B.TECH - R15 REGULATIONS

CHOICE BASED CREDIT COURSES (INTER DEPARTMENT)

OFFERED

IN

II YEAR I SEMESTER

w.e.f.

2015 ADMITTED BATCH

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (AUTONOMOUS) :: PULIVENDULA

PULIVENDULA – 516390, Y.S.R. (DIST), ANDHRA PRADESH, INDIA

ANNEXURE-I

Choice Based Credit Course of Inter Department
offered in
B.TECH II YEAR I SEMESTER

BRANCH	SUBJECT CODE	SUBJECT NAME
PHYSICS	15ABS12	Basics of Nano Science and Nano Technology
MATHEMATICS	15ABS14	Set Theory and Mathematical Logic
	15ABS23	Mathematical Modeling
CHEMISTRY	15ABS15	Green Chemistry and Catalysis for Sustainable Environment
	15ABS16	Instrumental Methods of Chemical Analysis
	15ABS17	Chemistry of Nano Material and Application
ENGLISH	15AHS08	Campus Recruitment Training & Soft Skills
	15AHS09	Competitive & Spoken English
CE	15ACE09	Green Buildings
	15ACE10	Disaster Management and Mitigation
	15ACE11	Water Harvesting and Conservation
ECE	15AEC08	Basic Electronics
	15AEC09	Fundamentals of Digital Electronics
	15AEC10	Electronic Measurements & Instrumentation
ME	15AME11	Robotics
	15AME12	Mechanical Manufacturing Process
	15AME13	Non-Conventional Sources of Energy
EEE	15AEE08	Principles of electrical engineering
	15AEE01	Electrical engineering materials
	15AEE09	Electrical measuring instruments
CSE	15ACS04	Data Structures
	15ACS11	Object oriented Programming
	15ACS08	Operating Systems

II B.Tech – I Sem

15ABS12-Basics of Nano science and Nanotechnology

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

OBJECTIVES:

1. To understand the fundamentals of nanoscience and nanotechnology
2. To give a general introduction to different classes of nanomaterials
3. To impart basic knowledge on various synthesis and characterization techniques involved in Nanotechnology
4. To make the learner familiarize with nanotechnology potentialities.

Unit-I Basics of Nanoscience:

Introductory quantum mechanics for nano science- Historical back ground of nanoscience - Density of states for zero, one, two and three dimensional materials, Quantum confinement, Quantum wells, wires, dots, Factors affecting to particle size, Metal semiconductor (MS) and metal insulator (MI).

Unit-II Properties of Nanomaterials:

Mechanical, Thermal, Electrical, Optical, Magnetic and Structural properties, Carbon based materials- Fabrication, structure, electrical properties and mechanical properties.

Unit-III Synthesis of Nanomaterials:

Physical methods: Bottom up-Ball Milling, Physical vapour deposition, Laser pyrolysis, Sputter deposition.

Chemical methods: Hydrothermal, Sol-gel method, solution combustion method, Co-precipitation method.

Unit-IV Characterization:

Spectroscopic techniques: UV- Visible Spectroscopy, Fourier Transform infrared (FTIR) spectroscopy, Principles and analysis of X-ray diffraction (XRD); electron diffraction, Scanning Electron Microscope (SEM) – Transmission Electron Microscope (TEM).

Unit –V Applications:

Nano engineered materials – coatings – catalysts - nano scale thin films for water-repellent, antireflective and self cleaning surfaces. Communication systems, solar cells and energy storage applications.

TEXT BOOKS

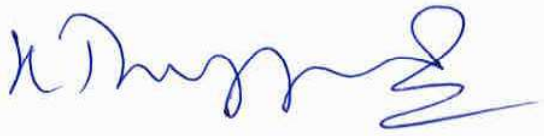
1. ***A Textbook of Nanoscience and Nanotechnology,*** Pradeep T.,Tata Mc Graw Hill Education Pvt. Ltd., 2012.
2. Introduction to Nano Technology, Charles P. Poole Jr & Frank J. Owens. John Wiley and Sons, 2003.
3. The Chemistry of nanomaterials: Synthesis, Properties and Applications, C.N.R. Rao, A. Muller and A.K. Cheetham, Vol – 1, Wiley Online Library, 2005.
4. The Physics of Micro/Nano- Fabrication, Ivor Brodie & Julius J.Muray, Springer, 1992.

REFERENCES

1. ***Nanoscience: Nanotechnologies and Nanophysics,*** Dupas C., Houdy P., Lahmani M., Springer-Verlag Berlin Heidelberg, 2007.
2. Quantum Physics, A. Ghatak & S. Lokanathan, 5th Edition, Mac Millan India, 2004.
3. Nanophysics and Nanotechnology, Edward L. Wolf, Wiley-VCH, 2006.
4. Elements of X-ray Diffraction, B.D.Cullity, Addision Wesely, 1978.
5. Concise Encyclopedia of Materials Characterization, Robert Cahn, 2nd Edition (Advances in Materials Science and Engineering), Elsevier Publication, 2005.

Outcomes:

- Students will have the exposure to the multidisciplinary area of nanoscience.
- The necessary foundation for advanced materials engineering subject.
- Familiarity about the necessary characterization tools for nanoscale.
- Overview on the importance of nanoscience and nanotechnology through recent applications.



II B.Tech – **I Sem**

15ABS14- SET THEORY AND MATHEMATICAL LOGIC

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objectives:

- This course aims at providing the student with the concepts of statements, sets relations and Mathematical induction.

UNIT – I

Statement, truth values, negation, conjunction, disjunction, conditional and biconditional, contrapositive statement.

UNIT – II

Set, subset, superset, operations viz. union, intersection, complement etc. of sets; power set, cartesian product.

UNIT – III

Equivalence relations, equivalence classes, partition, fundamental theorem of equivalence relation, partial order relation, Poset, chain, upper & lower bounds in poset, greatest & least elements, maximal & minimal elements, supremum & infimum, Zorn's lemma, introduction to lattice theory. Functions, injection, surjection and bijection; image and pre-image of set under function and inverse mapping, composite mapping.

UNIT – IV

Peano's axioms, principle of mathematical induction, well ordering principle, axiom of choice.

UNIT – V

Finite and infinite sets, countable and uncountable sets, Schroeder Bernstein Theorem, Continuum hypothesis.

TEXT BOOKS:

1. P. R. Halmos, Naive Set Theory Springer, 2009.
2. Bartle, R. G. and Sherbert, D. R. Introduction to Real Analysis, (John Wiley and Sons, Third (Indian) Edition), 2007.

REFERENCES:

1. K. Hrbacek and T. Jech, Introduction to Set Theory , 3rd edition, CRC press, 1999.

Outcomes: The student will be able to analyze the Mathematical logical structures with the concepts of statements, sets, relations and Mathematical Induction.

9.7.18

II B.Tech – **I Sem**

15ABS23-Mathematical Modeling
(Choice based Credit Course)

L	T	P	C
3	1	0	3

Objectives:

- This course aims at providing the basic knowledge to understand a Mathematical model and formulate a Mathematical model related to a real word problems of engineering, biological science etc.

