YBN UNIVERSITY,RANCHI

School Of Engineering and Technology

B.Tech. Semester-I **Common to all Branches**

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot							
			End Sem.	Mid Sem. MST(Two tests average)	Quiz, Assig-nment	End Sem	Term work						
							Lab work & sessional	Assignment / quiz	L	T	P		
1	YBE101	Engineering Chemistry	70	20	10	30	10	10	3	1	2	06	: One credit refers to one hour teaching in theory, Tutorial and in practical. :32 hour workload per week corresponding to LTP
2	YBE102	Engineering Mathematics -I	70	20	10				3	1		04	
3	YBE 103	Communication Skills	70	20	10	30	10	10	3	1	2	06	
4	YBE 104	Basic Electricals & Electronics Engg.	70	20	10	30	10	10	3	1	2	06	
5	YBE 105	Engineering Graphics	70	20	10	30	10	10	3	1	2	06	
6	YBE 106	Work Shop Practice	-	-	-	30	10	10	-	-	2	02	Total Mark
		Total	350	100	50	150	50	50	15	05	10	30	750

MST: Mid Semester Tests Taken at Least twice Per Semester **L:Lecture- T:Tutorial - P: Practical**

YBN UNIVERSITY,RANCHI

School Of Engineering and Technology

B.Tech. Semester-II **Common to all Branches**

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot							
			End Sem.	Mid Sem. MST	Quiz, Assign-ment	End Sem.	Term work						
							Lab work sessional	Assignment / quiz	L	T	P		
1	YBE201	Engineering Physics	70	20	10	30	10	10	3	1	2	06	: One credit refers to one hour teaching in theory, Tutorial and in practical. :32 hour workload per week corresponding to LTP
2	YBE202	Energy, Environment, Ecology & Society	70	20	10				3	1		04	
3	YBE203	Basic Mechanical Engg.	70	20	10	30	10	10	3	1	2	06	
4	YBE204	Basic Civil Engg. &Engg. Mechanics	70	20	10	30	10	10	3	1	2	06	
5	YBE205	Basic Computer Engg.	70	20	10	30	10	10	3	1	2	06	
6	YBE206	Language Lab. & Seminars	-	-	-	30	10	10	-	-	2	02	Total Mark
		Total	350	100	50	150	50	50	15	05	10	30	750

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Engineering Chemistry	YBE 101	Theory	Practical	
			Min.“D”	Min.“D”	5.0

Unit I

WATER AND ITS INDUSTRIAL APPLICATIONS :

Sources, Impurities, Hardness & its units, Industrial water characteristics, softening of water by various methods (External & Internal treatment), Boiler trouble causes, effect & remedies, Characteristics of municipal water &its treatment, Numerical problems based on softening methods.

Unit II

FUELS & COMBUSTION:

Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter Proximate and Ultimate analysis of coal and their significance, calorific value Computation based on ultimate analysis data, Carbonization, Manufacturing of coke & recovery of by products. Knocking, relationship between' knocking & structure of hydrocarbon, improvement of anti knocking characteristics of IC engine fuels, Diesel engine fuels, Cetane number, combustion and it related numericalproblems.

Unit III

A. LUBRICANTS:

Introduction, Mechanism of lubrication, Classification of lubricants, Properties and Testing of lubricating oils, Numerical problems based on testing methods.

B. CEMENT &REFRACTORIES:

Manufacture , IS-code, Setting and hardening of cement, Refractory : Introduction, classification and properties of refractories .

Unit IV

HIGH-POLYMER :

Introduction, types and classification of polymerization, Reaction. Mechanism, Natural &Synthetic Rubber; Vulcanization of Rubber, Preparation, Properties &uses of the following- Polythene, PVC, PMMA, Teflon, Poly acrylonitrile, PVA, Nylon 6, Nylon 6:6, Terylene, Phenol formaldehyde, Urea - Formaldehyde Resin, Glyptal, Silicone Resin, Polyurethanes; Butyl Rubber, Neoprene, Buna N, Buna S.

Unit V

A. INSTRUMENTAL TECHNIQUES IN CHEMICAL ANALYSIS:

Introduction, Principle, Instrumentation and applications of IR, NMR, UV, Visible, Gas Chromatography, Lambert's and Beer's Law

B. WATER ANALYSIS TECHNIQUES:

Alkalinity, hardness (Complexo-metric), Chloride, Free chlorine, DO, BOD and COD, Numerical problems based on above techniques.

Reference Books:

1. Chemistry for Environmental Engineering &Science- Sawyer, McCarty and Parkin – McGraw Hill, Education Pvt. Ltd., NewDelhi
2. Engineering Chemistry - B.K. Sharma, Krishna Prakashan Media (P) Ltd.,Meerut.
3. Basics of Engineering Chemistry - S. S. Dara& A.K. Singh, S. Chand & Company Ltd.,Delhi
4. Applied Chemistry - Theory and Practice, O.P. Viramani, A.K. Narula, New Age International Pvt. Ltd. Publishers, NewDelhi
5. Polymer Science – Ghosh, Tata McGrawHill.
6. Engg. Chemistry –ShashiChawla, DhanpatRai& company pvt. Ltd,Delhi.
7. Engg. Chemistry –Jain & Jain, DhanpatRai& company pvt. Ltd, NewDelhi
8. A Text book of Engg. Chemistry- Agrawal, C.V, Murthy C.P, Naidu, A, BSPublication, Hyderabad.

Engineering Chemistry Practical

NOTE: At least 10 of the following core experiments must be performed during the session.

1. WaterTesting

(i) Determination of Totalhardness by Complexometric titration method.
(ii) Determination of mixedalkalinity
(a) OH^- &$C0_3^{--}$
(b) CO_3^{--} &HCO_3^-
(iii) Chloride ion estimation by Argentometric method.

2. Fuels &lubricant testing:

(i) Flash &fire points determination by
a) Pensky MartinApparatus,
b) Abel'sApparatus,
c) Cleveland's open cupApparatus.
d) Calorific value by bombcalorimeter

(ii) Viscosity and Viscosity index determination by
a) Redwood viscometerNo.1
b) Redwood viscometer No.2

(iii) Proximate analysis of coal
a) Moisture content
b) Ashcontent
c) Volatile matter content
c) Carbon residue

(iv) Steam emulsification No &Anline point determination

(v) Cloud and Pour point determination of lubricating oil

3. AlloyAnalysis

(i) DeterminationofpercentageofFeinanironalloybyredoxtitrationusingN-Phenyl anthranilic acid as internalindicator.
(ii) Determination of Cu and or Cr in alloys by IodometricTitration.
(iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Engineering Mathematics - I	YBE102	Theory	Practical	
			Min."D"	-	5.0

Unit I

DIFFERENTIAL CALCULUS :

Expansion of functions by Maclaurin's and Taylor's theorem. Partial differentiation, Euler's theorem and its application in approximation and errors, Maxima and Minima of function of two variables, Curvature : Radius of curvature, centre of curvature.

Unit II

INTEGRAL CALCULUS :

Definite Integrals : Definite Integrals as a limit of a sum , its application in Summation of series, Beta and Gamma Functions , Double and Triple Integrals, Change of Order of Integration, Area,Volume and Surfaces using double and triple Integral.

Unit III

DIFFERENTIAL EQUATIONS :

Solution of Ordinary Differential Equation of first order and first degree for Exact differential Equations, Solution of Ordinary Differential Equation of first order and higher degree (solvable for p, x and y, Clairauts Equation), Linear Differential Equations with Constant Coefficients, Cauchy's Homogeneous differential Equation, Simultaneous differential Equations, Method of Variation ofParameters

Unit IV

MATRICES :

Rank, Solution of Simultaneous equation by elementary transformation, Consistency of System of Simultaneous Linear Equation, Eigen Values and Eigen Vectors, Cayley-Hamilton Theorem and its Application to find the inverse

Unit V

Algebra of Logic, Boolean Algebra, Principle of Duality, Basic Theorems, Boolean Expressions and Functions. Elementary Concept of Fuzzy Logic

Graph Theory : Graphs, Subgraphs, Degree and Distance, Tree, cycles and Network,

References:

(i) Advance Engg. Mathematics. By Ramana, Tata McGraw hill.
(ii) Higher Engineering Mathematics by BS Grewal, KhannaPublication
(iii) Advance Engineering Mathematics byD.G.Guffy
(iv) Engineering Mathematics by S SSastri.P.H.I.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Communication Skills	YBE103	Theory	Practical	
			Min.“D”	Min.“D”	5.0

Unit I - Languages and skills of communication

Linguistic techniques, Modern usages, Reading comprehension, English phonetic symbols/sings, Oral presentation, Audition Communication, Processes of Communication, Verbal and Non Verbal Communication, Barriers to Communication.

Unit II - Application of linguistic ability

Writing of definitions of Engineering terms, Objects, Processes and Principles (Listening) Topics of General Interest, Reproduction from business, daily life, travel, health, buying and selling, company structure, systems etc.

Unit III - Letter Writing:

Applications, Enquiry, Calling quotations, Tenders, Order and Complaint.

Unit IV

Precise Writing, Noting and drafting, Technical Description of simple engineering objects andprocesses (writing), Report writing, precise writing, Note writing, Slogan writing comment, Speechadvertising.

Unit V

Writing Technical reports of the type of observation report, Survey report, Report of trouble, Laboratory Report and ProjectReport on the subjects of engineering. (Speaking)Vocabulary, Presentations, Demonstrations, Conversation – Telephone media, socializing, cultural events, debates,speech.

Communicative Language Lab.

Course objective: The language lab focuses on the production and practice of sounds of English through audio – visual aids and Computer software. It intends to enable the students to speak English correctly with confidence and intends to help them to overcome their inhibitions and self – consciousness while speaking in English.

Topics to be covered in the Language laboratory sessions :

1. Basic Grammar & Vocabulary (Synonyms /Antonyms, Analogies, sentence completion, correctly spelt words, idioms, proverbs, common errors).
2. phonetic symbols and pronunciation.
3. Listening skills (Including Listening Comprehension)3
4. Reading Skills (Including Reading Comprehension)
5. Writing Skills (Including structuring resume and cover letter)
6. Speaking Skills
7. Body Language
8. Oral Presentation : Preparation and delivery using audio – visual aids with stress n body language and voice modulation (Topic to be selected by the teacher.)

Final Assessment Should be based on Assignment, presentation and interview.

Reference Books :-

1. Business Correspondence and Report Writing - By Sharma; TMH.
2. Living English Structure – By W.S. Allen; Longmans.
3. English Grammar – Ehrlich, Schaum Series; TMH.
4. Spoken Englishfor India – By R.K. Bansal and IB Harrison Orient Longman.
5. New International Business English – by Joans and Alexander; OUP.
6. Effective Technical Communication – Rizvi; TMH.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Electrical & Electronics Engineering	YBE104	Theory	Practical	
			Min."D"	Min."D"	5.0

Unit I

Electrical circuit analysis- Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, Thevenin's& superposition theorem, star-delta transformation.
1-phase AC circuits under sinusoidal steady state, active, reactive and apparent power, physical meaning of reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections.

Unit II

Transformers-Review of laws of electromagnetism, mmf, flux, andtheir relation, analysis of magnetic circuits. Single-phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuits, phasordiagram, voltage regulation, losses and efficiency, OC and SCtest.

Unit III

Rotating Electric machines- Constructional details of DCmachine, induction machine and synchronous machine, Working principle of 3-Phase induction motor, Emfequation of 3-Phase induction motor, Concept of slip in 3- Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor, Classification of self excited DC motor andgenerator.

Unit IV

Digital Electronics-Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, floating point and signed numbers, Demorgan's theorem, AND, OR, NOT, NOR, NAND, EX-NOR, EX-OR gates and their representation, truth table, half and full adder circuits, R-S flip flop, J-K flipflop.

Unit V

ELECTRONIC COMPONENTS AND CIRCUITS- Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations, different configurations and modes of operation of BJT, DC biasing of BJT.

References:

1. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, IIEdition
2. S.Ghosh,FundamentalsofElectricalandElectronicsEngineering,PHI,IIEdition.
3. Millman, Halkias& Parikh, Integrated Electronics, McGrawHill, IIEdition
4. Nagrath& Kothari, Basic Electrical Engineering, III EditionTMH.
5. J.S. Katre, Basic Electronics Engg, Max Pub.Pune.
6. Hughes, Electrical and Electronic Technology, Pearson Education IXEdition

List Of Experiments

1. Verificatiionsof Thevenin's Superpositiontheorem.
2. Study of Transformer, name plate rating, determination of rayioandpolarity.
3. Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests and estimation of voltage regulation and efficiency at various loading conditions and verification by loadtest.
4. Seperationof resistance and inductance of chokecoil.
5. Measurement of various line & phase quantities for a 3-phasecircuit.
6. Identification of different Electronicscomponents.
7. Observing input and output waveforms ofrectifiers.
8. Transistor application as amplifier andswitch.
9. Verification of truth table for variousgates.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the endof every even semester
B.Tech. Common	Engineering Graphics	YBE105	Theory	Practical	
			Min.“D”	Min.“D”	5.0

Unit I

Scales: Representative factor, plain scales, diagonal scales, scale of chords.

Conic sections: Construction of ellipse, parabola, hyperbola by different methods; Normal and Tangent.

Special Curves: Cycloid, Epi-cycloid, Hypo-cycloid, Involutes, Archimedean and logarithmic spirals.

Unit II

Projection: Types of projection, orthographic projection, first and third angle projection, **Projection of points and lines**, Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines.

Unit III

Projection of planes and solids: Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.

Unit IV

Section of Solids: Section of right solids by normal and inclined planes; Intersection of cylinders.

Development of Surfaces: Parallel line and radial - line method for right solids.

Unit V

Isometric Projections: Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.

Computer Aided Drafting (CAD): Introduction, benefit, software’s basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD.

References

1. Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTU Belgaum
2. Bhatt N.D.; Engineering Drawing,Charotar
3. VenugopalK.;Engineering Graphics; NewAge
4. John KC; Engg. Graphics for Degree;PHI.

5. Gill P.S.; Engineering Drawing;kataria
6. Jeyopoovan T.; Engineering drawing & Graphics Using AutoCAD;Vikas
7. Agrawal and Agrawal; EngineeringDrawing;TMH
8. Shah MB and Rana BC; Engg.drawing; PearsonEducation
9. LuzadderWJand DuffJM;FundamentalofEnggDrawing;PHI
10. JolheDA; Engg. Drawing an Introduction;TMH
11. Narayana K.L.; Engineering Drawing; Scitech

List of Practical:

Sketching and drawing of geometries and projections based on above syllabus

Term work: A min. of 30 hand drawn sketches (on size A4 graphic sketch Book) plus 5 CAD-printouts on size A4 sheets plus 10 sheets of size A2 or 6 sheets of size A1, (50% marks to be allotted for this record + 25% marks for attendance +25%marks for Teachers Assessmen

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Work Shop Practice	YBE 106	Theory	Practical	
			-	Min."D"	5.0

Unit I

Introduction: Manufacturing Processes and its Classification, Casting, Machining, Plastic deformation and metal forming, Joining Processes, Heat treatment process, Assembly nprocess. Powder Metallurgy, introduction to computers in manufacturing. Black Smithy Shop

Use of various smithy tools. Forging operations:Upsetting, Drawing down, Fullering, Swaging, Cutting down, Forge welding, Punching and drafting. Suggested Jobs : Forging of chisel., forging of Screw Driver

Unit II

Carpentry Shop:

Timber : Type, Qualities of timber disease, Timber grains, Structure of timber, Timber, Timber seasoning, Timber preservation .Wood Working tools: Wood working machinery, joints & joinery. Various operations of planning using various carpentry planes sawing & marking of various carpentry joints.

Suggested Jobs :Name Plate ,Any of the Carpentry joint like mortise or tennon joint

Unit III

Fitting Shop:

Study and use of Measuring instruments, Engineer steel rule, Surface gauges caliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling tapping Fitting operations: Chipping filling, Drilling and tapping.Suggested Jobs :Preparation of job piece by making use of filling, sawing and chipping , drilling and tapping operations.

Unit IV

Foundry: Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns. Moulding: Properties of good mould& Core sand, Composition of Green , Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mould using single piece and split patterns.

Unit V

Welding: Study and use of tools used for Brazing, Soldering, Gas& Arc welding. Preparing Lap & Butt joints using gas and arc welding methods, Study of TIG & MIG welding processes .Safety precautions.

Reference Books:

1. Bawa HS; Workshop Practice,TMH
2. Rao PN; Manufacturing Technology- Vol.1& 2,TMH
3. John KC; Mechanical workshop practice;PHI
4. HazaraChoudhary; Workshop Practices -, Vol. I &II.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Engineering Physics	YBE 201	Theory	Practical	
			Min."D"	Min."D"	5.0

Unit I

Quantum Physics

Group and particle velocities & their relationship. Uncertainty principle with elementary proof and applications (determination of position of a particle by a microscope, non existence of electron in nucleus, diffraction of an electron beam by a single slit). Compton scattering. Wave function and its properties, energy and momentum operators, time dependent and time independent Schrödinger wave equation. Application of time independent Schrödinger wave equation to particle trapped in a one dimensional square potential well (derivation of energy eigen values and wave function)

Unit II

Wave Optics

Interference: Fresnel's biprism, Interference in thin films (due to reflected and transmitted lght), interference from a wedge shaped thin film, Newton's rings and Michelson's interferometer experiments and their applications. Diffraction at single slit, double slit and n-slits (diffraction grating).Resolving power of grating and prism. Concept of polarized light, Brewster's laws, Double refraction, Nicol prism, quarter & half wave plate.

