lab  
Category: PCC  
Semester: III  
Course Code: 24AEEE32L  
Branch: EEE

Lecture Hours

Tutorial Hours

Practice Hours

Credits

3

1.5

### Course Objectives:

1. To verify basic laws and various theorems of electrical circuits
2. To calculate self and mutual inductance and coefficient of coupling of coupled circuits
3. To calculate network parameters of the two-port networks
4. To describe the phenomenon of series and parallel resonance
5. To measure active and reactive power of 3- $\Phi$  balanced loads

### Course Outcomes:

At the end of the course, the student will be able to...

1. Apply and validate fundamental circuit theorems experimentally to solve DC circuits.
2. Determine the self, mutual inductance parameters of single-phase transformer and Analyze the co-efficient of coupling.
3. Characterize the two port networks by evaluating Z, Y, ABCD and h parameters.
4. Investigate Resonance Phenomena in RLC circuits
5. Measure active and reactive power in balanced star/delta three-phase loads and correlate results with theoretical calculations.

### List of Experiments

Any 10 of the following experiments are to be conducted:

1. Verification of Ohm's law.
2. Verification of Thevenin's and Norton's theorems.
3. Verification of Maximum Power Transfer theorem.
4. Verification of Superposition theorem.
6. Verification of Reciprocity and Millman's theorems.
7. Determination of self and mutual inductances and co-efficient of coupling.
8. Determination of Z and Y Parameters.
9. Determination of Transmission and hybrid parameters.
10. Series and Parallel resonance.
11. Measurement of single-phase Active power for Star and Delta connected balanced loads.
12. Measurement of single-phase Reactive power for Star and Delta connected balanced loads.

Head of the Department  
ELECTRICAL AND ELECTRONICS ENGINEERING  
ANNAMACHARYA UNIVERSITY  
RAJAMPET, ANNAMAYYA DIST, A.P.

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P. Bhaskara Prasad

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13. Measurement of Active Power in a 3-Phase System Using the Two-Wattmeter Method.

14. Determination of cold and hot resistance of electric lamp.

**Hardware Requirements:** Regulated Power supplies, Analog/Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components.

**Prescribed Textbooks:**

1. Circuit Analysis Theory and Practice, 5Th Edition, Allan H Robbins Wilhelm C. Miller, Cengage Publishers.
2. Introduction to Electric Circuits, Sixth Edition, Richard C. Dorf, James A. Svoboda, Wiley Student Edition.

**Reference Books:**

1. Network Analysis – ME Van Altenburg, Prentice Hall of India, revised 3rd Edition, 2019
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.

**Web Resources:**

<https://asnm-iitkgp.vlabs.ac.in/>

**CO-PO-PSO Mapping:**

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering tool usage | The engineer and the world | Ethics | Individual and collaborative teamwork | Communication | Project management and finance | Life-long learning | PSO 1 | PSO 2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|---------------------------------------|---------------|--------------------------------|--------------------|-------|-------|
| 24AEEE32L. 1    | 3                     | 3                | 2                               | 2                                          | 3                      | 1                          | 1      | 2                                     | 2             | 1                              | 2                  | 3     | 1     |
| 24AEEE32L. 2    | 3                     | 2                | 1                               | 2                                          | 2                      | 1                          | 1      | 1                                     | 1             | 1                              | 1                  | 3     | 2     |
| 24AEEE32L. 3    | 3                     | 3                | 2                               | 3                                          | 3                      | 1                          | 1      | 1                                     | 2             | 1                              | 2                  | 3     | 1     |
| 24AEEE32L .4    | 2                     | 3                | 2                               | 2                                          | 3                      | 1                          | 1      | 1                                     | 1             | 1                              | 2                  | 2     | 2     |
| 24AEEE32L. 5    | 3                     | 3                | 2                               | 3                                          | 3                      | 2                          | 2      | 2                                     | 2             | 2                              | 2                  | 3     | 3     |

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ELECTRICAL AND ELECTRONICS ENGINEERING  
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P.S. Choudhary  
P. Bhaskar Prasad



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Title of the Course: Electrical and Electronics Simulation Lab  
Category: PCC  
Semester: III  
Course Code: 24AEEE33L  
Branch: EEE

Lecture Hours  
0

Tutorial Hours  
0

Practice Hours  
3

Credits  
1.5

### Course Objectives:

The main goal of this lab is to help students understand how electrical and electronic circuits work by using simulation software. Students will learn to verify circuit laws and theorems, analyze different types of networks, and study the behavior of electronic devices without using actual hardware. This hands-on practice through simulation will strengthen their basic concepts and improve their problem-solving skills.

### Course Outcomes:

At the end of the course, the student will be able to

1. Understand and verify basic electrical circuit laws and theorems using simulation tools.
2. Analyze electrical networks and determine various network parameters like Z, Y, ABCD, and hybrid models
3. Simulate and interpret the behavior of electronic devices such as diodes and transistors
4. Design and analyze basic analog circuits like rectifiers and filters using simulation software
5. Demonstrate the functioning of fundamental digital logic gates using circuit simulation

### List of Experiments:

Any 10 of the following experiments are to be conducted:

1. Verification of Kirchhoff's laws using simulation tools.
2. Verification of Thevenin's and Norton's theorems using simulation tools
3. Verification of super position and maximum power transfer theorems using simulation tools.
4. Verification of Reciprocity and Compensation theorems using simulation tools.
5. Determination of Impedance and Admittance parameters using simulation tools.
6. Determination of ABCD and Hybrid parameters using simulation tools.
7. Study of Logic gates AND, OR, XOR and NOT using simulation tools.
8. Measurement of Ripple factor of Half wave rectifier and Full wave Rectifier using simulation tools.
9. Simulation of PN junction diode characteristics.
10. Simulation of Zener diode characteristics.
11. Simulation of Input and output characteristics of Transistor in CE configuration.
12. Simulation of Input and output characteristics of Transistor in CB configuration.
13. Simulation of Low pass and High pass filters

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Prof  
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Dr. Madhan Mohan





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14. Simulation of series and parallel resonance circuit.

## Prescribed Textbooks:

1. Circuit Analysis Theory and Practice, 5<sup>th</sup> Edition, Allan H Robbins Wilhelm C. Miller, Cengage Publishers.

## Reference Books:

1. SPICE for Power Electronics and Electric power, third edition, Muhammad H. Rashid Hasan M. Rashid
2. Fundamentals of Electrical Circuits, seventh Edition, Charles K. Alexander, Mathew N.O. Sadiku
3. Introduction to Electric Circuits, Sixth Edition, Richard C. Dorf, James A. Svoboda, Wiley Student Edition.
4. Circuits and networks Analysis and Synthesis, fifth edition, A Sudhakar Shyammoohan S Palli

## Web resources:

1. [https://youtu.be/3aPp8L2jon8?si=uahAyPv22W\\_09Ezq](https://youtu.be/3aPp8L2jon8?si=uahAyPv22W_09Ezq)
2. <https://youtu.be/JuWQJYcl60Y?si=PQd511oJ47hwwN>
3. <https://youtu.be/ld1aqfOlm3w?si=JYSLcWWB8Cb7gc8>
4. <https://youtu.be/16POVzL4wRo?si=OPnhlaj074kObOIZ>
5. [https://youtu.be/Q\\_pi-VQsPpo?si=Pvm9073OIPHR7V2p](https://youtu.be/Q_pi-VQsPpo?si=Pvm9073OIPHR7V2p)

## CO-PO-PSO Mapping:

| CO          | ENGINEERING KNOWLEDGE | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-------------|-----------------------|------------------|---------------------------------|--------------------------------------------|-------------------|--------------------------|--------|--------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE33L.1 | 3                     | 2                | 1                               | 2                                          | 3                 | 1                        | -      | 1                        | 2             | 2                              | 2                  | 3    | 1    |
| 24AEEE33L.2 | 3                     | 3                | 2                               | 2                                          | 3                 | 1                        | 1      | 1                        | 2             | -                              | 2                  | 3    | 3    |
| 24AEEE33L.3 | 3                     | 3                | 2                               | 2                                          | 3                 | -                        | 1      | 1                        | 2             | 1                              | 2                  | 2    | 3    |
| 24AEEE33L.4 | 3                     | 3                | 3                               | 2                                          | 3                 | -                        | 1      | 1                        | 2             | 1                              | 2                  | 3    | 3    |
| 24AEEE33L.5 | 3                     | 2                | 2                               | 2                                          | 3                 | -                        | 1      | 1                        | 2             | 1                              | 2                  | 2    | 3    |

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P. N. U. →  
Dr. P. S. Chowdary  
P. Bhaskara Prasad

Dr. P. S. Chowdary  
Dr. P. S. Chowdary



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Title of the Course: PCB Design and Fabrication  
Category: SC  
Semester: III  
Course Code: 24AEEE34L  
Branch/es: EEE

Lecture Hours  
1

Tutorial Hours  
0

Practice Hours  
2

Credits  
3

### Course Objectives:

1. To impart knowledge on PCB designing.
2. Apply advance techniques, skills and modern tools for designing of PCBs
3. Apply the knowledge and techniques to fabricate Single layer Copper clad PCB
4. To impart knowledge on Fabricate of a Prototype PCB

### Course Outcomes:

At the end of the course, the student will be able to...

1. Summarize the steps involved in schematic, layout, fabrication and assembly process of PCB design.
2. Design a circuit and create a schematic Capture.
3. Design (schematic and layout) and fabricate PCB for simple circuits.
4. Summarize the concept of developing copper clad PCB.
5. Summarize the concept of copper clad PCB Etching process and soldering.

### Unit 1 Introduction to PCB

T:3, P:6

What is PCB - Types of PCBs: Single Sided (Single Layer), Multi-Layer (Double Layer)- PCB Materials. Draw a Schematic, Bill of materials (B.O.M.), Types of Components -Active Components- Diode- Transistor- MOSFET- LED- SCR- Integrated Circuits (ICs)- Passive Components- Resistor-Capacitor-Inductor-Transformer Speaker/Buzzer Component Package Types.

### Unit 2 Introduction: Setting up Software

T:3, P:6

Introduction to PCB Design using Software tool, installing software, Initial Startup, Components and Library Creation (Symbol, Package, Device), Creating a New Schematic Design (Starting a Project, Placing Parts, Finishing Up).

### Unit 3 PCB Laying Out the Board

T:3, P:6

PCB Layout Designing- Prototype Designing, Board Editor, Arrange the Components, Creating Traces, Ground Plane. Error Checking, Initialize and Outline Board, Connections and Routing (The Auto Router, Manual Routing, Setting Up a Simple Auto Route, Optimizations, Manual Traces & Shapes), Generating Gerber's, Self-Check and Final Touches, Post-lab Reviewing the Files. Selecting a Manufacturer.

Case Study: Design one circuit for hardware development.

