ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: TIRUPATI
AUTONOMOUS
AK 20 Regulations

Year: II   **Semester: III**   **Branch of Study: ECE and EEE**

Subject Code	Subject Name	L T P	Credits
20ABS9912	**Transform Techniques and Complex Variables**	**3 0 0**	**3**

Course Outcomes:
1) Find the differentiation and integration of complex functions used in engineering problems
2) Apply the Laplace transform for solving differential equations (continuous systems)
3) Find the Fourier series of periodic signals
4) Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
5) Develop Z transform techniques for discrete time systems

Unit I : Laplace transforms
Definition of Laplace transform, existence conditions, properties of Laplace transforms, inverse Laplace transforms, transforms of derivatives, transforms of integrals, multiplication by t^n, division by t, convolution theorem, periodic functions, unit step function, unit impulse function, applications to ordinary differential equations. (Without proofs)

Unit II: Fourier series
Dirichlet's conditions, Fourier series, conditions for a Fourier expansion, functions of any period, odd and even functions - half range series.

Unit III: Fourier transforms
Fourier integrals, Fourier cosine and sine integrals, Fourier transform, sine and cosine transform, properties, convolution theorem

Unit IV: Z-Transforms
Definition of Z-transform, elementary properties, linearity property, damping rule, shifting u_n to the right and left, multiplication by n, initial value theorem, final value theorem, inverse Z-transform, convolution theorem, formation of difference equations, solution of difference equations using Z-transforms.

Unit V : Complex Variables
Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate. Complex integration, Cauchy theorem (without proof), Cauchy integral formula (without proof), Taylor's series, zeros of analytic functions, singularities, Laurent's series, residues, Cauchy residue theorem (without proof).

Textbooks:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43/e, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.

References:
1. Dr.T.K.V Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N Prasad, Mathematics – II, S.Chand publications.

2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9/e, Wiley India, 2009.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India,1995.
4. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7/e, Mc-Graw Hill, 2004.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO2 : Analyse complex engineering problems	2.1	2.1.3
CO2	PO1: Apply the knowledge of mathematics	1.1	1.1.2
CO3	PO1: Apply the knowledge of mathematics	1.1	1.1.2
CO4	PO1: Apply the knowledge of mathematics	1.1	1.1.2
CO5	PO1: Apply the knowledge of mathematics	1.1	1.1.2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY ANDSCIENCES, TIRUPATI (AUTONOMOUS)

Year: II   Semester: III   Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0201	ELECTRICAL CIRCUITS - I	3	0	0	3

COURSE OUTCOMES:

1. Given a network, find the equivalent impedance by using network reduction techniques and determine thecurrentthroughanyelementandvoltageacrossandpowerthroughanyelement.
2. Given a circuit and the excitation, determine the real power, reactive power ,power factor etc.
3. Apply the network theorems suitably.
4. Determine the Dual of the Network, develop the Cut Set and Tie-set Matrices for a given Circuit. Also understand various basic definitions and concepts.

UNIT- 1 INTRODUCTION TO ELECTRICAL & MAGNETIC CIRCUITS
Electrical Circuits: Circuit Concept – Types of elements - Source Transformation-Voltage - Current RelationshipforPassiveElements. Current division and voltage division ruleKirchhoff'sLaws–NetworkReductionTechniques-Series,Parallel,Series Parallel, Star-to-Delta or Delta-to-Star Transformation.Examples
Definitions – Graph – Tree, Basic Cutset and Basic Tieset Matrices for Planar Networks – Loop and Nodal Methods of Analysis of Networks & Independent Voltage and Current Sources – Duality & Dual Networks. Nodal Analysis, Mesh Analysis

UNIT- 2 MAGNETIC CIRCUITS
Magnetic Circuits: Faraday's Laws of Electromagnetic Induction-Concept of Self and Mutual Inductance-Dot Convention-Coefficient of Coupling-Composite Magnetic Circuit-Analysis of Series and Parallel Magnetic Circuits, MMF Calculations.

UNIT- 3 SINGLE PHASE A.C CIRCUITS
R.M.S, Average Values and Form Factor for Different Periodic Wave Forms – Sinusoidal Alternating Quantities – Phase and Phase Difference – Complex and Polar Forms of Representations, j-Notation, Steady State Analysis of R, L and C (In Series, Parallel and Series Parallel Combinations) with Sinusoidal Excitation- Resonance - Phasor diagrams - Concept of Power Factor- Concept of Reactance, Impedance, Susceptance and Admittance-Apparent Power, Active and Reactive Power, Examples.