Unit III

Nuclear Physics

Nuclear liquid drop model (semi empirical mass formula), nuclear shell model, Linear Particle acceleratos: Cyclotron, general description of Synchrotron, Synchrocyclotron, and Betatron. Geiger- Muller Counter, Motion of charged particles in crossed electric and magnetic fields.Uses ofBainbridge and AustonmassSpectrographs.

Unit IV

Solid State Physics

Qualitative discussion of Kronig Penny model (no derivation), Effective mass, Fermi-Dirac statistical distribution function, Fermi level for Intrinsic and Extrinsic Semiconductors, Zenerdiode, tunnel diode, photodiode, solar-cells, Halleffect. Superconductivity: Meissner effect, Type I and Type II superconductors, Di-electric polarization, Complex permittivity, dielectric losses

UNIT V

Laser and Fiber Optics

Laser: Stimulated and spontaneous processes, Einstein's A & B Coefficients, transition probabilities, active medium, population inversion, pumping, Optical resonators, characteristicsof laser beam. Coherence, directionality and divergence.Principles and working of Ruby, Nd:YAG, He-Ne & Carbon dioxide Lasers with energy level diagram.. Fundamental idea about optical fiber, types of fibers, acceptance angle &cone, numerical aperture, V-number, propagation of light through step index fiber (Raytheory) pulse dispersion, attenuation, losses &various uses.

Applications of lasers and optical fibers.

Reference Books: -

1. Optics By Ghatak, TMH
2. Engineering Physics- V. S. Yadava, TMH
3. Optics by Brijlaland Subhraininyan.
4. Engineering physics by M.N. Avadhanuluand. S. Chand &Co.(2004)
5. Atomic and Nuclear physics by Brijlal andSubraminiyan.
6. Concepts of Modern Physics- Beiser, TMH
7. Solid State Physics by Kittel ,Wiley India
8. Fundamentals of Physics-Halliday, Wiley India

List of suggestive core experiments: -

1. Biprism, Newton's Rings, Michelsons Interferometer.
2. Resolving Powers –Telescope, Microscope, and Grating.
3. G.M. Counter
4. Spectrometers-R.I., Wavelength, using prism and grating
5. Optical polarization based experiments: Brewster's angle, polarimeteretc.
6. Measurements by LASER-Directionality, Numerical aperture, Distanceetc.
7. Uses of Potentiometers and Bridges (Electrical)..
8. Experiments connected with diodes and transistor.
9. Measurement of energy band gap of semiconductor.
10. To study Hall effect.
11. Solar cell.
12. To find the width of s single slit by f He-Ne Laser.
13. To determine the numeral aperture (NA) of a Optical Fibre.
14. To determine plank's constant.
15. Other conceptual experiments related to theory syllabus.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			Theory	Practical	
B.Tech. Common	Energy , Environment , Ecology & Society	YBE 202	Min."D"	-	5.0

Unit –I

Energy- Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass Geothermal, Hydrogen, Solar, Wind, hydal, nuclear sources.

Unit –II

Ecosystem – Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation,

Unit–III

Air Pollution & Sound Pollution -

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain. Sound Pollution: Causes, controlling measures, measurement ofsound pollution (deciblage), Industrial and non – industrial.

Unit –IV

Water Pollution– Water Pollution: Pollutants in water, adverse effects.Treatment of Domestic & Industrial water effluent.

Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

Unit –V

Society, Ethics & Human values– Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study . Preliminary studies regarding Environmental Protection Acts , introduction to value education, self exploration, sanyam & swasthya.

References:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3. Raynold, GW "Ethics in information Technology"; Ceng age.
4. Svakumar; Energy Environment & Ethicsin society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6. BK Sharma, "Environmental Chemistry"; Goel Publ. House.

7. Bala Krishna moorthy;“Environmental management”; PHI
8. Gerard Kiely, “Environmental Engineering” ; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. CunninghanWP and MA; principles of Environment Sc;TMH

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Basic Mechanical Engineering	YBE 203	Theory	Practical	
			Min.“D”	Min.“D”	5.0

UNIT- 1

Materials: Classification of engineering material, composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

UNIT-2

Measurement: Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainly analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lath, drilling, milling and shaping machines.

UNIT-3

Fluids: Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernauli’s equation for incompressible fluids, viscous and turbulent flow, working principle of fluidcoupling, pumps, compressors, turbines, positive displacement machines and pneumatic machines. Hydraulic power & pumped storage plants for peak load management as compared to base load plants.

UNIT-4

Thermodynamics: First andsecond law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, efficiency & performance analysis, natural and induced draught, calculation of chimney height. Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), refrigerant properties &eco friendlyrefrigerants.

UNIT-5

Reciprocating Machines: Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol & diesel IC engines

Reference Books:-

1. Narula; Material Science; TMH
2. Agrawal B &CM; Basic Mechanical Engg. WileyIndia
3. Nag PK, Tripathi et al; Basic Mechanical Engg; TMH
4. Rajput; Basic Mechanical Engg;
5. Sawhney GS; Fundamentals of Mechanical Engg; PHI
6. Nakra and Chaudhary; Instrumentation & measurement; TMH
7. Nag PK; Engineering Thermodynamics; TMH
8. Ganesan; Combustion Engines; TMH

List of Suggestive core Experiments(Please Expand it)

1. Tensile testing of standard mild steel specimen.
2. Experiments on Bernoulli's theorem.
3. Flow measurements by ventury and orificemeters.
4. Linear and angular measurement using, Vernier; micrometer, slip gauge, dial gauge and sine-bar.
5. Study of different types of boilers and mountings.
6. Experiment on mini-boiler (50Kg/Hour)
7. To find COP of a refrigeration unit.
8. Study of different IC engines & measurement of B.H.P. using rope/ belt dynamometer.
9. Analysis of exhaust gases on petrol, diesel & bio diesel engines.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Basic Civil Engineering & Engineering Mechanics	YBE 204	Theory	Practical	
			Min."D"	Min."D"	5.0

Unit I

Building Materials & Construction

Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete, Nominal proportion of Concrete preparation of concrete, compaction, curing. Elements of Building Construction, Foundations conventional spread footings, RCC footings, brick masonry walls, plastering and pointing, floors, roofs,Doors, windows, lintels, staircases – types and their suitability

Unit – II Surveying & Positioning:

Introduction to surveying Instruments – levels, thedolites, plane tables and related devices.Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurementof directions by different methods, measurement of elevations by different methods. Reciprocal leveling.

Unit –III Mapping & Sensing:

Mapping details and contouring, Profile Cross sectioning and measurement of areas, volumes, application of measurements in quantity computations, Survey stations, Introduction of remote sensing and its applications.

Engineering Mechanics

Unit - IV

Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and non-concurrent Co- planner forces, free Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems

Unit – V

Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes.

Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple.

Reference Books:

1. S. Ramamrutam & R. Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
2. Prasad I.B., Applied Mechanics, Khanna Publication.
3. Punmia, B.C., Surveying, Standard book depot.
4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
5. S.P, Timoshenko, Mechanics of stricture, East West press Pvt. Ltd.
6. Surveying by Duggal – Tata McGraw Hill New Delhi.
7. Building Construction by S.C. Rangwala- Charotar publications House, Anand.
8. Building Construction by Grucharan Singh- Standard Book House, New Delhi
9. Global Positioning System Principles and application- Gopi,TMH
10. R.C. Hibbler– Engineering Mechanics: Statics & Dynamics.
11. A. Boresi & Schmidt- Engineering Mechines- statics dynamics, Thomson' Books
12. R.K. Rajput, Engineering Mechanics S. Chand & Co.

List of suggestive core Experiments:

Students are expected to perform minimum ten experiments from the list suggested below by preferably selecting experiments from each unit of syllabus.

S.No. Title

1. Toper form traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
2. To perform leveling exercise by height of instrument of Rise and fall method.
3. To measure horizontal and vertical angles in the field by usingTheodolite.
4. To determine (a) normal consistency (b) Initial and Final Setting time of a cement Sample.
5. To determine the work ability of fresh concrete of given proportions by slump test or compaction factor test.
6. To determine the Compressive Strength of brick.
7. To determine particle size distribution and fineness modulus of course and fine Aggregate.
8. To verify the law of Triangle of forces and Lami's theorem.
9. To verify the law of parallelogram of forces.
10. To verify law of polygon of forces
11. To find the support reactions of a given truss and verify analytically.
12. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
13. To determine the moment of inertia of fly wheel by falling weight method.
14. To verify bending moment at a given section of a simply supported beam.

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Basic Computer Engineering	YBE 205	Theory	Practical	
			Min.“D”	Min.“D”	5.0

UNIT I

Computer: Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software. Computer Application in e-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc.

Operating System: Definition, Function, Types, Management of File, Process &Memory.

Introdcutionto MS word, MS powerpoint, MS Excel

UNIT II

Introduction to Algorithms, Complexities and Flowchart, Introduction to Programming, Categories of Programming Languages, Program Design, Programming Paradigms, Characteristics or Concepts of OOP, Procedure Oriented Programming VS object oriented Programming.

Introduction to C++: Character Set, Tokens, Precedence and Associativity, Program Structure, Data Types, Variables, Operators, Expressions, Statements and control structures, I/O operations, Array, Functions,

UNIT III

Object & Classes, Scope Resolution Operator, Constructors & Destructors, Friend Functions, In heritance, Polymorphism, Overloading Functions & Operators, Types of Inheritance, Virtual functions.

Introduction to Data Structures.

UNIT IV

Computer Networking: Introduction, Goals, ISO-OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model. Introduction to Internet, World Wide Web, E-commerce

Computer Security Basics: Introduction to viruses, worms, malware, Trojans, Spyware and Anti-Spyware Software, Different types of attacks like Money Laundering, Information Theft, Cyber Pornography, Email spoofing, Denial of Service (DoS), Cyber Stalking, ,Logic bombs, Hacking Spamming, Cyber Defamation , pharming Security measures Firewall, Computer Ethics & Good Practices, Introduction of Cyber Laws about Internet Fraud, Good Computer Security Habits,

UNIT V

Data base Management System: Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages.

Cloud computing: definition, cloud infrastructure, cloud segments or service delivery models (IaaS, PaaS and SaaS), cloud deployment models/ types of cloud (public, private, community and hybrid clouds), Pros and Cons of cloud computing

List of Experiment

01. Study and practice of Internal & External DOS commands.
02. Study and practice of Basic linux Commands – ls, cp, mv, rm, chmod, kill, psetc.
03. Study and Practice of MS windows – Folder related operations, My-Computer, window explorer, Control Panel,
04. Creation and editing of Text files using MS-word.
05. Creation and operating of spreadsheet using MS-Excel.
06. Creation and editing power-point slides using MS- power point
07. Creation and manipulation of database table using SQL in MS-Access. 08.WAP to illustrate Arithmetic expressions
09. WAP to illustrate Arrays.
10. WAP to illustrate functions.
11. WAP to illustrate constructor & Destructor
12. WAP to illustrate Object and classes.
13. WAP to illustrate Operator over loading
14. WAP to illustrate Function over loading
15. WAP to illustrate Derived classes &Inheritance
16. WAP to insert and delete and element from the Stack
17. WAP to insert and delete and element from the Queue
18. WAP to insert and delete and element from the Linked List

Recommended Text Books:

1. Fundamentals of Computers : E Balagurusamy, TMH
2. Basic Computer Engineering: Silakari and Shukla, WileyIndia
3. Fundamentals of Computers : V Rajaraman,PHI
4. Information Technology Principles and Application: Ajoy Kumar Ray &Tinku Acharya PHI.

Recommended Reference Books:

1. Introduction of Computers : Peter Norton, TMH
2. Object Oriented Programming with C++ :E.Bala gurusamy, TMH
3. Object Oriented Programming in C++: Rajesh K. Shukla, Wiley India
4. Concepts in Computing: Kenneth Hoganson, Jones & Bartlett.
5. Operating Systems – Silbers chatz and Galvin – Wiley India
6. Computer Networks: And rew Tananbaum, PHI
7. Data Base Management Systems, Korth, TMH
8. Cloud Computing, Kumar, WileyIndia

Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.Tech. Common	Communicative Language	YBE 206	Theory	Practical	
			-	Min."D"	5.0

Course objective:

This course intends to impart practical training in the use of English Language for Communicative purposes and aims to develop students' personality through LanguageLab.

Topics to be covered in the Language laboratory sessions:

1. Introducing oneself, family, social roles, personal image design, building relationships, body language, concept of time andspace.
2. Public Speaking and oral skills with emphasis on conversational practice, Role plays, extempore speech, JAM (Just a minute sessions), describing objects and situations, giving directions, debate, telephonicetiquette.
3. Reading Comprehension: Intensive reading skills, rapid reading, and reading aloud (Reading material to be selected by theteacher).
4. Translation from English to Hindi and viceversa.
5. Oral Presentation: preparation and delivery (Topic to be selected by the teacher.)

Assessment Criterion:

OralPresentation	10
Assignment	20
VivaVoice	20

YBN UNIVERSITY, RANCHI, JHARKHAND
School of Engineering & Technology

B.Tech. Semester III — Electrical Engineering

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot			Total Marks					
			End Sem.	Mid Sem. MST (Two tests average)	Quiz, Assig-nment	End Sem	Term work			Period per week				
							Lab work & sessional	Assignment/ quiz		L	T	P		
1	YBE301	Mathematics -II	70	20	10	-	-	-	100	3	1	-	04	
2	YBEE302	Electrical Engg. Materials	70	20	10	-	-	-	100	3	1	-	04	
3	YBEE303	Electrical Instrumentation	70	20	10	30	10	10	150	3	1	2	06	
4	YBEE304	Semiconductor Devices and circuits	70	20	10	30	10	10	150	3	1	2	06	
5	YBEE305	Network Analysis	70	20	10	30	10	10	150	3	1	2	06	
6	YBEE306	Java Programming	-	-	-	30	10	10	50	0	0	2	02	
7	YBEE307	Self study (Internal Assesment)	-	-	-	-	-	50	50	0	0	2	02	Grand Total
8.	YBEE308	Seminar / Group Discussion (Internal Assessment)	-	-	-	-	-	50	50	0	0	2	02	
		Total	350	100	50	120	40	140	800	15	5	12	32	800

MST: Mid Semester Tests Taken at Least twice Per Semester
L:Lecture- T:Tutorial- P: Practical

YBE 301 - ENGINEERING MATHEMATICS II

Unit-1

Fourier Series: Introduction of Fourier series , Fourier series for Discontinuous functions, Fourier series for even and odd function, Half range series Fourier Transform: Definition and properties of Fourier transform, Sine and Cosine transform.

Unit II

Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, second shifting property, Laplace transform of the derivative, Inverse Laplace transform & its properties, Convolution theorem, Applications of L.T. to solve the ordinary differential equations

Unit III

Second Order linear differential equation with variable coefficients : Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method

Unit IV

Linear and Non Linear partial differential equation of first order: Formulation of partial differential equations, solution of equation by direct integration, Lagrange's Linear equation, charpit's method. Linear partial differential equation of second and higher order: Linear homogeneous and Non homogeneous partial diff. equation of nth order with constant coefficients. Separation of variable method for the solution of wave and heat equations

Unit V

Vector Calculus: Differentiation of vectors, scalar and vector point function, geometrical meaning of Gradient, unit normal vector and directional derivative, physical interpretation of divergence and Curl. Line integral, surface integral and volume integral, Green's, Stoke's and Gauss divergence theorem

References

(i) Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India
(ii) Higher Engineering Mathematics by BS Grewal, Khanna Publication
(iii) Advance Engineering Mathematics by D.G.Guffy
(iv) Mathematics for Engineers by S.Arumungam, SCITECH Publuication
(v) Engineering Mathematics by S S Sastri. P.H.I.

YBEE302 Electrical Engg. Materials

Unit I

Conducting Material: Classification and main properties, High resistivity alloy: Constant Mangann,Nichrome, Electrochemical, properties of copper, Aluminum, steel tungsten, Molybdenum,Platinum, Tantalum, Niobium, Mercurry, Nickel, Titanum, Carbon, Lead, thermal, Bitmetals, thermocouple,materials, specific resistance, conductance, variation of resistance with temperature, super conductors.

Unit II

Semi Conductor Materials: General conception, variation of electrical conductivity, Elements having semiconductor properties, general application, hall effect, energy levels, conduction in semiconductors, Intrinsic conduction, impurity conduction, P and N type impurities, electrical change, Neutrality, Drift, Mobility current flow in semi conductors P-N junction formation by alloying, Elasing (forward and reverse) of P-n junction, Reverse separation current, Zener effect, Junction, capacitance, hall defects and hall coeffiecient.