UNIT – I

Mathematical Modeling: Need, Techniques, Classifications and Simple illustarations,
Mathematical modeling Through Ordinary differential equations of First Order :
Mathematical modeling Through differential equations; Linear growth and decay models; Non-Linear Growth and Decay models; Mathematical modeling in dynamics through ordinary differential equations of first order.

UNIT – II

Mathematical modeling Through System of Ordinary differential equations of First Order: Mathematical modeling in population dynamics; Mathematical modeling of Epidemics through system of ordinary differential equations of first order; Compartment models through Systems of ordinary differential equations; Mathematical modeling in dynamics through systems of ordinary differential equations of first order.

UNIT – III

Mathematical modeling Through Ordinary differential equations of Second Order: Mathematical modeling of Planetary motion ; Mathematical modeling of Circular motion and motion of satellites; Mathematical modeling through linear differential equations of second order.

UNIT – IV

Mathematical modeling Through Difference equations : Need for Mathematical modeling Through Difference equations and simple models; Basic theory of Linear difference equations with constant coefficients; Mathematical modeling Through Difference equations in population dynamics and genetics; Mathematical modeling Through Difference equations in Probability theory.

UNIT – V

Mathematical modeling Through Functional, Integral, Delay- Differential and Differential-Difference Equations: Mathematical modeling Through Functional equations;
Mathematical modeling Through Integral equations; Mathematical modeling Through Delay-Differential and Differential-Difference Equations.

TEXT BOOKS:

1. J. N. Kapoor. Mathematical Modeling, NEW AGE INTERNATIONAL PUBLISHERS.

REFERENCES:

1. A. C. Fowler. Mathematical Models in Applied Sciences, Cambridge University Press.

Outcomes: The student will be able to analyze the real word problem through the technique of modeling of that problem to have better insight of the real word problem.

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II B.Tech – I Sem

15ABS15-GREEN CHEMISTRY AND CATALYSIS FOR SUSTAINABLE ENVIRONMENT

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- Learn an interdisciplinary approach to the scientific and societal issues arising from industrial chemical production, including the facets of chemistry and environmental health sciences that can be integrated to promote green chemistry and the redesign of chemicals, industrial processes and products.
- Understand the use of alternatives assessments that combine chemical, environmental health, regulatory, and business considerations to develop safer products.

UNIT 1: Principles And Concepts Of Green Chemistry

Introduction, Green chemistry Principles, sustainable development and green chemistry, atom economy, atom economic: Rearrangement and addition reactions and un-economic reactions: Substitution, elimination and Wittig reactions, Reducing Toxicity. Waste - problems and Prevention: Design for degradation, Polymer recycling.

UNIT 2: Catalysis And Green Chemistry

Introduction to catalysis, Heterogeneous catalysts: Basics of Heterogeneous Catalysis, Zeolites and the Bulk Chemical Industry, Heterogeneous Catalysis in the Fine Chemical and Pharmaceutical Industries, Catalytic Converters, Homogeneous catalysis: Transition Metal Catalysts with Phosphine Ligands, Greener Lewis Acids, Asymmetric Catalysis, Heterogenising the Homogenous catalysts, Phase transfer catalysis: Hazard Reduction, C–C Bond Formation, Oxidation Using Hydrogen Peroxide, Bio-catalysis and photo-catalysis with examples.

UNIT 3: Organic Solvents: Environmentally Benign Solutions

Organic solvents and volatile organic compounds, solvent free systems, supercritical fluids: Super critical carbondioxide, super critical water and water as a reaction solvent: water based coatings, Ionic liquids as catalyst and solvent.

UNIT 4: Emerging Greener Technologies And Alternative Energy Sources

Biomass as renewable resource, Energy: Fossil Fuels, Energy from Biomass, Solar Power, Other Forms of Renewable Energy, Fuel Cells, Chemicals from Renewable feedstocks: Chemicals from Renewable Feedstocks: Chemicals from Fatty Acids, Polymers from Renewable Resources, Some Other Chemicals from Natural Resources, Alternative Economies: The Syngas Economy, The Biorefinery, Design for energy efficiency: Photochemical Reactions: Advantages of and Challenges Faced by Photochemical

Processes, Examples of Photochemical Reactions, Chemistry Using Microwaves: Microwave Heating, Microwave-assisted Reactions, Sonochemistry: Sonochemistry and Green Chemistry, Electrochemical Synthesis: Examples of Electrochemical Synthesis. Industrial applications of alternative environmentally benign catalytic systems for carrying out the important reactions such as selective oxidation, reduction and C-C bond formations (specific reactions).

UNIT 5: Green Processes For Green Nanoscience

Introduction and traditional methods in the nanomaterials synthesis, Translating green chemistry principles for practicing Green Nanoscience. Green Synthesis of Nanophase Inorganic Materials and Metal Oxide Nanoparticles: Hydrothermal Synthesis, Reflux Synthesis, Microwave-Assisted Synthesis, Other methods for Green synthesis of metal and metal oxide nanoparticles, Green chemistry applications of Inorganic nanomaterials

Text Books :

1. M. Lancaster, Green Chemistry an introductory text, Royal Society of Chemistry, 2002.
2. Paul T. Anastas and John C. Warner, Green Chemistry Theory and Practice, 4th Edition,

   Oxford University Press, USA

References :

1. Green Chemistry for Environmental Sustainability, First Edition, Sanjay K. Sharma and Ackmez Mudhoo, CRC Press, 2010.
2. Edited by Alvise Perosa and Maurizio Selva , Hand Book of Green chemistry Volume 8:

   Green Nanoscience, wiley-VCH, 2013.

Course Outcomes:

Upon completion of this course the students should recognize and acquire green chemistry concepts and apply these ideas to develop respect for the inter connectedness of our world and an ethic of environmental care and sustainability.

II B.Tech – **I Sem**

15ABS16-INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- To understand the principles of different instruments
- To apply the instruments for analysis of various species in different matrices
- To apply instrumental methods for framing project works

UNIT – I: Molecular Spectrophotometry

Absorption spectra, Lamberts Law, Beer's Law - Combined law equation; Derivations from Beer's Law. Block diagram of a uv- visible spectrophotometer – quantitative analysis ; Direct method for the determination of metal ions; Chromium, Manganese, Iron etc in alloys.

UNIT – II: Infrared Spectroscopy

Interaction of infra-red radiation with molecules, Sources of IR Radiation ; Spectral regions; Block diagram of IR Spectrometer , Function of each component; Sampling Techniques; Application of IR Spectroscopy to functional group analysis (-OH, $-NH_2$, -CHO, -CO-R, -CONH).

UNIT III: Chromatography

Gas Chromatography: Principles of Gas Chromatography, block diagram of gas chromatograph, Function of each component, Detectors (FID, ECD), stationary phase for column, mobile phase, chromatogram, qualitative analysis, quantitative analysis, retention time, retention volume, capacity factor, area., normalization method. Analysis of gaseous and volatile impurities.

HPLC: Principles of high performance liquid chromatography, Block diagram of HPCL, Systems, functions of each component, stationary phases, eluting solvents, pumps, detectors, quantitative applications of HPLC for environmental analysis.