UNIT- 4 NETWORK THEOREMS
Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millmann's, Tellegen's, and Compensation Theorems for D.C and Sinusoidal Excitations.

UNIT- 5 THREE PHASE A.C. CIRCUITS

Introduction - Analysis of Balanced Three Phase Circuits – Phase Sequence- Star and Delta Connection - Relation between Line and Phase Voltages and Currents in Balanced Systems - Measurement of Active and Reactive Power in Balanced and Unbalanced Three Phase Systems. Analysis of Three Phase Unbalanced Circuits - Loop Method - Star Delta Transformation Technique – for balanced and unbalanced circuits - Measurement of Active and reactive Power – Advantages of Three Phase System.

TEXT BOOKS:

1. FundamentalsofElectricCircuitsCharlesK.AlexanderandMatthew.N.O.Sadiku,McGraw Hill,5th Edition, 2013.
2. EngineeringcircuitanalysisWilliamHaytandJackE.Kemmerly, McGrawHillCompany,7th Edition, 2006.

REFERENCE BOOKS:

1. CircuitTheoryAnalysis&Synthesis A. Chakrabarti,DhanpatRai&Sons,7thRevisedEdition,2018.
2. Network Analysis M.E Van Valkenberg, Prentice Hall (India), 3rd Edition,1999.
3. ElectricalEngineeringFundamentalsV.DelToro,PrenticeHallInternational,2ndEdition,2019 .
4. Electric Circuits- Schaum's Series, Mc Graw Hill, 5th Edition,2010.
5. ElectricalCircuitTheoryandTechnologyJohnBird,Routledge,Taylor&Francis,5thEdition,2 014.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
CO2	PO1: Engineering knowledge	1.3	1.3.1
CO3	PO2: Problem analysis	2.4	2.4.1
CO4	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY ANDSCIENCES, TIRUPATI
(AUTONOMOUS)
Year: II   Semester: III   Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0401	ELECTRONIC DEVICES & CIRCUITS	3	0	0	3

Course Outcomes:
CO1: Understand the operation of diodes and special electronic devices.
CO2: Know operation of different rectifiers without and filters.
CO3: Understand construction, operation of BJT, FET in different configurations
CO4: Know the need of biasing and design of DC biasing circuits.
CO5: Design of amplifiers with BJTs and FETs by using small signal model

UNIT I:
PN JUNCTION DIODE & SPECIAL DIODE CHARACTERISTICS
Review of semiconductor Physics: Intrinsic &Extrinsic Semiconductors and their Fermi Levels, Open circuited p-n junction, Biased p-n junction, Current components in PN junction Diode, Diode Equation, V-I characteristics of p-n junction diode, Temperature dependence on V-I characteristics, Diode resistance, Diode capacitance.
Special Electronic Devices: Construction, Operation, V-I Characteristics of Zener diode, Breakdown mechanisms, Zener diode applications, Varactor diode, Tunnel diode, SCR, UJT.

UNIT II:
RECTIFIERS & FILTERS
Rectifiers: Introduction to DC Power supply, Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, derivations of rectifier parameters, Rectifier circuits-Operation, Input and Output waveforms.
Filters: Capacitor filter, Inductor filter, L-section filter, π-section filter, Multiple L-section and Multiple π section filter, comparison of various filter circuits in terms of ripple factors.

UNIT III:
TRANSISTOR CHARACTERISTICS
BJT: Bi-polar Junction Transistor, Transistor current components, Transistor as an amplifier, Transistor equation, Transistor configurations, Input- Output Characteristics of Transistor in Common Base, Common Emitter and Common Collector configurations, Punch through-Reach through, Photo transistor, Typical transistor junction voltagevalues.
FET: BJT Versus FET, Junction Field Effect Transistor JFET Types, Construction, Operation, parameters, Drain and Transfer characteristics, MOSFET Types -Enhancement and Depletion Types-Construction, Operation, Characteristics.

UNIT IV:

TRANSISTOR BIASING & THERMAL STABILIZATION

Need for biasing, operating point, Load line analysis, BJT biasing-Methods, Basic stability Fixed bias, Collector to base bias, Self-bias, Stabilization against variations in V_{BE}, I_C, and β, stability factors, (S', S'', S'''), Bias compensation, Thermal runaway, Thermal stability.

