

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### CONVENING ORDER - BOARD OF STUDIES

The Board of Studies is the basic constituent of the academic system of an autonomous college. Its functions will include framing the syllabi for various courses, reviewing and updating syllabi from time to time, introducing new courses of study, determining details of continuous assessment, recommending panels of examiners under the semester system, etc. The Board of studies is constituted with the following members:

S.No	Name of the Member	Designation/occupation	category
1	Dr. K Krishna Reddy	Head of the Department	Chairman
2	Dr. K Venkata Reddy	Professor, EEE Department, UCEK, JNTUK, Kakinada	University Nominee
3	Dr. Mercy Rosilina	Professor, Vignan University, Vadlamudi, Guntur	Subject experts outside university parent
4	Dr. V Sandeep	Associate Professor, NIT AP	
5	Mr. M. L T Rayudu	Sr. Site Engineer, Indpower, Vishakhapatnam	Industrialist
6	Dr. R.Simhachalam	Asst. Professor	Faculty Members
7	Mr. G Masthan Reddy	Asst. Professor	
8	Mrs. N Bhuvaneshwari	Asst. Professor	
9	Mr. R Koteswara Naik	Asst. Professor	
10	Mr. I. Anil Babu	Asst. Professor	
11	Mrs. R Usha	Goods Train Manager, Central Govt. Employee	Alumni Member

P.T.O.

1. K.K. Reddy

2. R. Simhachalam

3. Masthan Reddy

4. N. Bhuvaneshwari

5. I. Anilbabu

6. R. Koteswara Naik

7. Usha

**Term:** The term of the nominated members shall be three years.

**Meetings:** The Board of Studies shall meet at least twice a year.

**Functions:**

The Board of Studies of a Department in the college shall:

- Prepare syllabi for various courses keeping in view the objectives of the college, interest of the stakeholders and national requirement for consideration and approval of the Academic Council;
- Suggest methodologies for innovative teaching and evaluation techniques;
- Suggest panel of names to the Academic Council for appointment of examiners;
- Coordinate research, teaching, extension and other academic activities in the Department! College.

*K.K. Reddy*  
HoD  
Dept. Of EEE

HEAD OF THE DEPARTMENT  
ELECTRICAL AND ELECTRONICS ENGINEERING  
A.M. REDDY MEMORIAL COLLEGE OF ENGG & TECH  
PETLURIVARIPALEM  
Narasaraopet (Md.), Guntur (Dt.).

**Copy to:**

1. Principal.

2. IQAC

1. *K.K. Reddy*
2. *R. Sambachalam*
3. *G. Anasudhan*

4. *N.R.*  
N. BHUVANESWARAI
5. *I. Anilbabu*
6. *R. Koteswaranaikr*
7. *Praveen ce. Reddy*

AMR/EEE/BOS/2025-26/Circular/1

Date: 01/07/2025

## Meeting Notice

Greetings from A.M. Reddy Memorial College of Engineering and Technology.

We request you to participate in Electrical and Electronics Engineering Department Board of Study meeting scheduled 02<sup>ND</sup> July 2025 at 10.00 AM through online (Google Meet)

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1	Dr. K Krishna Reddy	Head of the Department	Chairman
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7. R. Koteswara Naik

2. R. Simhachalam

4. N. BHUVANESHWARI

6. R. Koteswara Naik

## Agenda of the meeting-

- Introducing the members of Board of Studies.
- Finalization of AMR- 24 CBCS (Choice Based Credit System) – Syllabus for II year I& II Sem which are related to EEE Department.
- Course structure modifications (If any)
- Discuss on All subjects and labs in II year - I Sem and II Sem.
- Text books and Reference Books finalization.
- Any other matters.

*K.K. Reddy*  
HoD

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ELECTRICAL AND ELECTRONICS ENGINEERING  
A.M. REDDY MEMORIAL COLLEGE OF ENGG & TECH  
PETTURIVARIPALEM  
Narasaraopet (Md.), Guntur (Dt.).

1. *K.K. Reddy*
2. *R. Sambhachalam*
3. *G. Masthan Reddy*

4. *N.R.*  
*N. BHUVANESWAR*

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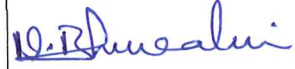



AMR/EEE/BOS/2025-26/MOM/2

Date: 02-07-2025

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### MINUTES OF MEETING - BOARD OF STUDIES (BOS)

The Meeting of the Board of Studies of EEE was held on 02<sup>ND</sup> July 2025 at 10.00 AM through online (Google Meet Platform). The following members were attended the online meeting.

S.No	Name of the Member	Designation/occupation	category	Signature
1	Dr. K Krishna Reddy	Head of the Department	Chairman	
2	Dr. K Venkata Reddy	Professor, EEE Department, UCEK, JNTUK, Kakinada	University Nominee	
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10	Mr. I. Anil Babu	Asst. Professor		
11	Mrs. R Usha	Goods Train Manager, Central Govt. Employee	Alumni Member	

The Meeting began with chairman, Board of studies extending a warm welcome to all the members of participating in the meeting.

**The following points were discussed and Ratified during the meeting**

1. University Nominee Dr. K Venkat Reddy Garu, congratulate the Management and Staff of A.M.Reddy Memorial College of Engineering and Technology.
2. The following proposed AMR 24 Course Structure and the detailed syllabi of II-I, II-II were presented, discussed and ratified.

<b>COURSES (EEE)</b>					
<b>II Year – I SEM</b>					
S.No.	Title	Credits	S. No.	Title	Credits
1	Complex Variables & Numerical Methods	3	6	Electrical Circuit Analysis-II and Simulation Lab	1.5
2	Universal human values understanding harmony and Ethical human conduct	3	7	DC Machines & Transformers Lab	1.5
3	Electromagnetic Field Theory	3	8	Data Structures Lab	2
4	Electrical Circuit Analysis-II	3	9	Environmental Science	0
5	DC Machines & Transformers	3			
<b>I SEM - TOTAL CREDITS</b>					<b>20</b>
<b>II Year – II SEM</b>					
1	Managerial Economics & Financial Analysis	2	6	Induction and Synchronous Machines lab	1.5
2	Analog Circuits	3	7	Control Systems Lab	1.5
3	Power Systems-I	3	8	Python Programming Lab	2
4	Induction and Synchronous Machines	3	9	Design Thinking & Innovation	2

5	Control Systems	3			
<b>II SEM - TOTAL CREDIT</b>					<b>21</b>

1. the syllabus for both II-I,II-II Semesters Has Been Approved By The Bord of Studies.

The following points were suggested for future possible implementations:

1. Suggested that we can change the syllabus up to 10% and 40% if necessary.
2. Suggested to enhance the quality as per industrial requirements.

1. **Prescribed Textbooks:** Advised to add recent prescribed textbooks or updated editions for the course.

2. **Information Sharing:** All the updated information should be shared at least 15 days before the next Board of Studies (BOS) meeting.

The BOS chairman concluded the session and informed that the suggested points will be implemented and mail the same for approval and requested the experts to approve and ended with Vote of Thanks.

3.