UNIT IV: Atomic Spectrophotometry

Principle of atomization, atomic absorption spectrometer, applications for metal ions, Atomic emission, application and principle of ICP-OES, X-ray fluorescence spectrometry- Applications

UNIT V: Thermal methods of analysis

TGA- Thermo Gavimetry – Principle, instrumentation and applications
DTA- Differential Thermal Analysis- Principle, instrumentation and applications
DSC- Differential Scanning Coulometry- Principle, instrumentation and applications

Text BOOK:

1. Principles of Instrumental Analysis, 6th Edition, Douglas A. Skoog, James Holler. J, Stanley R. Crouch, Cengage Learning, New Delhi, 2014.
2. Instrumentaiotn methods of analysis, Chatwal & Anand, Himalaya Publ;ications, 2003

REFERENCES:

1. Instrumental methods of analysis, Willand merrit and dean, caps publications & Distribution, 1999.
2. Vogels Text book of Quantitative chemical analysis, 6th edition ,Mendham J, Denny R.C,Barnes J.D, Thomas M.J.K, pearson education, 2002.
3. Modern Analytical Chemistry, 1St edition, David Harvey, McGraw-Hill Higher Education, 2010.

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Differentiate between classical and instrumental methods of Chemical analysis.
2. Apply different types of Instrumental methods for analysis of various samples in water and other environmental samples

II B.Tech – I Sem

15ABS17-CHEMISTRY OF NANO MATERIALS AND APPLICATIONS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objectives:

- To understand synthetic principles of Nanomaterials by various methods
- And also characterisae the synthetic nanomaterials by various instrumental methods
- To enumerate the applications of nanomaterials in engineering

Unit I:

Introduction:Scope of nanoscience and nanotecnology, nanoscience in nature, classification of nanostructured materials, importance of nano materials.

Synthetic Methods: Bottom-Up approach:- Sol-gel synthesis, microemulsions or reverse micelles, co-precipitation method, solvothermal synthesis, hydrothermal synthesis, microwave heating synthesis and sonochemical synthesis.

UNIT-II

Top-Down approach:- Inert gas condensation, arc discharge method, aerosol synthesis, plasma arc technique, ion sputtering, laser ablation, laser pyrolysis, and chemical vapour deposition method, electrodeposition method, high energy ball milling.

UNIT-III

Techniques for characterization: Diffraction technique, spectroscopy techniques, electron microscopy techniques for the characterization of nanomaterilas, BET method for surface area analysis, dynamic light scattering for particle size determination.

UNIT-IV

Studies of Nano-structured Materials: Synthesis, properties and applications of the following nanomaterials, fullerenes, carbon nanotubes, core-shell nanoparticles, nanoshells, self-assembled monolayers, and monolayer protected metal nanoparticles, nanocrystalline materials, magnetic nanoparticles and important properties in relation to nanomagnetic materials, thermoelectric materials, non-linear optical materials, liquid crystals.

UNIT.V

Engineering Applications of Nanomaterials

TEXT BOOKS:

1. NANO: The Essentials : T Pradeep, MaGraw-Hill, 2007.
2. Textbook of Nanoscience and nanotechnology: B S Murty, P Shankar, Baldev Rai, BB Rath and James Murday, Univ. Press, 2012.

REFERENCE BOOKS:

1. Concepts of Nanochemistry; Ludovico Cademrtiri and Geoffrey A. Ozin & Geoffrey A. Ozin, Wiley-VCH, 2011.

2. Nanostructures & Nanomaterials; Synthesis, Properties & Applications: Guozhong Cao, Imperial College Press, 2007.
3. Nanomaterials Chemistry, C. N. R. Rao, Achim Muller, K.Cheetham, Wiley-VCH, 2007.

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

- Understand the state of art synthesis of nano materials
- Characterize nano materials using ion beam, scanning probe methodologies, position sensitive atom probe and spectroscopic ellipsometry.
- Analyze nanoscale structure in metals, polymers and ceramics
- Analyze structure-property relationship in coarser scale structures
- Understand structures of carbon nano tubes

II B.Tech – **I Sem**

15AHS08-CAMPUS RECRUITMENT TRAINING & SOFT SKILLS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objectives:

1. To develop awareness in students of the relevance and importance of soft skills.
2. To provide students with interactive practice sessions to make them internalize soft skills.
3. To prepare the students for placements.
4. To train students to use language appropriately for interviews, group discussion and public speaking
5. To help the students to understand interpersonal skills.
6. To support them in building interpersonal skills.
7. To better the ability to work with others

Outcome:

After completing this course,

- The students would have Understood of what Soft Skills is,
- Understood the significance of soft skills in the working environment
- Turning out engineering students with a clear concept of soft skills and equipping them with readiness to implement them at work place.

UNIT I: Interview Dynamics-Preparation-Power Selling- Cracking the top Questions-Stress Control.

UNIT II: Intra Personal Skills: Knowing Strengths & Weaknesses – Goal Setting-Quotient Skills- Positive thinking- Problem Solving-analytical Skills.

UNIT III: Intra Personal Skills: Managerial Skills, Group dynamics- Negotiation Skills-Time Management.

UNIT IV: Verbal Skills: Dynamics of listening, Speaking, Reading & Writing skills- Email writing.

UNIT V: Non Verbal Skills: Body Language- Body Posture, Gestures, Eye Contact, Facial Expressions, Appearance, Space Distance /Proxemics , Touch/Haptics,. Para Language-Tone, Pace, Pause, Volume , Quality .

REFERENCE BOOKS:

1. M. Ashraf Rizvi: Effective Technical Communication, Tata McGraw Hill, New Delhi, 2014.
2. Alex.k, soft skills, 3rd ed. S. Chand Publication, New Delhi, 2014.
3. Technical Communication, Principle and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2009.

4. Sherfield, M. Robert at al Cornerstone Developing Soft Skills, 4th ed. Pearson Publication,
New Delhi, 2014.
5. Shalini Varma, Body Language for your success mantra, 4th ed, S. Chand Publication, New Delhi, 2014.

II B.Tech – I Sem

15AHS09-COMPETITIVE & SPOKEN ENGLISH

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objectives:

- To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence.
- To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
- To train students to use language appropriately for interviews, group discussion and public speaking
- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

Expected Outcomes:

- Becoming active participants in the learning process and acquiring proficiency in spoken English of the students.
- Speaking with clarity and confidence thereby enhancing employability skills of the students.
- Accomplishment of sound vocabulary and its proper use contextually
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities.

UNIT I: ~~Creating~~ Cracking the unknowing passage-Reading Comprehension- Listening Comprehension.

UNIT II: Correction of the Sentences Nouns – Pronouns – Verbs- Tenses- Articles- Prepositions- Sentences.

UNIT III: Competitive Vocabulary – Word Building – Memory techniques

UNIT IV: Functional English – Sentences – Construction – Neutralization of accent – Intonation.

UNIT V: Dynamics of Speaking – Communication Skills – Speech Preparation – Speaking Practices.

Reference books:

1. M. Ashraf Rizvi: **Effective Technical Communication**, Tata McGraw Hill, New Delhi, 2014.
2. Wren and Martin, **High School English Grammar and Composition,** S. Chand Publication, New Delhi, 2014.
3. Hari Mohan Prasad, **Objective English for Competitive Examination,** Tata McGraw Hill, New Delhi, 2014.
4. R.S. Aggarwal , **Objective General English**, S. Chand Publication, New Delhi.
5. R.K Bansal, **Spoken English : Manual of Speech and Phonetics,**4th Edition, Orient Black swan Pvt Ltd.-New Delhi, 2013.