UNIT V:

SMALL SIGNAL LOW FREQUENCY TRANSISTOR AMPLIFIER MODELS

BJT: Two port network, Transistor hybrid model, determination of h-parameters, generalized analysis of transistor amplifier model using h-parameters, analysis of CB, CE and CC amplifiers using exact analysis, approximate hybrid model, analysis of CB, CE and CC amplifiers using approximate hybrid model, Comparison of transistor amplifiers.

FET: Generalized analysis of small signal model, analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

Text Books:

1. David A. Bell, "Electronic Devices and Circuits", 5th Edition, Oxford University Press,2015.
2. Thomas L. Floyd, "Electronic Devices", 9th Edition, Pearson Education,2013
3. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices & Circuit Theory", 11th Edition, Pearson Education, 2013.

Reference Books:

1. Donald Neamen, "Electronic Circuits: Analysis and Design", 3rd Edition, McGraw-Hill Education,2011.
2. Muhammad Rashid, "Microelectronic Circuits: Analysis & Design", 2nd Edition, Cengage Learning, 2010.
3. S. Salivahanan, N. Suresh Kumar, "Electronic Devices and Circuits", 4th Edition, McGraw-Hill Education,2017.

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO2	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO3	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO4	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO5	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1

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Year: II   Semester: III   Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0202	**Power Systems – I**	3	0	0	3

Course Outcomes:
CO1: Acquire knowledge on thermal, gas and nuclear power plants operation.
CO2: Understand the operation of AC and DC distribution systems.
CO3: Understand the operation of Air Insulated & Gas Insulated (GIS) Substations.
CO4: Familiarize with voltage control and power factor improvement techniques.
CO5: Analyze economic aspects of power generation and different types of tariff methods.

UNIT-I:
Power Stations:
Thermal Power Station: Brief description of thermal power plant components - Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gasses.

Nuclear Power Stations: Nuclear Fission and Chain reaction, Nuclear fuels, Principle of operation of Nuclear reactor, Reactor Components-Moderators, Control rods, Reflectors and Coolants, Radiation hazards- Shielding and Safety precautions, Types of Nuclear reactor sand brief description of PWR, BWR and FBR.
Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only).

UNIT-II:
General Aspects of D.C & A.C Distribution Systems: Bulk Power Grids and Micro-grids. Transmission and Distribution Systems: Line diagrams, transmission and distribution voltage levels and topologies (meshed and radial systems). Synchronous Grids and Asynchronous (DC) interconnections. Classification of Distribution Systems - Comparison of DC vs. AC and Under-Ground vs. Over - Head Distribution Systems.

UNIT-III:
Air Insulated & Gas Insulated (GIS) Substations: Classification of substations: - Indoor & Outdoor substations: Substations layout 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, main and transfer bus bar system with relevant diagrams. Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

UNIT-IV:

Power Factor & Voltage Control: Causes of low power factor -Methods of Improving power factor -Phase advancing and generation of reactive KVAR using static Capacitors-Most economical power factor for constant KW load and constant KVA type loads, Numerical Problems. Methods of Voltage Control: Shunt Capacitors, Series Capacitors, Synchronous Capacitors, Tap changing and Booster Transformers**.**

UNIT-V:

Economic Aspects of Power Generation&Tariff: Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors- Numerical Problems. Costs of Generation and their division into Fixed, Semi-fixed and Running Costs.

Desirable Characteristics of a Tariff Method-Tariff Methods: Flat Rate, Block- Rate, two-part, three –part, and power factor tariff methods and Numerical Problems.

TEXT BOOKS:

1. Principles of Power Systems by V. K Mehta and Rohit Mehta, S. Chand Company Pvt. Ltd, New Delhi2004.
2. Electrical Power Systems, PSR. Murty, BS Publications.