4. Dr. V Sandeep, Subject expert suggested to prepare the course structure for all 4 years of B.Tech.

**Chairman**

**BoS – Dept. of EEE**

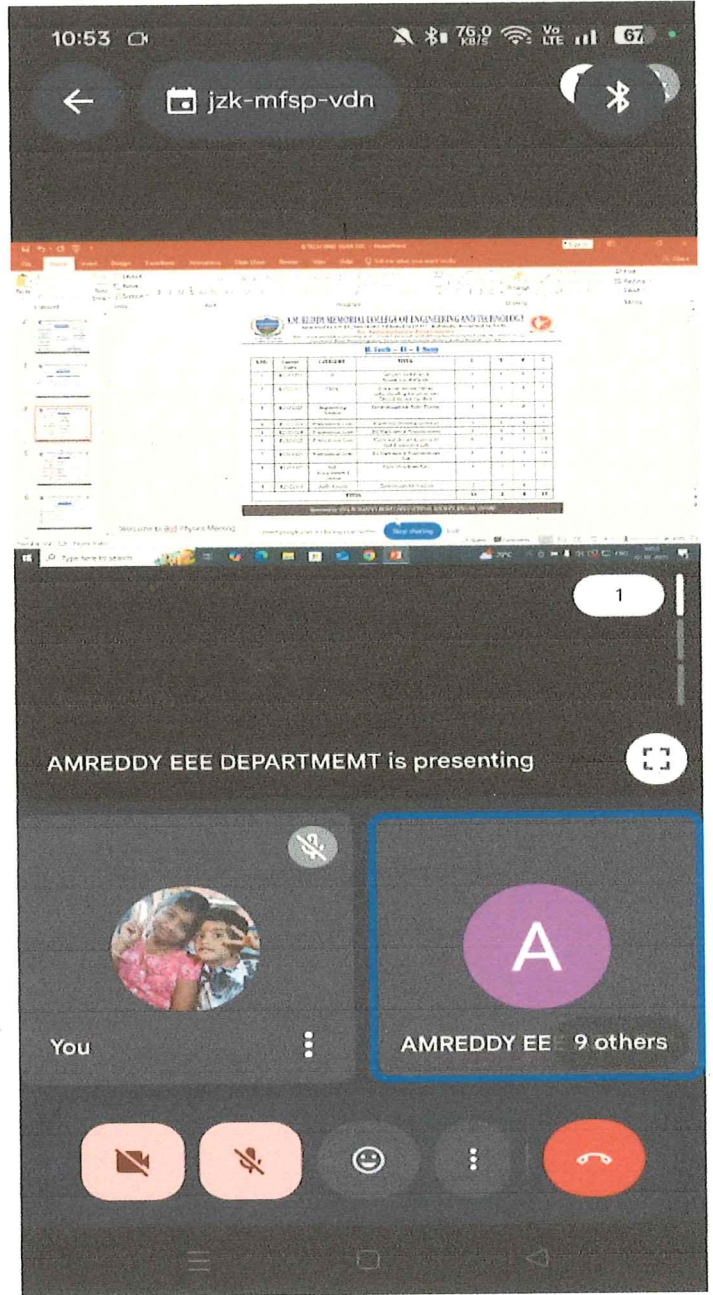
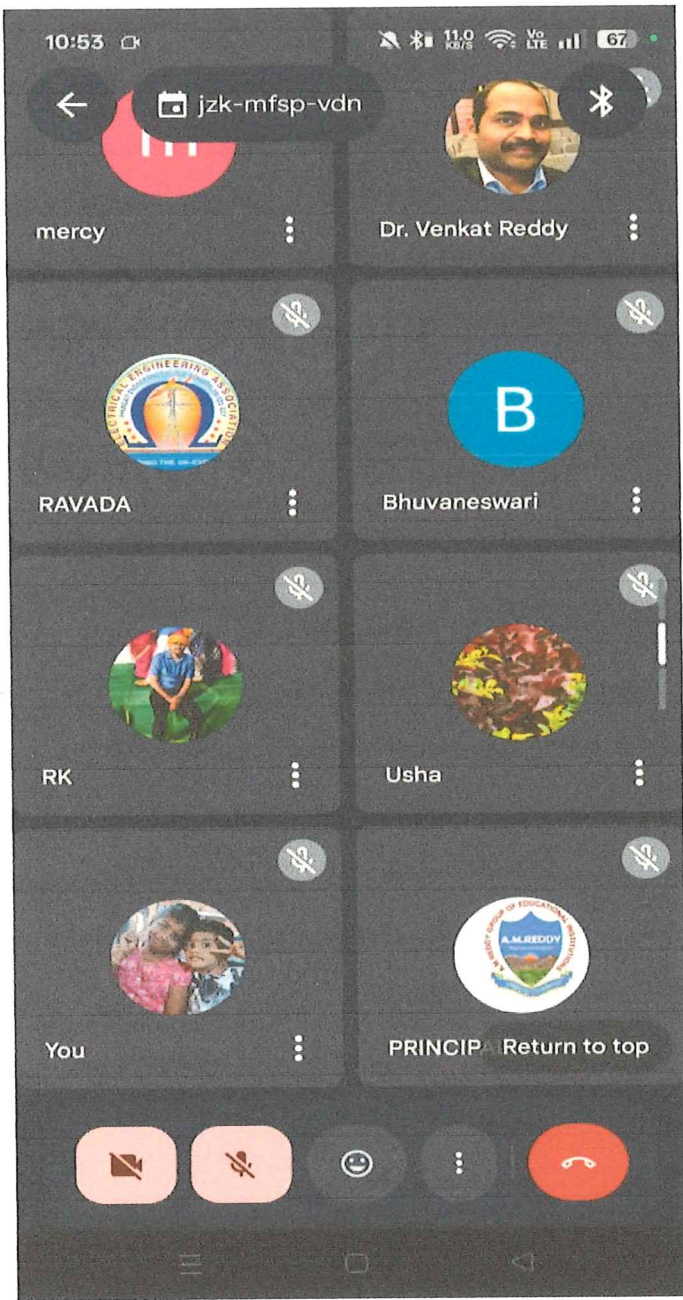
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1. Principal
2. IQAC

1. K.K.Reddy  
2. R. Sambachalam  
3. G. Masthan Reddy

4. N.B. BHUVANESWAR  
5. S. Anilbabu  
6. R.R.

7. G. Masthan Reddy



**Chairman**

**BoS – Dept. of EEE**

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2. IQAC

1. *K.V. Reddy*

2. *R. Sambachalam*

3. *G. Sridhary  
9 mas from Reddy*

4. *N. J. P.*

5. *I. Anilbala*

6. *RR*

7. *Pradab u. Reddy*

## ANNEXURE – I

AMR- 24

### COMPLEX VARIABLES & NUMERICAL METHODS (II-I)

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#### Course Objectives:

- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To familiarize the complex variables.
- To equip the student to solve application problems in their disciplines.

#### Course Outcomes:

1. Evaluate the approximate roots of polynomial and transcendental equations by different algorithms. Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
2. Apply numerical integral techniques to different Engineering problems. Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
3. Apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3)
4. Evaluate the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues. Make use of the Cauchy residue theorem to evaluate certain integrals (L3)
5. Explain properties of various types of conformal mappings (L5)

#### UNIT – I: Iterative Methods:

Introduction – Solutions of algebraic and transcendental equations: Bisection method Secant method – Method of false position -General Iteration method -Newton Raphson method (Simultaneous Equations).

**Interpolation:** Newton's forward and backward formulae for interpolation - interpolation

with unequal intervals – Lagrange's interpolation formula.

#### UNIT – II: Numerical integration, Solution of ordinary differential equations with initial conditions:

Trapezoidal rule– Simpson's 1/3rd and 3/8th rule– Solution of initial value problems by Taylor's series– Picard's method of successive approximations -Euler's method –Runge-Kutta method (second and fourth order) -Milne's Predictor and Corrector Method.