II B.Tech – I Sem

15ACE09-GREEN BUILDINGS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT-I Introduction :Concept of Green Building, Need for Green Building, Benefits of Green Buildings, Green Building Materials and Equipment in India, Key Requisites for Constructing a Green Building, Important Sustainable features for Green Building,

UNIT-II Green Building Concepts and Practices Indian Green Building Council, Green Building Moment in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation;
Green Building Opportunities And Benefits: Opportunities of Green Building, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy Saving Approach in Buildings, LEED India Rating System and Energy Efficiency,

UNIT-III Green Building Design Introduction, Reduction in Energy Demand, Onsite Sources and Sinks, Maximise System Efficiency, Steps to Reduce Energy Demand and Use Onsite Sources and Sinks, Use of Renewable Energy Sources. Ecofriendly captive power generation for factory, Building requirement,

UNIT-IV Air Conditioning Introduction,CII Godrej Green business centre,Design philosophy,Design interventions,Energy modeling, HVAC System design,Chiller selection,pump selection,Selection of cooling towers,Selection of air handing units,Precooling of fresh air,Interior lighting system,Key feature of the building. Eco-friendly captive power generation for factory,Building requirement.

UNIT-V Material Conservation Handling of non process waste, waste reduction during construction,materials with recycled content,local materials,material reuse,certified wood ,Rapidly renewable building materials and furniture; Indoor Environment Quality And Occupational Health: Air conditioning, Indore air quality, Sick building syndrome, Tobacco smoke control, Minimum fresh air requirements avoid use of asbestos in the building, improved fresh air ventilation, Measure of IAQ, Reasons for poor IAQ, Measures to achieve Acceptable IAQ levels,

Text Books:

1. Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers, 2009.

2. Green Building Hand Book by Tomwoolley and Samkimings, 2009.

Reference Books: 1. Complete Guide to Green Buildings by Trish riley
2. Standard for the design for High Performance Green Buildings by Kent Peterson, 2009

II B.Tech – I Sem

15ACE10-DISASTER MANAGEMENT AND MITIGATION

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT-I - Introduction To Disaster :Meaning, Nature, Importance of Hazard, Risk, Vulnerability and Disaster- Dimensions & Scope of Disaster Management - India's Key Hazards – Vulnerabilities - National disaster management framework - Disaster Management Cycle.

UNIT-II - Natural Disaster :Natural Disasters- Meaning and nature of natural disaster; their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion.

UNIT-III - Anthropogenic DisasteR :Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation and industrial waste water pollution.

UNIT-IV - Approaches In Disaster Management :Pre- disaster stage (preparedness) - Preparing hazard zonation maps, Predictability/ forecasting & warning - Preparing disaster preparedness plan - Land use zoning - Preparedness through Information, education. Emergency Stage - Rescue training for search & operation - Immediate relief - Assessment surveys. Post Disaster stage – Rehabilitation - Social Aspect - Economic Aspect and Environmental Aspect.

UNIT-V - Disaster Mitigation :Meteorological observatory - Seismological observatory - Hydrology Laboratory and Industrial Safety inspectorate. Technology in Disaster Management - Emergency Management Systems (EMS) in the Disaster Management Cycle - Remote Sensing and Geographic Information Systems(GIS) in Disaster Management. 2

Text Book:

1. Sharma.S.R, "Disaster management", A P H Publishers, 2011.

REFERENCES:

1. VenuGopalRao.K, "Geoinformatics for Disaster Management", Manglam Publishers and Distributors, 2010.
2. Singh.R.B, "Natural Hazards and Disaster Management: Vulnerability and Mitigation", Rawat Publications, 2006.

3. Gupta.H.K, "Disaster Management", University Press, India, 2003.
4. Gupta.M.C, "Manuals on Natural Disaster management in India", National Centre for Disaster Management,IIPA, New Delhi, 2001.

II B.Tech I-Sem

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
COLLEGE OF ENGINEERING: PULIVENDULA (AUTONOMOUS)

II Year B.Tech (Civil Engineering) I Semester

T	L	C
1	3	3

15ACE11 – WATER HARVESTING AND CONSERVATION (CBCC)

OBJECTIVE: *The course aims at bringing awareness about the need for conservation of Water. The student will be taught different methods of Water Harvesting and also the methods of Water Conservation. He will also learn the principles of Watershed Management.*

UNIT – I

Origin, Occurrence & Movement of Groundwater:-Introduction-sources of ground water – Hydro geological Cycle – Infiltration – natural openings in rocks – zones of aeration , saturation and water table – classification of ground water – laboratory and field methods of sampling ground water- aquifers – aquifuges- aquicludes – aquitards – ill effects due to lowering of water table -Artificial recharge.

UNIT – II

Water Harvesting: Principles of water harvesting-methods of rainwater harvestingdesign of rainwater harvesting structures-Purification Techniques for direct use-Harvesting of surface runoff-onsite detention basin - ponds - types - Recycling of harvested water

UNIT – III

Water Recovery and Reuse: Perspective on recycle and reuse- factors affecting the development of water reclamation and reuse criteria- elements/components of water reclamation and reuse criteria / guidelines- sewage irrigation- Waste water reclamation-waste water recharge for reuse – Treatment Requirements for Water Reuse-methods.

UNIT – IV

Sustainable Watershed Approach & Watershed Management Practices: Concept of watershed-Introduction to watershed management- Integrated water resources management- natural resources management-agricultural practices-integrated farming-Conjunctive use of water resources-Community participation-Watershed Management Practices in Arid and Semiarid Regions-Case studies-Short term and long term strategic planning.

UNIT – V

Soil and Water Conservation: Scope of soil and water conservation-Mechanics and types of erosion-their causes-Soil erosion control measures - bank protectionvegetative barriers-contour bund- contour trenches-contour stone walls-contour ditchesterraces-outlets and grassed waterways-Gully control structures - temporary and permanent - design of permanent soil conservation structures-Design of farm ponds and percolation ponds.

TEXT BOOKS:

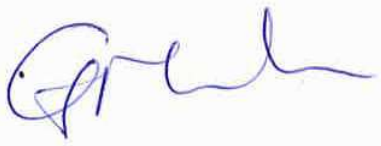
1. Watershed Management by Murty, J.V.S, New Age Intl., New Delhi .
2. Water Resources Conservation and Management by Chatterjee, S. N.,Atlantic Publishers.
3. Ground Water by S.Ramakrishnan, SCITECH Publishers.