### Unit 4 PCB Fabrication Process-I

T:3, P:6

Finalizing PCB and Studying the Circuit for errors, printing final circuit using laser printer on glossy paper, selecting proper size of Copper clad PCB, transform the circuit on to copper clad PCB with proper temperature.

P. S. U. S.

Dr.

(Dr. P. S. Chenniah)

(K. R. Reddy)

P. Bhaskara Prasad

Head of the Department  
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## Unit 5 PCB Fabrication Process-II

T:3, P:6

Etching process (any Etching process). Safety precautions before starting the Etching process, Cleaning the PCB. Drilling holes on PCB. Components Mounting, Soldering and De-soldering.

Case Study: DIY PCB Prototyping

### Prescribed Textbooks:

1. Simon Monk, Duncan Amos - Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards, 2nd Edition 2017.

### Reference Books:

1. Tom Clarke, © Imperial College London The EAGLE Schematic & PCB Layout Editor - A Guide
2. Scarpino Matthew, Designing Circuit Boards with EAGLE: Make High-Quality PCBs at Low-Cost 1st Edition, Kindle Edition
3. Kenji Aono-Application Note: PCB Design with EAGLE. April 4, 2011.
4. Autodesk Eagle manual version 9.5 Copyright © 2019 Autodesk.
5. R. S. KHANDPUR - Printed Circuit Boards\_ Design, Fabrication, Assembly and Testing (2005, MC GRAW HILL INDIA).
6. Kraig Mitzner - Complete PCB Design Using OrCAD Capture and PCB Editor (2009, Newnes).

### Web Resources

1. [https://onlinecourses.nptel.ac.in/noc24\\_ee127/preview](https://onlinecourses.nptel.ac.in/noc24_ee127/preview)
2. <https://hillmancurtis.com/nptel-pcb-design/>
3. <https://www.youtube.com/watch?v=f1soGt0uNqc>

### CO-PO-PSO Mapping:

| CO          | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering tool usage | The engineer and World | Ethics | Individual and Collaborative team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE34L.1 | 2                     | -                | 2                               | -                                          | 2                      | -                      | -      | -                                      | 1             | 2                              | -                  | 2    | 1    |
| 24AEEE34L.2 | 3                     | 2                | 3                               | -                                          | 3                      | -                      | -      | -                                      | 1             | 2                              | -                  | 3    | 2    |
| 24AEEE34L.3 | 3                     | 2                | 3                               | -                                          | 3                      | -                      | -      | -                                      | 2             | 1                              | -                  | 3    | 3    |
| 24AEEE34L.4 | 2                     | -                | 2                               | -                                          | 1                      | -                      | -      | -                                      | -             | -                              | -                  | 1    | 1    |

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P. S. V. P  
Comp. A. Chaurav  
P. Bhaskar Prasad

Dr. R. P. Reddy



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Title of the Course: Numerical methods

Category: BSC

Semester: IV

Course Code: 24AMAT42T

Branch: EEE

Lecture Hours  
3

Tutorial Hours  
0

Practice Hours  
0

Credits  
3

## Course Objectives:

The objective of the Numerical Methods course is to introduce students to numerical techniques for solving algebraic and transcendental equations, and to familiarize them with interpolation methods for estimating values between known data points. The course also aims to explain various numerical approaches for evaluating definite integrals and solving ordinary differential equations. Additionally, it describes the applications of numerical methods in solving partial differential equations, equipping students with practical tools for computational problem-solving in scientific and engineering contexts.

## Course Outcomes:

At the end of the course, the student will be able to

1. Solve algebraic and transcendental equations using numerical methods.
2. Solve the simultaneous equations using numerical methods.
3. Apply interpolation techniques to solve real-world problems by estimating intermediate values from discrete data points.
4. Evaluate differentiation and integration of a function using numerical technique.
5. Solve the ordinary differential equations using numerical methods.

Unit 1 Solutions of algebraic and transcendental equations 12

Bisection method - Regula-Falsi method - The Iteration Method-Newton-Raphson method.

Unit 2 Numerical solutions of simultaneous equations and Eigen value problems 10

Introduction, Gaussian elimination method, Gauss-Jordan elimination method. Iterative methods: Gauss Jacobi iteration method, Gauss-Seidel iteration method. Power method for determining the largest eigen values.

Unit 3 Interpolation and Curve fitting 8

**Interpolation:** Finite differences - forward differences and backward differences - Newton's forward interpolation formula - Newton's backward interpolation formula - Lagrange's interpolation formula.

**Curve fitting:** Fitting a straight line-second degree parabola-Exponential curve -power curve by the method of least squares.

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P. BHASKARA PRASAD

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CRP Adhar Mohan





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## Unit 4 Numerical Differentiation and Numerical integration

8

Numerical Differentiation, Numerical integration - Trapezoidal rule - Simpson's 1/3rd and Simpson's 3/8 rules.

## Unit 5 Numerical solutions of ordinary differential equations of first order

10

Picard's method -Taylor's series- Euler's method - Modified Euler's method - Runge-Kutta method of fourth order

### Prescribed Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. R.K. Jain, S.R.K. Iyengar, Advanced Engineering Mathematics, 5/e, Narosa Publishers, 2016.

### Reference Books:

1. P. Kandasamy, K. Thilagavathi, K. Gunavathi, Numerical Methods, S. Chand & Company, 2/e, Reprint 2012.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
3. T. Veerarajan, Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.

### CO-PO Mapping:

| CO          | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering tool usage | The engineer and society | Ethics | Individual and Collaborative team work | Communication | Project management and finance | Life-long learning |
|-------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|--------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|
| 24AMAT41T.1 | 2                     | 2                | 1                               | 1                                          | -                      | -                        | -      | -                                      | -             | -                              | 1                  |
| 24AMAT41T.2 | 3                     | 3                | 2                               | 2                                          | -                      | -                        | -      | -                                      | -             | -                              | 1                  |
| 24AMAT41T.3 | 2                     | 2                | 1                               | 1                                          | -                      | -                        | -      | -                                      | -             | -                              | 1                  |
| 24AMAT41T.4 | 3                     | 2                | 1                               | 2                                          | -                      | -                        | -      | -                                      | -             | -                              | 1                  |
| 24AMAT41T.5 | 3                     | 2                | 1                               | 2                                          | -                      | -                        | -      | -                                      | -             | -                              | 1                  |

*Shalitha*  
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*P. S. V. P.*  
(Dr. P. S. V. P.)

*P. Bhasheem Prasad*

*R. Medha Mohan*



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Title of the Course: Digital Electronics  
Category: PCC  
Semester: IV  
Course Code: 24AEEE41T  
Branch: EEE

Lecture Hours  
3

Tutorial Hours  
0

Practice Hours  
0

Credits  
3

### Course Objectives:

1. To analyze the concepts and techniques associated with the number systems and codes.
2. To minimize the logical expressions using Boolean laws, postulates and K-Map method.
3. To design, and implement combinational logic circuits for digital functions.
4. To design of sequential logic, memory elements, and their use in registers and counters.
5. To analyze the finite states machines & classification of memory devices.

### Course Outcomes:

At the end of the course, the student will be able to...

1. Analyze the number systems and codes.
2. Simplify the logical expressions using Boolean laws, postulates & also by using k map method.
3. Design of combinational logic circuits using conventional logic gates and various programmable logic devices.
4. Design of sequential logic circuits.
5. Analyze the finite state machines & classification of memory devices.

### Unit 1 Number Systems, Codes & Boolean Algebra:

10

Introduction to number systems –  $r$ ,  $(r-1)$ 's complement 1's & 2's complement, 9's & 10's Complement, representation of negative numbers, Binary arithmetic, Binary codes, Error detecting & Error correcting codes, hamming code.

Boolean Algebra: Fundamental postulates of Boolean algebra, Basic theorems and Properties, Logic gates, Properties of XOR gate, universal gates.

### Unit 2 Switching Functions and Their Minimization:

10

Switching Functions-Canonical and Standard forms, Algebraic simplification using Boolean theorems, two level & Multilevel Realization of Boolean Functions using Universal Gates.

Minimization: K-Map methods, Prime implicants, don't care combinations, Minimal SOP and POS forms (up to 4 variables).

### Unit 3 Combinational Logic Design & Programmable Logic Devices:

9

Design using conventional logic gates-Binary Adders(half,full,parallel), Subtractors, Magnitude comparator, Encoder, Decoder, Multiplexer, De-Multiplexer (1-Line to 4-Line and 1-Line to 8-Line).

Programmable Logic Devices (PLDs): Introduction to PLDs; PROM, PLA, PAL, FPGA (Theoretical concepts only).

### Unit 4 Sequential Circuits:

10

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode), Basic flip-flops, Triggering and excitation tables, flip flop conversions, Design of modulo-N Synchronous counters – up/down counter, ring counter, Johnson counter(Synchronous counters only).

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P.B.U  
(Dr. P. S. Choudhary)

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P. Bhaskar Prasad





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## Unit 5 FSM Minimization and Memory Devices:

8

Finite state machine-capabilities and limitations, Mealy and Moore models and their conversions, minimization of completely specified sequential machines, Partition technique.

Memory Devices: Classification of memories; RAM (SRAM, DRAM); ROM (PROM, EPROM, EEPROM, Flash) (theoretical concepts only).

### Prescribed Textbooks:

1. M. Morris Mano and Michael D. Ciletti, *Digital Design with an Introduction to the Verilog HDL*, 6th Edition, Pearson Education, 2017.

### Reference Books:

1. R. P. Jain and Kishor Sarawadekar, *Modern Digital Electronics*, 5th Edition, McGraw Hill India, 2022
2. A. Anand Kumar, "Fundamentals of Digital Circuits," 4th Edition, PHI Learning, 2018.
3. Charles H. Roth, Jr, Larry L. Kinney. *Fundamentals of Logic Design*. Cengage Learning, 2015, 6th Ed.
4. William I. Fletcher, *An Engineering Approach to Digital Design*. Pearson, 3rd Ed, 2015.