1. K.K. Reddy

3. Anand  
Anasthina Reddy

5. I. Anilbaby

7. Godwin Reddy

2. R. Sambasudam

4. N. R. D.

6. R. D.

## UNIT – III: Functions of a complex variable and Complex integration:

Introduction – Continuity – Differentiability- Analyticity –Cauchy-Riemann equations in Cartesian and polar coordinates Harmonic and conjugate harmonic functions-Milne-Thompson method.

Complex integration: Line integral -Cauchy's integral theorem-Cauchy's integral formula-Generalized integral formula (all without proofs) and problems on above theorems.

## UNIT – IV: Series expansions and Residue Theorem:

Radius of convergence – Expansion of function in Taylor's series, Maclaurin's series and Laurent series

Types of Singularities: Isolated-Essential singularities – Pole of order  $m$ – Residues- Residue theorem (without proof). Evaluation of real integral of the types  $\int f(x)dx$  and  $\int f(\cos\theta \sin\theta)d\theta$ .

## UNIT – V: Conformal mapping :

Transformation by  $e^z$ ,  $\ln z$ ,  $z^2$ ,  $z^n$  ( $n$  positive integer),  $\sin z$ ,  $\cos z$ ,  $z + a/z$ . Translation rotation, inversion and bilinear transformation - fixed point – cross ratio- properties- invariance of circles and cross ratio – determination of bilinear transformation mapping 3 given points.

**Textbooks:** 1. B. S. Grewal, Higher Engineering Mathematics, 44<sup>th</sup> edition, Khanna Publishers.

2. Micheael Greenberg, Advanced Engineering Mathematics, 2<sup>nd</sup> edition, Pearson edition.

**Reference Books:** 1 Erwin Kreyszig, Advanced Engineering Mathematics, 10

2. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

3. Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineering Science, Tata Mc. Graw Hill Education.

4. M. K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publications.

1. K.K. Reddy

2. R. Sambachalam

3. G. Mustha Reddy

4. N. B. R. S. N. BHUVANESWAR

5. F. Anilbabu

6. R. K.

7. G. Prasad Reddy

## ANNEXURE – II

### AMR- 24

## UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT(II-I)

### Course Objectives:

- To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct
- understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

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### Course Outcomes:

- Define the terms like Natural Acceptance, Happiness and Prosperity (L1, L2)
- Identify one's self, and one's surroundings (family, society nature) (L1, L2)
- Apply what they have learnt to their own self in different day-to-day settings in
- real life (L3)
- Relate human values with human relationship and human society. (L4)
- Justify the need for universal human values and harmonious existence (L5)
- Develop as socially and ecologically responsible engineers (L3, L6)

### UNIT I:

Introduction to Value Education (6 lectures and 3 tutorials for practice Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) Lecture 2: Understanding Value Education Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture 3: self-exploration as the Process for Value Education Lecture 4: Continuous Happiness and Prosperity – the Basic Human Aspirations Tutorial 2: Practice Session PS2 Exploring Human Consciousness. Lecture 5: Happiness and Prosperity – Current Scenario Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance.

1. K.K. Reddy

3. G. Srinivas Reddy

5. I. Anilbabu

7. Chandrababu

2. S. Srinivas Reddy

4. N. R. Reddy

6. R. Reddy

## UNIT II:

Harmony in the Human Being (6 lectures and 3 tutorials for practice session) 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 Session PS4 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 Session PS5 Exploring Sources of Imagination in the self Lecture 11: Harmony of the self with the body Lecture 12: Programmed to ensure self-regulation and Health Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body.

## UNIT III:

Harmony in the Family and Society (6 lectures and 3 tutorials for practice session) Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction Lecture 14: 'Trust' – the Foundational Value in Relationship Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust Lecture 15: 'Respect' – as the Right Evaluation Tutorial 8: Practice Session PS8 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 Session PS9 Exploring Systems to fulfil Human Goal.

## UNIT IV:

Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice 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 PS10 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 Session PS11 Exploring Co-existence in Existence.

## UNIT V:

Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session) Lecture 23: Natural Acceptance of Human Values Lecture 24: Definitiveness of (Ethical) Human Conduct Tutorial 12: Practice Session PS12 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 Session PS13 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 Session PS14 Exploring Steps of Transition towards Universal Human Order.

**READINGS:** Textbook and Teachers Manual a. The Textbook R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1 b. The Teacher's Manual R R Gaur, R Asthana, G P Bagaria, Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

**Reference Books:** 1. Kelaniya: Parichay, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999. 2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004. 3. The Story of Stuff (Book). 4. The Story of My Experiments with Truth.

1. K.K. Reddy

3. *Smriti*  
Smriti Reddy

5. *Dr*  
F. Anilbabu

7. *Dr*  
Dr. Anilbabu

2. *Dr*  
R. Simha Chalam

4. *NO. 10*  
N. BHUVANESWAR

6. *RR*

## ANNEXURE – III

### AMR- 24

### ELECTROMAGNETIC FIELD THEORY(II-I)

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#### Course Objectives:

To study the production of electric field and potentials due to different configurations of static charges.

To study the properties of conductors and dielectrics, calculate the capacitance of different configurations. Understand the concept of conduction and convection current densities.

To study the magnetic fields produced by currents in different configurations application of Ampere's law and the Maxwell's second and third equations.

To study the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current loops. To develop the concept of self and mutual inductances and the energy stored.

To study time varying and Maxwell's equations in different fourth equation for the induced EMF.

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

CO1: Compute electric fields and potentials using Gauss law/ solve Laplace's or Poisson's equations for various electric charge distributions.

CO2: Analyze the behavior of conductors in electric fields, electric dipole and the capacitance and energy stored in dielectrics.

CO3: Calculate the magnetic field intensity due to current  $c$  understanding the application of Ampere's law, Maxwell's second and third law

CO4: Estimate self and mutual inductances and the energy stored in the magnetic field.

CO5: Understand the concepts of Faraday's laws, Displacement current, Poynting theorem, pointing vector.

#### UNIT – I: Vector Analysis:

**Vector Algebra:** Scalars and Vectors, Unit vector, Vector addition and subtraction, Position and distance vectors, Vector multiplication, Components of Coordinate Systems: Rectangular, Cylindrical and Spherical coordinate systems.

**Vector Calculus:** Differential length, Area and Volume. Del operator, Gradient of a scalar, Divergence of a vector and Divergence theorem (definition only). Curl of a vector, Stoke's theorem (definition only), Laplacian of a scalar

1. K.K. Reddy      3. G. M. S. Reddy      5. I. Anil Kumar      7. Reddy & Reddy  
2. R. S. Reddy      4. N. J. Reddy      6. R. K.

**Electrostatics:** Coulomb's law and Electric field intensity (EFI) distributions (line and surface charge), Electric flux density, Applications of Gauss's law, Electric Potential, Work done 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 – II : Dielectrics and Capacitance Behavior of conductor in Electric field:

EFI due to an electric dipole, Torque on an Electric dipole placed in an electric field, Current density conduction and convection current densities, Ohm's law in point form, 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 –III: Magneto statics, Ampere's Law and Force in magnetic fields:

Boit-Savart's law and its applications viz. Straight current carrying filament, circular, square, rectangle and solenoid current carrying wire- Magnetic flux density and Maxwell's second Equation ( $\nabla \cdot \mathbf{B} = 0$ ), Ampere's circuital law and its applications viz. MFI due to an infinite sheet, long filament, solenoid, toroidal current carrying conductor, point form of Amperes circuit law, Maxwells third equation. Magnetic force, moving charges in a magnetic field - Lorentz force equation, force 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 conductor's Magnetic dipole, Magnetic torque, and moment.