REFERENCE BOOKS:

1. Advances in Soil and Water Conservation by Pierce, F.J. and Frye, W. W. (1998):, Ann Arbor Press, Michigan.
2. Soil and Water Conservation Engineering, 4th Ed. By Schwab, G. O., Fangmeier, D. D., Elliot, W. J. and Frevert, R. K. (1993), John Wiley and Sons Inc., USA
3. Watershed Management in India by Murthy, J.V.S., Wiley Eastern, New Delhi, 1994 .
4. Irrigation Water Management - Principles and Practice by Dilip Kumar Majumdar,, PHI Pvt.Ltd.NewDelhi-1.
5. Irrigation and Water Power Engineering by Madan Mohan Das & Mimi Das Saikia, PHI learning Pvt. Ltd., NewDelhi-1

Course Outcomes: *On completion of the course, the student will be able to*

a) Appreciate the importance of Water Conservation
b) Understand the methods of Water Harvesting
c) Understand the principles of Watershed Management and its importance in sustainability



II B.Tech – **I Sem**

15AEC08-BASIC ELECTRONICS
(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT – I:
Semiconductor devices: Diode, BJT, their structures and principle of operations.
Amplifiers: Functionality, specifications-voltage gain, current gain, input resistance, output resistance, dynamic range, bandwidth, linearity, power efficiency

UNIT- II:
Power electronics: Half wave and full wave rectification, filtering, regulation with Zener diode and linear regulators.
Filters: Low pass, high pass, band pass and band stop filters, specifications-cutoff frequency, roll off.

UNIT – III
Feedback Amplifiers: Basic concept of negative and positive feedback, application of negative feedback in amplifiers, effect on gain, bandwidth, input resistance, output resistance and de-sensitivity to parameter variations.
Oscillators: Barkhausen criterion, RC phase shift, Wien bridge, Colpitts, Hartley and Crystal oscillators, applications of oscillators.

UNIT – IV
Operational amplifier: Differential mode of operation, common mode rejection, typical op-amp specifications-open loop gain, differential input resistance, unity gain-bandwidth, inverting amplifier, non-inverting amplifier, summing amplifier, Instrumentation Amplifier, concept of active filters.

UNIT – V
Digital electronics: Review of Boolean algebra and signed number representation schemes in binary, implementation of Boolean functions using various logic gates, concept of combinatorial and sequential circuits, registers and counters from functional viewpoint.

Text Books:

1. Electronics Devices and Circuits, J.Millman and Christos. C. Halkias, 3rd edition, Tata McGraw Hill, 2006.
2. Electronics Devices and Circuits Theory, David A. Bell, 5th Edition, Oxford University press., 2008.

References:

1. Electronics Devices and Circuits Theory, R.L.Boylestad,Lousis Nashelsky and K.Lal Kishore, 12th edition, 2006, Pearson, 2006.
2. Electronic Devices and Circuits, K. Lal Kishore, 3rd Edition, BSP, 2008.
3. Electronic Devices and Circuits, N.Salivahanan, and N.Suresh Kumar, 3rd Edition, TMH, 2012

II B.Tech – I Sem

15AEC09-FUNDAMENTALS OF DIGITAL ELECTRONICS
(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT-I:

Binary Systems: Introduction of Digital Computers and Digital Systems, Binary numbers, Base Conversion: Binary, Decimal, Hex, Octal. Complements: R's Complement, 2's and 10's Complement, (R-1)'s Complement, 1's and 9's Complement, Binary Codes: Decimal Codes, Error Detection codes, Reflected Code.

UNIT-II:

Binary Logic And Boolean Algebra: Basic Binary logic, Logic Gates: AND, OR, INVERTER, Postulates, Boolean algebra, Two value Boolean algebra, Basic theorems of Boolean algebra: De-Morgan's Theorems, Boolean functions Boolean forms: Canonical, Standard.

UNIT-III:

Boolean Function Implementation: Need for simplification, K–Map method: 2–Variable K–map, 3–Variable K–map, 4–variable K–map, K–Map using Don't care condition, Universal Gates: NAND, NOR, NAND Implementation, NOR Implementation.

UNIT-IV:

Basic Combinational Logic: Design procedure of combinational logic, Adder: Half Adder, Full Adder, Subtractor, Half Subtractor, Full Subtractor, Code Conversion, BCD – Excess-3 conversion.

UNIT-V:

Combinational Logic Using MSI And LSI: Binary Parallel Adder, Magnitude Comparator: 2 Input Comparator, Decoder: 2–4 Decoder, 3–8 Decoder, Encoder: 4–2 Encoder, 8–3 Encoder, Multiplexer: 4–1 multiplexer, Demultiplexers: 1–4 Demultiplexers.

Text Book:

1. Digital Design, M.Morris Mano & Michel D. Ciletti, 5th Edition, Pearson Education, 1999.
2. Switching theory and Finite Automata Theory, Zvi Kohavi and Nirah K.Jha, 2nd Edition, Tata McGraw Hill, 2005.

Reference Books:

1. Fundamentals of Digital Circuits, Anand Kumar, Prentice-Hall of India, Latest Edition
2. Digital electronics Principles, Malvino & Leech, Tata McGraw-Hills publication, Latest Edition.

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II B.Tech – **I Sem**

15AEC10-ELECTRONIC MEASUREMENTS & INSTRUMENTATION
(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives for electrical measurements and instrumentation:

1. This course introduces the basic principles of different types of electrical instruments for the Measurement of voltage, current, power factor, power and energy.
2. It also explains the measurements of RLC parameters using bridge principles.
3. The principles of magnetic measurements are also explained.
4. The principle of working of CRO and its applications are explained.

Course outcomes for electrical measurements and instrumentation:

1. Use wattmeters, pf meters, and energy meters in a given circuit.
2. Extend the range of ammeters and voltmeters
3. Measure active power, reactive power, power factor, and energy in both 1-phase and 3-phase circuits
4. Determine the resistance values of various ranges, L and C values using appropriate a.c bridges

UNIT – I:

Fundamentals of Measurements: Introduction, types of measurements, static & dynamic characteristics of measurement system, types of Errors, error sources and remedies.
Multimeter: Principle of measurement of D.C. Voltage and current, A.C. Voltage and current, Resistance, AC and DC sensitivity, Specifications.

UNIT – II:

Fundamentals of Cathode Ray Oscilloscope: Block diagram, CRO probes, Delay line, types of Oscilloscopes. Measurement of: Signal voltage, Current, Phase & Frequency using Lissajous patterns, Industrial applications of CRO.

UNIT – III:

Review of DC Bridges: Wheatstone bridge, Wien Bridge, errors and precautions in using bridges,
AC bridges: Measurement of inductance-Maxwell's bridge, Anderson Bridge. Measurement of capacitance- Shearing Bridge. Kelvin Bridge, Q-meter.

UNIT – IV:

Signal generator-fixed and variable, AF oscillators, function generators, pulse, random noise, sweep waveform generators, and their standards, specifications and principles of working (Block diagram approach).

UNIT – V:

Sensors and Transducers: Active and passive transducers: Measurement of displacement (Resistance, capacitance, inductance; LVDT) Force (strain gauges) Pressure (piezoelectric

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transducers) Temperature (resistance thermometers, thermocouples, and thermistors), Velocity, Acceleration, Vibration, pH measurement Signal Conditioning Circuits.

Text Books:

1. A course in electrical & electronic measurements and instrumentation – AK Sawhney, Puneet Sawhney, 4th Edition, Dhanpat Rai & Sons Educational and technical publisher, 2012.
2. Modern Electronic Instrumentation and Measurement Techniques, Albert D.Helfrick and William D.Cooper, Pearson / Prentice Hall of India, 2007

References:

1. Measurement Systems- Application and Design, Ernest O. Doebelin, TMH, 2007.
2. Electronic Instrumentation, H.S.Kalsi, 2nd edition, Tata McGraw Hill, 2004.
3. Principles of Measurements and Instrumentation, Alan. S. Morris, 2nd Edition, Prentice Hall of India, 2003.