Unit III

Magnetic Materials: Details of magnetic materials, reduction between B.H. and □, soft and hard magnetic materials. Di-magnetic, Para magnetic and Ferromagnetic materials, electrical sheet steel, cast iron. Permanent magnetic materials. Dynamic and static hysteresis loop. Hysterisis loss, eddy current loss, Magnetisation, magnetic susceptibility, coercive force, core temperature, rectangular hysteresia loop, Magnet rest square loop core materials, iron silicon, Iron alloys.

Unit IV

Insulating Materials: General electrical mechanical and chemical properties of insulating material, Electrical characteristics volume and surface resistivity complex permitivity loss, and dielectric loss, equivalent circuits of an imperfect dielectric polarization and polarisability classification of dielectric.

Unit V

Mechanical Properties: Classification insulating materials on the basis of temperature rise. General properties of transformer oil, commonly used varnishes, solidifying insulating materials, resins, bituminous waxes, drying oils, Fibrous insulating materials, wood, paper and cardboard, insulating textiles, varnished adhesive tapes, inorganic fibrous material and other insulating materials, such as mica, ceramic, bakelite, ebonite, glass, PVC, rubber, other plastic molded materials.

References:

1. TTTI Madras; Electrical Engineering Materials; TMH.
2. Electrical Engineering Material s & Devices; John Allison ;TMH
3. Materials for Electrical Engineering: B.M. Tareev
4. Anderson; Di-Electrics :
5. Kortisky; Electrical Engineering Materials:
6. Indulkar and S. Thruvengadem; Electrical Engineering Materials; S. Chand
7. Dekkor AK; Electrical Engineering Materials; PHI.

YBEE 303 Electrical Instrumentation

Unit I

Measurement and error, Accuracy and precision, sensitivity resolution, Error & Error analysis, Effect of temperature, Internal friction, Stray field, Hysterisis and Frequency variation & method of minimizing them, Loading effects, due to shunt connected and series connect ed instruments, calibration curve, Testing & calibration of instruments.

Galvanometers – Theory & operation of ballistic galvanometer, D'arsonal galvanometer, galvanometer motion & damping, Sensitivity, Flux meter, Vibration galvanometer, Spot deflection galvanometer. Definition of analog & digital instruments, Classification of analog instruments, theiroperating principle, Operating force, Types of supports, Damping, Controlling.

Unit II

Different types of Ammeter & Voltmeter – PMMC, MI, Electrodynamometer, Hotwire, Electrostatic, Induction, Rectifier, Ferro dynamic & Electro-thermic, Expression for control & deflection torque, their advantages, disadvantages & error, Extension of range of instruments usingshunt & multiplier.

Unit III

Instrument transformers: Potential and current transformers, ratio and phase angle errors, testing of instrument transformers, Difference between CT and PT, errors and reduction of errors.

Measurement of power: Power in AC and DC Circuit, Electrodynamometer type of wattmeter, Construction, theory, operation & error, Low power factor & UPF wattmeter, Double element andthree element dynamometer wattmeter, Measurement of power in three phase circuit, one, two & three wattmeter method, Measurement of reactive power by single wattmeter, Measurement of power using CTs & PTs.

Unit IV

Measurement of Energy: Single phase induction type energy meter – construction & operation –driving and braking torques –errors & compensations – Testing by phantom loading and using

R.S.S. meter- Three phase energy meter – Tri-vector meter – Maximum demand meter, Ampere hour meter.

Potentiometer – DC potentiometer standardization – Lab type Crompton's potentiometer, application of DC potentiometer, AC polar type and coordinate type potentiometer, their construction and applications.

Unit V

Miscellaneous Instruments & Measurements: Power factor meter, Single phase and three phase Electro-dynamometer type & moving iron type.

Frequency meter – Vibrating reed, Resonance type & Weston type, Synchronoscope, Ohmmeter –series & stunt type, Multi-meter, Megger & Ratio meter.

Resistance Measurement – Classification of low, medium & high resistance – Voltmeter, Ammeter, Wheatstone Bridge, Kelvin's double bridge & loss of charge methods for resistance measurement, **Earth resistance** measurement.

Magnetic Measurement – B-H Curve, Hysterisis Loop determination, Power loss in sheet metal –Lloyd Fischer square for measurement of power loss.

References:

1. E W Golding & F C Widdis; Electrical Measurement & Measuring Instruments; Wheeler Pub.
2. A.K. Sawhney; Electrical & Electronic Measurements & Instrument; Dhanpat Rai & Sons Pub.
3. Buckingham & Price; Electrical Measurements; Prentice Hall

List of experiments (Expandable):

1. Measurement of low resistance using Kelvin's Double bridge
2. Measurement of medium resistance using Wheatstone's bridge
3. Measurement of high resistance by loss of charge method
4. Measurement of Insulation resistance using Megger
5. Measurement of earth resistance by fall of potential method and verification by using earth tester
6. Measurement of power in a single phase ac circuit by 3 voltmeter/ 3 Ammeter method
7. Calibration of a dynamometer type of wattmeter with respect to a standard/Sub Standard wattmeter
8. Calibration of a induction type single phase energy meter
9. Calibration of a dynamometer type of wattmeter by Phantom Loading method
10. Measurements using Instrument Transformers
11. Study of various types of Indicating Instruments
12. Measurement of Power in three phase circuit by one, two & three wattmeters.

YBEE304 Semiconductor Devices and circuits

Unit I

Semiconductor device, theory of P-N junction, temperature dependence and break down characteristics, junction capacitances, Zener diode, Varactor diode, PIN diode, LED, Photo diode, Transistors BJT, FET, MOSFET, types, working principal, characteristics, and region of operation, load line biasing methods,. transistor as an amplifier, gain, bandwidth, frequency response, Variousapplications of diode and special diodes.

UNIT II

Small signal analysis of transistor (low frequency) using h-parameters, thermal runaway and thermalstability.

Unit III

Feedback amplifier, negative feedback, voltage-series, voltage shunt ,current series and current shunt feedback , Sinusoidal oscillators, L-C (Hartley-Colpitts) oscillators, RC phase shift, Wien bridge, and Crystal oscillators. Power amplifiers, class A, class B , class A B, C amplifiers , their efficiency and power Dissipation, Pushpull and complimentary pushpull amplifier.

Unit IV

Switching characteristics of diode and transistor, turn ON, OFF time, reverse recovery time , transistor as switch , Multivibrators, Bistable, Monostable, Astable multivibrators. Cllipers and clampers, Differential amplifier, calculation of differential , common mode gain and CMRR using h-parameters, Darlington pair , Boot strapping technique. Cascade and cascade amplifier.

Unit V

Operational amplifier characteristics, slew rate , bandwidth, offset voltage ,basic current, application ,inverting , non inverting amplifier , summer , average, differentiator, integrator, differential amplifier ,instrumentation amplifier , log and antilog amplifier , voltage to current and current to voltage converters , comparators Schmitt trigger , active filters, 555 timer and its application.

References:

1. Nashelsky & Boysted; Electronic Devices and Circuits; PHI
2. Millman Halkias; Electronic Devices and Circuits; McGraw- Hill
3. Achuthan MA and Bhatt KN; Fundamentals of semiconductor devices; TMH
4. Neamen Donald; Semiconductor Physics and devices
5. Millman & Grabel; Micro Electronics; McGraw-Hill
6. Bogart; Electronic Devices and Circuits; Universal Book Stall, NDelhi
7. Millman & Halkias; Integrated Electronics; McGraw- Hill.
8. Tobbey; OP- Amps their design and Application
9. R.A. Gaikward; OP- Amp and linear Integreted circuit; PHI
10. D. Raychowdhary and Shail Jain; Linear Integrated Circuits
11. Botkar; Integrated Circuits; Khanna
12. Clayton; Applications of linear Integrated circuits
13. I.J. Nagrath; Electronics -Analog and Digital; PHI

List of experiments (Expandable):

1 V-I Characteristics of different types of Diodes.
2 Applications of diodes and Design of various clipping and clamping circuits. 3 Design half & full wave rectifier
4 Design & Analysis of transistor amplifier in CE, CB & CC configuration.
5 Design & Analysis of JFET Amplifier.
6 Design & Analysis of MOSFET Amplifier.
7 To study and construct power amplifiers of various classes. 8 Study of various oscillators.
9 Char. of Op-Amp (input offset voltage, slew rate CMRR, BW, Input bias current)
10 Linear application of OP-Amp (voltage follower, inviting and non-inverting amplifier and their frequency response adder subtractor differential amplifier, integrator and differential frequency response) .
11 study of Op-Amp as a comparator12 design of Schmitt trigger
13 Design of monoastable & astable multivibrator

NOTE- All experiments (wherever applicable) should be performed through the following steps.

Step 1:
Circuit should be designed/ drafted on paper.

Step 2: Where ever applicable the designed/drafted circuit should be simulated using Simulation S/W (TINA-V7/ PSPICE/ Labview/ CIRCUIT MAKERetc.).

Step 3: The designed/drafted circuit should be tested on the bread board and compare the resultswith the simulated results.

Step 4: Where ever required the bread board circuit should be fabricated on PCB.

YBEE305 Network analysis

Unit-1

Introduction to circuit elements R,L,C and their characteristics in terms of linearity & time dependant nature, voltage & current sources controlled & uncontrolled sources KCL and KVL analysis, Nodal & mesh analysis, analysis of magnetically coupled circuits, Transient analysis :- Transients in RL, RC&RLC Circuits, initial conditions, time constants. Steady state analysis- Concept of phasor & vector, impedance & admittance, Network topology, concept of Network graph, Tree, Tree branch & link, Incidence matrix, cut set and tie set matrices, dual networks, Dot convention, coupling co- efficient, tuned circuits, Series & parallel resonance.

Unit II

Network Theorems for AC & DC circuits- Thevenins & Norton's, Superpositions, Reciprocity, Compensation, Substitution, Maximum power transfer, and Millman's theorem, Tellegen's theorem,problems with dependent & independent sources.

Unit III

Frequency domain analysis – Laplace transform solution of Integro-differential equations, transform of waveform synthesized with step ramp, Gate and sinusoidal functions, Initial & final value theorem,Network Theorems in transform domain

Unit IV

Concept of signal spectra, Fourier series co-efficient of a periodic waveform, symmetries as relatedto Fourier coefficients, Trigonometric & Exponential form of Fourier series.

Unit V

Network function & Two port networks – concept of complex frequency, Network & Transfer functions for one port & two ports, poles and zeros, Necessary condition for driving point & transfer function. Two port parameters – Z,Y, ABCD, Hybrid parameters, their inverse & image parameters,relationship between parameters, Interconnection of two ports networks, Terminated two port network.

References:

1. M.E. Van Valkenburg, Network Analysis, (PHI)
2. F.F.Kuo, Network Analysis.
3. Mittal GK; Network Analysis; Khanna Publisher
4. Mesereau and Jackson; Circuit Analysis- A system Approach; Pearson.
5. Sudhakar & Pillai; Circuit & Networks- Analysis and Synthesis; TMH
6. Hayt W.H. & J.E. Kemmerly; Engineering Circuit Analysis; TMH
7. Decarlo lin; Linear circuit Analysis; Oxford
8. William D Stanley : Network Analysis with Applications, Pearson Education
9. Roy Choudhary D; Network and systems; New Age Pub
10. Charles K. Alexander & Matthew N.O. Sadiku: Electrical Circuits :TMH
11. Chakraborti :Circuit theory: Dhanpat Rai
12. B.Chattopadhyay & P.C.Rakshit; Fundamental of Electrical circuit theory; S Chand
13. Nilson & Riedel , Electric circuits ;Pearson

List of experiments (Expandable):

1. To Verify Thevenin Theorem.
2. To Verify Superposition Theorem.
3. To Verify Reciprocity Theorem.
4. To Verify Maximum Power Transfer Theorem.
5. To Verify Millman's Theorem.
6. To Determine Open Circuit parameters of a Two Port Network.
7. To Determine Short Circuit parameters of a Two Port Network.
8. To Determine A,B, C, D parameters of a Two Port Network
9. To Determine h parameters of a Two Port Network
10. To Find Frequency Response of RLC Series Circuit.
11. To Find Frequency Response of RLC parallel Circuit.

NOTE- - All experiments (wherever applicable) should be performed through the following steps. **Step 1**: Circuit should be designed/ drafted on paper. **Step 2**: Where ever applicable the designed/drafted circuit should be simulated using Simulation S/W (TINA-V7/ PSPICE/ Labview/ CIRCUIT MAKER etc.). **Step 3**: The designed/drafted circuit should be tested on the bread boardand compare the results with the simulated results. **Step 4**: Where ever required the bread boardcircuit should be fabricated on PCB.

YBEE306 Java Technology

UNIT-I

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methodsand Classes

UNIT–II

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithmsorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

UNIT–III

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

UNIT–IV

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT–V

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
2. E. Balaguruswamy, "Programming In Java"; TMH Publications
3. The Complete Reference: Herbert Schildt, TMH
4. Peter Norton, "Peter Norton Guide To Java Programming", Techmedia.
5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall

List of Program to be perform (Expandable)

1. Installation of J2SDK
2. Write a program to show Concept of CLASS in JAVA
3. Write a program to show Type Casting in JAVA
4. Write a program to show How Exception Handling is in JAVA
5. Write a Program to show Inheritance and Polymorphism
6. Write a program to show Interfacing between two classes

7. Write a program to Add a Class to a Package
8. Write a program to demonstrate AWT.
9. Write a program to Hide a Class
10. Write a Program to show Data Base Connectivity Using JAVA
11. Write a Program to show “HELLO JAVA ” in Explorer using Applet
12. Write a Program to show Connectivity using JDBC
13. Write a program to demonstrate multithreading using Java.
14. Write a program to demonstrate applet life cycle.

YBEE307 Self Study (Internal Assessment)

Objective of Self Study: is to induce the student to explore and read technical aspects of hisarea of interest / hobby or new topics suggested by faculty.

Evaluation will be done by assigned faculty based on report/seminar presentation and viva.

YBEE308 Seminar / Group Discussion(Internal Assessment)

Objective of GD and seminar is to improve the MASS COMMUNICATION and CONVINCING/ understanding skills of students and it is to give student an opportunity to exercise their rights toexpress themselves.

Evaluation will be done by assigned faculty based on group discussion and power point presentation.

YBN UNIVERSITY, RANCHI, JHARKHAND
School of Engineering & Technology

B.Tech. Semester IV — Electrical Engineering

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot			Total Marks					
			End Sem.	Mid Sem. MST (Two tests average)	Quiz, Assig-nment	End Sem	Term work			Period per week				
							Lab work & sessional	Assignment/ quiz		L	T	P		
1	YBE401	Mathematics -III	70	20	10	-	-	-	100	3	1	-	04	
2	YBEE402	Electrom agnetic Theory	70	20	10	-	-	-	100	3	1	-	04	
3	YBEE403	Power System	70	20	10	30	10	10	150	3	1	2	06	
4	YBEE404	Electric M/C -1	70	20	10	30	10	10	150	3	1	2	06	
5	YBEE405	A D Communication	70	20	10	30	10	10	150	3	1	2	06	
6	YBEE406	Dot Net	-	-	-	30	10	10	50	0	0	2	02	
7	YBEE407	Self study (Internal Assessment)	-	-	-	-	-	50	50	0	0	2	02	Grand Total
8.	YBEE408	Seminar / Group Discussion (Internal Assessment)	-	-	-	-	-	50	50	0	0	2	02	
		Total	350	100	50	120	40	140	800	15	5	12	32	800

MST: Mid Semester Tests Taken at Least twice Per Semester
L:Lecture- T:Tutorial- P: Practical

YBE401 - ENGINEERING MATHEMATICS III

Unit-1

Functions of complex variables : Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line Integral, Cauchy's Theorem, Cauchy's Integral Formula, Singular Points, Poles & Residues, Residue Theorem, Application of Residues theorem for evaluation of real integrals

Unit II

Errors & Approximations, Solution of Algebraic &Trancedental Equations (RegulaFalsi , Newton-Raphson, Iterative, Secant Method), Solution of simultaneous linear equatins by Gauss Elimination, Gauss Jordan, Crout's methods , Jacobi's and Gauss-Siedel Iterative methods

Unit III

Difference Operators, Interpolation (Newton Forward & Backward Formulae, Central Interpolation Formulae, Lagrange's and divided difference formulae), Numerical Differentiation and Numerical Integration.

Unit IV

Solution of Ordinary Differential Equations(Taylor's Series, Picard's Method, Modified Euler's Method, Runge-Kutta Method, Milne's Predictor & Corrector method), Correlation and Regression, Curve Fitting (Method of Least Square).