## UNIT – IV: Self and mutual inductance:

Self and mutual inductance – determination of self-inductance: solenoid, toroid, coaxial cable and mutual inductance between a straight long wire and a square loop wire in the same plane – Energy stored and energy density in a magnetic field.

## UNIT – V: Time Varying Fields:

Faraday's laws of electromagnetic induction, Maxwell's 4<sup>th</sup> equation integral and point forms of Maxwell's equations, statically and dynamically induce EMF, Displacement current, Modification of Maxwell's equations for time varying fields, Poynting theorem and Poynting vector.

### Textbooks:

1. "Elements of Electromagnetics" by Matthew N O Sadiku, Oxford Publications, 7th edition, 2018.
2. "Engineering Electromagnetics" by William H. Hayat & John. A. Buck Mc. Graw 7th Edition. 2006.

### Reference Books:

1. "Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt. Ltd, 2nd edition.
2. "Electromagnetic Field Theory" by Yaduvir Singh, Pearson India, 1<sup>st</sup> edition, 2011

1. K.K. Reddy

3. G. Srinivas Reddy

5. E. Anilbala

7. D. Venkatesh Reddy

2. R. Simha Chelam

4. N. R. Reddy

6. R. K. Reddy

**ANNEXURE – IV**

**AMR- 24**

**ELECTRICAL CIRCUIT ANALYSIS-II(II-I)**

**Course Objectives:**

- To understand three phase circuits
- To analyses transients in electrical systems
- To evaluate network parameters of given electrical network
- To apply Fourier analysis to electrical s
- To understand graph theory for circuit analysis and to understand the behavior of filters.

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**Course Outcomes:**

- At the end of the course, student will be able to,
- CO1: Analyze the balanced and unbalanced 3 phase circuits for power calculations.
- CO2: Analyze the transient behavior of electrical networks in different domains.
- CO3: Estimate various Network parameters.
- CO4: Apply the concept of Fourier series to electrical systems.
- CO5: Analyze the filter circuit for electrical circuits.

**UNIT – I: Analysis of three phase balanced circuits:**

Phase sequence, star and delta connection of sources and loads, relation between line and phase quantities, analysis of balanced three phase circuits, measurement of active and reactive power

**Analysis of three phase unbalanced circuit:**

Loop method, Star-Delta transformation technique, two watt meter method for measurement of three phase power.

**UNIT – II: Laplace transforms:**

Laplace transforms – Definition and Laplace transforms of standard functions-shifting theorem Transforms of derivatives and integrals-Inverse Laplace transforms and applications.

**Transient Analysis:** Transient response of R-L R-C and R-L-C circuits (Series and parallel combinations) for D.C. and sinusoidal excitations- Initial conditions - Solution using differential equation- approach and Laplace transform approach.

1. K.K.Reddy      3. J. Anilbaly  
2. R. Sambuchalam      4. N.R.P.      5. I. Anilbaly      7. Omkar u. Reddy  
6. R.P.

## UNIT – III: Network Parameters:

Impedance parameters, Admittance parameters, Hybrid parameters, Transmission (ABCD) parameters, conversion of Parameters from one form to other, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations- problems.

## UNIT – IV: Analysis of Electric Circuits with Periodic Excitation:

Fourier series and evaluation of Fourier coefficients, Trigonometric and complex Fourier series for periodic waveforms, Application to Electrical Systems periodic waveforms, power factor, effect of harmonics.

## UNIT – V: Filters:

Classification of filters-Low pass, High pass, Band pass and Band Elimination filters.

### Textbooks:

1. Engineering Circuit Analysis, William Hayat and Jack E. Kemmerly, 8th Edition McGraw-Hill, 2013
2. Fundamentals of Electric Circuits, Charles K. Alexander, Mathew N. O. Sadiku, 3rd Edition, Tata McGraw-Hill, 2019.

### Reference Books:

- Network Analysis, M. E. Van Valkenburg, 3rd Edition, PHI, 2019.
- Network Theory, N. C. Jagan and C. Lakshminarayana, 1st Edition, B. S. Publications.
- Circuits and Networks Analysis and Synthesis, A. Sudhakar, Shyam Mohan S. Palli, 5th Edition, Tata McGraw.
- Circuit Theory: Analysis and Synthesis, A. Chakrabarti, Dhanpat Rai & Co., 2018, 7 Revised Edition.

1. K.K. Reddy
2. R. Sambasubramanian
3. G. M. Reddy

4. N. B. N. BHUVANESWARI
5. E. Anilbabu
6. R. R.

7. G. Lakshminarayana

## ANNEXURE – V

### AMR- 24

## DC MACHINES & TRANSFORMERS(II-I)

### Course Objectives:

Students will get exposure to

- Understand the characteristics and applications of DC Machines.
- Develop problem solving skills about the starting, speed control and testing of DC Machines.
- Understand the concepts of efficiency and regulation of a transformer by obtaining equivalent circuit.
- Analyze the performance of single diagrams of three-phase transformers.

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### Course Outcomes

- CO1: Understand the process of voltage build-up in DC generators and characteristics
- CO2: Understand the process of torque production, starting and speed control of DC motors
- CO3: Obtain the equivalent circuit of single-phase transformer and determine efficiency & regulation.
- CO4: Analyze various configurations of three-phase transformers.

### UNIT – I: DC Generators:

Construction and principle of operation of DC machines-EMF equation for generator-Excitation techniques – characteristics of DC generators –applications of DC Generators,Back-emf and torque equations of DC motor-Armature reaction and commutation

### UNIT – II: Starting, Speed Control and Testing of DC Machines:

Characteristics of DC motors – losses and efficiency – applications of DC motors. Necessity of a starter-starting by 3-point and 4-point starters – speed control by armature voltage and field current control – testing of DC machines- brake test, Swinburne's test -Hopkinson's test-Field Test.

### UNIT – III: Single-phase Transformers:

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Introduction to single-phase Transformers (Construction and principle of operation) equation – operation on no-load and on load—lagging, leading and unity power factors loads—phasor diagrams— equivalent circuit—regulation – losses and efficiency – effect of variation

#### UNIT –IV: Testing of Transformers:

Open Circuit and Short Circuit tests-Summer's test – separation of losses –Parallel operation with equal and unequal voltage ratios-auto transformer – equivalent circuit -comparison with two winding transformers.

#### UNIT – V: Three-Phase Transformers:

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

#### Textbooks:

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

#### Reference Books:

1. Electrical Machines by D. Kothari, I .J .Magrath, McGraw Hill Publications, 5th edition
2. Electrical Machinery Fundamentals by Stephen J Chapman McGraw Hill.
3. Generalized Theory of Electrical Machines by Dr. P S Bamber Khanna Publishers, 2021.
4. Theory & Performance of Electrical Machines by J.B.Gupta, S.K.Kataria & Sons, 2007.