REFERENCE BOOKS:

1. A Text book of Power system Engineering, R. K. Rajput, Laxmi Publications (P)Limited.
2. Electrical Power Generation, Transmission and Distribution, S.N.Singh.,PHI.
3. Electrical Power Systems by C.L.Wadhawa New Age International(P) Limited, Publishers.
4. Generation of Electrical Energy, Dr. B. R. Gupta, S.Chand.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1:Engineering knowledge	1.3	1.3.1
CO2	PO1: Engineering knowledge	1.3	1.3.1
CO3	PO2: Problem analysis	2.4	2.4.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO1:Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO5	PO4: Conduct investigations of complex problems	4.3	4.3.1

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Year: II   Semester: III   Branch: EEE

Course Code	Course Title	L	T	P	Credits
20APC0203	Electrical Machines-I	3	0	0	3

COURSE OUTCOMES:

CO1: Apply the concepts of magnetic circuits to compute induced EMF and force in Electro-magnetic systems.
CO2: Analyze the operation, conditions required of self excitation of DC Generators and parallel operation of DC Generators.
CO3: Distinguish the operation of various dc motors and determine the performance of DC machine using the results of tests.
CO4: Explain the principle, constructional features and evaluate the performance characteristics of single-phase transformers by conducting various tests.
CO5: Analyze the operations of Auto Transformer, Three Phase Transformer and parallel operation of Transformers.

UNIT-I: **Electromechanical Energy Conversion:**
Electromechanical Energy Conversion - Forces and torques in magnetic field system, Energy balance, singly excited and multiple excited magnetic systems, MMF, Flux, Reluctance, Series and Parallel Magnetic Circuits, B-H curve of magnetic materials.

UNIT-II: **DC Generators:**
Constructional details of a DC machine, principle of operation, armature windings and its types, EMF equation, armature reaction and its effects, commutation, methods of improving commutation, methods of excitation and classification of DC Generators, voltage build-up in a shunt generator, critical field resistance and critical speed, generator characteristics, parallel operation of DC shunt and series generators, applications of DC Generators.

UNIT-III: **DC Motors:**
Principle of operation, significance of back EMF, torque equations, types of DC Motors, characteristics, speed control of DC Motors, necessity of starter, 3-point and 4- point starters, Losses and efficiency, applications of DC Motors.
Testing of DC machines: Brake test, Swinburne's test, Hopkinson's test, Fields test, Separation of iron and frictional losses.

UNIT-IV :**Transformers:**
Constructional features, principle of operation, EMF equation, ideal transformer, transformer on No load and ON load and its phasor diagrams, equivalent circuit, voltage regulation, losses and efficiency. Testing of transformer - polarity test, open circuit and short circuit tests, Sumpner's test, separation losses.

UNIT-V:
Parallel operation of single-phase transformers, Autotransformers - construction, principle, applications and comparison with two winding transformer.
Three-phase transformer– construction, types of connection and their comparative features, Phase conversion - Scott connection, three-phase to six-phase conversion.

TEXT BOOKS:

1. P.S. Bimbhra, Electrical Machinery, Khanna Publishers, 7th Edition, Delhi, 2011.
2. R.K. Rajput, Electrical Machinesin S.I. Units, Laxmi Publications (P) Ltd, 6th Edition, New Delhi, 2017.
3. JB Gupta, Theory and performance of Electrical Machines(DC machines, Poly phase Circuits & AC machines) in SI Units, S.K. Kataria& Sons, New Delhi, 15th Edition, 2015.

REFERENCE BOOKS:

1. Electrical Machines by U ABakshi and M V Bakshi, Technical Publications.
2. B.L. Theraja and A.K. Theraja, *A Text Book of Electrical Technology (in S. I. Units)*, Vol.2, S. Chand & Company Ltd, Multicolour illustrative Edition, New Delhi, 2014.

ADDITIONAL LEARNING RESOURCES:

1. http://www.nptelvideos.in/2012/11/electrical-machines-i.html
2. https://nptel.ac.in/courses/108/102/108102146/
3. https://freevideolectures.com/course/3085/electrical-machines-i
4. https://www.youtube.com/playlist?list=PL9RcWoqXmzaJpnkjoNleyFNgGk9-znOji

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
CO2	PO1: Engineering knowledge	1.3	1.3.1
CO3	PO2: Problem analysis	2.4	2.4.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO5	PO4: Conduct investigations of complex problems	4.3	4.3.1

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Year: II   Semester: III   Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0204	**ELECTRICAL CIRCUITS-I LAB**	**0**	**0**	**3**	**1.5**

COURSE OUTCOMES:
1. Remember, understand and apply various theorems and verify practically.
2. Understand and analyze active, reactive power measurements in three phase balanced & un balanced circuits.