### CO-PO-PSO Mapping:

| CO          | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering tool usage | The engineer and World | Ethics | Individual and Collaborative team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE41T.1 | 3                     | 2                | 1                               | -                                          | -                      | -                      | 2      | -                                      | 3             | -                              | 1                  | -    | -    |
| 24AEEE41T.2 | 3                     | 3                | 2                               | -                                          | -                      | -                      | -      | 1                                      | 3             | -                              | -                  | -    | -    |
| 24AEEE41T.3 | 3                     | 3                | 3                               | 2                                          | 3                      | 1                      | 1      | -                                      | 2             | 1                              | 1                  | 3    | 2    |
| 24AEEE41T.4 | 3                     | 2                | 3                               | 2                                          | 2                      | -                      | -      | 2                                      | 3             | -                              | -                  | 3    | 1    |
| 24AEEE41T.5 | 2                     | 3                | 2                               | -                                          | 1                      | 1                      | 1      | -                                      | 3             | -                              | 1                  | 2    | -    |

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*P.B.U.P*  
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CRP (Dr. P. Chandra)

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Title of the Course: Induction and Synchronous Machines

Category: PCC

Semester: IV

Course Code: 24AEEE42T

Branch: EEE

Lecture Hours

3

Tutorial Hours

0

Practice Hours

0

Credits

3

### Course Objectives:

1. To understand the constructional features and operating principles of Induction Motors and Synchronous Machines.
2. To analyze the performance characteristics of single-phase and three-phase Induction Motors under various load conditions.
3. To evaluate the torque-speed characteristics and starting methods of Induction Motors.
4. To describe the principle of operation, excitation methods, and types of Synchronous Machines.
5. To illustrate the synchronization, V-curves, and power-angle characteristics of Synchronous Generators and Motors.

### Course Outcomes:

At the end of the course, the student will be able to

1. Understand the construction, principle and operation of single phase and three phase induction motors
2. Understand the construction, principle and operation of synchronous generator and synchronous motor
3. Understand various applications of various alternating machines
4. Apply the induction and synchronous machines concepts to solve various mathematical and complex problems
5. Analyze the characteristics of induction motor, synchronous motor and synchronous generators

### Unit 1 3-phase induction motors

9

Construction of Squirrel cage and Slipring induction motors– production of rotating magnetic field – principle of operation – rotor emf and rotor frequency – rotor current and power factor at standstill and during running conditions– rotor power input, rotor copper loss and mechanical power developed and their interrelationship – equivalent circuit – phasor diagram, Applications.

### Unit 2 Performance of 3-Phase induction motors

9

Torque equation – expressions for maximum torque and starting torque – torque-slip characteristics – double cage and deep bar rotors – No load, Brake test and Blocked rotor tests – circle diagram for predetermination of performance- methods of starting –starting current and torque calculations - speed control of induction motor with V/f control method, rotor resistance control and rotor emf injection technique –crawling and cogging – induction generator operation.

### Unit 3 Single Phase Motors

9

Single phase induction motors – constructional features – double revolving field theory, Cross field theory – equivalent circuit- starting methods: capacitor start capacitor run, capacitor start induction run, split phase & shaded pole, AC series motor, Applications.

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Dr. P. Bhaskara Prasad





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## Unit 4 Synchronous Generator

9

Constructional features of non-salient and salient pole type alternators- armature windings – distributed and concentrated windings – distribution & pitch factors – E.M.F equation – armature reaction – voltage regulation by synchronous impedance method – MMF method and Potier triangle method – two reaction analysis of salient pole machines - methods of synchronization- Slip test – Parallel operation of alternators.

## Unit 5 Synchronous Motor

9

Synchronous motor principle and theory of operation – Effect of excitation on current and power factor– synchronous condenser –expression for power developed –hunting and its suppression – methods of starting.

### Prescribed Text Books:

1. Electrical Machinery, Dr. P.S. Bimbhra, Khanna Publishing, 2021, First Edition.

### References Books:

1. Electrical machines, D.P. Kothari and I.J. Nagrath, McGraw Hill Education, 2017, Fifth Edition.
2. Theory & Performance of Electrical Machines by J.B.Gupta, S.K.Kataria & Sons, 2007.
3. Electric Machinery, A.E.Fitzgerald, Charles kingsley, Stephen D.Umans, McGraw-Hill, 2020, Seventh edition

### CO-PO-PSO Mapping:

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering Tool Usage | The Engineer and The World | Ethics | Individual and Collaborative Team work | Communication | Project management and finance | Life-long learning | PSO 1 | PSO 2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|-------|-------|
| 24AEEE42T.1     | 2                     | 2                | 1                               | 1                                          | -                      | -                          | -      | -                                      | 1             | 2                              | 2                  | 2     | 2     |
| 24AEEE42T.2     | 2                     | 2                | 1                               | 1                                          | -                      | -                          | -      | -                                      | 1             | -                              | -                  | 2     | 2     |
| 24AEEE42T.3     | 2                     | 2                | 1                               | 1                                          | -                      | -                          | -      | -                                      | 1             | -                              | -                  |       |       |
| 24AEEE42T.4     | 3                     | 2                | 1                               | 2                                          | -                      | -                          | -      | 1                                      | 1             | -                              | -                  | 1     | 1     |
| 24AEEE42T.5     | 3                     | 3                | 2                               | 2                                          | -                      | -                          | -      | 1                                      | 1             | -                              | -                  | 2     | 2     |

*Lalitha*  
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*P.K.U.*  
*Dr. P.K. Choudhary*

*Dr. P.K. Choudhary*  
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**Title of the Course:** Electrical and Electronics Measurements and Instrumentation

**Category:** PCC

**Semester:** IV

**Course Code:** 24AEEE43T

**Branch:** EEE

**Lecture Hours**

3

**Tutorial Hours**

0

**Practice Hours**

0

**Credits**

3

### Course Objectives:

1. To understand the basic methods of electrical measurement and the classification of instruments.
2. To understand the construction and working of various types of wattmeters, energy meters and power factor meter.
3. To apply the principle and operation of DC and AC potentiometers.
4. To analyze the methods of measuring resistance inductance and capacitance using bridge techniques.
5. To analyze the advantages and limitations of different types of digital measuring instruments.

### Course Outcomes:

At the end of the course, the student will be able to

1. Understand various methods of measurement and classify different types of measuring instruments.
2. Describe the construction and working of single-phase and three-phase wattmeters and energy meters.
3. Apply the principle, standardization, and applications of DC Crompton's and AC potentiometers (Polar and Coordinate types).
4. Analyze low, medium, and high resistances, inductance, capacitance using appropriate bridge methods
5. Analyze the basic block diagram of CRO and operation of different types of digital voltmeters

### Unit 1 Measuring Instruments

10

Methods of measurements, Classification of instruments, Characteristics of instruments, Error-definition and types – Forces required to operate an instrument, different mechanisms used to obtain deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, Dynamometer, Moving Iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance.

### Unit 2 Measurement of Power, Energy & Power Factor

10

Power measurement: Single-phase dynamometer wattmeter – LPF wattmeter – Double element and three element dynamometer wattmeter. Energy measurement: Single-phase induction type energy meter – Driving and braking torques – Errors and compensations, Single-phase Dynamometer Power factor meters.

### Unit 3 Potentiometers & Measurement of Frequency

10

Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: Polar and Coordinate type's standardization – applications. Principle and operation of single-phase frequency meter- vibrating reed type, - Ferro dynamic type meters.

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P.B.U.  
(Dr. P. S. Chakraborty)

*Signature*

(K. Medha Mishra)  
P. P. Prasad





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## Unit 4 DC & AC Bridges

10

Method of measuring low, medium and high resistance – sensitivity of Wheat stone's bridge – Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method. Measurement of inductance–Maxwell's bridge, Anderson's bridge. Measurement of capacitance–Desauty's bridge, Schering Bridge. Measurement of frequency–Wien's bridge.

## Unit 5 Oscilloscope, Smart & Digital Meter

10

Cathode Ray Oscilloscope- Cathode Ray Tube- Time base generator- Horizontal and vertical amplifiers application of CRO- Measurement of phase, frequency, current & voltage- Lissajous pattern. Digital Voltmeter- Successive approximation, ramp, integrating type DVM's, Digital frequency meter-Digital multimeter-Digital Tachometer. Construction and working of smart energy meter- Advantages and Disadvantages.

### Prescribed Textbooks:

1. A.K.Sawhney, Electrical & Electronic Measurement & Instruments, 4 th Edition, Dhanpat Rai & Co. Publications.

### Reference Books:

1. E.W. Golding and F.C. Widdis Electrical Measurements and measuring Instruments, 5th Edition, Reem Publications.
2. R K Rajput Electrical & Electronic Measurement & Instrumentation., 2nd Edition, S. Chand & Co
3. H. S. Kalsi Electronic Instrumentation. Tata Graw Hill Mc, 3rd Edition.
4. Reissland, M.U Electrical Measurements: Fundamentals, Concepts, Applications-New Age International (P) Limited, Publishers.

### Web resources:

1. <https://nptel.ac.in/courses/108105153>
2. <https://www.indiabix.com/electrical-engineering/electrical-measurements/>

### CO-PO-PSO Mapping:

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering Tool Usage | The Engineer and The World | Ethics | Individual and Collaborative Team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE43T .1    | 3                     | 1                | -                               | 1                                          | 1                      | -                          | -      | -                                      | 3             | -                              | -                  | 1    | 2    |
| 24AEEE43T .2    | 3                     | 3                | 1                               | 2                                          | 2                      | -                          | -      | -                                      | 2             | -                              | -                  | 2    | 2    |
| 24AEEE43T .3    | 3                     | 3                | 2                               | 3                                          | 2                      | -                          | -      | -                                      | 2             | -                              | -                  | 2    | 2    |
| 24AEEE43T .4    | 2                     | 3                | 1                               | 3                                          | 1                      | -                          | -      | -                                      | 2             | -                              | -                  | -    | 2    |
| 24AEEE43T .5    | 2                     | 2                | 3                               | 2                                          | 3                      | -                          | -      | -                                      | 3             | -                              | -                  | 1    | 1    |

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P.V.P  
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CR Medha May  
P. B. Sharma  
Prasanna





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Title of the Course: Electromagnetic Field theory  
Category: PCC  
Semester: IV  
Course Code: 24AEEE44T  
Branch: EEE

Lecture Hours  
2

Tutorial Hours  
1

Practice Hours  
0

Credits  
3

### Course Objectives:

1. To introduce the fundamentals of vector analysis and its applications in electric and magnetic field theory.
2. To provide an understanding of electrostatics, magnetostatics, time-varying fields, and Maxwell's equations.
3. To enable students to apply field theory concepts to real-world electrical systems.

### Course Outcomes:

At the end of the course, the student will be able to

- 1 Understand Coulombs law and Gauss's Law and its applications.
- 2 Evaluate electric field intensity and potential for various charge distributions.
- 3 Analyze the behavior of conductors, dielectrics, and capacitors in electrostatic fields.
- 4 Examine the laws of magnetostatics and determine forces and inductance in magnetic circuits.
- 5 Apply Maxwell's equations to time-varying fields and understand Poynting theorem.

### Unit 1 Electrostatics

10

Review of Vector Algebra.

Coulomb's law and Electric field intensity (EFI) – EFI due to Continuous charge distributions (line and surface charge), Electric flux density, Gauss's law, Maxwell's first equation, Applications of Gauss's law, Electric Potential, Work done in moving a point charge in an electrostatic field, second Maxwell's equation for static electric fields, Potential gradient, Laplace's and Poisson's equations.