1. K.K.Reddy

2. R.Somachalam

3. G. Anand Reddy  
G. Anand Reddy

4. N.B. HANESWARA  
N.B.HANESWARA

5. I. Anandbabu  
I. Anandbabu

6. R.R.

7. Chandu C. Reddy

**ANNEXURE – VI**

**AMR- 24**

**ELECTRICAL CIRCUIT ANALYSIS-II & SIMULATION LAB(II-I)**

**Course Objectives:**

- To measure three phase Active and Reactive power
- To analyses transient behavior of circuits
- To determine 2-port network parameters
- To analyses electrical circuits using simulation tools

L	T	P	C
0	0	3	1.5

**Course Outcomes:**

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

- CO1: Understand the power calculations in three phase circuits.
- CO2: Evaluate the time response of given network.
- CO3: Evaluate two port network parameters.
- CO4: Simulate and analyses electrical circuits using suitable software.

**LIST OF EXPERIMENTS:**

1. Measurement of Active Power and Reactive Power for balanced loads.
2. Measurement of Active Power and Reactive Power for unbalanced loads.
3. Determination of Z and Y parameters.
4. Determination of ABCD and Hybrid parameters.
5. Verification of Kirchhoff's current law and voltage law using simulation tools.
6. Verification of mesh and nodal analysis using simulation tools.
7. Verification of super position and maximum power transfer theorems using simulation tools.
8. Verification of Reciprocity and Compensation theorems using simulation tools.
9. Verification of Thevenin's and Norton's theorems using simulation tools.
10. Verification of series and parallel resonance using simulation tools.
11. Simulation and analysis of transient response of RL, RC and RLC circuits
12. Verification of self-inductance and mutual inductance by using simulation tools.

1. K.K. Reddy

3. Anil Reddy  
G. Masthan Reddy

5. I. Anil baby

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## ANNEXURE – VII

### AMR- 24

## DC MACHINES & TRANSFORMERS LAB(II-I)

### Course Objectives:

The objectives of this course

- To conduct the experiment and plot the characteristics and applications of DC machines.
- To perform the starting, speed control and testing methods of DC Machines.
- To determine/Predetermine efficiency and regulation of the transformer through equivalent circuit.

L	T	P	C
0	0	3	1.5

### Course Outcomes:

At the end of the course, the student

CO1: Demonstrate starting and speed control methods of DC Machines.

CO2: Apply theoretical concepts in analyzing the performance characteristics of DC machines.

CO3: Determine the performance characteristics of DC machines using different testing methods.

CO4: Determine the performance parameters of single-phase transformers.

### LIST OF EXPERIMENTS

Any 10 of the following experiments are to be conducted:

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

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3. G. Masthan Reddy

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11. Scott connection of transformers.
12. Parallel operation of Single-phase Transformers.
13. Separation of core losses of a single-phase transformer.

1. K.K. Reddy

2. R. Srinivasachalam

3. G. Venkatesh Reddy

4. N. B. Srinivas Swari

5. S. Anil Babu

6. A.K.

7. Chandu e. s. s.

Freed, Silicon Press, 2008

### Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders.

2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft.

5. Problem Solving with Algorithms and Data Structures by Brad Miller and David.

1. K.K. Reddy

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## ANNEXURE – IX

AMR- 24

### ENVIRONMENTAL SCIENCE(II-I)

L	T	P	C
2	0	0	-

#### Course Objectives:

- To make the students to get awareness on environment
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of human life.
- To save earth from the inventions by the engineers.

#### UNIT – I:

Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance - Need for Public Awareness.

**Natural Resources** : Renewable and non- renewable resources Natural resources and associated problems – Forest resources-Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people -Water resources – Use and over utilization of surface-Floods, drought conflicts over water, dams –benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources case studies

**Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture--pesticide problems, water logging, salinity, case studies. – Energy resources.

#### UNIT – II

Ecosystems: Concept of an ecosystem.consumers and decomposers – Energy flow in the ecosystem chains, food webs and ecological pyramids structure and function of the following ecosystem:

A. Forest ecosystem.B. Grassland ecosystem C. Desert ecosystem

D. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation : Introduction and Definition: genetic spics &ecosystem diversity.-Bio-geographical classification of India -Value of biodiversity consumptive use, Productive use, social, ethical, aesthetic and option values Biodiversity at global, National and local levels- India as a mega-diversity nation Hot-spots of biodiversity – Threats to biodiversity :habitat loss, poaching of wild life conflicts – Endangered and endemic species of India Conservation of biodiversity In-situ and Ex-situ conservation of biodiversity

1. K.K. Reddy

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## ANNEXURE-I

AMR- 24

### MANAGERIAL ECONOMICS AND FINANCIAL ANALYSISII-II (EE)

L	T	P	C
3	0	0	3

#### Course Objectives:

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

#### Course Outcomes:

1. Define the concepts related to Managerial Economics, financial accounting and management
2. Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets
3. Apply the Concept of Production cost and revenues for effective Business decision
4. Analyze how to invest their capital and maximize returns
5. Evaluate the capital budgeting techniques.
6. Develop the accounting statements and evaluate the financial performance of business entity

### SYLLABUS

#### 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- Isoquants and Is 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

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## 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 Method, 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.

### Textbooks:

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

### Reference Books:

1. Ahuja Hl Managerial economics Schad.
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.  
Domnick Salvatore: Managerial Economics in a Global Economy, Engage.

### 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>

1. K.K. Reddy

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7. S. Srinivasulu

## ANNEXURE-II

### AMR- 24

### ANALOG CIRCUITS II-II (EE)

#### Course Learning Objectives:

The objective of this course is:

L	T	P	C
3	0	0	3

1. To acquire the basic knowledge on clippers, clampers & biasing circuits
2. To determine the h-parameters of a transistor circuit & understand the concepts of Feedback amplifiers
3. To know the operation of oscillators and operational amplifier.
4. To understand the applications of operational amplifier.
5. To acquire the knowledge on IC 555 timer and their applications.
6. To know the operation of Analog to Digital Converters and Digital to Analog Converters.

#### Course Outcomes:

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

1. Analyze diode clipping and clamping circuits. Understand different types of biasing circuits of a transistor.
2. Use small signal modeling for transistor circuit analysis and illustrate the operation of feedback amplifiers.
3. Understand operation of oscillators, operational amplifier and their applications.
4. Use 555 timers in multi-vibrators, Schmitt Trigger and PLL applications
5. Describe the operation of different ADC's and DAC's

#### SYLLABUS

#### UNIT-I Diode clipping and clamping circuits :

Diode clippers, clipping at two independent levels Transfer characteristics of clippers, clamping circuit operation. DC biasing of BJTs: Load lines, Operating Point, Bias Stability, collector to base bias Self-Bias, Stabilization against Variations in  $V_{BE}$  and  $\beta$  for the Self-Bias Circuit Bias Compensation, Thermal Runaway, Thermal Stability.

#### UNIT-II Small Signals Modelling of BJT:

Analysis of a Transistor Amplifier Circuit using hParameters Simplified CE Hybrid Model, Analysis of CE, CC, CB Configuration using Approximate Model, Frequency Response of CE and CC amplifiers. Feedback Amplifiers: Classification of Amplifiers, the Feedback Concept, General Characteristics of Negative-Feedback Amplifiers, Effect of Negative Feedback upon Output and Input Resistances, Voltage-Series Feedback, Current-Series Feedback, Current-Shunt Feedback, Voltage-Shunt Feedback

1. K.K. Reddy

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5. I. Anu Baby

7. Pradeep C. Reddy

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## UNIT-III Oscillator Circuits:

Barkhausen Criterion of oscillation, Oscillator operation, Rshift oscillator, Wien bridge Oscillator, Crystal Oscillator. Operational Amplifiers: Introduction, Basic information of Op-Amp, Ideal Operational Amplifier, Block Diagram Representation of Typical Op-Amp, OP-Amps Characteristics: Introduction, DC and AC characteristics, 741 op-amp & its features.