List of Experiments:
1. Verification of Ohm law.
2. Verification of KVL and KCL.
3. Verification of Mesh and Nodal Analysis.
4. Verification of Thevenin's and Norton's Theorems
5. Verification of Superposition Theorem for average and RMS values.
6. Maximum Power Transfer Theorem for DC circuits.
7. Verification of Reciprocity Theorem for DC circuits.
8. Verification of Compensation Theorem for DC circuits.
9. Verification of, Millmann's Theorems for DC circuits
10. Determination of Self, Mutual Inductances and Coefficient of Coupling.
11. Measurement of Active Power for Star Connected Balanced Loads.
12. Measurement of Reactive Power for Star Connected Balanced Loads.
13. Measurement of Active Power for Delta Connected Balanced Loads.
14. Measurement of Reactive Power for Delta Connected Balanced Loads.

REFERENCE BOOKS:
1. Circuit Theory Analysis & Synthesis A. Chakrabarti, DhanpatRai&Sons,7th Revised Edition,2018.
2. Network Analysis M.E Van Valkenberg, Prentice Hall (India), 3rd Edition,1999.
3. Electrical Engineering Fundamentals V. Del Toro, Prentice Hall International, 2nd Edition, 2019
4. Electric Circuits- Schaum's Series, Mc Graw Hill, 5th Edition,2010.
5. Electrical Circuit Theory and Technology John Bird, Routledge, Taylor & Francis, 5th Edition,2014.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
			2.3.2
CO1	PO1: Engineering knowledge	1.3	1.3.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO2	PO4: Conduct investigations of complex problems	4.3	4.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI (AUTONOMOUS)

Year: II   **Semester: III**   **Branch of Study: EEE**

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0404	**ELECTRONIC DEVICES & CIRCUITSLAB**	**0**	**0**	**3**	**1.5**

Course Outcomes:
CO1: Test and operate diodes and special electronic devices.
CO2: Construct and operate rectifiers without and with filters.
CO3: Construct and operate BJT, FET in different configurations.
CO4: Design DC biasing circuits for Transistors.
CO5: Design amplifiers using BJTs and FETs.

LIST OF EXPERIMENTS:
1. PN Junction Diode Characteristics
2. Zener Diode Characteristics and Zener Diode as Voltage Regulator.
3. Rectifiers (With and Without Filter).
4. BJT Characteristics (CB Configuration).
5. BJT Characteristics (CE Configuration).
6. FET Characteristics (CS Configuration).
7. SCR Characteristics
8. Transistor Biasing
9. BJT-CE Amplifier
10. Emitter Follower-CC Amplifier
11. FET-CS Amplifier
12. UJT Characteristics

EQUIPMENT REQUIRED FOR LABORATORY
1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components
10. Bread Boards
11. Connecting Wires
12. CRO Probes etc.

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.3	1.3.1
CO2	PO 2: Problem analysis	2.3	2.3.1
CO3	PO 2: Problem analysis	2.3	2.3.1
CO4	PO 3: Design/Development of solutions	3.3	3.3.1
CO5	PO 3: Design/Development of solutions	3.3	3.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY &SCIENCES::TIRUPATI
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Year: II	Semester: III			Branch: EEE	
Course Code	**Course Title**	**L**	**T**	**P**	**Credits**
20APC0205	**Electrical Machines-I Lab**	**0**	**0**	**3**	**1.5**

Course Outcomes:
1. Conduct and analyze load test on DC shunt generator.
2. Understand and analyze magnetization characteristics of DC shunt generator.
3. Understand and analyze speed control techniques and efficiency of DC machines.
4. Understand to predetermine efficiency and regulation of single-phase Transformers.

List of Experiments:
Minimum ten experiments from the following list are required to be conducted
1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
2. Load test on DC shunt generator. Determination of characteristics.
3. Brake test on DC shunt motor. Determination of performance curves.
4. Swinburne's test on DC shunt motor, Predetermination of efficiency.
5. Speed control of DC shunt motor (Armature control and Field control method).
6. Hopkinson's tests on DC shunt machines. Predetermination of efficiency.
7. OC and SC test on single phase transformer.
8. Parallel operation of single phase transformers.
9. Sumpner's test on single phase transformers.
10. Load test on DC long shunt compound generator. Determination of characteristics.
11. Load test on DC short shunt compound generator. Determination of characteristics.
12. Separation of losses in DC shunt motor.
13. Separation of losses of single phase transformer