### Unit 2 Conductors – Dielectrics and Capacitance

10

Behavior of conductor in Electric field, Electric dipole and dipole moment – Potential and EFI due to an electric dipole, Torque on an Electric dipole placed in an electric field, Current density-conduction and convection current densities, Behavior of conductors in an electric field, Polarization, dielectric constant and strength, Continuity equation and relaxation time, Boundary conditions between conductor to dielectric, dielectric to dielectric and conductor to free space, Capacitance of parallel plate, coaxial and spherical capacitors, Energy stored and density in a static electric field.

### Unit 3 Magneto statics, Ampere's Law and Force in magnetic fields

10

Biot-Savart's law and its applications viz. Straight current carrying filament, circular and solenoid current carrying wire – Magnetic flux density and Maxwell's second Equation), Ampere's circuital law and its applications viz. MFI due to an infinite sheet, long filament, solenoid, toroidal current carrying conductor, point form of Ampere's circuital law, Maxwell's third equation.

Magnetic force, moving charges in a magnetic field – Lorentz force equation, force on a current element in a magnetic field, force on a straight and a long current carrying conductor in a magnetic field, force between two straight long and parallel current carrying conductors, Magnetic dipole, Magnetic torque, and moment.

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P.B.L. P  
(Dr. P.B. Chourav)

CPM Madhukrishna

P. Bhaskar  
Principal





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Unit 5 Time Varying Fields

10

Faraday's laws of electromagnetic induction, Maxwell's fourth equation, integral and point forms of Maxwell's equations, statically and dynamically induced EMF, Displacement current, Modification of Maxwell's equations for time varying fields, Poynting theorem and Poynting vector.

**Prescribed Text Books:**

1. "Elements of Electromagnetics" by Matthew N O Sadiku, Oxford Publications, 7th edition, 2018.

### Reference Books:

1. Introduction to Electro Dynamics by D J Griffiths, Prentice-Hall of India Pvt. Ltd, 2nd edition, 1989.
2. "Engineering Electromagnetics" by William H. Hayt Jr. & John A. Buck, McGraw-Hill Education, 9th Edition 2019.
3. Field Theory by Yaduvir Singh, Pearson India, 1st edition, 2011.
4. Fundamentals of Engineering Electromagnetics by Sunil Bhooshan, Oxford University Press, 2012.
5. Schaum's Outline of Electromagnetics by Joseph A. Edminister, Mahamood Navi, 4th Edition, 2014.

**CO-PO-PSO Mapping:**

| CO          | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering tool usage | The engineer and World | Ethics | Individual and Collaborative team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE44T.1 | 3                     | 3                | 2                               | 2                                          | 2                      | -                      | -      | 1                                      | 1             | -                              | 2                  | 3    | -    |
| 24AEEE44T.2 | 3                     | 3                | 2                               | 2                                          | 2                      | 1                      | -      | 1                                      | 1             | -                              | 2                  | 3    | -    |
| 24AEEE44T.3 | 3                     | 2                | 2                               | 2                                          | 2                      | 1                      | 1      | 1-                                     | 1             | 1                              | 2                  | 3    | 2    |
| 24AEEE44T.4 | 3                     | 3                | 2                               | 2                                          | 2                      | 1                      | 1      | 1                                      | 1             | 1                              | 2                  | 3    | 3    |
| 24AEEE44T.5 | 3                     | 3                | 2                               | 2                                          | 2                      | 1                      | 1      | 1                                      | 1             | 1                              | 2                  | 3    | 3    |

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Title of the Course: Analog and Digital Electronics Lab

Category: PCC

Semester: IV

Course Code: 24AEEE41L

Branch/es: EEE

| Lecture Hours | Tutorial Hours | Practice Hours | Credits |
|---------------|----------------|----------------|---------|
| 0             | 0              | 3              | 1.5     |

### Course Objectives:

1. To analysis of transistor-based amplifiers
2. To generate different types of non-sinusoidal signals
3. To verify the applications of Op-Amp

### Course Outcomes:

1. At the end of the course, the student will be able to Blooms Level of Learning
2. Design of Amplifiers with its frequency response
3. Design of oscillators with its frequency response
4. Evaluate the efficiency of power Amplifier
5. Analysis of wave shaping circuits
6. Discuss the applications of Op-Amp and Timer

### List of Experiments Perform any ten experiments out of the following

- | S.NO | Name of Experiment                                   |
|------|------------------------------------------------------|
| 1.   | Two stage RC-Coupled Amplifier                       |
| 2.   | Hartley/ Colpitts Oscillator                         |
| 3.   | Feedback Amplifier (Current Series & Voltage Series) |
| 4.   | Linear Wave Shaping                                  |
| 5.   | Class A power Amplifier                              |
| 6.   | Class B power Amplifier                              |
| 7.   | Non-Linear Wave Shaping-Clippers                     |
| 8.   | Non-Linear Wave Shaping-Clampers                     |
| 9.   | Op-Amp application – Adder and Subtractor circuits   |

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10. Op-Amp application- LPF, HPF (First order)
11. Function Generator using Op-Amp
12. IC 555-Timer- Monostable / Astable operation circuit.
13. Three-Bit DAC using Op-Amp
14. Three-Bit ADC using Op-Amp.

## CO-PO-PSO Mapping:

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering Tool Usage | The Engineer and The World | Ethics | Individual and Collaborative Team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|------|------|
| 24AEEE41L.1     | 3                     | 2                | 2                               | 2                                          | 2                      | -                          | -      | -                                      | -             | -                              | -                  | 3    | 2    |
| 24AEEE41L.2     | 3                     | 2                | 2                               | -                                          | -                      | -                          | -      | -                                      | -             | -                              | -                  | 3    | 2    |
| 24AEEE41L.3     | 3                     | 1                | 1                               | -                                          | 2                      | -                          | -      | -                                      | -             | -                              | -                  | 3    | 2    |
| 24AEEE41L.4     | 3                     | 2                | 2                               | 2                                          | 2                      | -                          | -      | -                                      | -             | -                              | -                  | 2    | 1    |
| 24AEEE41L.5     | 3                     | 2                | 2                               | 2                                          | -                      | -                          | -      | -                                      | -             | -                              | -                  | 2    | 1    |

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*DR*

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**Title of the Course:** Induction and Synchronous Machines Lab

**Category:** PCC

**Semester:** IV

**Course Code:** 24AEEE42L

**Branch/es:** EEE

### Course Objectives:

1. To analyze the characteristics and parameters of induction motors using no-load, blocked rotor, and brake tests.
2. To determine voltage regulation and sequence impedance of alternators and understand synchronous machine behaviour using V-curves and salient pole analysis.

### Course Outcomes

Students can able to

1. Analyze the performance characteristics of single-phase and three-phase induction motors using various test methods.
2. Determine the voltage regulation of three-phase alternators using various standard methods, such as EMF, MMF, and the Potier Triangle Method.
3. Examine the operational behavior of synchronous machines using V-curves, inverted V-curves, and sequence impedance tests.
4. Demonstrate speed control and power factor improvement techniques for AC machines.
5. Evaluate machine parameters such as efficiency, reactance ( $X_d$  and  $X_q$ ), and equivalent circuits using experimental data.

### Perform any ten in the following Experiments

1. Performance of 3-Ph induction motor using No-load & blocked rotor tests.
2. Calculation Regulation of a three-phase alternator by E.M.F. and M.M.F. methods.
3. V and inverted V curves of a three-phase synchronous motor.
4. Determination of  $X_d$  and  $X_q$  of a salient pole synchronous machine.
5. Equivalent circuit of a single-phase induction motor.
6. Determination of the performance of a 3-phase Induction motor using the Brake test.
7. Determination of performance of Single-Phase Induction motor using Brake test.
8. Measurement of sequence impedance of a three-phase alternator.
9. Speed control of a three-phase induction motor by the V/F method.
10. Power factor improvement of a single-phase induction motor by using capacitors.
11. Regulation of the three-phase alternator by the Potier triangle method.
12. Determination of the efficiency of a single-phase AC series Motor by conducting a Brake test.

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## CO-PO-PSO Mapping:

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering tool usage | The engineer and the world | Ethics | Individual and collaborative teamwork | Communication | Project management and finance | Life-long learning | PSO 1 | PSO 2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|---------------------------------------|---------------|--------------------------------|--------------------|-------|-------|
| 24AEEE41L.1     | 3                     | 3                | 3                               | 3                                          | -                      | -                          | -      | -                                     | -             | -                              | 1                  | -     | -     |
| 24AEEE41L.2     | 3                     | 3                | 2                               | 2                                          | -                      | -                          | -      | -                                     | -             | -                              | 1                  | 1     | 1     |
| 24AEEE41L.3     | 3                     | 3                | 2                               | 2                                          | -                      | -                          | -      | -                                     | -             | -                              | 1                  | 1     | -     |
| 24AEEE41L.4     | 2                     | 2                | 2                               | 2                                          | -                      | -                          | -      | -                                     | -             | -                              | 1                  | 1     | 1     |
| 24AEEE41L.5     | 2                     | 2                | 2                               | 2                                          | -                      | -                          | -      | -                                     | -             | -                              | 1                  | 1     | 1     |

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(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

**Title of the Course:** Measurements and Instrumentation Lab

**Category:** PCC

**Semester:** IV

**Course Code:** 24AEEE43L

**Branch/es:** EEE

**Lecture Hours**

0

**Tutorial Hours**

0

**Practice Hours**

3

**Credits**

1.5

### Course Objectives:

1. To enable students to calibrate electrical measuring instruments such as wattmeters, energy meters, and power factor meters using standard techniques.
2. To develop the ability to measure electrical parameters like resistance, inductance, and capacitance using conventional bridge methods.
3. To provide hands-on experience in measuring power and energy in single-phase and three-phase systems using practical and simulation-based approaches.
4. To familiarize students with the use of modern test instruments, including CROs and DSOs, for signal observation and analysis.
5. To introduce the use of transducers and sensors for measuring physical quantities such as displacement, temperature, and strain.

### Course Outcomes:

At the end of the course, the student will be able to ...

1. Calibrate single-phase electrical instruments such as wattmeters, energy meters, and power factor meters using standard testing methods.
2. Measure electrical parameters including resistance, inductance, and capacitance using Kelvin's double bridge, Wheatstone bridge, Anderson bridge, and Schering bridge.
3. Evaluate power and energy in single-phase and three-phase systems using conventional methods and simulation tools.
4. Analyze electrical waveforms and signal parameters using CRO and DSO, including amplitude, frequency, phase, and RMS computation.
5. Demonstrate the working and application of transducers such as LVDTs, RTDs, thermocouples, and strain gauges for physical quantity measurement.