## UNIT-IV OP-AMPS Applications:

Introduction, Basic Op-Amp Applications, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converter, Sample and Hold Circuit, Log and Antilog Amplifier, Multiplier and Divider, Differentiator, integrator. Comparators and Waveform Generators: Introduction, Comparator, Square Wave Generator, Monostable Multivibrator, Triangular Wave Generator, Sine Wave Generators.

## UNIT-V Timers and Phase Locked Loop:

Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger, PLL block schematic, principles and description of individual blocks, 565 PLL, Applications of VCO (566). Digital to Analog And Analog to DI vital Converters: Introduction, basic DAC techniques weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, A-D Converters , parallel Comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

## TEXT BOOKS:

1. Electronic Devices and Circuits- J. Millman, Halkias, Tata Mc-Graw Hill, 2<sup>nd</sup> Edition, 2010.
2. Linear Integrated Circuits- D. Roy Choudhury ,New Age International (p) Ltd, 2<sup>nd</sup> Edition, 2003.

## REFERENCES:

1. Electronic Devices and Circuit Theory Robert Bolstad and Lowis Natinsky Pearson Edition, 2021
2. Electronic Devices and Circuits-G.K. Mithal, Khanna Publisher, 23rd Edition, 2017.
3. Electronic Devices and Circuits- David Bell, Oxford, 5th Edition, 2008.
4. Electronic Principles-Melvino, Albert Paul, and David J. Bates, McGraw Hill/Higher Education, 2007.
5. Operational Amplifiers and Linear Integrated Circuits- Gayakwad R.A, Prentice Hall India, 2002.
6. Operational Amplifiers and Linear Integrated Circuits -Sanjay Sharma, Kataria & Sons, 2nd Edition, 2010.

## Online Learning Resources:

1. <https://nptel.ac.in/courses/122106025>.
2. <https://nptel.ac.in/courses/108102112>.

1. K.K. Reddy

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3. G. Mesthaleddy

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5. I. Anilbabu

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7. *Online resources*

## Sample experiments:

1. Write a program to implement the following operations.
  - a. Insert b. Deletion c. Traversal
2. Write a program to store name, roll no, and marks of students in a class using circular double linked list.
3. Write a program to perform addition of given two polynomial expressions using linked list.

## UNIT III Stacks:

Introduction to stacks: properties and operations, implementing stacks using arrays and linked list, Applications of stacks in expression evaluation, backtracking, reversing list etc. Sample experiments:

1. Implement stack operations using
  - a. Arrays b. Linked list
2. Convert given infix expression into post fix expression using stacks.
3. Evaluate given post fix expression using stack.
4. Write a program to reverse given linked list using stack.

## UNIT IV Queues:

Introduction to queues: properties and operations, Circular queues, implementing queues using arrays and linked lists, Applications of queues scheduling, etc.

**Deque:** Introduction to deques (double applications)

## UNIT V Trees:

Introduction to Trees, Binary trees and traversals, Binary Search Tree -insertion Deletion & Traversal

## Sample experiments:

1. Implement binary tree traversals using linked list.
2. Write program to create binary search tree for given list of integers. Perform traversal of the tree. Implement insertion and deletion operations.

## Textbooks:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni,

1. K.K. Reddy

3. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni

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## ANNEXURE – VIII

### AMR- 24

### DATA STRUCTURES LAB(II-I)

#### Course Objectives:

- To provide the knowledge of basic data structures and their implementations.
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving

L	T	P	C
0	1	2	2

#### Course Outcomes:

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

- CO1: Identify the role of data structures in organizing and accessing data.
- CO2: Design, implement, and apply linked lists for dynamic data storage.
- CO3: Develop applications using stacks and queues.
- CO4: Design and implement algorithms for operations on binary trees and binary trees.
- CO5: Devise novel solutions such as stacks, queues, Trees.ons to small scale programming challenges involving data structures.

#### UNIT I: Introduction to Data Structures:

Definition and importance of Data structures –Abstract data types (ADTs) and its specifications  
Arrays: Introduction, 1-D, 2-D Arrays, accessing

#### Searching Techniques:

Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Quick sort. Sample experiments:

- Program to find min & max element in an array
- Program to implement matrix multiplication.
- Find an element in given list of sorted elements in an array using Binary
- Implement Selection and Quick sort techniques

#### UNIT II: Linked Lists:

Singly linked lists: representation and operations, doubly linked lists and circular linked lists,  
Comparing arrays and linked lists, Applications of linked list

1. K.K. Reddy

3. G. R. Reddy

5. E. Anil baby

7. D. Lakshmi

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4. N. R.

6. R. R.

AMR/EEE/BOS/2025-26/MOM/1

Date: 02-07-2025

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**MINUTES OF MEETING - BOARD OF STUDIES (BOS)**

The Meeting of the Board of Studies of EEE was held on 02<sup>ND</sup> July 2025 at 10.00 AM through online (Google Meet Platform). The following members were attended the online meeting.

S.No	Name of the Member	Designation/occupation	category	Signature
1	Dr. K Krishna Reddy	Head of the Department	Chairman	
2	Dr. K Venkata Reddy	Professor, EEE Department, UCEK, JNTUK, Kakinada	University Nominee	ONLINE
3	Dr. Mercy Rosilina	Professor, Vignan University, Vadlamudi, Guntur	Subject experts outside parent university	ONLINE
4	Dr. V Sandeep	Associate Professor, NIT AP		ONLINE
5	Mr. M. L T Rayudu	Sr. Site Engineer, Indpower, Vishakhapatnam	Industrialist	ONLINE
6	Dr. R.Simhachalam	Asst. Professor	Faculty Members	
7	Mr. G Masthan Reddy	Asst. Professor		
8	Mrs. N Bhuvaneswari	Asst. Professor		
9	Mr. R Koteswara Naik	Asst. Professor		
10	Mr. I. Anil Babu	Asst. Professor		
11	Mrs. R Usha	Goods Train Manager, Central Govt. Employee	Alumni Member	ONLINE

1. K.K.Reddy

3. K. Venkata Reddy

5. I. Anil Babu

7. R. Usha

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The Meeting began with chairman, Board of studies extending a warm welcome to all the members of participating in the meeting.

**The following points were discussed and Ratified during the meeting**

1. University Nominee Dr. K Venkat Reddy Garu, congratulate the Management and Staff of A.M.Reddy Memorial College of Engineering and Technology.
2. The following proposed AMR 24 Course Structure and the detailed syllabi of II-I, II-II were presented, discussed and ratified.