Unit V

Concept of Probability : Probability Mass function, Probability density function. Discrete Distribution: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Exponential Distribution, Gamma Distribution, Beta Distribution ,Testing of Hypothesis |:Students t-test, Fisher's z-test, Chi-Square Method

Reference:

(i) Numerical Methods using Matlab by J.H.Mathews and K.D. Fink, P.H.I.
(ii) Numerical Methods for Scientific and Engg. Computation by MK Jain, Iyengar and RK Jain, New Age International Publication
(iii) Mathematical Methods by KV Surya narayan Rao, SCITECH Publuication
(iv) Numerical Methods using Matlab by Yang,Wiley India
(v) Pobability and Statistics by Ravichandran ,Wiley India
(vi) Mathematical Statistics by George R.,Springer

YBEE402 Electromagnetic Theory

Unit I

Cartesian, cylindrical & spherical co-ordinate systems, scalar & vector fields, gradient, divergence & curl of a vector field, Divergence theorem &Stokes's theorem, concept of vectors. Electrostatic Fields – Coulomb's law, electric field intensity due to different charge distribution viz. linecharge, sheet charge, Field due to continuous volume–electric potential, properties of potential function, potential gradient equipotential surfaces, line of force, Gauss law, applications of Gauss law, Gauss law in point form, method ofimages.

Unit II

Laplace's & Poisson's equations, solution of Laplace's equation, Electric dipole, dipole moment, potential & electric field intensity due to dipole, Behavior of conduct or sinanel ectric field. Conductor & insulator, electric field inside a dielectric, polarization, Boundary value conditions for electric Field, Capacitance & Capacitances of various types of capacitors Energy stored and energy densityinstaticelectricfield,Currentdensity,conduction&convectioncurrentdensityohmslawi n point form, equation of continuity.

Unit III

Static Magnetic Field, Biot-Savart's law, Magnetic Field intensity due to straight current carrying filament, circular, square and solenoidal current carrying wire, Relationship between magnetic flux, flux density & magnetic Field intensity; Ampere's circuital law and its applications, magnetic Field intensity due to infinite sheet and various other configurations, Ampere's circuit allaw in point form, Magnetic force, moving chargeina magnetic field, Lorentz Force on straight and long current carrying conductors in magnetic field, force between two long & parallel current carrying conductors. Magnetic dipole & dipole moment, a differential current loop as dipole, torque on a current carrying loop inmagnetic field, Magnetic Boundary conditions.

UnitIV

Scalar magnetic potential and its limitations, Vector magnetic potential and its properties, vector magnetic potential due to different simple configurations; Self and Mutual inductances, determination of self & mutual inductances, self inductance of solenoid, toroid coils, mutual inductance between a straight long wire & asquare loop. Energy stored in magnetic Field & energy density, Faraday's Law, transformer & motional EMFs, Displacement current, Maxwell's equations as Generalization of circuit equations, Maxwell's equation in free space, Maxwell's equation for harmonically varying Field, static and steady fields, Maxwell's equations in differential & integral form.

UnitV

Electro Magnetic Waves: Uniform plane wave in time domain in free space, Sinusoidally time varying uniform plane wave in free space, Wave equation and solution formaterial

medium, Uniform plane wave in dielectrics and conductors, Pointing Vector theorem, instantaneous, average and complex poynting vector, power loss in a plane conductor, energy storage, Polarization of waves, Reflection by conductors and dielectric – Normal & Oblique incidence, Reflection at surface of a conducting medium, surface impedance, transmission lineanalogy.

References:

1. Mathew N.O Sadiku; Elements of Electromagnetic; Oxford.
2. P.V. Gupta; Electromagnetic Fields; Dhanpat Rai.
3. N.N. Rao; Element of Engineering Electromagnetic; PHI.
4. William H. Hayt; Engineering Electromagnetic; TMH.
5. John D. Kraus; Electromagnetic; TMH.
6. Jordan Balmian; Electromagnetic wave & Radiating System;PHI.
7. DavidK .Cheng Fields and Wave Electromagnetic; Addison Wesley.
8. S.P. Seth; Electromagnetic Field ;DhanpatRai&Sons

Note: Field plotting of electromagnetic systems on a PC using standard softwares. Application for low and high frequency devices. Suggested softwares, GEMINI(Infolytica), ANSYS, ANSOFT, NISA.

YBEE403 Power System

Unit I

Transmission Systems: Various system of transmission & their comparison, HVDC transmission Converter, inverter, filters & substation layout. Voltage and Reactive Power control.

UnitII

Distribution Systems: Primary and secondary distribution systems, concentrated & uniformly distributed loadson distributors fed at one and both ends, ring distribution, submains and tapered mains, voltage drop and power loss calculations, voltage regulators, Feeders Kelvin's law and modified Kelvin's law for feeder conductor size and its limitations.

Unit III Overhead Transmission Lines: Types of Conductors, Line Parameters: calculation of inductance and capacitance of single and double circuit transmission lines, three phase lines with stranded and bundle conductors, Generalized ABCD constants and equivalent circuits of short, medium & longlines. Line Performance: circle diagram, regulation and efficiency of short, medium and long lines, Series and shunt compensation, FACTS.

UnitIV

Overhead Line Insulators: Types, string efficiency, gradingring, preventive maintenance. Mechanical Design of Transmission Lines: Different types of tower, sag-tension calculations, sagtemplate, string charts, vibration dampers, line supports, spacing of conductors and grounds. Coronacoronalosses, radio & audio noise, transmission line-communication line interference

UnitV

Cables: Classification, Construction and characteristic of different types. Insulation resistance and capacitance, grading (capacitance and inter sheath), laying, jointing and splicing of cables. Phenomenon of dielectric losses, dielectric stress and sheath loss in cables.

References:

1. NagrathI Jand Kothari DP;"Power System Engineering",TataMc Graw Hill
2. John S. Grainger and W.D. Stevenson Jr.,"PowerSystemAnalysis",McGrawHill.
3. Deshpande MV; "Electric Power System Design",TMH.
4. Central Electricity Generating Board;" Modem Power System Practice", Vol1-8,Pergamon Oxfd
5. James J. Burke," Power Distribution Engineering: Fundamentals & Applications"; Marcel Dekker
6. Westing house Electric Corp; Electric Transmission & Distribution Reference Book; East Pittsbrg
7. Wadhwa CL;" Electric Power Systems"; Wiley Eastern Limited.
8. Ashfaq Hussain; "Electrical Power System
9. Gupta BR; "Power System Analysis and Design"
10. Ray " Electrical Power System: Concepts, Theory and practice", PHI

List of Experiments (Expandable):

1 Electrical design of transmission line.
2 Mechanical design of transmission line. 3
Drawing of Tower structure.
4 Drawing of insulators

YBEE404 Electric M/C -1

Unit-I Transformer-I

Working principle, e.mf. equation, construction, phasor diagrams, equivalent circuit, voltage regulation, losses, separation of hysteresis and eddy current losses, efficiency, tests: open circuit and short circuit, load, Sumpner's test, Condition form aximum efficiency and regulation, Power and distribution transformer, allday efficiency, Excitation phenomenon, Autotransformer: working, advantages , its equivalent circuit and phasordiagram.

Unit-II Transformer-II

Three phase transformer: its construction, groups and connections, their working and applications; Scott connection; Parallel operation of Transformers: application ,advantages, requirement and load sharing; Tap changers, cooling, conservator and breather. Pulseand high frequency transformers.

Unit III Three phase Induction Motor-I

Working principle, construction, comparison of slip ring and squirrel cage motors, steady state analysis, phasor diagram and equivalent circuit, power flow diagram, torque-speed and power-speed characteristics, Losses and efficiency, No load and block rotortest, circle diagram

Unit IV Three phase Induction Motor-II

Startingofsquirrelcageandslipringmotors,powerfactorcontrol,Cogging&Crawling,Doublec age &Deep bar Indication Motor, impact of unbalanced supply and harmonics on performance, speed control, braking, Induction Generator.Applications

Unit V Single Phase Motors:

Single Phase Induction motor; double revolving field theory, equivalent circuit and its determination, performance calculation, starting method sand types of single phase Induction motors: their working principle and applications, comparis on with three phases InductionMotor.SinglephaseA.C.series motor, Servo motors, Linear Induction Motor

Reference Books:

1. M. G. Say, Alternating Current Machines', (5th Ed.) ELBS,1986.
2. V.DelToro,"ElectricalMachines&PowerSystems",1985,Prentice-Hall,Inc.,EnglewoodCliffs.
3. V.Del Toro, "Electromechanical Devices for Energy Conversion & Control Systems", PHI Pvt. Ltd.,1975.

Text Books:

1. Electrical Machines by Nagrath and Kothari(TMH).
2. A.C. Machines by Langsdorf(McGraw-Hill)
3. Electrical Machines by Dr.P.S.Bimbhra(Khanna).

List of Experiments (expandable)

Experiments can cover any of the above topics, following is a suggestive list:

1. Perform turn ratio and polarity test on 1-phasetransformer

2. Performloadtestona1-phasetransformerandplotitsloadcharacteristic

3. Perform OC and SC testsona1-phase transformer and determine its equivalent circuit. Also find its efficiency and regulation at different load and power factor.

4. Perform OC and SC tests on a 3-phase transformer and determine its equivalent circuit. Also find its efficiency and regulation at different load and power factor.

5. Perform Sumpner's test on two 1-phase transformer and determine its efficiency at various load.

6. Perform No-load and block rotorte stona3-phase IM and determine its equivalent circuit.

7. Perform load test on a 3-phase IM and plotits performance characteristics.

8. Study various types of starters used for 3-IMs.

9. Perform No-load and block rotortestona1-phase IM and determine its equivalent circuit.

YBEE405 Analog & Digital Communication

Unit-I

Time domain and frequency domain representation of signal, Fourier Transform and its properties, Transform of Gate, Periodic gate, Impulse periodic impulse sine and cosine wave, Concept of energy density and power density (Parseval'stheorem), Power density of periodic gate and impulse function, impuls eresponse of a system, convolutions, convolution with impulse function, causal and non causal system impulse response of ideal low pass filter, Correlation & Auto correlation.

Unit-II Base band signal, need of modulation, Introduction of modulations techniques, Amplitude modulation, Equation and its frequency domain representation, Band width, Power distribution. AM suppressed carrier waveform equation and frequency domain representation Generation (Balance/Chopper modulator) and synchronous detection technique, errors in synchronous detection, Introduction to SSB and VSB Transmission Angle modulation, Frequency and phase modulation equation and their relative phase and frequency deviations, modulation index frequency spectrum, NBFM and WBFM, Band width comparison of modulation techniques.

Unit-III Sampling of signal, sampling theorem for low pass and Band pass signal, Pulse amplitude modulation (PAM), Time division, multiplexing (TDM). Channel Band width for PAM-TDM signal Type of sampling instantaneous, Natural and flat top, Aperture effect, Introduction to pulse position and pulse duration modulations, Digital signal, Quantization, Quantization error, Pulsecode modulation, signal to noise ratio, Companding, Data rate and Baud rate, Bit rate, multiplexed PCM signal, Differentia lPCM(DPCM), Delta Modulation(DM) and Adaptive Delta Modulation (ADM), comparison of varioussystems.

Unit-IV

Digital modulation stechniques, Generation, detection, equation and Band width of amplitude shift keying (ASK) Binary Phase Shif keying (BPSK), Differential phase shiftkeying(DPSK), offset and non offset quadrature phase shift keying (QPSK), M-Ary PSK, Binary frequency Shift Keying (BFSK), M-Ary FSK Quadrature Amplitude modulation(QAM), MODEM, Introduction toprobabilityof error.

Unit-V

Informationtheoryandcoding-Information,entropies(Marginal and conditional), Model of a communication system, Mathematical representation f source, channelandreceivercharacteristics, Mutual information, channel capacity efficiency of noise free channel Binary symmetric channel (BSC) Binary erasure channel (BEC), Repetition of signal, NM symmetric Binary channel, Shannon theorem, Shanon-Hartley theorem (S/N-BW trade off)Source encoding code properties; Shanon, Fano and Huffman coding methods and their efficiency error control coding, Minimum Hamming distance,Linear Block Code, Cyclic code and convolutioncodes. Line Encoding:Manchestercoding, RZ, NRZ coding.

References:

1. Singh & Sapre, Communication System, TMH
2. Taub & shilling, Communication System, TMH
3. Hsu; Analog and digital communication(Schaum);TMH
4. B.P. Lathi, Modern Digital and analog communication system,
5. Simon Haykins, Communication System. John Willy
6. Wayne Tomasi, Electronic Communication system.
7. Martin S.Roden, Analog & Digital Communication System; Discovery Press.
8. Frank R. Dungan, Electronic Communication System, Thomson/Vikas.

List of Experiments(Expandable)

1. Study of sampling process and signal reconstruction andaliasing.
2. Study of PAM PPM andPDM
3. Study of PCM transmitter andreceiver.
4. Time division multiplexing(TDM) and Demultiplexing
5. Study of ASKPSK and FSK transmitter and receiver.
6. Study of AM modulation and Demodulation techniques (Transmitter and Receiver) Calculate of parameters
7. Study of FM modulation and demodulation (TransmitterandReceiver) & Calculation of parameters
8. To construct and verify preemphasis and de-emphasis and plot the wave forms.
9. Study of super hetro dyne receiver and characteristics of ratio radio receiver.
10. To construct frequency multiplier circuit and too bserve the wave form
11. Study of AVC and AFC.

YBEE406 Dot Net

UNIT I

Introduction .NET framework, features of .Net framework, architecture and component of .Net, elements of .Net.

UNITII

Basic Features Of C# Fundamentals, Classes and Objects, Inheritance and Polymorphism, Operator Overloading, Structures. **Advanced Features Of C#** Interfaces, Arrays, Indexers and Collections; Stringsand Regular Expressions, Handling Exceptions, Delegates and Events.

UNIT III

Installing ASP.NET framework, overview of the ASP .net framework, overview of CLR, classlibrary, over view of ASP. Net control, understanding HTML controls, study of standard controls, validations controls, rich controls. **Windows Forms:** All about windows form, MDI form, creating windows applications, adding controls to forms, handling Events, and using various Tolls

UNIT IV

Under standing and handling control sevents, **ADO.NET**-Component object model, ODBC, OLEDB, and SQL connected mode, disconnected mode, dataset, data-reader **Data base controls:** Over view of data access data control, using grid view controls, using details view and frame view controls, ado.net data readers, SQL data source control, object data source control, site map data source.

UNIT-V

XML: Introducing XML, Structure, and syntax of XML, document type definition (DTD), XML Schema, Document object model, Presenting and Handling XML. Xml data source, using navigation controls, introduction of web parts, using java script, Web Services

References:

1. C# for Programmers by Harvey Deitel, Paul Deitel, Pearson Education
2. Balagurusamy; Programming in C#;TMH
3. **Web** Commerce **Technology** Handbook by Daniel **Minoli**, Emma **Minoli**, TMH
4. Web Programming by Chris Bates, Wiley
5. XML Bible by Elliotte Rusty Harold,
6. ASP .Net Complete Reference by Mc Donald, TMH.
7. ADO .Net Complete Reference by Odey, TMH

List of Experiments/ program (Expandable):

1. Working with call backs and delegates in C#
2. Code access security with C#.
3. Creating a COM+ component with C#.
4. Creating a Windows Service with C#
5. Interacting with a Windows Service with C#
6. Using Reflection in C#
7. Sending Mail and SMTP Mail and C#
8. Perform String Manipulation with the String Builder and String Classes and C#:

9. Using the System. Net Web Clientto Retrieveor Upload Data with C#
10. Reading and Writing XML Documents with the XML Text-Reader/-Writer Class and C#
11. Working with Page using ASP.Net.
12. Working with Forms using ASP.Net
13. Data Sources access through ADO.Net,
14. Working with Data readers ,Transactions

YBN UNIVERSITY, RANCHI, JHARKHAND
School of Engineering & Technology

B.Tech. Semester V — Electrical Engineering

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot			Total Marks					
			End Sem.	Mid Sem MST	Quiz, Assig-nment	End Sem	Term work			Period per week				
							Lab work & sessional	Assignment/ quiz		L	T	P		
1	YBEE501	Electrical Machine-II	70	20	10	30	10	10	150	3	1	2	06	
2	YBEE502	Electronic Instrumentation	70	20	10	30	10	10	150	3	1	2	06	
3	YBEE503	Signals & Systems	70	20	10	-	-	-	100	3	1	-	04	
4	YBEE504	Digital Electronics & LogicDesign	70	20	10	30	10	10	150	3	1	2	06	
5	YBEE505	Principles of Management and Managerial Economics	70	20	10	-	-	-	100	3	1	-	04	
6	YBEE506	Electrical Engg. SimulationLab	-	-	-	30	10	10	50	0	0	2	02	
7	YBEE507	Self study (Internal Assessment)	-	-	-	-	-	50	50	0	0	2	02	Grand Total
8.	YBEE508	Seminar / Group Discussion(Internal Assessment)	-	-	-	-	-	50	50	0	0	2	02	
		Total	350	100	50	120	40	140	800	15	5	12	32	800

MST: Mid Semester Tests Taken at Least twice Per Semester
L:Lecture- T:Tutorial- P: Practical

YBEE501 – Electrical Machine-II

Unit I

Polyphase Synchronous Machines : Constructional features. Polyphase Distributed AC Windings: Types, Distribution, coil span and winding factors. Excitation systems, emf equation and harmonic elimination. Generator Mode, Interaction between excitation flux and armature mmf, equivalent circuit model and phasor diagram for cylindrical rotor machine. Salient pole machines: two reaction theory, equivalent circuit model and phasor diagram. Power angle equations and characteristics. Voltage regulation and affect of AVR. Synchronising methods, Parallel operation and load sharing, operation on infinite busbar.