### LIST OF EXPERIMENTS: (Execute any 10 experiments)

1. Calibration of 1- $\Phi$  wattmeter by Phantom testing.
2. Calibration of 1- $\Phi$  energy meter.
3. Calibration of 1- $\Phi$  dynamometer type power factor meter.
4. Measurement of 3- $\Phi$  reactive power with 1- $\Phi$  wattmeter.
5. Measurement of parameters of an inductive coil using 3-voltmeter and 3-ammeter method.
6. Measurement of resistance using Kelvin's double Bridge, Wheatstone Bridge.
7. Measurement of inductance using Anderson bridge and capacitance using Schering Bridge.
8. Measurement of Insulation resistance using Megger.
9. Simulation of Maxwell's Bridge and De-Sauty's Bridge.

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P. R. V. P.  
(Dr. P. S. Chennu)

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CRO P. Dhanu Mohan

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P. Bhaskar Prasad





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- Measurement of three phase Active Power using Simulation.
- Study of CRO: Measurement of amplitude, time period, frequency and phase shift using Lissajous patterns.
- Download of one-cycle data of a periodic waveform from a DSO and use values to compute the RMS value
- Measurement of displacement using LVDT.
- Measurement of different ranges of temperatures using i) RTD ii) Thermocouple.
- Measurement of strain with the help of strain gauge transducers.

## Web Resources:

- <https://www.youtube.com/watch?v=TlkITHPa1js&pp=ygUnRWxly3RyaWNhbCBNZWFzdXJlbWVudHMgTGFiEV4cGVyaW1lbnRz>
- [https://www.youtube.com/watch?v=\\_GfNeGi8xKg&pp=ygUnRWxly3RyaWNhbCBNZWFzdXJlbWVudHMgTGFiEV4cGVyaW1lbnRz](https://www.youtube.com/watch?v=_GfNeGi8xKg&pp=ygUnRWxly3RyaWNhbCBNZWFzdXJlbWVudHMgTGFiEV4cGVyaW1lbnRz)
- <https://www.youtube.com/watch?v=rDPcBqtn6yE&pp=ygUnRWxly3RyaWNhbCBNZWFzdXJlbWVudHMgTGFiEV4cGVyaW1lbnRzOgcJCd4JAYcqIYzv>
- <https://www.youtube.com/watch?v=Huu3p4k25DM&pp=ygUnRWxly3RyaWNhbCBNZWFzdXJlbWVudHMgTGFiEV4cGVyaW1lbnRz>
- <https://www.youtube.com/watch?v=NXuRrOBj8sY&pp=ygUnRWxly3RyaWNhbCBNZWFzdXJlbWVudHMgTGFiEV4cGVyaW1lbnRz>

## CO-PO Mapping:

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Engineering Tool Usage | The Engineer and The World | Ethics | Individual and Collaborative Team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|------------------------|----------------------------|--------|----------------------------------------|---------------|--------------------------------|--------------------|------|------|
| 1               | 3                     | 2                | 2                               | 2                                          | 3                      | 2                          | 1      | 2                                      | 2             | 2                              | 2                  | 3    | 2    |
| 2               | 3                     | 3                | 2                               | 2                                          | 3                      | 1                          | –      | 2                                      | 2             | 1                              | 2                  | 3    | 2    |
| 3               | 3                     | 3                | 2                               | 2                                          | 3                      | 2                          | –      | 2                                      | 2             | 2                              | 3                  | 3    | 3    |
| 4               | 3                     | 3                | 2                               | 3                                          | 3                      | 2                          | –      | 2                                      | 2             | 2                              | 3                  | 3    | 3    |
| 5               | 3                     | 3                | 3                               | 3                                          | 3                      | 2                          | 2      | 2                                      | 2             | 3                              | 3                  | 3    | 3    |

*Signature*

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RAJAMPET, ANNAMAYYA DIST, A.P.

*Signature*  
(Dr. P. S. Chennur)

*Signature*  
P. S. Chennur Prasad



# ANNAMACHARYA UNIVERSITY

Estd. under Andhra Pradesh Private Universities (Establishment and Regulation) Act, 2016

(Formerly Annamacharya Institute of Technology and Sciences, Rajampet)

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

18.07.2025

To

The Head of the Department,  
Electrical and Electronics Engineering,  
Annamacharya University.

**Subject:** Forwarding of Java Programming Syllabus as Recommended by the Board of Studies of Computer Science and Engineering

Dear Sir,

This is to inform you that the syllabus for the subject '**Java Programming**' [24ACSE45L] II B. Tech II Semester EEE Students offered by the Department of Computer Science and Engineering, has been prepared and duly recommended by the Board of Studies (BOS) of our department.

In this regard, we are forwarding the approved syllabus for your kind reference and necessary academic coordination, especially in case the subject is offered as skill course in your department.

We request you to kindly go through the syllabus and take note of the contents for your department's planning and alignment purposes.

Your cooperation in this academic matter is sincerely appreciated.

Thanking you.

With regards,

**Dr. M. Subba Rao**  
Professor & Head,  
Department of CSE,  
Annamacharya University

Enclosure: Approved Syllabus  
Copy to: Head, EEE  
Copy to: Dean, Academics  
Copy to: Department for filing



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**Title of the Course:** Java Programming  
**Category:** Skill Course  
**Couse Code:** 24ACSE45L  
**Year** II B. Tech  
**Semester:** II Semester  
**Branch** EEE

| Lecture Hours | Tutorial Hours | Practice Hours | Credits |
|---------------|----------------|----------------|---------|
| 1             | 0              | 2              | 2       |

**Course Objectives:** This course will be able to

1. Understand the basic concepts of java programming.
2. Analyze and apply concepts like packages, interfaces, and exception handling.
3. Implement the multi-threading and GUI applications developed using JAVA

**Course Outcomes:** At the end of the course, the student will be able to

1. Understand the importance of datatypes, operators, functions, arrays and strings in Java Programming.
2. Apply reusability concepts like Inheritance, interfaces and packages in real time applications developed using JAVA
3. Relate the abstract class and interfaces in java programming
4. Construct and classify error and exception handling
5. Implement genetics and JavaFX basic concepts in java programs

**Unit 1 Introduction to Java Programming**

10

Introduction to Java: Install Java & Java IDE, First Java Program, Variables and Data Types in Java, Operators in Java, Flow Control Statements in Java, functions in java, arrays in java, Strings in java

**Unit 2 Object Oriented Programming**

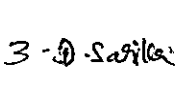
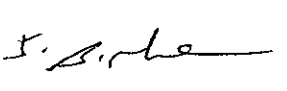
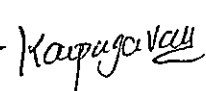
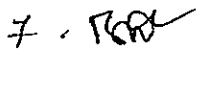
10

Object-Oriented Programming, Classes and Objects, Encapsulation, Abstraction, Inheritance, polymorphism.

**Unit 3 Packages and Interfaces**

10

Packages and Interfaces: Packages, Defining a Package, A Short Package Example, Access Protection, an Access Example, Importing Packages. Abstract keyword, Interfaces: Defining an Interface, Implementing Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces, Interfaces Can Be Extended

1.  2.  3.  4.   
5.  6.  7. 

**Unit 4                    Exception Handling and Multithreaded Programming                    10**

Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Displaying a Description of an Exception, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Built-in Exceptions

Multithreaded Programming: The Java Thread Model, Thread Priorities, Synchronization, Messaging, The Thread Class and the Runnable Interface, The Main Thread, Creating a Thread, Implementing Runnable, Extending Thread, Choosing an Approach, Creating Multiple Threads

**Unit 5                    Generics and JavaFX Basics                    10**

Generics: What Are Generics, Generics Work Only with Reference Types, A Generic Class with Two Type Parameters, The General Form of a Generic Class.

JavaFX Basic Concepts, Using Image and Image View, Button, Radio Button, CheckBox, TextField

**Prescribed Text Book:**

1. Herbert Schildt.Java. The complete reference, TMH, 9th Edition

**Reference Books:**

1. Nino and F.A. Hosch, An Introduction to programming and OO design using Java, John Wi. & sons.
2. Y. Daniel Liang, Introduction to Java programming, Pearson Education. 6th Edition
3. R.A. Johnson- Thomson, An introduction to Java programming and object-oriented Application Development

**CO-PO Mapping:**

| Course Outcomes | Engineering Knowledge | Problem Analysis | Design/Development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | PSO1 | PSO2 |
|-----------------|-----------------------|------------------|---------------------------------|--------------------------------------------|-------------------|--------------------------|--------------------------------|--------|--------------------------|---------------|--------------------------------|--------------------|------|------|
| 24ACSE36L-1     | 3                     | 3                | -                               | -                                          | -                 | -                        | -                              | -      | -                        | -             | -                              | -                  | 2    | -    |
| 24ACSE36L-2     | -                     | 3                | 3                               | 2                                          | -                 | -                        | -                              | -      | -                        | -             | -                              | -                  | 3    | -    |
| 24ACSE36L-3     | 3                     | 3                | 3                               | 2                                          | -                 | -                        | -                              | -      | -                        | -             | 3                              | 3                  | 2    | -    |
| 24ACSE36L-4     | 3                     | 3                | 3                               | -                                          | -                 | -                        | -                              | -      | -                        | -             | 3                              | 3                  | 3    | -    |
| 24ACSE36L-5     | 3                     | 3                | 3                               | -                                          | -                 | -                        | -                              | -      | -                        | -             | 3                              | 3                  | 3    | 3    |

*K. S. Narayana*

*D. Sarika*  
*S. S. S. S.*

*Raj*  
*Raj*





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## ANNEXURE-IV

### M.Tech course structure

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#### M.Tech - ELECTRICAL POWER SYSTEMS

#### I Semester

| S<br>·<br>N | Category | Course<br>Code | Course Title                       | Hours / week |   |   | Credits |
|-------------|----------|----------------|------------------------------------|--------------|---|---|---------|
|             |          |                |                                    | L            | T | P |         |
| 1           | PC       | 24DEPS11T      | Advanced Power System Protection   | 3            | - | - | 3       |
| 2           | PC       | 24DEPS12T      | Advanced Power System Analysis     | 3            | - | - | 3       |
| 3           | PE       | MOOC           |                                    | -            | - | - | 3       |
| 4           | PE       | MOOC           |                                    | -            | - | - | 3       |
| 5           | MC       | 24DMBA11T      | Research Methodology and IPR       | 2            | - | - | 2       |
| 6           | AU       | 24DAUD1AT      | English for Research Paper Writing | -            | - | - | -       |
|             |          | 24DAUD1BT      | Disaster Management                |              |   |   |         |
|             |          | 24DAUD1CT      | Sanskrit for Technical Knowledge   |              |   |   |         |
|             |          | 24DAUD1DT      | Value Education                    |              |   |   |         |
| Lab courses |          |                |                                    |              |   |   |         |
| 7.          | PL       | 24DEPS11L      | Power System lab                   | -            | - | 4 | 2       |
| 8.          | PL       | 24DEPS12L      | Power system Simulation lab-1      | -            | - | 4 | 2       |
|             |          |                |                                    | 14           |   | 8 | 18      |