<b>COURSES (EEE)</b>					
<b>II Year – I SEM</b>					
S.No.	Title	Credits	S. No.	Title	Credits
1	Complex Variables & Numerical Methods	3	6	Electrical Circuit Analysis-II and Simulation Lab	1.5
2	Universal human values understanding harmony and Ethical human conduct	3	7	DC Machines & Transformers Lab	1.5
3	Electromagnetic Field Theory	3	8	Data Structures Lab	2
4	Electrical Circuit Analysis-II	3	9	Environmental Science	0
5	DC Machines & Transformers	3			
<b>I SEM - TOTAL CREDITS</b>					<b>20</b>
<b>II Year – II SEM</b>					
1	Managerial Economics & Financial Analysis	2	6	Induction and Synchronous Machines lab	1.5
2	Analog Circuits	3	7	Control Systems Lab	1.5
3	Power Systems-I	3	8	Python Programming Lab	2
4	Induction and Synchronous Machines	3	9	Design Thinking & Innovation	2

1. K.K.Reddy

3. G. Venkat Reddy  
G. Venkat Reddy

5. I. Anil babu

7. Chakravarthy

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## ANNEXURE-III

### AMR- 24

### POWER SYSTEMS-I II-II (EE)

L	T	P	C
3	0	0	3

#### Course Objectives

Pre-requisite: Electrical Circuit Analysis

1. To study principle of operation of different components of a hydro and thermal power stations.
2. To study principle of operation of different components of a nuclear power stations
3. To study constructional and operation of different components of an Air and Gas Insulated substations.
4. To study different types of cables and distribution systems.
5. To study different types of load curves and tariffs applicable to consumers.
- 6.

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

1. Understand the different types of power plants, operation of power plants.
2. Describe the different components of air and gas insulated substations.
3. Discuss the construction of single core and three core cables and describe distribution system configurations
4. Analyse different economic factors of power generation and tariffs

#### SYLLABUS

##### UNIT- I Hydroelectric Power Stations:

Selection of site, general layout of a hydroelectric power plant with brief description of major components and principle of operation Thermal Power Stations: Selection of site, general layout of a thermal power plant. Brief description of components: boilers, super heaters, economizers and electrostatic precipitators, steam turbines: impulse and reaction turbines, condensers, feed water circuit, cooling towers and chimney.

##### UNIT- II Nuclear Power Stations:

Location of nuclear power plant, working principle, nuclear fission, nuclear fuels, nuclear chain reaction, nuclear reactor components: moderators, control rods, reflectors and coolants, types of nuclear reactors and brief description of PWR, BWR and FBR. Radiation: radiation hazards and shielding, nuclear waste disposal.

##### UNIT- III Substations:

Air Insulated Substations – indoor & outdoor substations, substations layouts of 33/11 kV showing the location of all the substation equipment. Bus bar arrangements in the sub stations: simple arrangements like single bus bar, sectionalized single bus bar, double bus bar with one and two circuit breakers, main and transfer bus bar system with relevant

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## ANNEXURE-IV

### AMR- 24

### INDUCTION AND SYNCHRONOUS MACHINES-II (EE)

#### Course Learning Objectives

Students will get exposure to understand the concepts of

1. characteristics, starting and testing methods of Induction Motor
2. torque production and performance of Induction Motor.
3. In determining the performance parameters of Induction Motor
4. working of synchronous machines

L	T	P	C
3	0	0	3

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

1. Explain the construction and operation of three-phase induction motor.
2. Analyse the performance of three-phase induction motor.
3. Describe the working of single-phase induction motors.
4. Analyse the performance of Synchronous generators and motors.

#### SYLLABUS

#### UNIT – I 3-phase induction motors:

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 inter- relationship –equivalent circuit – phasor diagram

#### UNIT – II Performance of 3-Phase induction motors:

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 – III Single Phase Motors:

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

#### UNIT – IV Synchronous Generator:

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 – V Synchronous Motor:

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P. Anil Babu
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7.   
S. Prasad ce. d. d. d.

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.

### Textbooks:

1. Electrical Machinery, Dr. P.S. Bhambra, Khanna Publishing, 2021, First Edition
2. Performance and analysis of AC machines by M.G. Say, CBS, 2002.

### Reference Books:

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

### Online Learning Resources:

1. [nptel.ac.in/courses/108/105/108105131](https://nptel.ac.in/courses/108/105/108105131)
2. <https://nptel.ac.in/courses/108106072>

1. K.K. Reddy

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3. G. M. Reddy

4. N.R.P.  
N. B. H. V. ANOESWAR

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6. R.R.

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## ANNEXURE-V

### AMR- 24

### CONTROL SYSTEMS II-II (EE)

L	T	P	C
3	0	0	3

#### Course Objectives:

1. To obtain the mathematical models of physical systems and derive transfer function
2. To determine the time response of systems and analyses system stability
3. To analyses system stability using frequency response methods.
4. To design compensators using Bode diagrams
5. To obtain the mathematical models of physical system and determine the response

#### Course Outcomes:

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

1. Derive the transfer function of physical systems and determine overall transfer function using block diagram algebra and signal flow graphs
2. Obtain the time response of first and specifications of second order systems and determine error constants. Analyze the absolute and relative stability of LTI systems using Routh's stability criterion and root locus method.
3. Analyze the stability of LTI systems using frequency response methods.
4. Design Lag, Lead, Lag Lag-Lead compensators to improve system performance using Bode Diagrams.
5. Apply state space analysis concepts to represent physical systems as state models, derive transfer function and determine the response. Understand the concepts of controllability and observability.

### SYLLABUS

#### UNIT – I Mathematical Modelling Of Control Systems:

Classification of control systems - open loop and closed loop control systems and their differences - Feedback characteristics - transfer function of linear system, differential equations of electrical networks- translational and rotational mechanical systems transfer function of Armature voltage-controlled DC servo motor block diagram algebra representation by signal flow graph – reduction using Mason's gain formula.

#### UNIT – II Time Response Analysis:

Standard test signals – time response of first and second order systems – time domain specifications - steady state errors and error constants - effects of proportional (P) proportional integral (PI) - proportional derivative (PD) proportional integral derivative (PID) systems.

Stability And Root Locus Technique: The concept of stability – Routh's stability criterion – limitations of Routh's stability, root locus concept – construction of root loci (simple problems) - Effect of addition of Poles and Zeros to the transfer function.

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## UNIT – III Frequency Response Analysis:

Introduction to frequency domain specifications – Bode diagrams – transfer function from the Bode diagram – Polar plots, Nyquist stability criterion- stability analysis using Bode plots (phase margin and gain margin).

## UNIT – IV Classical Control Design Techniques :

Lag, lead, lag-lead compensators - physical realization - design of compensators using Bode plots.

## UNIT – V State Space Analysis of LTI Systems:

Concepts of state - state variables and state model - state space representation of transfer function: Controllable Canonical Form Observable Canonical Form - Diagonal Canonical Form - diagonalization using linear transformation solving the time invariant state equations State Transition Matrix and its properties concepts of controllability and observability

## TEXT BOOKS: -

1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House 22nd, 2019.
2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2nd edition 2018

## Reference Books:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd. New Delhi 11th edition, 2024.
2. Fluid Mechanics by Frank M. White, Henry Xue, Tata McGraw Hill, 9th edition , 2022.
3. C. S. P. Ojha, R. Berndtsson and P. N. Chandarmouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
4. Introduction to Fluid Mechanics & Fluid Machines by S K Som, Gautam Biswas, S Chakraborty 3rd edition 2011

## Online Learning Resources:

1. <https://nptel.ac.in/courses/105105203>
2. <https://archive.nptel.ac.in/courses/112/106/112106300/>
3. <https://archive.nptel.ac.in/courses/112/103/112103249/>

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**ANNEXURE-VI**  
**AMR- 24**

**INDUCTION AND SYNCHRONOUS MACHINES LABII-II (EE)**

L	T	P	C
0	0	3	1.5

**Course Objectives:**

The objectives of this course is

- To apply the concepts of speed control methods in 3-phase Induction Motor.
- To experimentally develop circle diagram and obtain equivalent circuit to analyse the performance of 3-phase induction motor
- To apply the concepts of power factor improvement on single phase Induction Motor
- To perform various testing methods on alternators for experimentally predetermine the regulation.