Unit II

Motoring mode, Transition from motoring to generating mode, Phasor diagram, steady state operating characteristic, V-curves, starting, synchronous condenser, hunting -damper winding effects, speed control including solid state control.

Unit III

Analysis under sudden short circuit. Transient parameters of synchronous machines, various transient and sub-transient reactance, time constant. Expression of transient and sub transient reactance in terms of self and mutual inductances of various windings, Analysis of 3-ph short circuit oscillogram and determination of transient parameters from oscillogram.

Testing of Synchronous Machines - Stability considerations. Brush less generators, Single phase generators.

Unit IV

Generalized theory of Electrical Machines: Basics for development of generalized approach for analysis of electrical machines, Kron's Primitive machine, Concept of rotational transformer, voltage and pseudo stationary coil, Expression for self and mutual inductances of various windings w.r.t. rotor position, Park's and Inverse Parks transformation.

Unit V

Special Electric motors: Switched reluctance motor, linear machines- power energy and levitation types, PM brushless DC motors.

Reference Books:

1. Fitzgerald, C.Kingslay, S.D. Umans, Electric machinery ,5th Ed., McGraw Hills, 1992
2. GMC pherson and R.D. Laramorl, An Introduction to Electric Machine & Transformer,2nd Ed.,John Wiley & Sons, 1990

Text Books:

1. P.S. Bimbhra, Generalised Theory of Electrical Machines.
2. E. Open claw Tayler, The performance & Design of AC Computer Meters, A.H.Wheeler & Co. (P) Ltd. Alalhabad, 1971

Electrical Machine-II EXPERIMENTS

1. Determination of complete torque speed characteristics of a three phase induction machine in braking, motoring and generating regions and it's calibration
2. Study of effect of rotor resistance on the load characteristics of a wound - rotor induction motor.
3. (a) Determination of equivalent circuit parameters, prediction of performance. Verification from

actual load test. (b) Separation of losses of Induction motors and estimation of efficiency.
4. Speed control of Induction motor - Conventional, electronic. Solid state speed control using (i) V constant, (ii) V/f constant, (iii) slip - energy injection
5. Determination of equivalent circuit parameters of a single phase Induction motor. Prediction torque -speed characteristics. Verification from load test
6 Study of torque step rate characteristic of a stepper motor. Determination of operating range.
7. Load characteristic of universal motor, operating on dc and ac supply. Comparison of performance.
8. Load characteristic of shaded pole-motor.
9. Characteristic of switched reluctance motor.
10. Circle diagram of 3 phase Induction Motor.
11. Performance of 3 Ph. Induction Motor with single phasing and comparison.

YBEE502 – Electronic Instrumentation

Unit-I

Introduction to CRO, Different parts of CRO, Its Block diagram, Electrostatic focusing, Electrostatic deflection, post deflection acceleration, Screen for CRTs, Graticule, Vertical & Horizontal deflection system, Time base circuit, Oscilloscope probes and transducers, Attenuators, Application of CROs, Lissajous patterns, Special purpose CROs- Multi input, Dual trace, Dual beam, Sampling, Storage (Analog & Digital) Oscilloscopes.

Unit-II

A.C. Bridge Measurement

Sources and detectors, Use of Bridges for measurement of inductance, Capacitance & Q factor Maxwells bridge, Maxwells inductance capacitance bridge, Hays bridge, Andersons bridge, Owen's Bridge, De-sauty's Bridge, Schering Bridge, High Voltage Schering bridge, Measurement of relative permittivity, Heaviside cambell's bridge, Weins bridge, Universal bridge, Sources of errors in Bridge circuit, Wagner's Earthing device, Q meter and its applications and measurement methods.

Unit-III

Transducers

Transducers definition and classification, mechanical devices as primary detectors, Characteristic & choice of Transducers, Resistive inductive and capacitive transducers, strain gauge and gauge factor, Thermistor, Thermo couples, LVDT, RVDT, Synchros, Piezo-Electric transducers, Magnet elastic and magnetostrictive Hall effect transducers, Opto-electronic transducers such as photo voltaic, Photo conductive, photo diode and photo conductive cells, Photo transistors, Photo optic transducers. Introduction to analog & Digital data acquisition systems-Instrumentation systems used, Interfacing transducers to electronic control & measuring systems Multiplexing - D/A multiplexing A-D Multiplexing, Special encoders. Digital control description

Unit-IV

Signal Generators

Fixed & variable frequency AF oscillators, Sine wave generators, Standard signal generator, AF Sine and Square wave generator Function generator, Square and pulse generator, Random noise generator, Sweep generator, TV Sweep generator, Marker generator, Sweep- Marker generator, Wobblyscope, Video pattern generator Vectroscope, Beat frequency oscillator

Wave analyser Basic wave analyzer, Frequency selective wave analyzer, Heterodyne wave analyzer, Harmonic distortion, analyzer, spectrum analyzer digital Fourier analyzer.

Unit-V

Digital Instruments

Advantages of Digital instruments over analog instruments, resolution and sensitivity of Digital meters., Digital Voltmeter - Ramp type, Dual slope integration type, Integrating type, Successive approximation type, Continuous balance DVM or Servo balancing potentiometer type □VM. , compression of Electronic & Digital Volt meter, Digital Multimeter, Digital frequency meter, Time period measurement, High frequency measurement, Electronic counter, Digital tachometer, Digital PH meter, Digital phase meter, Digital capacitance meter. Digital display system and

indicators like CRT, LED, LCD, Nixies, Electro luminescent, Incandescent, Electrophoretic image display, Liquid vapour display dot-matrix display, Analog recorders, X-Y recorders. Instruments used in computer-controlled instrumentation RS 232C and IEEE 488, GPIB electric interface.

List of Experiments:-

1. Measurement of inductance of a coil using Anderson Bridge.
2. Measurement of capacitance of a capacitor using schering bridge.
3. LVDT and capacitance transducers characteristics and calibration.
4. Resistance strain gauge- Strain Measurement and calibration.
5. Measurement of R,L,C & Q using LCR-Q meter.
6. Study & measurement of frequency using Lissajous patterns.
7. Measurement of pressure using pressure sensor.
8. Study of Piezo-electric Transducer and Measurement of impact using Piezo-electric Transducer
9. Measurement of Displacement using LVDT.
10. Measurement of speed of a Motor using photoelectric transducer.
11. Study & Measurement using ph meter.
12. Temperature measurement & Control using thermo couple & using thermistor.

References:

1. Albert. D. Helfrick, W.D. Cooper, Modern Electronic Instrumentation and measurement techniques, PHI.
2. Kalsi H.S., Electronic Instrumentation, TMH.
3. A.K. Sawhney, Electrical and Electronic measurements and Instrumentation, Dhanpat Rai and Co.
4. E.W. Golding, Electrical Measurement and Measuring Instruments Sir Isaac Pitman and Sons, Ltd. London 1940
5. C.S. Rangan, G.R. Sarma, V.S.V. Mani, Instrumentation Devices and Systems Tata McGraw-Hill Publishing
6. Company Ltd.
7. B.C. Nakra, K.K. Choudhry, Instrumentation, Measurement and Analysis Tata McGraw-Hill Publishing CompanyLtd.
8. Morris A.S., Principles of Measurement & Instrumentation, PHI
9. Murthy BVS, "Transducers and Instrumentation", PHI.
10. Doeblin D.O., Measurement Systems- Applications and Desig Albert D. Helfrick, William D.Cooper, Modern Electronic Instrumentation and Measurement Techniques Pearson Education.

YBEE503 – Signals & Systems

Unit I

Dynamic Representation of Systems: Systems Attributes, Causality linearity, Stability, timeinvariance. Special Signals, Complex exponentials, Singularity functions (impulse and step functions).. Linear Time-Invariant Systems: Differential equation representation convolution Integral. Discrete form of special functions. Discrete convolution and its properties. Realization of LTI system (differential and difference equations).

Unit II

Fourier Analysis of Continuous Time Signals and Systems : Fourier Series, Fourier Transform and properties, Parseval's theorem, Frequency response of LTI systems. Sampling Theorem.

Unit III

Fourier Analysis of Discrete Time Signals & Systems : Discrete-Time Fourier series, Discrete-Time Fourier Transform (including DFT) and properties. Frequency response of discrete time LTI systems.

Unit IV

Laplace Transform: Laplace Transform and its inverse: Definition, existence conditions, Region of Convergence and properties, Application of Laplace transform for the analysis of continuous time LTI system (stability etc.) Significance of poles & zeros.

Z-Transform : Z-Transform and its inverse: Definition, existence, Region of convergence and properties, Application of Z-Transform for the analysis of Discrete time LTI Systems, Significance of poles and zeros.

Unit V

Sampling: The sampling theorem, reconstruction of signal from its samples, sampling in the frequency domain, sampling of discrete-time signals.

References

1. Alan V. Oppenheim, Alan S. Willsky and H. Nawab, Signals and Systems, Prentice Hall, 1997
2. Simon Haykin, Communication Systems, 3rd Edition, John Wiley, 1995.

YBEE504 – Digital Electronics & Logic Design

Unit I

(A) Number System: Various number systems-decimal, Binary, Hex and Octal with mutual conversion, binary arithmetic in computers, addition, subtraction, multiplication and division.
(B) Binary Codes: Weighted, non-weighted codes, error detecting and correcting codes, alphanumeric codes, ASCII codes

Unit II

Boolean Algebra & Logic Hardware
(A) Boolean Algebra: AND, OR, NOT, NAND, NOR, EXOR, operations and gates, laws of Boolean algebra, reduction of Boolean expression, logic diagram, universal building blocks, negative logic
(B) Logic hardware " Diode as switch, Bipolar transistor as switch FET as switch, MOSFET (Deplection and Enhancement mode) IC Technology, MSI, LSI, VLSI, logic specification, logic families (DTL, TTL, ECL, MOS, CMOS)

Unit III

Combinational circuits and system
(A) Combinational logic: Minterms and maxterms, Truth table and Karnaugh mapping, reduction of Boolean expression with SOP, POS and mixed terms, incompletely specified functions multiple output minimization, variable mapping, minimization by labular/ Quine Mc cluskey method.
(B) Encoders, Decoders, Multiplexers, Demultiplexers, code convertors, Binary address Digital comparator, parity checker/ generator, programming logic Array (PLA);

Unit IV

(A) State tables and diagrams, flip flop and its various types- JK, RS, T, D, pulse and edge triggered flip flops transition and excitation tables, timing diagrams.
(B) Shift registers: Series and parallel data transfer, ripple counters, synchronous counters, Modulo N counter design, Up down counters, Ring

Unit V

Memory & A/D Conversion

(A) Semiconductor ROM, Bipolar and MOS RAM, organization of RAM memory subsystem. Timing circuit, clock circuit and IC Timer.
(B) Analog/ Digital conversion: Digital to analog conversion, dualeslope integration successive approximation, parallel and parallel/ series conversion, converter specifications.

Reference Books:

1. An Introduction to Digital Computer Design by V. rajaraman and T. Radhakrishnan, 3rd Edn. PHI.
2. Digital Principles and Applications by A.P. Malvino and B.P. Leach, 4th Edn. McGraw Hill.
3. Digital computer Fundamentals by T.C. Bratee, 6th Edn. McGraw Hill.
4. Pulse, Digital and switching circuits-Millman

YBEE505 – Principles of Management & Economics

Unit I

Management Concept: Management, Administration and Organization Difference and Relationship between Organization Management and Administration. Importance of Management, Characteristics of Management

Unit II

Management: Scientific Management, Principles of Management, Process of Management, Functions of Management, Levels of Management, Project Management

Unit III

Decision Making: Introduction and Definition, Types of Decisions, Techniques of Decision Making, Decision making under certainity Decision making under uncertainty, Decision Making under risk

Unit IV

Managerial Economics: Introduction, Factors Influencing Manager, Micro and Macro-economics, Theory of the Cost, Theory of the Firm, Theory of Production Function.

Unit V

Productivity: Input-Output Analysis, Micro-economics Applied to Plants and Industrial Undertakings, Production and Production system, Productivity, Factors affecting Productivity, Increasing Productivity of Resources

Reference Books

1. The Practice of Management Peter Drucker Harper and Row
2. Essentials of Management: Koontz, Prentice Hall of India
3. Management Staner, Prentice Hall of India
4. Principle and Practice of Management T.N. Chhabra, Dhanpat Rai New Delhi
5. Industrial Organisation and Engineering T.R. Banga and S.C. Sharma,Economics Khanna Publishers
6. Industrial Engineering and Management O.P. Khanna, Dhanpat Rai
7. Managerial Economics Joel Dean, Prentice Hall of India
8. Managerial Economics Concepts & Cases V.L. Mote, Samuel Paul, G.S. Gupta, Tata Mc Graw Hill New Delhi
9. Managerial Economics V.L.Mote, Tata McGraw Hill
10. Analytical Models for Managerial and Engineering Economics Schweyer Reinhold

YBEE506 – Electrical Engg. Simulation Lab

LIST OF EXPERIMENT

1. To generate the pulse with the help of comparator.
2. To generate the pulse with the help of PWM techniques
3. To generate the pulse with the help of sine pulse width modulation
4. To find the time response for series RL, RC,RLC circuit.
5. Write a program to calculate the efficiency of the transformer at various laod conditions and plot the graph between efficiency and load for given data.
6. Write a program to determine the equivalent circuit parameter for given problem.
7. Determine the output waveform for the clipper and clamper circuit
8. To observe the output waveform for the MOSFET
9. To observe the waveform of single phase full wave rectifier circuit with R load
10. To observe the waveform of single phase half wave thyristor circuit with R load
11. To observe the waveform of single phase full wave thyristor circuit with RL & RLE load
12. To observe the waveform of single phase semi convertor circuit with RL & RLE load
13. To observe the waveform of single phase semi convertor circuit, when one of the thyristor is replaced by diode
14. To observe the waveform for class-B COMMUTATION
15. To observe the waveform of single phase half wave AC VOLTAGE CONTROLLER

16. To observe the load current ,voltage and speed waveform of Asynchronous Machine

REFERNCES :-

1. Shailandra Jain, Modeling and simulation using MATLAB/SIMULINK ,willey
2. I.J.Nagrath,D.P. Kothari, Electrical machine,TMH
3. P.C. Sen ,Power Electronics, TMH

YBN UNIVERSITY, RANCHI, JHARKHAND
School of Engineering & Technology

B.Tech. Semester VI — Electrical Engineering

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot			Total Marks					
			End Sem.	Mid Sem. MST	Quiz, Assig-nment	End Sem	Term work			Period per week				
							Lab work & sessional	Assignment/ quiz		L	T	P		
1	YBEE601	Microprocessor & Microcontrollers	70	20	10	30	10	10	150	3	1	2	06	
2	YBEE602	Electrical Power Generation	70	20	10	-	-	-	100	3	1	-	04	
3	YBEE603	Electrical Machine Design	70	20	10	-	-	-	100	3	1	-	04	
4	YBEE604	Power Electronics	70	20	10	30	10	10	150	3	1	2	06	
5	YBEE605	Energy Conservation &Management	70	20	10	-	-	-	100	3	1	-	04	
6	YBEE606	Minor Project	-	-	-	60	20	20	100	0	0	4	04	
7	YBEE607	Electrical Machine Design(CAD)	-	-	-	30	10	10	50	0	0	2	02	Grand Total
8.	YBEE608	Self Study / Seminar	-	-	-	-	-	50	50	0	0	2	02	
		Total	350	100	50	150	50	100	800	15	5	12	32	800

YBEE601 Microprocessor & Microcontroller

UNIT 1: Microprocessor 8086

Introduction to 16-bit 8086 microprocessors, architecture of 8086, Pin Configuration, interrupts, minimum mode and maximum mode, timing diagram, Memory interfacing, Comparative study of Salient features of 8086, 80286 and 80386.

UNIT-2: Microprocessor 8086 programming

Instruction set of 8086, Addressing mode, Assembler directives & operations, assembly and machine language programming, subroutine call and returns, Concept of stack, Stack structure of 8086, timings and delays,

UNIT 3:Input-Output interfacing:

Memory Mapped I/O and Peripherals I/O. PPI 8255 Architecture and modes of operation, Interfacing to 16-bit microprocessor and programming, DMA controller (8257) Architecture, Programmable interval timer 8254, USART 8251, 8 bit ADC/DAC interfacing andprogramming.

UNIT 4:Microcontroller 8051

Intel family of 8 bit microcontrollers, Architecture of 8051, Pin description, I/O configuration, interrupts; Interrupt structure and interrupt priorities, Port structure and operation, Accessing internal & external memories and different mode of operations, Memory organization, Addressing mode, instruction set of 8051 and programming.