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II B.Tech – I Sem

15AME11-ROBOTICS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives

- To design, develop and complete robotic activities and challenges
- This course aims at providing the students the fundamental knowledge of the various subscriptions such as kinematics, Dynamics, controls, sensors, actuators, etc.
- It is aimed to provide adequate background in both analysis and design of robots.

UNIT – I

Fundamentals of Robots: Introduction, definition, classification and history of robotics, robot characteristics and precision of motion, advantages, disadvantages and applications of robots. Introduction to matrix representation of a point in a space a vector in space, a frame in space, Homogeneous transformation matrices, representation of a pure translation, pure rotation about an axis.

UNIT – II

Kinematics of robot: Forward and inverse kinematics of robots- forward and inverse kinematic equations for position and orientation, Denavit-Hartenberg(D-H) representation of forward kinematic equations of robots, The inverse kinematic of robots, Degeneracy and Dexterity, simple problems with D-H representation.

Differential motions and Velocities: Introduction, differential relationship, Jacobian, differential motions of a frame-translations, rotation, rotating about a general axis, differential transformations of a frame. Differential changes between frames, differential motions of a robot and its hand frame, calculation of Jacobian, relation between Jacobian and the differential operator, Inverse Jacobian.

UNIT – III

Control of Manipulators: Open- and Close-Loop Control, the manipulator control problem, linear control schemes, characteristics of second-order linear systems, linear second-order SISO model of a manipulator joint, joint actuators, partitioned PD control scheme, PID Control Scheme, computer Torque control, force control of robotic manipulators, description of force-control tasks, force control strategies, hybrid position/force control, impedance force/torque control.

UNIT – IV

Robot Vision: Industrial applications of vision-controlled robotic systems, process of imaging, architecture of robotic vision system, Image acquisition, description of other components of vision system, image representation, image processing.

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UNIT – V

Robot Cell Design and Programming: Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work cell design, Work cell control, Inter locks, Error detection, Work cell controller.

Methods of robot programming, WAIT, SIGNAL, and DELAY commands, Robotic languages, VAL system.

Text Books:

1. Industrial Robotics – Mikell P. Groover and Mitchell Weiss, Roger N. Nagel,Nicholas G.Odrey – Mc Graw Hill, 1986.
2. Robotics and control – R K Mittal and I J Nagrath, - Tata Mc Graw Hill

References:

1. Introduction to Robotics – Analysis, System, Applications by Saeed B. Niku, PHI Publications
2. Robot Analysis and Control - H. Asada and J.J.E. Slotine John Willey & Sons.
3. Fundamentals of Robotics: Analysis and control, Robert J. Schilling, Prentice Hall, 1990.
4. A robot Engineering text book – Mohsen shahinpoor, Harper & Row Publishers,1987
5. Introduction to Robotics: Mechanics and Control, John.J.Craig, Addison- Wesley, 1999
6. Robotics: Control, sensing, vision, and intelligence – K.S. FU, R.C. Gonzalez and C.S.G Lee. Mc Graw Hill, 1987.
7. Robotic Engineering an integrated approach- Richard D. Klafter Thomas – PHI publications

Course outcomes

By studying this course, students will be

- Familiar with the history, concept development and key components of robotics technologies.
- Understand basic mathematic manipulation of spatial coordinate representation and transformation.
- Understand and able to solve basic robot forward and inverse kinematic problems.
- Understand and able to solve robotic dynamics, path planning and control problems.
- Able to undertake practical robotics experiments that demonstrate the above skills.

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II B.Tech – **I Sem**

15AME12-MECHANICAL MANUFACTURING PROCESSES

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objectives:

The objectives of this course are to introduce to demonstrate the various manufacturing processes. To develop knowledge and importance of surface treatment, processing of powder metals, glass, ceramics plastics. To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes and acquire knowledge on advanced manufacturing processes.

UNIT – I

Surface treatment: Scope, Cleaners, Methods of cleaning, Surface coating types, and ceramic and organic methods of coating, economics of coating. Electro forming, Chemical vapour deposition, thermal spraying, Ion implantation, diffusion coating, Diamond coating and cladding.

UNIT – II

Processing of Powder metals, Glass and Superconductors: Introduction, production of metal powders, compaction of metal powders, sintering, secondary and finishing operations, design considerations for powder metallurgy, Process capabilities, economics of powder metallurgy, forming and shaping of Glass, techniques for strengthening and treating Glass, design considerations for Glass, processing of superconductors.

Processing of ceramics: Applications, characteristics, classification .Processing of particulate ceramics, Powder preparations, consolidation, Drying , sintering, Hot compaction, Area of application , finishing of ceramics.

UNIT – III

Fabrication of Microelectronic devices: Crystal growth and wafer preparation, Film Deposition oxidation, lithography, bonding and packaging, reliability and yield, Printed Circuit boards, computer aided design in microelectronics, surface mount technology, Integrated circuit economics. E-Manufacturing, nanotechnology, and micromachining, High speed Machining

UNIT – IV

Processing Of Plastics, injection and blow moulding, calendaring, thermo forming, compression moulding, transfer moulding, High energy rate forming methods Rapid manufacturing: - Introduction - concepts of rapid manufacturing, information flow for rapid prototyping, classification of rapid prototyping process, sterer holography fused deposition modeling, selective laser sintering, Applications of rapid prototyping process

UNIT – V

Processing of Composites: Composite Layers, Particulate and fiber reinforced composites, Elastomers, Reinforced plastics, MMC, CMC, Polymer matrix composites.

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Text Books:

1. Manufacturing Engineering and Technology, Schmid and kalpakjin, Pearson Education.
2. Manufacturing Technology, Foundry forming and welding, Vol I , P.N. Rao,TMH
3. Rapid Prototyping Principles and Applications, RafiqNoorani, Wiely Pub

Reference Books:

1. Production Technology, R.K. Jain, Khanna Publishers,17th edition, 2012
2. Process and materials of manufacturing -Lindberg, PE
3. Principles of Metal Castings, Rosenthal.
4. Welding Process, Parmar, Khanna publication.
5. Manufacturing Technology, R.K. Rajput, Laxmi Pub

Course Outcomes:

After completion of this course student will be able to

- Understand the principles of processing of various powder metals, glass, ceramics and semiconductors.
- Understand the applications of rapid prototyping and processing of plastics

Suggested Links:

- www.casde.iitb.ac.in/store/events/2003/IAT-Pune.../DFMA.ppt
- www.rose-hulman.edu/~stienstr/ME470/DFA.ppt
- www.design4manufacturability.com/DFM_article.htm
- http://www.learnerstv.com/Free-Engineering-Video-lectures-ltv234-Page1.htm

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II B.Tech – I Sem

15AME13-NON-CONVENTIONAL SOURCES OF ENERGY

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course Objective:

- To explain concept of various forms of renewable energy
- To outline division aspects and utilization of renewable energy sources for both domestics and industrial applications
- To analyse the environmental and cost economics of using renewable energy sources compared to fossil fuels.

UNIT - I

Principles Of Solar Radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Solar Energy Storage And Applications :

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications solar heating technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-III

Wind Energy : Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

Bio-Mass : Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engineoperation and economic aspects.