*Head of the Department*  
HEAD OF THE DEPARTMENT  
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*P.B.V.P*  
(Dr. P.B. Chennu)

*GR. Madhan Mohan*  
GR. Madhan Mohan

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## II Semester

| S.No        | Category | Course Code | Course Title                                              | Hours / week |   |    | Credits |
|-------------|----------|-------------|-----------------------------------------------------------|--------------|---|----|---------|
|             |          |             |                                                           | L            | T | P  |         |
| 1.          | PC       | 24DEPS21T   | Power System Stability and Control                        | 3            | - | -  | 3       |
| 2.          | PC       | 24DEPS22T   | Power Electronics Applications in Power Systems           | 3            | - | -  | 3       |
| 3           | PE       | MOOC        |                                                           |              | - | -  | 3       |
| 4           | PE       | MOOC        |                                                           |              | - | -  | 3       |
| 5           | AU       | 24DAUD2AT   | Constitution of India                                     | -            | - | -  | -       |
|             |          | 24DAUD2BT   | Pedagogy Studies                                          | -            | - | -  | -       |
|             |          | 24DAUD2CT   | Stress Management by Yoga                                 |              |   |    |         |
|             |          | 24DAUD2DT   | Personality development through life enlightenment skills |              |   |    |         |
| Lab Courses |          |             |                                                           |              |   |    |         |
| 6           | PL       | 24DEPS23L   | Power System Simulation Lab II                            | -            | - | 4  | 2       |
| 7           | PL       | 24DEPS24L   | Renewable Energy and Green Technology Lab                 | -            | - | 4  | 2       |
| 8           | PS       | 24DEPS21P   | Mini Project with Seminar                                 | -            | - | 4  | 2       |
|             |          |             |                                                           | 12           |   | 12 | 18      |

## III semester

| S.No | Category | Course Code | Course Title         | Hours / week |   |    | Credits |
|------|----------|-------------|----------------------|--------------|---|----|---------|
|      |          |             |                      | L            | T | P  |         |
| 1.   | PE       | MOOC        |                      | -            | - | -  | 3       |
| 2    | OE       | MOOC        |                      | -            | - | -  | 3       |
| 3.   | PW       | 24DEPS31P   | Dissertation Phase-I | -            | - | 20 | 10      |
|      |          |             |                      | 6            |   | 20 | 16      |

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## IV semester

| S.No | Category | Course Code | Course Title          | Hours / week |   |    | Credits |
|------|----------|-------------|-----------------------|--------------|---|----|---------|
|      |          |             |                       | L            | T | P  |         |
| 1.   | PW       | 24DEPS41P   | Dissertation Phase-II | -            | - | 32 | 16      |
|      |          |             |                       |              |   | 32 | 16      |

### List of MOOC Courses in 1 Semester

| S. No. | Category | Course Code | Course Title                                         |
|--------|----------|-------------|------------------------------------------------------|
| 1      | PE       | 24DEPS1AT   | Optimization theory and Algorithms                   |
| 2      |          | 24DEPS1BT   | DC Micro Grid and Control Systems                    |
| 3      |          | 24DEPS1CT   | Design of Photo Voltaic Systems                      |
| 4      |          | 24DEPS1DT   | Introduction to Electric and Hybrid Electric Vehicle |
| 5      |          | 24DEPS1ET   | Advances in UHV Transmission and Distribution        |
| 6      |          | 24DEPS1FT   | Advanced Power Electronics and Control               |

### List of MOOC Courses in II-Semester:

| S. No. | Category | Course Code | Course Title                                         |
|--------|----------|-------------|------------------------------------------------------|
| 1      | PE       | 24DEPS2AT   | EV Vehicle Dynamics and Electric Motor Dynamics      |
| 2      |          | 24DEPS2BT   | Optimization Techniques in Power systems             |
| 3      |          | 24DEPS2CT   | Power System Dynamics, Control and Monitoring        |
| 4      |          | 24DEPS2DT   | Power Quality Improvement Techniques                 |
| 5      |          | 24DEPS2ET   | Introduction to microgrid system                     |
| 6      |          | 24DEPS2FT   | Operation and planning of Power Distribution Systems |

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(Dr. P.B. Chowdhury)

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GR. Madhan Mohan

*Br*  
P. Bhaskara Prasad



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## List of MOOC Courses in III-Semester:

| S. No | Category | Course code | Course title                                |
|-------|----------|-------------|---------------------------------------------|
| 1     | PE       | 24DEPS3AT   | Design of Photo Voltaic Systems             |
| 2     |          | 24DEPS3BT   | Smart Grid: Basics to Advanced Technologies |
| 3     |          | 24DEPS3CT   | Digital Power Systems Protection            |
| 4     | OE       | 24DCIV3AT   | Cost Management of Engineering Projects     |
| 5     |          | 24DCIV3BT   | Industrial Safety                           |
| 6     |          | 24DME3AT    | Composite Materials                         |
| 7     |          | 24DME3BT    | Operations Research                         |
| 8     |          | 24DEEE3AT   | Electric Vehicles                           |
| 9     |          | 24DEEE3BT   | Energy Conversion Systems                   |
| 10    |          | 24DECE3AT   | Image Processing                            |
| 11    |          | 24DECE3BT   | Wireless Communications                     |
| 12    |          | 24DCSE3CT   | Artificial Intelligence                     |
| 13    |          | 24DCSE3DT   | Introduction to Machine learning            |
| 14    |          | 24DMBA3AT   | Business Analytics                          |
| 15    |          | 24DMBA3BT   | Project appraisal and Finance               |

**NOTE:** All the above-mentioned MOOCs list of courses are tentative depending upon the semester location with MOOCs calendar and the subject relevant course will be selected by the BOS chairman and Module Coordinator along with students.

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## ANNEXURE-V Revised BEEE theory and lab

Name of the Course with Code as per R24 Regulations: Basic Electrical and Electronics Engineering 24AEEE11T (Common to all Branches)

| S. No. | Available Course<br>RED COLOUR - Content Removed                                                                                                                                                                                                       | Revised Course<br>GREEN COLOUR - Content Added                                                                        |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1      | <p>Subject Name: Basic Electrical and Electronics Engineering</p> <p>Unit-2:<br/>Regulation of single phase transformer and three phase induction motor construction and working principle.</p> <p>Unit-3: Multi-meter, DSO and Function generator</p> | <p>Subject Name: Basic Electrical and Electronics Engineering</p> <p>Unit-5: Different parameters and comparisons</p> |
| 2      | <p>Unit-5: Transistor operation in CB, and CC configurations and their Characteristics</p>                                                                                                                                                             |                                                                                                                       |

Name of the Course with Code as per R24 Regulations: Basic Electrical and Electronics Engineering Lab 24AEEE11L (Common to all Branches)

| S. No. | Available Course<br>RED COLOUR - Content Removed                                                                                                                                                                                                                                      | Revised Course<br>GREEN COLOUR - Content Added                    |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1.     | <p>Lab Name: Basic Electrical and Electronics Engineering Lab</p> <p>Experiment -2: Study and operation of</p> <ul style="list-style-type: none"> <li>• Multi-meters (Analog and Digital)</li> <li>• Function Generator</li> <li>• Regulated Power Supplies</li> <li>• CRO</li> </ul> | <p>Lab Name: Basic Electrical and Electronics Engineering Lab</p> |
| 2      | <p>Experiment-6: Magnetization Characteristics of DC shunt Generator</p>                                                                                                                                                                                                              | <p>Experiment-6: Speed Control of a DC Shunt Motor</p>            |

*Galitha*

*P.B.V.*

*CR. Madhan Mohan*

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Unit 5 **Diode Applications and Introduction to Transistors** 9  
Half Wave and Full Wave Rectifiers – Different parameters and comparison, General Filter Considerations – Capacitor Filter.  
Transistor constructions – Types, Transistor operation in CE configuration and its Characteristics.

## Prescribed Text Books:

1. S.K.Bhattacharya, "Basic Electrical & Electronics Engineering" Pearson Education, Second Edition 2017.

## References Books:

1. A.Sudhakar and Shyammoan S Palli, "Circuits and Networks: Analysis and Synthesis" McGraw Hill, Third Edition, 2017.
2. V.K. Mehta and Rohit Mehta, "Principles of Power System", S chand and Company Ltd, Third Edition, 2005..
3. B.L.Theraja, "Basic Electronics", S chand and Company Ltd, First Edition, 2007.

## Course Outcomes:

At the end of the course, the student will be able to

1. Understand the fundamental laws and circuit elements.
2. Analyze the Working of DC and AC Machines.
3. Summarize the different Energy Resources, various Measuring Instruments and importance of Safety Measures
4. Analyze basic Semiconductor devices
5. Illustrate the concepts of Bipolar Junction transistor and Diode Applications.

Blooms Level of Learning  
L2

L4

L2

L4

L3

## Web Resources:

1. <https://electricalvani.com>
2. <https://www.electrical4u.com>
3. <https://nptel.ac.in/courses/108105053>
4. <https://nptel.ac.in/courses/108108076>

## CO-PO Mapping:

| CO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PS01 | PS02 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | 2   | 2   | 1   | 1   | -   | 2   | -   | -   | 1   | -    | 1    | -    | -    |
| CO2 | 3   | 3   | 2   | 2   | -   | 2   | -   | -   | 2   | -    | 1    | 1    | -    |
| CO3 | 2   | 2   | 1   | 1   | -   | 2   | -   | -   | 1   | -    | 1    | 1    | 1    |
| CO4 | 3   | 3   | 2   | 2   | -   | 2   | -   | -   | 2   | -    | 1    | 1    | -    |
| CO5 | 3   | 2   | 1   | 1   | -   | 2   | -   | -   | 2   | -    | 1    | 1    | -    |

*Signature*

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*P.B. Choudhary*

*Dr. P.B. Choudhary*

*Signature*  
*Dr. M. Balan Murthy*

*Signature*  
*P. Bhaskara Prasad*



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## Syllabus of Revised Basic Electrical and Electronics Engineering Laboratory

**ANNAMACHARYA UNIVERSITY**

## Department of Electrical and Electronics Engineering

|                            |                                                  |
|----------------------------|--------------------------------------------------|
| <b>Title of the Course</b> | Basic Electrical and Electronics Engineering Lab |
| <b>Category</b>            | BSC(LAB)                                         |
| <b>Course Code</b>         | 24AEEE11L                                        |
| <b>Year</b>                | I                                                |
| <b>Semester</b>            | I                                                |
| <b>Branch</b>              | Common to all branches                           |