UNIT 5: 8051 Interfacing, Applications and serial communication

8051 interfacing to ADC and DAC, Stepper motor interfacing, Timer/ counter functions, 8051 based thyristor firing circuit, 8051 connections to RS-232, 8051 Serial communication , Serial communication modes, Serial communication programming, Serial port programming in C.

BOOKS:

1. Hall Douglas V. “Microprocessor and interfacing, Programming and Hardware”, second edition, Macmillan, McGrawHill,.
2. Ray A.K., Bhurchandi K.M. "Advance Microprocessor and peripheral", first edition,TMH
3. Muhammad Ali Mazidi and Janice Gillespie Mazidi “The 8051 Microcontroller and Embedded Systems” Pearson education,2005.
4. V.Udayashankara and M.S.Mallikarjunaswamy “8051 Microcontroller” McGrawHill.
5. McKinlay“The 8051 Microcontroller and Embedded Systems – using assembly and C”- PHI, 2006 / Pearson,

YBEE602 – Electrical Power Generation

Unit-1

General consideration on various sources of energy, energy conversion employing steam, energy conversion using water gas turbine

a) MHD generation
b) Solar generation
c) Wind power station
d) Geothermal power generation.

Unit-2

Thermal, nuclear and gas power station:

Block diagram of thermal power station, selection of site. Different types of auxiliaries used in thermal power station. Nuclear Power Station: Different types of reactors and fuels, safety methods, waste disposal.

Unit-3

Gas power station:

Block diagram, gas cycles, combined cycle power plants. Comparison between these power stations.

Hydro Power Station:

Choice of site, block diagram including surge tank and penstock, Hydrographs, flow duration curve. Types of turbines, base load and peak load power station.

Unit-4

Economic aspects of power plant operations:

Definitions load factor, demand factor and Diversity factor. Calculation of cost of generation, fixed charges, interest and depreciations, Methods of Depreciation. Tariffs: Different types of tariffs, power factor improvement.

Unit-5

Economic Scheduling of Power Stations:

Economic operation of power system, criteria of loading of power plants with and without transmission loss, load dispatching in power system, co-generation and coordination of power plants.

Reference:

1.G.R.Nagpal,"Power Plant Engineering", Khanna Publisher

2.. S.N. Singh Electric Power Generation.PHI.

3. M.V.Deshpandey,"Modern Design of Power Station"

YBEE603 – Electrical Machine Design

Unit-I

Introduction: Design problem-Mathematical programming methods, computer aided design-Mathematical formulation of the problem. Programming techniques (LP & NLP only), Methods of solution, Unconstrained optimization problems, constrained optimization problems.

Unit-II

Optimal design of DC machine:-Design of armature, Windings and field systems, Selection of variables for optimal design, Formulation of design equations, Objective function, Constraint functions, Algorithms for optimal design.

Unit-III

Optimal design of power transformer:-Design of magnetic circuit, Design of windings, Selection of variables for optimal design, Formulation of design equations, Objective function, Constraint functions, Algorithms for optimal design.

Unit-IV

Optimal design for 3-phase alternator:-Design of stator, windings, Design of Field systems for salient pole and non-salient pole machines, Selection of variables for optimal design, Formulation of design equations, Objective function, Constraint functions, Algorithms for optimal design.

Unit-V

Optimal design of 3-phase induction motor:-Design of stator, Windings Design of squirrel cage rotor, Design of slip ring rotor, Selection of variables for optimal design, Formulation of design equations, Objective functions Constraint functions, Algorithms for optimal design.

References:

1. Computer- Aided Design of Electrical Equipment- by Dr. M. Ramamoorthy-Affiliated East-West press Pvt. Ltd. NewDelhi.
2. Electrical Machine Design- by A.K. Sawhney, DhanpatRai&Sons.
3. Principles of Electrical Machine Design with Computer Programmes by- S.K. Sen, Oxford & IBH Publishing Co.
4. Performance and Design of A.C. Machines-M.G. Say, Affiliated East West Press Pvt. Ltd., New Delhi.
5. Performance and Design of D.C. Machines- Clayton &Hancock.
6. Design & Testing of Electrical Machines-Deshpande,PHI.

YBEE604 – Power Electronics

Unit-I

Advantages and application of power electronic devices characteristics, Symbol & application of power diodes, power transistors, GTO, Triac, Diac, Power MOSFET, IGBT, LASCR, Fast recovery diode, schottey diode MCTs. Principle of operation of SCR, Two transistor analogy, brief idea of construction of SCR, Static characteristics of SCR, Condition of turn on & off of SCR Gate characteristics, Method for turning on of SCR, Turnoff methods, different commutation techniques (Class A,B,C,D,E, & F Commutation) firing of SCR, Use of pubic transformer and opto isolator in firing, Resistance firing Ckt, Resistance capacitance firing circuit, UJT firing cut, and ramp triggering, firing for 3-Φ circuit. SCR rating & protection of SCR over voltage, Over current, Suprior firing, Design of snub ber circuit and protection of gate of SCR, heating, cooling & mounting of SCR series and parallel operation of SCR, String efficiency & problem associated with series and parallel operation of SCR

Unit-II

Operation and analysis of single phase (Half wave & Full Wave) and multiphase (Three Phase) uncontrolled and controlled rectifier circuit with resistive, resistive & inductive load (continuous & non continuous conduction, Fw small & very large inductive loads) and RLE loads. Estimation of average load voltage and load current for above rectifier cirucits active and reactive power input. Effect of free wheeling diode and source inductance on performance of these rectifier circuits .Comparison of mid point& Bridge rectifier circuits.

Unit-III

Series and parallel inverter, Voltage source & current source inverter, Single phase and three phase bridge inverter, Self cumulated inverters,, Mc- murray& MC murray bed ford inverters, Voltage control of single phase and three phase bridge inverter, Harmonics & their reduction techniques.

Unit-IV

Principle of chopper operation, Various control strategies in chopper, Step up & step-up/step down choppers, chopper configuration (Type A, B, C, D, & E), Steady state analysis of chopper circuits, Current & voltage commutation of chopper circuits Jones & Morgenschopper

Unit-V

Single phase (mid point & bridge configuration) and three phase cyclo convertor configuration and operating principles. AC voltage controllers (using SCRs &Traics) single phase full wave controller with R and RL load, Estimation of RMS load voltage, RMS load current and input power factor, three phase AC voltage controller (Without analysis) Dual converter Switched mode voltage regulator buck, Boost, Buch & Boost, Ck regulators.

References:

1 M.H. Rashid, Power Electronics Circuits, Devices and Applications,Pearson
2 Education, Singapore, 1993.
3 M Ramsmoorthy, An Introduction to transistor and their application, AffiliatedEast-West Press.
4 P.C. Sen, Power Electonics,TMH.
5 M.D. Singh, K.B. Khanchandani, Power Electronics, TMH, Delhi,2001.
6 Chakravarti A., Fundamental of Power Electronics and Drives, Dhanpat Ray &Co.,
7 Dr. P.S. Bhimbhra, Power Electonics, KhannaPub.

YBEE605 – Energy Conservation & Management

Unit-I

General energy problem: Energy use patterns and scope for conservation.
Energy audit: Energy monitoring, Energy accounting and analysis, Auditing and targeting. Energy conservation policy, Energy management & audit, Energy audit, Types of energy audit, energy management (audit), qualities and function of energy managers, language of an energy manager, Questionnaire, Check list for top management, Loss of energy in material flow, energy performance, Maximizing system efficiency, Optimizing, input energy requirements, Energy auditing instruments, Material load energy balance diagram.

Unit-II

Thermodynamics of Energy Conservation.Basic principle. Irreversibility and second law efficiency analysis of systems. Primary energy sources, optimum use of prime-movers, energy efficient house keeping, energy recovery in thermal systems, waste heat recovery techniques, thermal insulation. Thermal energy audit in heating, ventilation and air conditioning. Maintenance and Energy audit – friction, lubrication and tribo-logical innovations. Predictive and preventive maintenance.

Unit-III

Load curve analysis & load management DSM, Energy storage for power systems (Mechanical, Thermal, Electrical & Magnetic) Restructuring of electric tariff from energy conservation consideration, Economic analysis depreciation method, time value of money, Evaluation method of projects, replacement analysis, special problems inflation risk analysis. Pay back period, Energy economics, Cost Benefit Risk analysis, Pay back period.

Unit-IV

Energy efficient electric drives, Energy efficient motors V.S.D. power factor improvement in power system. Energy Conservation in transportation system especially in electric vehicle. Energy flow networks, Simulation & modeling, formulation & Objective & constraints, alternative option, Matrix chart.

Unit-V

Energy conservation task before industry, Energy conservation equipments, Co-Generation, Energy conservation process, Industry Sugar, Textiles, Cement Industry etc Electrical Energy Conservation in building, heating and lighting.domestic gadgets

References:

- Energy Management – W.R. Murphy & G. Mckey Butlerworths.
- Energy Management Head Book- W.C. Turner, JohnWiley
- Energy Management Principles- Craig B. Smith, PergamonPress
- Energy Conservation- Paul O Callagan- PergamonPress
- Design & Management of energy conservation.Callaghan,
- Elect, Energy Utilization & Conservation. Dr. TripathiS.C.,

YBN UNIVERSITY, RANCHI, JHARKHAND
School of Engineering & Technology

B.Tech. Semester VII — Electrical Engineering

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot			Total Marks					
			End Sem.	Mid Sem. MST	Quiz, Assig-nment	End Sem	Term work: Lab work & sessional	Term work: Assignm ent/ quiz		Period per week: L	T	P		
1	YBEE701	Power System Analysis & Control	70	20	10	30	10	10	150	3	1	2	06	
2	YBEE702	Utilization of Electrical Energy	70	20	10	-	-	-	100	3	1	-	04	
3	YBEE703	Electrical Drives	70	20	10	30	10	10	150	3	1	2	06	
4	YBEE704	Elective-I	70	20	10	-	-	-	100	3	1	-	04	
5	YBEE705	Elective-II	70	20	10	-	-	-	100	3	1	-	04	
6	YBEE706	Major Project -I (Planning &Literature Survey)	-	-	-	60	20	20	100	0	0	4	04	
7	YBEE707	Industrial Training (2 Week)	-	-	-	30	10	10	50	0	0	2	02	Grand Total
8.	YBEE708	Self Study / Seminar	-	-	-	-	-	50	50	0	0	2	02	
		Total	350	100	50	150	50	100	800	15	5	12	32	800

YBEE704 (Elective –I)

704(A) Computer Aided Design of Electrical Machines
704 (B) Soft Computing Techniques & Applications
704(C) SCADA Systems & Application

YBEE705 (Elective –II)

705(A) High Voltage Engg.
705(B) Calibration and Testing of Electrical Equipments
705(C) Generalised Theory of Electrical Machines

YBEE701 – Power System Analysis & Control

Unit-I

General - Problems associated with modern interconnected power Systems, deregulation, power systems restructuring, distributed generation, congestion, available transfer capacities, pricing of energy and transmission services.

Unit-II

Power flow studies - Formulation of static power flow equations and solutions using Gauss-Seidel, Newton Raphson and FDLF methods, comparison of these methods, Economic operation of power system - Economic dispatch, Emission dispatch, line loss, ITL, economic dispatch usinglagrangian multiplier method.

Unit-III

MW Frequency control- Coherency, control area, modeling of speed control mechanism, load damping, block diagrammatic representation of single and two area interconnected system, static and dynamic response, .optimum parameter adjustment.

Unit-IV

MVAR Voltage control Problem- Difference in control strategy over MW– f control, characteristics of an excitation system, DC AC and static excitation system, General block diagram representation of voltage regulators.

Unit-V

Power System Stability - Steady state, dynamic and transients stability, Swing equation , equal area criterion, solution of swing equation using step by step method modified Eulers method and Rnge-Kutta method, methods of improving transient stability.

Reference Books :

1.Modern Power Sdystem Analysis-by I.J. Nagrath & D.P. Kothari Tata McGraw - Hill Publication Company Ltd 2n edition.

2 A Chakrawarti Power System Analysis: Operation and Control PHI Learning 3rd edition

3. Electrical Power Systems-by C.L. Wadhwa New Age International (P) Limited Publishers, 2ndedition1998.

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4. Weedy B.M."Electric Power System" John Wiley andSons,3 edition.
5. Reactive power Control in Electric Systems-by T.J.E. Miller, John Wiley & Sons.
6. T.K.Nagsarkar,M.S.Sukhiza,-"Power System Analysis", Oxford University Press.
7. Elgerd O.I.,"Electric Energy Systems Theory",TMH, New Delhi,Second Edition1983.
8. Prabha Kundur,"Power system stability and control",Mc-Graw HillInc, New York,1993.
9. Taylor C.W., "Power System Voltage Stability", Mc-Graw Hill Inc, New York,1993.
10. Nagrath IJ, Kothari D.P., "Power System Engineering",Tata Mc-Graw Hills, New Delhi1994.
11. P.S.R. Murthy, "Power System Operation and Control", B S Publication -

List Of Experiments:

1. To develop a program in Matlab for information of Y-bus matrix for N bus system.
2. Load flow solution for 3-bus system using Gauss- Seidel, Newton Raphson and FDLF methods up to 3iteration.
3. Load flow solution for IEEE 6-bus and 30-bus system in Matlab using Newton Raphson method.
4. Assessment of transient stability of a single machine system.
5. Effect of compensation on voltage profile of IEEE 6-bussystem.
6. Study of any software tools (PSCAD, EDSA, Mi POWER, ETAPetc).

YBEE702 – Utilization of Electrical Energy

UNIT I

ILLUMINATION ENGINEERING

Nature of light, units, sensitivity of the eye, luminous efficiency, glare. Production of Light; Incandescent lamps, arc lamps gas discharge lamps- fluorescent lamps-polar curves, effect of voltage variation on efficiency and life of lamps, Distribution and control of light, lighting calculations, solid angle, inverse square and cosine laws, methods of calculations, factory lighting, flood lighting and street lighting, Direct diffused and mixed reflection & transmission factor, refractors, light fittings.

UNIT II

HEATING, WELDING AND ELECTROLYSIS

Electrical heating-advantages, methods and applications, resistance heating, design of heating elements, efficiency and losses control. Induction heating: core type furnaces, core less furnaces and high frequency eddy current heating, dielectric heating: principle and special applications, arc furnaces: direct arc furnaces, Indirect arc furnaces, electrodes, design of heating elements, power supply and control. Different methods of electrical welding, resistance welding, arc welding, energy storage welding, laser welding, electro beam welding, and electrical equipment for them. Arc furnaces transformer and welding transformers. Review of electrolytic principles., laws of electrolysis, electroplating, an odisisng- electro- cleaning, extraction of refinery metals, power supply for electrolytic process, current and energy efficiency.

UNIT III

TRACTION

Special features of Traction motors, Different system of electric traction and their Advantages and disadvantages, diesel electric locomotives. Mechanics of train movement: simplified speed time curves for different services, average and schedule speed, tractive effort, specific energy consumption, factors affecting specific energy consumption, acceleration and braking retardation, adhesive weight and coefficient of adhesion.

UNIT IV

TRACTION MOTORS

DC motors, single phases and three phases motors, starting and control of traction motors, braking of traction motors: plugging, rheostatic and regenerative braking, Modern 25 KV a.c. single phase traction systems: advantages, equipment and layout of 25 KV, line and current selection,
single phase power frequency A.C. traction.

UNIT V

ELECTRIC DRIVES

Individual and collective drives- electrical braking, plugging, rheo static and regenerative braking load equalization use of fly wheel criteria for selection of motors for various industrial drives, calculation of electrical loads for refrigeration and air-conditioning, intermittent loading and temperature rise curve.

References:

- Tailor, E.O., Utilization of Elect. Energy.
- H. Pratap, Art and Science of Utilization of Electrical Energy.
- Gupta, J.B., Utilization of Elect. Energy
- Garg, G.C., Utilization of Elect. Power and Elect. Traction.
- N V Sury anarayan, Utilization of Elect. Power including Electric Drives and Elect. Traction, New AgeInternational.
- Hancok N N, Electric Power Utilisation, Wheeler Pub.

YBEE703 – Electrical Drives

Unit I

Basic Concepts of Electric Drives

Elements of drive systems, Requirement of electric drives, Rating & Selection of drives, groups and individual drives, Constant power and Constant torque drives. **Motor Mechanism dynamics**

Review of Characteristics of AC & DC motors, load characteristic, load-drive speed torque characteristics, quadrant speed torque characteristics. Mechanical Systems Stability of Electric drives, referred moment of inertia and torque of motor load combination, load equalization.

Unit II

DC Drives

Starting &Braking of conventional, Phase controlled and chopper controlled drives, Transient & Steady state analysis, Energy recovery systems.

Unit III

Induction Motor Drives

Conventional method of Starting braking and speed control, PWM, (VSI) Voltage source Inverter and Current Sources (CSI) fed IM drives, cyclo converter fed drive, Vector control drives.