UNIT-IV

Geothermal Energy : Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy : OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-V

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, principles of DEC.

Thermo-electric generators, Seebeck, Peltier and Joule Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux,

MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion,

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economic aspects.Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

Text Books:

1. Renewable energy resources, Tiwari and Ghosal, Narosa.
2. Non-Conventional Energy Sources ,G.D. Rai

References :

1. Renewable Energy Sources, Twidell& Weir
2. Solar Energy, Sukhatme
3. Solar Power Engineering,B.S.Magal Frank Kreith&J.F.Kreith.
4. Principles of Solar Energy, Frank Krieth& John F Kreider.
5. Non-Conventional Energy, Ashok V Desai, Wiley Eastern 6. Non-Conventional Energy Systems, K Mittal , Wheeler.

Course Outcome:

At the end of the course the student will

1. Have knowledge about various renewable energy sources
2. Be able to choose the appropriate renewable energy as an alternate for conventional power in any application.

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II B.Tech – **I Sem**

15AEE08-PRINCIPLES OF ELECTRICAL ENGINEERING

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives for Principles of Electrical Engineering:

1. Students can learn about fundamental concepts circuits, DC, AC Machines.
2. Students can learn about Electrical instruments.
3. Student learn how to apply electrical principles in their applications.
4. Student can able verify theorems such as super position, thevinins and maximum power transfer and the measurements of RLC parameters using bridge principles

UNIT I: Fundamentals of Electrical Circuits

Circuit Concept–R-L-C Parameters -Kirchhoff's Laws – Network Reduction Techniques-Series, Parallel, Series Parallel, Star-to-Delta or Delta-to-Star Transformation. R.M.S, Average Values and Form Factor for Different Periodic Wave Forms – Sinusoidal Alternating Quantities – Phase and Phase Difference. Concept of Power Factor-Concept of Reactance, Impedance, Susceptance and Admittance-Real and Reactive Power, Complex Power. Examples. Star Delta Transformation Technique. Thevenin's, Norton's and Superposition Theorems for D.C Excitations.

UNIT II: DC Machines

Principle of Operation of DC Machines, Constructional features, EMF equation, Types of Generators, Magnetization and load characteristics of DC Generators.

DC motors, Types of DC Motors, Characteristics of DC Motors, Losses and Efficiency, Swinburne's Test, Speed control of DC Shunt and series Motors, Flux and Armature voltage control methods.

UNIT III: Transformers & Induction machines

Principle of Operation of Single Phase transformer, Types, Constructional Features, EMF equation, Phasor Diagrams for no load and loaded conditions, efficiency of Transformer and regulation, OC and SC Tests, predetermination of Efficiency and Regulation (Simple Problems). Concept of rotating field, Principle of Operation of induction motors.

UNIT IV: Special Machines

Principle of operation of Shaded pole motors, Capacitor motors, AC Servo motors, AC Tachometers, Synchros, Stepper motors and its characteristics.

Vijaya
BOS – chairman

UNIT V: Electrical Measurements

Moving Coil & Moving Iron Instruments (Ammeter & Voltmeter).Dynamometer Type Watt meters & Energy Meters(operating principles).

Course outcomes for Principles of Electrical Engineering:

1. Students able to demonstrate knowledge on fundamental concepts circuits, DC, AC Machines.
2. Students able to demonstrate knowledge on how to measure the electrical quantities using measuring instruments.
3. Students are able to apply electrical principles in their applications.
   Students are able to determine the RLC parameters using bridge principles.

Text Books

1. Network Analysis – A Sudhakar, Shyammohan S.Palli, 3 ed., 2009. TMH.
2. Introduction to Electrical Engineering – M.S.Naidu and S. Kamakshaiah, 2008, TMH.

References:

1. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers, 3rd Edition, 2004.
2. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co.

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II B.Tech – I Sem

15AEE01-ELECTRICAL ENGINEERING MATERIALS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Course objectives for Electrical Engineering material:

1. To aquire knowledge on general properties of different conductors.
2. To learn the fundamental properties of dielectric materials and high resistivity materials.
3. To gain knowledge on different insulating materials.
4. To learn about different types of wiring and wiring materials.

UNIT-I Conducting Materials:

Introduction – classification of materials – Metals and Non metals, physical, thermal, mechanical and electrical properties of materials – classification of electrical materials – concept of atom – electron configuration of atom, conductors, general properties of conductors, factors effecting resistivity of electrical materials –electrical/mechanical/thermal properties of copper, aluminum, iron, steel, lead, tin and their alloys – applications.

UNIT-II Dielectric Materials And High Resistivity Materials :

Introduction – solid, liquid and gaseous dielectrics, leakage current, permittivity, dielectric constant, dielectric loss – loss angle – loss constant, Breakdown voltage and dielectric strength of – solid, liquid and gaseous dielectrics, effect of break down– electrical and thermal effects ,Polarization – electric, ionic and dipolar polarization. Effect of temperature and Frequency on dielectric constant of polar dielectrics. High Resistivity materials – electrical / thermal / mechanical properties of Manganin, Constantan, Nichrome, Tungsten, Carbon and Graphite and their applications in electrical equipment.

UNIT-III Insulating Materials-I:

Introduction – characteristics of a good electrical insulating materials – classification of insulating materials – electrical, thermal, chemical and mechanical properties of solid insulating materials, electrical, thermal and mechanical properties of, Asbestos, Bakelite, rubber, plastics, thermo plastics. Resins, polystyrene, PVC, porcelain, glass, cotton and paper.

UNIT-IV Insulating Materials-II:

Liquid insulating materials – Mineral oils, synthetic liquids, fluorinated liquids – their Electrical, thermal and chemical properties – transformer oil – properties – effect of moisture on insulation properties Gaseous insulators – classification based on dielectric strength – dielectric loss, chemical stability properties and their applications .

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UNIT-V Domestic Wiring:

Wiring materials and accessories – Types of wiring – Types of Switches - Specification of Wiring – Stair case wiring - Fluorescent lamp wiring-Godown wiring – Basics of Earthing – single phase wiring layout for a residential building

Course outcomes for Electrical Engineering material:

1. Able to demonstrate the knowledge on different types of electrical materials.
2. Able to evaluate the leakage current, loss angle, permittivity, dielectric constant and loss constant of different dielectrics.
3. Able to understand the fundamentals of different insulating materials

Able to demonstrate knowledge on types of switches and wiring.

Text Books:

1. Electrical engineering materials by G.K. Mittal, Khanna publication 2nd edition.
2. A course in Electrical Engineering Materials by R.K .RAJPUT, Laxmi publications.
3. Electrical technology volume-I by B.L. Theraja, SChand publications.