## Credits

1

**Course Objectives:**

1. To identify the various electrical and electronic components and devices.
2. To impart knowledge and practical exposure on various elements of electrical circuits, operational aspects of various electrical machines and electronic circuits
3. To analyze the performance of rectifier circuits in practical approach
4. To observe the characteristics of semiconductor devices

## List of Experiments

Name of Experiments

- 1 Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs, Diodes, BJT)
- 2 Study and operation of
  - Multi-meters (Analog and Digital)
  - Function Generator
  - Regulated Power Supplies
- 3 Verification of KCL and KVL
- 4 Measurement of resistance by using Ammeter and Voltmeter method
- 5 Measurement of Earth Resistance using Megger
- 6 Speed control of a DC Shunt Motor
- 7 Brake Test on DC Shunt Motor
- 8 OC and SC Test on Single Phase Transformer
- 9 Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias
- 10 Plot V – I characteristics of Zener Diode
- 11 Determination of Ripple Factor and Regulation of Half Wave Rectifier with and without capacitive

filter

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12 Determination of Ripple Factor and Regulation of Full Wave Rectifier with and without capacitive filter

13 Study of Cathode Ray Oscilloscope. (CRO)

## Course Outcomes:

At the end of the course, the student will be able to Blooms Level of Learning

1. Identify the various Electrical and Electronic Components and Devices. L1
2. Analyze various characteristics of electrical circuits, electrical machines and measuring instruments. L4
3. Analyze the characteristics of various semiconductor devices through practical investigations. L4
4. Comprehend the usage of Electronic devices as half wave and full wave rectifier L2

## CO-PO Mapping:

| CO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PS01 | PS02 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO1 | 1   | 1   | 1   | 1   | -   | 1   | -   | 2   | 2   | -    | 1    | -    | -    |
| CO2 | 3   | 3   | 2   | 2   | -   | 2   | -   | 2   | 2   | -    | 1    | 1    | 1    |
| CO3 | 3   | 3   | 2   | 2   | -   | 2   | -   | 2   | 2   | -    | 1    | 1    | -    |
| CO4 | 2   | 2   | 1   | 1   | -   | 1   | -   | 2   | 2   | -    | 1    | 1    | 1    |

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*P. B. V. P.*  
(Dr. P. S. Chennu)

*GR. M. S. S. S. S.*  
GR. M. S. S. S. S.

*P. B. B. B. B.*  
P. B. B. B. B.



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## ANNEXURE-VI

### AURAT SYLLABUS For Electrical and Electronics Engineering

Annamacharya University  
Department of Electrical & Electronics Engineering  
Research Admission Test Syllabus

#### **Module 1: Electric Circuits**

Network graph, KCL, KVL, Node and Mesh analysis, Transient response of dc and ac networks, Sinusoidal steady-state analysis, Resonance, Passive filters, Ideal current and voltage sources, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem, Two-port networks, Three phase circuits, Power and power factor in ac circuits.

#### **Module 2: Electromagnetic Fields**

Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Inductance.

#### **Module 3: Electrical Machines**

Single phase transformer: equivalent circuit, Phasor diagram, open circuit and short circuit tests, regulation and efficiency; three phase transformers: connections, parallel operation; Auto-transformer.

Three phase induction motors: principle of operation, types, performance, torque-speed characteristics, equivalent circuit, starting and speed control methods.

Synchronous machines: cylindrical and salient pole machines, performance, regulation and parallel operation of generators, starting of synchronous motor, characteristics; Types of losses and efficiency calculations of electric machines.

#### **Module 4: Power Systems**

Models and performance of transmission lines and cables, Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per-unit quantities, Bus admittance matrix, Newton-Raphson method of load flows, Load Frequency control, economic load dispatch, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

#### **Module 5: Control Systems**

Mathematical modelling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Routh-Hurwitz criteria, Root loci, Stability analysis, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, State transition matrix.

#### **Module 6: Electrical Measurements**

Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers.

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P. B. Bhaskar Prasad

P. B. J.

cor. p. s. chennu

R. M. Reddy





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## Module 7: Digital Electronics

Combinational and Sequential logic circuits, Multiplexer, Demultiplexer, Schmitt trigger, Sample and hold circuits, A/D and D/A converters

## Module 8: Power Electronics

Characteristics of semiconductor power devices: Diode, Thyristor, Triac, GTO, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost converters; Single and three phase configuration of uncontrolled rectifiers, Line commutated thyristor based converters, Bidirectional ac to dc voltage source converters.

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R. Bhaskara Prasad



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## ANNEXURE-VII

### Course Structure -Pre Ph.D Programme in Electrical and Electronics Engineering

ANNAMACHARYA UNIVERSITY

Course Structure and Syllabi for Pre Ph.D Programme

ELECTRICAL ENGINEERING

### **PART - I**

Choose any one subject from the following list

| S. No. | PAPER                                              | Course code |
|--------|----------------------------------------------------|-------------|
| 1      | Power System Stability and Control                 | 24CEEE01T   |
| 2      | Smart Grid Technologies                            | 24CEEE02T   |
| 3      | Advanced Power Electronics                         | 24CEEE03T   |
| 4      | Applications of Power Electronics to Power Systems | 24CEEE04T   |
| 5      | Modern Control Engineering                         | 24CEEE05T   |

### **PART – II**

Choose any one subject from the following list

| S. No. | PAPER                                                     | Course code |
|--------|-----------------------------------------------------------|-------------|
| 1      | Restructured Power System                                 | 24CEEE06T   |
| 2      | Distribution Automation & Control                         | 24CEEE07T   |
| 3      | Reliability Engineering and Applications to Power Systems | 24CEEE08T   |
| 4      | Distributed Generation and Micro-Grid Control             | 24CEEE09T   |
| 5      | Energy Auditing and Management                            | 24CEEE0AT   |
| 6      | Advanced Drives & Control                                 | 24CEEE0BT   |
| 7      | Power Quality                                             | 24CEEE0CT   |
| 8      | HVDC Transmission Systems                                 | 24CEEE0DT   |
| 9      | Hybrid Electric Vehicle Systems                           | 24CEEE0ET   |

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P. D. Bhaskara Rao

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|    |                                            |           |
|----|--------------------------------------------|-----------|
| 10 | Digital Control Systems                    | 24CEEE0FT |
| 11 | Adaptive and Learning Control              | 24CEEE0GT |
| 12 | Solar Energy Conversion Systems            | 24CEEE0HT |
| 13 | Wind Energy Conversion Systems             | 24CEEE0IT |
| 14 | Optimization & Heuristic Search Techniques | 24CEEE0JT |
| 15 | Intelligent Control Techniques             | 24CEEE0KT |
| 16 | Introduction to Machine Learning           | 24CEEE0LT |
| 17 | Modern Flexible AC Transmission System     | 24CEEE0MT |

|              |                                 |           |
|--------------|---------------------------------|-----------|
| Subject<br>3 | Research Methodology            | 24CMBA01T |
| Subject<br>4 | Research and Publication Ethics | 24CMBA02T |

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*P.B.V.*

*CDR. P.S. Chounaly*

*Dr. G. R. K. Lakshmi*

*P. Bhaskara Prasad*



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## ANNEXURE-VIII

Discussion on the inclusion of courses aligned with Sustainable Development Goals (SDGs), cross-cutting issues and Indian Knowledge System (IKS) in the curriculum of the respective departments

| Course                                    | Relevant SDGs                                             | Cross-Cutting Issues                                  | Integration with IKS                                                                                     |
|-------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| DC Machines and Transformers              | SDG 7 (Affordable and Clean Energy)                       | Ethics in Engineering                                 | Application of traditional energy systems and practices in Indian contexts.                              |
| Electrical Circuits-II                    | SDG 9 (Industry, Innovation, and Infrastructure)          | Sustainable Design Practices                          | Incorporation of indigenous knowledge in circuit design and sustainability.                              |
| Analog Electronics                        | SDG 9 (Industry, Innovation, and Infrastructure)          | Ethical Use of Technology                             | Exploration of analog technologies in traditional Indian devices and systems.                            |
| Universal Human Values-II                 | SDG 16 (Peace, Justice, and Strong Institutions)          | Gender Equality, Inclusivity, Ethics                  | Study of ethical frameworks and values rooted in Indian philosophy and culture.                          |
| Managerial Economics & Financial Analysis | SDG 8 (Decent Work and Economic Growth)                   | Ethical Business Practices                            | Understanding of traditional Indian economic models and their relevance today.                           |
| Environmental Science                     | SDG 13 (Climate Action), SDG 15 (Life on Land)            | Sustainable Practices, Environmental Ethics           | Integration of traditional environmental conservation methods and practices.                             |
| DC Machines Lab                           | SDG 9: Industry, Innovation & Infrastructure              | Technical skill development Industrial applications   | Early principles of motion and energy found in Indian mechanical devices                                 |
| Electrical Circuits Lab                   | SDG 4: Quality Education SDG 7: Affordable & Clean Energy | Problem-solving Foundational knowledge for green tech | Use of logic and systematic analysis in ancient Indian sciences (e.g., Vaastu-based electrical planning) |
| Electrical & Electronics                  | SDG 9: Industry & Innovation SDG 13:                      | Simulation for low-carbon tech Digital skill          | Algorithmic thinking rooted in ancient Indian mathematics (e.g., Panini's                                |

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P. Bhaskara Prasad

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P. S. Chandra  
COR. P. S. Chandra

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|                                                          |                                                                                       |                                                           |                                                                                        |
|----------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------|
| Simulation Lab                                           | Climate Action                                                                        | enhancement                                               | grammar as logic-based model)                                                          |
| PCB Design using Eagle / MATLAB Programming              | SDG 12: Responsible Consumption & Production<br>SDG 9                                 | Innovation & entrepreneurship Digital and design skills   | Indigenous minimal design philosophy; low-waste traditions in Indian craftsmanship     |
| Numerical Methods and Random Variables (Mathematics-III) | SDG 4 (Quality Education)                                                             | Analytical Thinking, Problem-Solving Skills               | Application of mathematical concepts in traditional Indian architecture and astronomy. |
| Digital Electronics                                      | SDG 9 (Industry, Innovation, and Infrastructure)                                      | Digital Literacy, Ethical Technology Use                  | Exploration of digital systems in traditional Indian technologies and crafts.          |
| Induction Motor and Synchronous Machines                 | SDG 7 (Affordable and Clean Energy)                                                   | Energy Efficiency, Ethical Engineering Practices          | Study of traditional mechanical systems and their modern counterparts.                 |
| Electrical Measurements and Electronics Instrumentation  | SDG 9 (Industry, Innovation, and Infrastructure)                                      | Precision Engineering, Ethical Instrumentation            | Application of traditional measurement techniques and their evolution.                 |
| Electromagnetic Field Theory                             | SDG 7 (Affordable and Clean Energy), SDG 9 (Industry, Innovation, and Infrastructure) | Ethical Use of Electromagnetic Technologies               | Exploration of traditional Indian concepts related to energy and magnetism.            |
| AC machines Lab                                          | SDG 9: Industry, Innovation & Infrastructure<br>SDG 7: Clean Energy                   | Energy Efficiency, Ethical Engineering Practices          | Industrial skill development<br>Energy efficiency awareness                            |
| Electrical Measurements Lab                              | SDG 4: Quality Education<br>SDG 9: Innovation                                         | Precision Engineering, Ethical Instrumentation            | Accuracy, instrumentation, precision engineering                                       |
| Analog & Digital Electronics Lab                         | SDG 9: Innovation<br>SDG 12: Responsible Consumption                                  | Digital Literacy, Ethical Technology Use                  | Electronics hardware design<br>Low-power design awareness                              |
| JAVA Programming                                         | SDG 4: Quality Education<br>SDG 8: Decent Work & Economic Growth                      | Programming skills<br>Digital literacy<br>Problem-solving | Programming skills<br>Digital literacy<br>Problem-solving                              |