Slip Controlled IM Drives

Review of Conventional methods & converter controlled-Crammers &Scherbius drives; rotor impedance control.

Unit IV

Synchronous Motors Drives

VSI and CSI fed; self-controlled-Brush less &. Commutator less dc & ac motor drives.

Unit V

Special Drives :Fundamentals of Switched reluctance motors, Stepper Motors, Permanent Magnet Motor Introduction to vector control; Digital control of drives. **Case Studies** Electric traction, steel & cements plants, textile & paper mills, machine tool drive and CNC, electric cars.

List of Experiments:

1. Study the starting and running characteristics of converter fed DC traction motor.
2. To study the energy recovery systems and braking of a DC drive.
3. To study the braking Methods of a three-phase induction motor.
4. To study the performance of VSI fed three-phase induction motor using PWM technique.
5. To control the speed of a three phases lipring Induction motor using rotor impedance control.
6. To study the performance of Vector Controlled three phase Induction motor drive.
7. To Study frequency Controlled Synchronous motor drive.

8. To study the control & performance Characteristics of switched Reluctance motor.
9. To study the performance & control of a Stepper motor.
10. To Study the Performance of a permanent magnet Brush less dc motor drive.

References:

- Pillai S.K."A first course on Electrical Drives", Second edition, Wiley Eastern.
- Ned Mohan Electrical Machine Drive WILEYINDIA
- Dubey G. K., "Power Semiconductor Controlled Drives", PHI,
- Dubey G.K., "Fundamentals of Electrical Drives". Narosa Publishing House.
- Bose B.K., "Power Electronics and AC Drives", PHI Learning.
- Murphy M. D., and Tumbuli F., "Power Electronic Control of AC Motors", Pergamon Press, Oxford University Press.
- P.V. Rao, "Power semiconductor Drives", BS Publications
- S.Shiva Nagarajupower semiconductor drive PHI learning

Elective-I

(YBEE704(A) – Computer Aided Design of Electrical Machines)

Unit-I

Design of Synchronous Machine

Features of construction of low speed and medium speed Machine, design consideration of turbo and water wheel alternators, output coefficient and choice of main dimensions, design of stator winding, design of field systems, regulation, losses and efficiency, cooling systems.

Unit-II

Design of 3 Phase Induction Motor

Design consideration of ac motors, calculation of main dimensions, design of stator winding, effect of air gap on performance.

Rotor Design:

Design of slip ring and squirrel cage rotor, components of leakage reactance, calculation of leakage reactance and its effect on the performance.

Unit-III

Design of single phase Induction motor

Calculation of main dimensions of stator, complete design of stator with its punching details, design of main and auxiliary winding, design of rotor, performance calculation of designed rotor and performance by equivalent circuit approach.

Unit-IV

Design of Electrical Equipments

Design of choke, DC motor starter, Lifting magnets and other electro magnetic devices.

Unit-V

Computer Aided Design

Philosophy and economics of computer aided design, advantages limitations, analysis and synthesis methods, and selection of input data and design variables, flow charts for design of induction motor and synchronous machine. Optimization of design constrained and unconstrained optimization problem

References:

1. Desh pandey M.V., "Design of Electrical Machines" PHI Learning
2. VeinotCyril G., "Computer Aided Design of Electrical Machinery", MIT Press, London, UK.
3. Say M.G., "Performance Design of AC Machinery"
4. Clayton, "Performance Design of DCMachine"
5 Sharanugasundararn A., Gangadharan G., &Palani R., "Electrical Machine Design Data Book", Wiley Eastern Ltd., New Delhi.
6. Veinolt Cyril.G., "Theory & Design of Small Induction Motors", McGraw-Hill Book Company, Inc..
7. Rama Moorthy, "Computer Aided Design of Electrical Equipment", Affiliated East-West Press, NewDelhi.

Elective-I

(YBEE704(B) – Soft Computing Techniques & Application)

UNIT-1

Review of probability theory: Random variable, distribution functions, function of random variable. generation of random digit, and random variants from various distribution function, Monte Carlo simulation, sampling distributions station evolution using MCS, confidence interval, coefficient of variation.

UNIT-2

Evolution of ANN, Artificial neurons activation functions general network structure g - rule, and back propagation rule of training, RBF and FLN network.

UNIT-3

Draw back of classical optimization techniques, genetic algorithm; binary and real parameter GA, constraints handling in GA.

UNIT-4

Evolution strategies(ES), two members non-recombinative ES, multi member ES, recombinative ES. Optimization based on swarm intelligence particle, swarm optimization and its variants .

UNIT-5

Application of soft computing techniques to problem of electrical engg.e.g. economic dispatch, reliable optimization, ANN training using evolutionary algorithms.

References:

1. R.Y. Rubinste in Simulation and the Monte Carlo method, John Wiley & sons 1st Edition.
2. Paul.L.Mayer-Introducing prob ability and statical application, Addition Weslay.
3. Rajase karan and pai- Neural Network, Fuzzy logic &Genetic Algorithms. PHI Learing
4. Li Min. Fu, Neural Networks in Computer Intelligence, 9th Reprint TMH
5. Multi objective optimization using evolutionary algorithm- Kalyanmoy Deb John Wiley Sons Ltd.
6. Probability and Random processes for Electrical Engineering , Alberto Leon Garcia IInd Pearson.
7. Principles of soft computing-SN Shivan andan ,SN Deepa Wiley India(P) Ltd, I edition2007.
8. Hand book of genetic algorithm- Rajaserkharans, vijaya laxmi pai.
9. PSO Tutorial- Kennedy Ebue hart.
10. Sivanandam & Deepa- An Introduction to Neural Networks using Matlab6.0 1sted., TMH
11. M.Amirthavalli, Fuzzy logic and neural networks, Scitech publications.

Elective-I

(YBEE704(C) – SCADA Systems and Applications)

Unit I

Introduction to SCADA and PLC:SCADA: Data acquisition system, evaluation of SCADA, communication technologies, monitoring and supervisory functions. PLC: Block diagram, programming languages, Ladder diagram, Functional Block diagram, Applications, Interfacing of PLC with SCADA.

Unit II

SCADA system components: Schemes, Remote Terminal Unit, Intelligent Electronic Devices, Communication Network, SCADA server.

Unit III

SCADA Architecture-Various SCADA Architectures, advantages and disadvantages of each system, single unified standard architecture IEC 61850 SCADA / HMI Systems.

Unit IV

SCADA Communication-Various industrial communication technologies- wired and wireless methods and fiber optics, open standard communication protocols.

Unit V

Operation and control of interconnected power system-Automatic substation control, SCADA configuration, Energy management system, system operating states, system security, state estimation, SCADA applications Utility applications, transmission and distribution sector operation, monitoring analysis and improvement. Industries oil gas and water. Case studies, implementation, simulation exercises.

Reference Books:

1. Stuart A Boyer: SCADA supervisory control and data acquisition.
2. Gordan Clark, Deem Reynders, Practical Modem SCAD A Protocols.
3. Sunil S. Rao, Switchgear and Protections, Khanna Publication.

Elective-II
(YBEE705(A) – High Voltage Engg.)

Unit - I

Breakdown in gases

Mechanisms of breakdown in gases, various related ionization processes. Town sends and streamer theories. Paschen's law, Breakdown in Non-uniform fields. Effect of wave shape of impressed voltage on the breakdown strength. Breakdown of sphere gap arid rod gap.

Unit - II

Breakdown in liquid and solids

Mechanisms of breakdown in liquids, suspended particle, suspended water, cavitation and tubble and electronic breakdown theories. Mechanisms of breakdown in solids; intrinsic electro-mechanical, erosion, surface, thermal and streamer, Relation between electric strength of solids and time, intrinsic breakdown strength.

Unit - III

Impulse Generator

Specifications of an impulse voltage Wave, standard impulse, reasons for adopting the particular shape, Analysis and control of simple circuit of impulse generator. Multistage impulse generator (Marks circuit) circuit working, earthing arid tripping.Techniques to observe wave front on C.R.O.

Generation of High Voltage

Methods of generation of power frequency high voltage cascade transformers and resonance methods, Generation of high voltage d.c., voltage stabilization. Tesla coil.

Unit – IV

Measurement of High Voltage

Potential dividers-resistive, capacitive and mixed dividers for high voltage. Sphere gap; construction, mounting, effect of nearby earthed objects, humidity and atmospheric conditions, effect of irradiation and polarity, Electrostatic voltmeter; principle and classification, constructional details of an absolute electrostatic voltmeter. Oscilloscopes and their applications in high voltage measurement.

Unit - V

High Voltage Testing

Measurement of insulation resistance of cables.Wet and dry flashover test of insulators.Testing of insulators in simulated polluted conditions. Testing off transformers and rotating machines. Measurement of breakdown strength of oil. Basic techniques of non-destructive testing of insulators; measurement of loss angle, High Voltage Schering bridge, and partial discharge measurement techniques.

Over Voltage and Insulation Coordination

Lighting, Switching and temporary over voltages, BIL, SIL, methods of insulation coordination.

References:

- L. V. Bewley, "Traveling Waves on Transmission Systems", Wiley New York.M. S. Naidu and V. Kamaraju," High Voltage Engineering", Tata Mc Graw Hill.
- D.V. Razevig:" High Voltage Engineering", translated by Dr. M.P.Chourasia,
- Khanna Publisher
- Kuffel & Zingal, High Voltage Engg.
- Kuffel & Abdullah, High Voltage Engg.

Elective-II

(YBEE705(B) – Calibration and Testing of Electrical Equipments)

Unit - I

Electricity Rules: Indian Electricity Rules, Indian Electricity Act, Electricity Supply Act.

Unit - II

Standards: Study of Various Indian Standards codes for various important electrical equipments.

Unit - III

Installation & Commissioning : Installation & Commissioning of out door Indoor electrical equipments like transformer, Motors, Switchgears, Panels, Relays, CT, PT, Earthing etc.

Unit - IV

Testing: Testing of new & Old electrical installation as per IS of the following. Transformer, Cables, Insulating Oil, Protective relays, Circuit Breakers, CT, PT, Meters, Energy Meters, PVC insulated cables, High voltage Testing & Routing Test, Type test on above.

Unit - V

Calibration : Calibration of meters, Energy meters, Relays, Circuit breakers, & other equipments as per IS specification.

References:

- M. Subbarao, Installation Commissioning & testing of Electrical Engineering Equipments, Khanna Pub.
- Jagdishlal, Hanbook of Electricity Laws, Delhi LawHouse.

Elective-II

(YBEE705(C) – Generalised Theory of Electrical Machines)

Unit-I

Review : Primitive machine, voltage and torque equation.
Concept of transformation change of variables & m/c variables and transform variables. Application to D.C. machine for steady state and transient analysis, and equation of cross field commutator machine.

Unit-II

Induction Machine : Voltage, torque equation for steady state operation, Equivalent circuit, Dynamic performance during sudden changes in load torque and three phase fault at the machine terminals. Voltage & torque equation for steady state operation of 1- ö induction motor &scharge motor.

Unit-III

Synchronous Machine : Transformation equations for rotating three phase windings, Voltage and power equation for salient and non salient alternator, their phasor diagrams, Simplified equations of a synchronous machine with two damper coils.

Unit-IV

Operational Impedances and Time Constants of Synchronous Machines: Park's equations in operational form, operational impedances and G(P) for a synchronous machine with four Rotor Windings, Standard synchronous machine Reactances, time constants, Derived synchronous machine time constants, parameters from short circuit characteristics.

Unit-V

Approximate Methods for Generator & System Analysis : The problem of power system analysis, Equivalent circuit & vector diagrams for approximate calculations, Analysis of line to line short circuit, Application of approximate method to power system analysis.

References:

- P.C.Krause, Analysis of Electric Machinery, Wiley India.
- B.Adkins, The General theory of Electrical Machines.
- B.Adkins &R.G.Harley, The General theory of AC Machines.
- P.S.Bhimbra, Generalised theory of Electrical m/c
- White & Woodson, Electro Mechanical Energy Conversion.

YBEE706 – Major Project –I(Planning & Literature Survey)

The Major Project Work provides students an opportunity to do something on their own and under the supervision of a guide. Each student shall work on an approved project, which may involve fabrication, design or investigation of a technical problem that may take design, experimental or analytical character or combine element of these areas. The project work involves sufficient work so that students get acquainted with different aspects of manufacture, design or analysis. The students also have to keep in mind that in final semester they would be required to implement whatever has been planned in the Major Project in this semester. It is possible that a work, which involves greater efforts and time may be taken up at this stage and finally completed in final semester, but partial completion report should be submitted in this semester and also evaluated by an external examiner. At the end of semester, all students are required to submit a synopsis.

YBEE707 – Industrial Training

SCHEME OF STUDIES

Duration: 2 weeks after the VI semester in the summer break, Assessment in VII semester.

SCHEME OF EXAMINATION

For the assessment of industrial training undertaken by the students, following components are considered with their weightage.

(a) Termwork

In Industry	Marks allotted
1. Attendance and General Discipline	05
2. Daily diary Maintenance	05
3. Initiative and participative attitude during training	05
4. Assessment of training by Industrial Supervisor/s	05
TOTAL	20

(b) Practical/Oral Examination(Viva-Voce)

In Institution	Marks allotted
1. Training Report	10
2. Seminar and crossquestioning(defense)	20
TOTAL	30

Marks of various components in industry should be awarded to the students, in consultations with the Training and Placement Officer/Faculty of Institute, Who must establish contact with the supervisor/Authorities of the organisation where, students have taking training to award the marks for term work and I/c of training from Industry. During training students will prepare a first draft of training report in consultation with section in-charge. After training they will prepare final draft with the help of T.P.O./Faculty of the institute. Then they will present a seminar on their training and they will face viva-voce on training in theinstitute.

1.1OBJECTIVE OF INDUSTRIALTRAINING

The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved. The student should take this course as a window to the real World of Work and should try to learn as much as possible from real life experiences by involving and interacting with industry staff. Industrial training also provides an opportunity to students to select an engineering problem and possibly an industry guide for their Major Project in final semester.

Industrial training of the students is essential to bridge the wide gap between the classroom and industrial environment. This will enrich their practical learning and they will be better equipped to integrate the practical experiences with the classroom learning process.

1.2LEARNING THROUGH INDUSTRIALTRAINING

During industrial training students must observe following to enrich their learning:

- Industrial environment and work culture.
- Organisational structure and inter personalcommunication.
- Machines/ equipment/ instruments - their working andspecifications.
- Product development procedures andphases.
- Project planning, monitoring andcontrol.
- Quality control andassurance.
- Maintenance system.
- Costingsystem.
- Stores and purchasesystems.
- Layout of Computer/ EDP/MIScentres.
- Roles and responsibilities of different categories ofpersonnel.
- Customerservices.
- Problems related to various areas of Worketc.

Faculty and TPO are supposed to plan industrial training in such a manner that students get exposure on most of the above arena in the field (world of work). Students are supposed to acquire the knowledge on above by -

1. Observation,
2. Interaction with officials at theworkplace
3. Study of Literature at the workplace (e.g. User Manual, standards, maintenanceschedules, etc.)
4. "Hand's on"experience
5. Undertaking / assisting projectwork.
6. Solving problems at the workplace.
7. Presenting aseminar.
8. Participating in-group meeting/discussion.
9. Gathering primary and secondary data/ information through various sources, Storage, retrieval and analysis of the gathered data.
10. Assisting officials and managers in theirworking.
11. Undertaking a short action researchwork.
12. Consulting current technical journals and periodicals in thelibrary.
13. Discussions with peers.

1.3 GUIDANCE TO THE FACULTY/TPO FOR PLANNING ANDIMPLEMENTING THE INDUSTRIALTRAINING

The industrial training programme, which is spread to 2 weeks' duration, has to be designed inconsultation with the authorities of the work place, keeping in view the need of the contents. Following are some of the salient points:

- Spelling out the objectives of the industrial training in behavioral terms and same is informed in advance to the 1) students, 2) authorities of the work place and 3) supervising faculty members.
- Discussing and preparing students for the training for which meetings with thestudents has to beplanned.
- Meeting with industrial personnel and orienting them regarding the objective ofthe training and the expectations of theprogramme.

- Correspondence with the authorities of the workplace.
- Orientation classes for students on how to make the training most beneficial - monitoring daily diary, writing weekly reports, how to interact with various categories of industrial personnel, how to behave and undertake responsibilities, how to gather information from the workplace,ethicsetc.
- Guiding students to make individual plans (week wise/ day wise) to undertakeindustrial training
- Developing a system of maintaining training records, by teachers for every batch of students for convenientretrieval.
- Inviting industrial personnel to deliver lectures on some aspects oftraining.

1.4 ACTION PLAN FOR PLANNING STAGES AT THE INSTITUTIONLEVEL

S.No.	Activity	Commencing Week	Finishingweek	Remarks
1.	Meeting withPrincipal			
2.	Meeting withColleagues			
3.	Correspondence with work place (Industriesconcerned)			
4.	Meeting with authorities of work place			
5.	Orientation of students forindustrial training			
6.	Scrutinizing individual training plan of students			
7.	Commencement of industrial training			
8.	First monitoring of industrial training			
9.	Second monitoring of industrial training			
10.	Finalization of Training report			
11.	Evaluation of industrial programme in theinstitution.			