**Course Outcomes:**

- At the end of the course, the student will be able to,
- CO1: Analyse the speed control methods on 3-phase Induction Motor.
- CO2: Evaluate the performance of 3-phase Induction Motor by obtaining the locus diagram and equivalent circuit of 3-phase Induction Motor
- CO3: Adapt the power factor improvement methods for single phase Induction Motor CO4: Pre-determine the regulation of 3-phase alternator
- CO5: Determine the synchronous machine reactance of 3-phase alternator.

**List of Experiments**

**Any 10 experiments of the following are required to be conducted**

1. Brake test on three phase Induction Motor.
2. Circle diagram of three phase induction motor.
3. Speed control of three phase induction motor by V/f method.
4. Equivalent circuit of single-phase induction motor.
5. Power factor improvement of single-phase induction motor by using capacitors.
6. Load test on single phase induction motor.
7. Regulation of a three -phase alternator by synchronous impedance &MMF methods.

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2. R. Simha Chalam      4. N. R. Reddy      6. R. Reddy

8. Determination of efficiency of three phase alternator by loading with three phase induction motor.
9. Regulation of three-phase alternator by Potier triangle method.
10. V and Inverted V curves of a three-phase synchronous motor.
11. Determination of  $X_d$ ,  $X_q$  & Regulation of a salient pole synchronous generator.
12. Parallel operation of three-phase alternator under no-load and load conditions.
13. Determination of efficiency of a single-phase AC series Motor by conducting Brake test.

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## ANNEXURE-VII

### AMR- 24

### CONTROL SYSTEMS LAB II-II(EE)

L	T	P	C
0	0	3	1.5

#### Course Objectives:

- To impart hands on experience to understand the performance of basic control system components such as magnetic amplifiers, D.C. servo motors, A.C. Servo motors and Synchro's.
- To understand time and frequency responses of control system with and without controllers and compensators.
- To know the different logic gates and Boolean expressions using PLC.

#### Course Outcomes:

- At the end of the course, the student will be able to,
- CO1: Analyze the performance of Magnetic amplifier, D.C and A.C. servo motors and synchro's.
- CO2: Design of PID controllers and compensators.
- CO3: Evaluate temperature control of an oven using PID controller
- CO4: Determine the transfer function of D.C Motor and examine the truth table of logic gates using PLC.
- CO5: Judge the stability in time and frequency domain and Kalman's test for controllability and observability.

#### List of Experiments

- Analysis of Second order system in time domain
- Characteristics of Synchro's
- Effect of P, PD, PI, PID Controller on a second order systems
- Design of Lag and lead compensation – Magnitude and phase plot
- Transfer function of DC motor
- Root locus, Bode Plot and Nyquist Plot for the transfer function of systems up to 5<sup>th</sup> order using MATLAB.

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7. Kalman's test of Controllability and Observability using MAT LAB.
8. Temperature controller using PID
9. Characteristics of magnetic amplifiers
10. Characteristics of AC servo motor
11. Characteristics of DC servo motor

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## ANNEXURE-VIII

### AMR- 24

## SKILL ENHANCEMENT COURSE: PYTHON PROGRAMMING LAB II-II(EE)

L	T	P	C
0	0	3	1.5

### Course Objectives:

The main objectives of the course are to

- Introduce core programming concepts of Python programming language.
- Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
- Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications using these objectives.

### UNIT-I:History of Python Programming Language

Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupiter Notebook  
Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments  
Reading Input, Print Output, Type Conversions, the type () Function and Is Operator  
Dynamic and Strongly Typed Language.  
Control Flow Statements: if statement, if-else statement, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

### Sample Experiments:

1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.
  - i) Arithmetic Operators
  - ii) Relational Operators
  - iii) Assignment Operators
  - iv) Logical Operators
  - v) Bit wise Operators
  - vi) Ternary Operator
  - vii) Membership Operators
  - viii) Identity Operators

1. Write a program to add and multiply complex numbers
2. Write a program to print multiplication table of a given number.

### UNIT-II:Functions:

Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, \*args and \*\*kwargs, Command Line Arguments.  
Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters inString by Index

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Number, String Slicing and Joining, String Methods, Formatting Strings. Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.

### Sample Experiments:

1. Write a program to define a function with multiple return values.
2. Write a program to define a function using default arguments.
3. Write a program to find the length of the string without using any library functions.
4. Write a program to check if the substring is present in a given string or not.
5. Write a program to perform the given operations on a list:
  - i. addition
  - ii. insertion
  - iii. slicing
6. Write a program to perform any 5 built-in functions by taking any list.

### UNIT-III: Dictionaries:

Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement. Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Frozen set.

1. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples.
2. Write a program to count the number of vowels in a string (No control flow allowed).
3. Write a program to check if a given key exists in a dictionary or not.
4. Write a program to add a new key-value pair to an existing dictionary.
5. Write a program to sum all the items in a given dictionary.

### UNIT-IV: Files:

Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python OS and path Modules. Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects,

### Sample Experiments:

1. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
2. Python program to print each line of a file in reverse order.
3. Python program to compute the number of characters, words and lines in a file.

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4. Write a program to create, display, append, insert and reverse the order of the items in the array.
5. Write a program to add, transpose and multiply two matrices.
6. Write a Python program to create a class that represents a shape. Include methods to calculate its area and perimeter. Implement subclasses for different shapes like circle, triangle, and square.

### Reference Books:

1. Gowri Shankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2<sup>nd</sup> Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

### Online Learning Resources/Virtual Labs:

1. <https://www.coursera.org/learn/python-for-applied-data-science-ai>  
<https://www.coursera.org/learn/python?specialization=python#syllabus>

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## ANNEXURE-IX AMR- 24

### DESIGN THINKING & INNOVATION

L	T	P	C
1	0	2	2

#### Course Objectives:

The objectives of the course are to

- Bring awareness on innovative design and new product development.
- Explain the basics of design thinking.
- Familiarize the role of reverse engineering in product development.
- Train how to identify the needs of society and convert into demand.
- Introduce product planning and product development process.

#### UNIT – I Introduction to Design Thinking

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

#### UNIT - II Design Thinking Process

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, customer, journey map, brainstorming, product development

**Activity:** Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

#### UNIT – III Innovation

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the impact and value of creativity.

**Activity:** Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

#### UNIT – IV Product Design

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies.

**Activity:** Importance of modeling, how to set specifications, Explaining their own product design.

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## UNIT – V Design Thinking in Business Processes

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining

Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.

**Activity:** How to market our own product, about maintenance, Reliability and plan for startup.

### Textbooks:

1. Tim Brown, Change by design, 1/e, Harper Bollin's, 2009.
2. Idris Mootee, Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014.

### Reference Books:

1. David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
2. Shruti N Shetty, Design the Future, 1/e, Norton Press, 2018.
3. Chesbrough, The era of open innovation, 2003.

### Online Learning Resources:

- <https://nptel.ac.in/courses/110/106/110106124/>
- <https://nptel.ac.in/courses/109/104/109104109/>
- [https://swayam.gov.in/nd1\\_noc19\\_mg60/preview](https://swayam.gov.in/nd1_noc19_mg60/preview)
- [https://onlinecourses.nptel.ac.in/noc22\\_de16/preview](https://onlinecourses.nptel.ac.in/noc22_de16/preview)

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