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## ANNEXURE-IX List of External Examiners

| S.No. | Examiner Name             | Address                                                                                     |
|-------|---------------------------|---------------------------------------------------------------------------------------------|
| 1     | Dr. T. Vinopraba          | Associate Professor, EEE Department, NIT Puducherry                                         |
| 2     | Dr. V. Nagabhaskar Reddy  | Professor & HoD, Department of EEE, RGM CET, Nandyal                                        |
| 3     | Dr. R. Sridhar            | Professor, Department of EEE, SRMIST, Chennai.                                              |
| 4     | Dr. M. Sushma             | Professor, Department of EEE, JNTUCEH, Hyderabad                                            |
| 5     | Dr. D. Sri Vidhya         | Associate Professor,<br>K. S. Rangasamy College of Technology, Tiruchengode                 |
| 6     | Dr. M. N. Giri Prasad     | Professor, Dept of E.C.E, JNTUACEA, Anantapur.                                              |
| 7     | Dr. M. Janardhan Raju     | Principal, SIET, Puttur                                                                     |
| 8     | Dr. H. Devanna            | Professor, SJCET, Yemmiganur                                                                |
| 9     | Dr. K. Sudhakar           | HoD, Dept of E.C.E., SJCET, Yemmiganur                                                      |
| 10    | Dr. M. Padmaja Rani       | Associate Professor, SJCET., Yemmiganur                                                     |
| 11    | Dr K. Narasimha Rao       | Professor & Head, Department of EEE, GVP College of Engineering (Autonomous), Visakhapatnam |
| 12    | Dr. V.C. Veera Reddy      | Professor, Department of EEE, SPMVV, Tirupati                                               |
| 13    | Dr. V. S. Vakula          | Assistant Professor & HOD, Department of EEE, JNTUK, Vizianagaram                           |
| 14    | Dr. G. V. Sivakrishna Rao | Professor, Department of EEE, AU, Visakhapatnam                                             |
| 15    | Dr. K. Jithendra Gowd     | Assistant Professor, Department of EEE, JNTUCEA, Anantapur                                  |
| 16    | Dr. N. Naga Raja Rao      | Professor & HOD, GPREC, Kurnool                                                             |
| 17    | Dr. D. Vishnuvardhan      | Assistant Professor, JNTUACEA, Anantapuramu                                                 |
| 18    | Dr. B. Polaiah            | Professor, KLU, Vijayawada                                                                  |
| 19    | Dr. P. V. Ramana          | HOD, Dept of E.C.E., SVNEC, Rangampet                                                       |
| 20    | Dr. M. Venkata Narayana   | Professor, KSRRM College of Engineering, Kadapa                                             |
| 21    | Dr. P. Sujatha            | Professor, Department of EEE, JNTUCEA, Anantapur                                            |
| 22    | Dr. Ch. Chengaiah         | Professor, Department of EEE, SVUCE, SVU, Tirupati                                          |
| 23    | Dr. B. Urmila             | Associate Professor, Department of EEE, GPREC, Kurnool                                      |
| 24    | Dr. V. Maheswari          | Associate Professor, Department of EEE, SITAMS, Chittoor.                                   |
| 25    | Dr. S. Ravindra           | Professor, Department of EEE, Vasireddy Venkatadri Institute of Technology, Guntur.         |
| 26    | Dr. G. Venkateswarlu      | Professor & HoD, Department of EEE, Narayana Engineering College, Nellore.                  |
| 27    | Dr. P. Nagaraju Mandadi   | Professor, Dept. of EEE, SITAMS, Chittoor.                                                  |
| 28    | Dr. S. Suresh Reddy       | Professor & HoD, Department of EEE, NBRIST, Vakadu.                                         |
| 29    | Dr. B. Mouli Chandra      | Professor & HoD, Department of EEE, QISCET, Ongole.                                         |
| 30    | Dr. K. S. R. Krishna      | Professor, Department of EEE, NIT Warangal                                                  |

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|        |  |
|--------|--|
| Prasad |  |
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| S.No. | Examiner Name                 | Address                                                                    |
|-------|-------------------------------|----------------------------------------------------------------------------|
| 31    | Dr. T. Sreenivasulu Reddy     | Associate Professor, Department of ECE, SVUCE, Tirupathi                   |
| 32    | Dr. R. Srinivasa Rao          | Professor, Dept. of EEE, JNTU, Kakinada                                    |
| 33    | Dr. M. Sivasatya Narayana     | Associate Professor, Department of EEE, GPREC, Kurnool                     |
| 34    | Dr. C. Kamal Basha            | Professor, Department of EEE, MITS, Madanapalle                            |
| 35    | Dr. Y. V. Siva Reddy          | Professor, Department of EEE, GPREC, Kurnool                               |
| 36    | Dr. R. Rathinam               | Professor, Department of EEE, SRMIST, Chennai.                             |
| 37    | Dr. I. Prabhakara Reddy       | Professor, Department of EEE, NBRIST, Vakadu                               |
| 38    | Dr. K. Amaresh                | Professor, Department of EEE, St. Peters Engineering College, Hyderabad    |
| 39    | Dr. R. Kiranmayi              | Professor, Dept. of EEE, JNTUCEA, Anantapur                                |
| 40    | Dr. P. V. Prasad              | Professor, Department of EEE, CBIT, Hyderabad                              |
| 41    | Dr. P. Chandra Sekhar         | Associate Professor, Department of EEE, MGIT, Hyderabad                    |
| 42    | Dr. N. Chellammal             | Associate Professor, Department of EEE, SRM University, Chennai.           |
| 43    | Dr. D. Suresh                 | Professor, RNSIT, Bengaluru                                                |
| 44    | Dr. S. Shafiulla Basha        | Assistant Professor, Dept. of ECE, YVU, Proddatur                          |
| 45    | Dr. C. Chandrasekhar          | Professor, HOD, SVCEW, Tirupathi                                           |
| 46    | Dr. M. V. Subramanyam         | Professor, Shantiram Engg College, Nandyal                                 |
| 47    | Dr. J. Siva Vara Prasad       | Professor, Dept. of EEE, LBRCE, Krishna                                    |
| 48    | Dr. G. Sambasiva Rao          | Professor, R. V. R. & J. C. College of Engineering, Guntur                 |
| 49    | Dr. P. Ramkishore Kumar Reddy | Professor, Dept. of EEE, MGIT, Hyderabad                                   |
| 50    | Dr. O. Chandra Sekhar         | Associate Professor, Dept. of EEE, NIT, Delhi                              |
| 51    | Dr. M. Senthilkumar           | Professor, Department of EEE, Sona college of Technology, Salem, Tamilnadu |
| 52    | Dr. Y. N. Vijay Kumar         | Professor, Dept. of EEE, SVCET, Chittoor                                   |
| 53    | Dr. P. Srinivas Varma         | Associate Professor, Department of EEE, K L University, Guntur             |
| 54    | Dr. M. Damodar Reddy          | Professor, Department of EEE, SVUCE, SVU, Tirupati                         |
| 55    | Dr. S. S. Dash                | Professor, Department of EEE, Government College of Engineering, Orissa    |
| 56    | Dr. D. Satya Narayana         | Professor, Dept of E.C.E, RGM CET, Nandyal                                 |
| 57    | Dr. K. Hari Kishore           | Professor, KLU, Vijayawada                                                 |
| 58    | Dr. S. Chandra Mohan Reddy    | Assistant Professor, Dept. of E.C.E, JNTUCEP, Pulivendula                  |
| 59    | Dr. C. Srinivasa rao          | Professor, Dept. of EEE, GPCET, Kurnool                                    |

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|       |                               |                                                                                     |
|-------|-------------------------------|-------------------------------------------------------------------------------------|
| 60    | Dr. D. Lenine                 | Professor, Dept. of EEE, RGM CET, Nandyal                                           |
| S.No. | Examiner Name                 | Address                                                                             |
| 61    | Dr. V.V.K Reddy               | Professor, Dept. of EEE, NBKRIST, SPSR, Nellore                                     |
| 62    | Dr. K. Nagireddy              | Professor, NBKR, Vakadu                                                             |
| 63    | Dr. R. Sumalatha              | Professor, VCE, Hyderabad                                                           |
| 64    | Dr. T. Gowri Manohar          | Professor, Dept. of EEE, SVUCE, SVU, Tirupati                                       |
| 65    | Dr. B. Vijaya Krishna         | Associate Professor, Department of EEE, Bapatla Engineering College, Bapatla        |
| 66    | Dr. J. Sreenivasulu           | Assistant Professor, Department of EEE, JNTUCEA, Anantapur                          |
| 67    | Dr. K. Vaisakh                | Professor, Department of EEE, Andhra University, Visakhapatnam                      |
| 68    | Dr. V. Somasekhar             | Professor, Dept. of EEE, NIT Warangal                                               |
| 69    | Dr. K. Udhayakumar            | Professor, Department of EEE, Anna University, Chennai                              |
| 70    | Dr. M. Kiran Kumar            | Associate Professor, Department of EEE, K L University, Guntur                      |
| 71    | Dr. Sailaja Kumari M          | Professor, Department of EEE, NIT Warangal                                          |
| 72    | Dr. K. Chandra Sekhar         | Professor, Department of EEE, RVR & JC college of Engineering, Guntur.              |
| 73    | Dr. V. Usha Reddy             | Associate Professor, Department of EEE, SVUCE, SVU, Tirupati                        |
| 74    | Dr. E. Vidya Sagar            | Professor, Department of EEE, Osmania University, Hyderabad                         |
| 75    | Dr. Madhuri Avinash Chaudhari | Professor, Department of EEE, Visveswaraya National Institute of Technology, Nagpur |

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*P. B. U. P.*

*(Dr. P. B. Choudhary)*

*Dr.*

*Dr. P. B. Choudhary*

*P. Bhushara Praseel*