Reference Books:

1. "An Introduction to electrical engineering materials" by C.S. Indulkar and S. Thiruvengadam, SChand & Company.
2. "Electrical engineering Materials" by T.T.T.I, Madras, Tata McGraw Hill
3. "A course in electrical engineering materials" by S.P. Seth, Dhanapatrai & Sons, New Delhi

V. Sarala
BOS-chairman

II B.Tech – I Sem

15AEE09-ELECTRICAL MEASURING INSTRUMENTS

(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

Objective:

Electrical measurements course introduces the basic principles of all measuring instruments. It also deals with the measurement of RLC parameters voltage, current Power factor, power, energy and magnetic measurements and Digital Meters

UNIT- I Measuring Instruments

Classification – Deflecting, Control and Damping Torques – Ammeters and Voltmeters – PMMC, Dynamometer, Moving Iron Type Instruments – Expression for the Deflecting Torque and Control Torque – Errors and Compensations, Extension of range using Shunt and Series Resistance. Cathode Ray Oscilloscope- Cathode Ray tube-Time base generator- Horizontal and Vertical Amplifiers – Application of CRO – Measurement of Phase , Frequency, Current & Voltage- Lissajous Patterns

UNIT – II Measurement Of Power And Energy

Single Phase Dynamometer Wattmeter, LPF and UPF, Double Element and Three Element Dynamometer Wattmeter, Expression for Deflecting and Control Torques. Types of P.F. Meters – Dynamometer and Moving Iron Type – 1-ph and 3-ph Meters. Single Phase Induction Type Energy Meter – Driving and Braking Torques – Errors and Compensations. Three Phase Energy Meter.

UNIT – III Instrument Transformers And Potentiometers

CT and PT – Ratio and Phase Angle Errors – Design Considerations.

Potentiometers: Principle and Operation of D.C. Crompton's Potentiometer – Standardization – Measurement of unknown Resistance, Current, Voltage.

A.C. Potentiometers: Polar and Coordinate types- Standardization – Applications.

UNIT – IV D.C & A.C Bridges

Method of Measuring Low, Medium and High Resistance – Sensitivity of Wheatstone's Bridge – Kelvin's Double Bridge for Measuring Low Resistance, Measurement of High Resistance – Loss of Charge Method. Measurement of Inductance - Maxwell's Bridge, Anderson's Bridge. Measurement of Capacitance and Loss Angle - Desauty Bridge. Wien's Bridge – Schering Bridge.

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UNIT – V Magnetic Measurements

Ballistic Galvanometer – Equation of Motion – Flux Meter – Constructional Details, Comparison with Ballistic Galvanometer. Determination of B-H Loop Methods of Reversals - Six Point Method – A.C. Testing – Iron Loss of Bar Samples.

Text Books:

1. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co. Publications.
2. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, 5th Edition, Reem Publications.

Reference Books:

1. Electronic Instrumentation by H. S. Kalsi, Tata Grawhill Mc, 3rd Edition.
2. Electrical Measurements – by Buckingham and Price, Prentice – Hall
3. Electrical Measurements: Fundamentals, Concepts, Applications – by Reissland, M.U, New Age International (P) Limited, Publishers
4. Electrical & Electronic Measurement & Instrumentation by R. K. Rajput, 2nd Edition, S. Chand & Co.

V. Sarada
BOS - Chairman

II B.Tech – **I Sem**

15ACS04-DATA STRUCTURES
(Choice Based Credit Courses (Inter-department))

L	T	P	C
3	1	0	3

UNIT-I

Stacks & Queues: stacks, stacks using dynamic arrays, Queues, circular queues using dynamic arrays, amazing problem, evaluation of expressions.

Linked List: single linked list and chains, representing chains in C, Linked stacks and queues, polynomials, additional list operations, equivalence classes, sparse matrices, double linked list.

UNIT –II

Trees : Introduction, Binary tree, Binary tree traversals , Additional binary tree operations, Threaded binary trees, Heaps, Binary search trees, Selection trees, Forests, Representation of disjoint sets, Counting binary trees.

UNIT-III

Graphs: The graph abstract datatype, Elementary graph operations, Minimam cost spanning trees, Shortest paths and transitive closure.

Sorting: Motivation, Insertion sort, Quick sort, Merge sort , Heap sort, sorting on several keys, list and table sorts, external sorting.

UNIT –IV

Hashing: Introduction, Static hashing, dynamic hashing, Bloom Filters.

Priority Queues: Single ended and double ended priority queues, leftist trees, Binominal Heaps, Fibonacci Heaps, Pairing Heaps, Symmetric Min-Max Heaps, and Interval Heaps.

UNIT-V

Efficient binary search trees: Optimal binary search trees, AVL Trees, RED Black Trees, Splay Trees, M- Way search trees, B-Trees, B+ -Trees.

Text Books:

1. Fundamentals of Data structures in C 2nd edition HOROWITZ , SAHNI, ANDERSON-FREED.

II B.Tech I/Sem R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANATHAPURAMU
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REGULATION - R15

15ACS11– OBJECT ORIENTED PROGRAMMING (CBCC)

L	T	P	C
3	1	0	3

Learning Objectives:

- This subject will help to improve the analytical skills of object oriented programming
- Overall development of problem solving and critical analysis
- Formal introduction to Java programming language

Learning Outcomes: On successful completion of this course, the student should be able to:

- Show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard
- Understand the basic principles of the object-oriented programming
- Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.

Unit-I :

Introduction to Java : Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.

Unit-II :

Objects and Classes : Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference.

Unit-III :

Inheritance and Polymorphism : Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.

Unit-IV :

Event and GUI programming : Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing.

Unit-V :

Multithreading in java : Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.

Text Books:

1 Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.

2 Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.

3 Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.

Reference Books:

4 Core Java Volume-I Fundamentals, Eight Edition, Horstmann& Cornell, Pearson Education.

5 The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH.

6 Java Programming, D. S. Malik, Cengage Learning.

II B.Tech – I Sem

15ACS08-OPERATING SYSTEMS

L	T	P	C
3	1	0	3

Course Objective

- To make the students understand the basic operating system concepts such as processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection.
- To get acquaintance with the class of abstractions afford by general purpose operating systems that aid the development of user applications

Course Outcomes

- Understand what makes a computer system function and the primary PC components.
- Understand past and current trends in computer technology.
- Use basic software applications.
- Add functionality to the exiting operating systems
- Design new operating systems

UNIT I

Operating Systems Overview: Operating system functions, Operating system structure, operating systems Operations, protection and security, Kernel data Structures, Computing Environments, Open- Source Operating Systems

Operating System Structure: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.

Processes: Process concept, process Scheduling, Operations on processes, Inter process Communication, Examples of IPC systems.

UNIT II

Threads: overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit threading, Threading Issues.

Process Synchronization: The critical-section problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Alternative approaches.

CPU Scheduling: Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple- Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.

UNIT III

Memory Management: Swapping, contiguous memory allocation, segmentation, paging, structure of the page table.

Virtual memory: demand paging, page-replacement, Allocation of frames, Thrashing, Memory- Mapped Files, Allocating Kernel Memory

Deadlocks: System Model, deadlock characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

UNIT IV

Mass-storage structure: Overview of Mass-storage structure, Disk structure, Disk attachment, Disk scheduling, Swap-space management, RAID structure, Stable-storage implementation.

File system Interface: The concept of a file, Access Methods, Directory and Disk structure, File system mounting, File sharing, Protection.

File system Implementation: File-system structure, File-system Implementation, Directory Implementation, Allocation Methods, Free-Space management.

UNIT V

I/O systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O requests to Hardware operations.

Protection: Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.

Text Books:

1. Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Ninth Edition, 2012, Wiley.
2. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition, 2009, Pearson Education.

Reference Books:

1. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
2. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
3. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S.Godbole, Second Edition, TMH.
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
7. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.