References:
D. P. Kothari and B. S. Umre, Laboratory Manual for Electrical Machines, I.K International Publishing House Pvt. Ltd., 2017
Online Learning Resources/Virtual Labs:
http://em-coep.vlabs.ac.in/List%20of%20experiments.html?domain=Electrical Engineering
http://vlabs.iitb.ac.in/vlabs- dev/vlab_bootcamp/bootcamp/Sadhya/experimentlist.html

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO2	PO2: Problem analysis	2.3	2.3.1
			2.3.2
CO3	PO1: Engineering knowledge	1.3	1.3.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO4: Conduct investigations of complex problems	4.3	4.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI (AUTONOMOUS)
AK20 Regulations

II B. Tech   **Semester-III**   **Branch: EEE**

Subject Code	Subject Name	L	T	P	Credit
20AHE9902	**Principles of Effective Public Speaking**	2	0	0	**2**

Course Outcomes:
Students will be able to:
 1. Apply knowledge of principles, concepts and skills learned in speech preparation.
 2. Develop skills in effective listening.
3. Evaluate the delivery of speeches.
4. Develop skills in speech composition.
5. Use supporting materials and presentation aids in speech preparation.

Syllabus

Unit -1
Introduction to Public Speaking:
  Basic communication concepts, processes, and models Communication concepts and principles and public speaking Steps and methods of speech preparation; Ethics in public speaking

Unit -2
Listening and Speech Criticism:
  Effective listening, the listening process, and types of listening; Listening barriers; Identifying and improving listening styles; Evaluating speech and effective speech techniques.

Unit -3
Selecting Topic and Knowing your Audience:

  Identifying sources; Tools and techniques for selecting and refining speech topics; Identifying speech purposes; Central idea statement; The central idea; Audience analysis techniques.

Unit – 4
Speaking with a Purpose:
Informative, persuasive, and ceremonial speeches

Unit:5
Delivering your speech and using Visual Aids.

  The mechanics of verbal and nonverbal communication in speech delivery; Modes of speech delivery; Speaking style and language; Effective delivery techniques; Incorporating presentation aids

References:

1. DeVito, J.A. (2009). The Essential Elements of Public Speaking. (3rd ed.) Boston: Pearson Education, Inc.

2. Lucas, S.E. (2009). The Art of Public Speaking. (10th ed.) New York: McGraw - Hill Co.

3. Zarefsky, D. (2011). Public Speaking: Strategies for Success. (6th ed. Boston: Pearson Education, Inc).

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.2.2
CO2	PO10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.2.1
CO3	PO9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	9.2	9.2.1
CO4	PO10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.2.2
CO5	PO10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.3	10.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI

(Autonomous)

Year: II B.Tech   Semester: III   Branch: Common to All

Subject Code	Subject Name	L	T	P	Credits
20AMC9903	Environmental Studies	3	0	0	0

Course Outcomes

1. Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
2. Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning.
3. Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
4. . Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
5. To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting

UNIT – I

18Hr

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

Natural Resources: Renewable and non-renewable energy 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 and sub-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, fertilizer-pesticides problems, water logging, salinity, case studies.

Energy resources: Renewable and non-renewable energy resources.

UNIT – II   **20Hr**

Ecosystems: Concept of an ecosystem. – Structure and functions of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Biodiversity And Its Conservation : Introduction- Definition: genetic, species and ecosystem diversity – 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-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man – wildlife conflicts – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III   **10Hr**

Environmental Pollution: Definition, Causes, effects and its control measures of : Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards.

Solid Waste Management: Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone, Tsunami and landslides.

UNIT – IV   **15Hr**

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting and watershed management – Resettlement and rehabilitation of people – Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies– Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Public awareness.

UNIT – V   **10Hr**

Human Population and the Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

TEXT BOOKS:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Kaushik, New Age Publishers.
3. Environmental Studies by Sri Krishna Hitech publishing Pvt. Ltd.

REFERENCES:

1. Environmental studies by R.Rajagopalan, Oxford University Press.

2. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.

3. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.

4. Environmental studies by A. Ravi Krishnan, G. Sujatha Sri Krishna Hitech publications.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO:1	PO1:Apply the knowledge of Basic science	1.2	1.2.1
CO:2	PO1:Apply the knowledge of Basic science	1.2	1.2.1
CO:3	PO1:Apply the knowledge of Basic science	1.2	1.2.1
CO:4	PO1:Apply the knowledge of Basic science	1.2	1.2.1
CO:5	PO1:Apply the knowledge of Basic science	1.2	1.2.1