YBN UNIVERSITY, RANCHI, JHARKHAND
School of Engineering & Technology

B.Tech. Semester VIII — Electrical Engineering

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted							Credits Allotted Subject wise			Total Credits	Remark
			Theory Slot			Practical Slot			Total Marks					
			End Sem.	Mid Sem. MST	Quiz, Assig-nment	End Sem	Term work			Period per week				
							Lab work & sessional	Assignm ent/ quiz		L	T	P		
1	YBEE801	Control System	70	20	10	30	10	10	150	3	1	2	6	
2	YBEE802	Power System Protection	70	20	10	30	10	10	150	3	1	2	6	
3	YBEE803	Elective –III	70	20	10	-	-	-	100	3	1	-	4	
4	YBEE804	Elective -IV	70	20	10	-	-	-	100	3	1	-	4	
5	YBEE805	Major Project	-	-	-	120	80	-	200	-	-	8	8	
6	YBEE806	Modeling & Simulation Lab	-	-	-	30	10	10	50	-	-	2	2	
7	YBEE807	Self study & Seminar	-	-	-	-	-	50	50	-	-	2	2	Grand Total
		Total	**280**	**80**	**40**	**210**	**110**	**80**	**800**	12	4	16	32	800

ELECTIVE-III					
YBEE8301	Advanced Electrical drives	YBEE8302	Process Control	YBEE8303	Computer Application to Power Systems

ELECTIVE-IV					
YBEE8401	Renewable & Non Conventional Energy Systems	YBEE8402	Power System Planning & reliability	YBEE8403	EHVAC and DC Transmission

YBEE801 Control Systems

Unit-1

Modeling of dynamic systems: Electrical, Mechanical and hydraulic systems, Concept of transfer function, Simulation of differential equations in analog computer, State space description of dynamic systems: Open and closed loop systems, Signal flow graph, Mason's formula, Components of control systems: Error detectors (Synchros & Potentiometer), Servomotors (AC & DC), techo generators, power amplifier, steepermotors

Unit-2

Time - domain analysis of closed loop systems: Test signals, time response of first and second order systems, Time domain performance specifications, Steady state error & error constants Feedback control actions: Proportional, derivative and integral control. Solution of state equation: Eigen values & eigenvectors digitalization state transitive matrix, stability Routh-Hurwit stability analysis.

Unit-3

Characteristics equation of closed loop system root loci, construction of loci, Effect of adding, poles and Zeros on the loci, Stability by root loci.

Unit-4

Frequency, Domain analysis, Bode plots, Effect of adding, poles and Zeros, Polar plot, Nyquist stability analysis, Relative stability : Gain and phase margins.

Unit-5

Frequency- Domain compensation : lead lag, Lag-lead compensation, Design of compensatingnetworks

List of Experiments

Time response of second order system.
Characteristics of Synchros.
Effect of feedback on servomotors.
Determination of transfer function of A-C servomotor Determination of transfer functionof D-C motor.
Formulation of PI & PD controller and study of closed loop responses of 1st and 2nd order dynamic systems.

Reference:

1. Automatic Control System – B.C. Kuo, PHI, New York,1975.
2. Control System Engineering Norman N Nise WileyIndia
3. Modern Control Engineering: K. Ogata, PHI. New Delhi,1992.
4. Digital Control Systems – B. C. Kuo, OxfordPub.
5. Discrete-Time Control Systems – K. Ogata. PHI. NewDelhi
6. Advanced Control Systems N Sarkar PHILearning
7. Control system –K Padmanabhan I KInternational

YBEE802 Power System Protection

Unit-I Fault Analysis

Faults in power systems, single line diagram, equivalentimpedance diagram, per unit reactances. Analysis (using matrices) of power systems by symmetrical components under:

(a) Three phase shortcircuit.
(b) Line to linefault.
(c) Line to groundfault.
(d) Double line to groundfault.

Sequence networks and their inter connections for different types of faults, effects of fault impedance. Current Limiting Reactors: Applications, types, construction and location of current limiting reactors, short circuit calculation using reactors.

Unit-II Relays

General considerations, sensing of faults, construction of electro-magnetic attraction and induction types relays, Buchholz and negative sequence relay, concept of reset, pick up, inverse time and definite time characteristics, over current , over voltage, directional, differential and distance relays on R-X diagram. Static Relays: Introduction, advantage and limitation of static relays,static over current, directional, distance and differential relays.

Unit-III Protection

Types & detection of faults and their effects, alternator protection scheme (stator,rotor, reverse power protection etc.). Power transformer protection (external and internal faults protection), generator-transformer unit protection scheme, bus bar protection. Transmission line protection (current/time grading, distance), Pilot relaying schemes, power line carrier protection.

Unit-IV

Switchgear

Theory of current interruption- energy balance and recovery rate theory, arc quenching, recovery and rest riking voltages. Types of circuit breakers. bulk oil and minimum oil, air break and air blast, sulphur hexa fluride (SF6) and vacuum circuit breakers. Rating selection and testing of circuit breakers/operating mechanisms. LT switchgear, HRC fuses, types construction and applications.

Unit-V

Modern Trends In Protection

Electronic relays, static relays functional circuits: comparators, level detectors, logic and training circuits, microprocessor and computer based protection schemes, software development for protection, security &reliability.

List of Experiments:

1) Over Voltage Relays
2) IDMT Relays
3) Percentage based differential relays
4) Determination of instantaneous relays
5) Buchholz relays
6) Solid state over current relays

References:

1Van A. R & Warrington C., " Protective Relays : Their Theory and Practice", Vol 1 & 2, Chapman and Hall.

2. Paithankar & Bhide – Fundamentals of Power System Protection –PHI Learning

3.Paithankar Y. O.," Transmission Network Protection: Theory and Practice", Marcel Deicker, Inc.

4.GEC Measurements," Protective Relays : Application Guide", GEC Measurements.

5.Masson R.J., Art &Science of Protective Relaying.

6.J& P Switchgear handbook Ravindra Nath B., and Chandar M., Power systems protection and switchgear

7.Rao Sunil S, Switchgear and protection. 7Crane P.H.C., Switchgear Principle.

9. The Elementary Council, "Power System Protection", Vol.1,2&3, Peter Peregrinus Ltd.

10. Badriram & Vishwakarma, Power System Protection.

11. Ravi10Ravindranath & Chander, Power System Protection & switchgear.

12. Singh–Swithgear and Power System Protection–PHI Learning

YBEE8301 Advanced Electrical Drives

Unit-I

Review of electric motors & Solid state converters: Speed control techniques of DC, Induction & synchronous motor, Converters, inverters, chopper and cyclo converter operation, Effects of power electronic equipments on load side & supply side.

Unit-II

Review of closed loop controllers, sensors &transducers : PI, PID, Variable structure.

AC, DC & Pulse tacho- generators.

DC Drives : Converter & chopper fed DC drive, Reversing, Starting, Regenerative breaking

, Four quadrant operation, High power application.

Unit-III

AC Drive: Inverter &cyclo converter fed drive, Vector control, Sensor less operation, Linear electrical motor concept, Synchronous motor Drive

Unit-IV

Special Drives: Switched reluctance & permanent magnet brushless DC Operation, Converters, Characteristics &Control, PLC based drives.

Servo drives & stepper motor- AC& DC Servomotor, Stepper motor, Control techniques, Controllers,Microstepping,Sensorlessoperation.

Unit-V

Power Quality & energy Conservation- Line Side pollution, standards, Harmonic elimination techniques in converter, Filters, Energy efficient electric motors, Pay back periods, Energy conservation through sold state control.

Reference:

- Ned Mohan, T.M. Undeland, W.P. Robbins, Power Electronics-Converters, Applications and design", John Wiley &Sons.
- J.M.D. Murphy, F.O. Turnbull, "Power Electronic Control of AC motors", PergamonPress.
- P.C. Sen, D.C. drive, PergamonPress
- Sivanagaraju–Power Semiconductor Drives –PHILearning
- B.K. Bose, Power Electronics & AC drive prenticeHall.
- Dubey G.K. "Power semi Conductor controller drives, Prentice Hall. VedamSubramanyam, "ElectricalDrives".
- T.J.E. Miller, Switched Reluctance & P.M. B.L. DC motor, PergamonPress
- P.V. Rao, "Power semiconductor Drives", BS Publications.

YBEE8302 Process Control

Unit-I

Special characteristics of process systems large time constants, interaction, multistaging, pure lag; control loops for simple systems and their Dynamics & stability.

Unit-II

Generation of control action in electronic and pneumatic controllers. Control valves, valve positioners, relief and safety valves, relays, volume boosters, pneumatic transmitters for process variable. Tuning of controllers - Zeigler Nichols and other techniques.

Unit-III

Different control techniques and interaction of process parameters e.g. feed forward, cascade, ratio, over- ride controls Batch continuous process controls. Feed forward Controlschemes.

Unit-IV

Various process schemes / unit operations and their control schemes e.g. distillation columns, absorbers, heat exchangers, furnaces, reactors, mineral processing industries, etc. Use of control schemes for process optimization.

Unit-V

Advanced control strategies with case studies. Use of DDC and PLC.Introduction to supervisory control. Conversion of existing control schemes in operating plants, data loggers.

References:

Dale Patrick, Stephen Fardo, "Industrial Process Control System".

Shinskey F.G., "Process Control System", III Ed., Mc Graw Hill.

Smith C.A. & A.B. Corripio, "Principle & Practiced Automatic Process Control",

J. Willey. Rao M &S.Qiv, "Process Control Engg.",Gorden & Breach.

YBEE8303 Computer Application to Power Systems

Unit-I

Models of power system components, network model using graph theory, formation of Z bus, transmission line models, regulating transformer, line loadability, capability curves of alternator.

Unit-II

Control of load bus voltage using reactive power control variable, SVC & SVS, Regulated shunt compensation, series and shunt compensation, Uniform series and shunt compensation and effect on loadabilityof transmissionlines.

Unit-III

Sensitivity analysis- General sensitivity relations, generation shift distribution factors, line outage distribution factors, compensated shift factors, sensitivity associated with voltage- VAR, sensitivities relating load bus voltage changes in terms of PV bus voltage changes, sensitivity relating changes in reactive power generation for changes in PV Bus Voltage.

Unit-IV

Power system security - Security functions, Security level, contingency analysis, security control, economic dispatch using LP formulation, pre-contingency and post- contingency, correctiverescheduling.

Unit-V

Voltage stability - Difference between voltage and angle stability, PV Curve for voltage stability assessment, proximity and mechanism, modal analysis using reduced Jacobian, participation factor, effect of series and shunt compensation on voltage stability , effectof loadmodels.

References:

- Power Generation, Operation and Control by A.J. wood and B.F. Wollenberg John Wiley &Sons Inc.1984.
- Computer methods in power systems analysis - by stage G.W. and E.L. AbiadA.H. McGraw Hill. Computer Techniques in Power Systems Analysis- Pai M.A. Tata McGrawHill.
- Computer Modeling of Electrical Power Systems, Arrillaga J. Arnord C.P Harker B.J. John Wiley&Son
- Computer Aided Power Systems Analysis KusicG.L.- 2nd Edition, CRC Press
- Modern Power Systems Analysis Nagrath I.J.and Kothari D.P.Tata Mc Graw Hill.
- Power System Analysis Grainger J.J. & Stevnson W.D. Mc Graw Hill.
- Power System Stability and control -P Kundur , IEEE Press 1994.
- Advance Power Systems Analysis and Dynamics Singh L.P. John Wiley.
- Chakrabarti –Power System Analysis operation & Control – PHI

YBEE8401 Renewable &Non Conventional Energy Systems

Unit - I

Renewable Energy Systems

Energy Sources, Comparison of Conventional and non-conventional, renewable and non-renewable sources.Statistics of world resources and data on different sources globally and in Indian context.Significance of renewable sources and their exploitation.Energy planning, Energy efficiency and management.

Unit - II

Wind Energy System

Wind Energy, Wind Mills, Grid connected systems. System configuration, working principles, limitations.Effects of wind speed and grid conditions. Grid independent systems - wind-battery, wind- diesel, wind-hydro biomass etc. wind operated pumps, controller for energy balance.Small Hydro System Grid connected system, system configuration, working principles, limitations. Effect of hydro potential and grid condition.Synchronous versus Induction Generator for stand alone systems. Use of electronic load controllers and self excited induction generators. Wave Energy System: System configuration: grid connected and hybrid Systems.

Unit - III

Solar Radiation

Extraterrestrial solar radiation, terrestrial solar radiation, Solar thermal conversion,

Solar Phototonic System

Solar cell, Solar cell materials, efficiency, Characteristics of PV panels under varying insulation. PV operated lighting and water pumps, characteristics of motors and pumps connected to PVpanels.

Biomass Energy System: System configuration, Biomass engine driven generators, feeding loads in stand-alone or hybrid modes, Biomass energy and their characteristics.

Unit - IV

Energy from oceans

Ocean temperature difference, Principles of OTEC, plant operations,

Geothermal Energy Electric Energy from gaseous cells, Magneto-hydro generated energy, Non hazardous energy from nuclear wastes, Possibilities of other modern non- conventional energy sources.

Unit - V

Electric Energy Conservation

Energy efficient motors and other equipment. Energy saving in Power Electronic controlled drives. Electricity saving in pumps, air-conditioning, power plants, process industries, illumination etc. Methods of Energy Audit.

Measurements systems; efficiency measurements.energy regulation, typical case studies, various measuring devices analog and digital, use of thyristers.

References:

1. John Twidell & Toney Weir, Renewable Energy Resources, E & FN Spon.
2. El-Wakil, Power Plant Technology, Mc Graw Hill.
3. Rai G D, Non-conventional Energy Resources, Khanna.
4. F Howard E. Jordan, "Energy-Efficient Electric Motor & their Application-II", Plenum Press, New York USA
5. Anna Mani, "Wind Energy Resource Survey **in** India-Ill", Allied Publishers Ltd., New Delhi,
6. S.P. Sukhatme: Solar Energy, TMH- 4e,
7. Dr. A. Ramachandran, Prof B.V Sreekantan& M F.C. Kohlietc, "TERI Energy Data Directory &Year book 1994-95", Teri Tata Energy Research Institute, NewDelhi,
8. Solanki–Renewable Energy Technologies – PHI Learning
9. Sawhnew –Non Conventional Energy Resources – PHI Learning

YBEE8402 Power System Planning & Reliability

UNIT-I

Review of Probability Theory Element of probability theory Probability Distribution, Random variable, Density and distribution functions. Mathematical expectation. Binominal distribution, Poisson distributions, Normal distribution, Exponential distribution, Weibull distribution.

UNIT-II

Reliability of Engineering Systems

Component reliability, Hazard models, Reliability of systems wit non-repairable components, series, Parallel, Series-Parallel, Parallel-series configurations. Non-series-parallel configurations, minimal tie-set, minimal cut-set and decomposition methods. Repairable systems, MARKOV process, Long term reliability, Power System reliability.

UNIT-III

Reliability of Engineering Systems

Reliability model of a generating unit, State space methods, Combing states, sequential addition method, Load modeling, Cumulative load model, merging of generation and load models, Loss of load probability, Percentage energy loss, Probability and frequency of failure, Operating reserve calculations.

UNIT-IV

Power Network Reliability

Weather effect on transmission lines, Common mode failures, Switching after fauls, three, state components, Normally open paths, Distribution system reliability.

UNIT-V

Composite System Reliability

Bulk Power supply systems, Effect of varying load, Inter connected systems, correlated and uncorrelated load models, Cost and worth of reliability.

References:

- J. Endreny, Reliability Modeling in Electric Power Systems, John Wiley & Sons.
- Roy Billinton&Ronald, N allan, Reliability Evaluation of Power Systems, Plenum Press, NewYork.

YBEE8403 EHV A.C. and D.C. Transmission

UNIT-I

Constitution of EHV a.c. and d.c. links, Kind of d.c. links, Limitations and Advantages of a.c. and d.c. transmission, Principal application of a.c. and d.c. transmission, Trends in EHV a.c. and d.c. transmission, Power handling capacity. Converter analysis garetz circuit, Firing angle control, Overlapping.

UNIT-II

FACTS devices, basic types of controller, series controller, static synchronous series compensator(SSSC), thyristor-controlled series capacitor(TCSC), thyristor controlled series reactor(TCSR), shunt controller (STATCOM), static VAR compensator(SVC),series-seriescontroller,combinedseries-shuntcontroller,unified power flow controller(UPFC), thyristor controlled phase shiftingtransformer(TCPST).

UNIT-III

Components of EHV d.c. system, converter circuits, rectifier and inverter valves, Reactive power requirements, harmonics generation, Adverse effects, Classification, Remedial measures to suppress, filters, Ground return. Converter faults & protection harmonics misoperation, Commutation failure, Multiterminal D.C. lines.

Unit-IV

Control of EHV d.c. system desired features of control, control characteristics, Constant current control, Constant extinction angle control. Ignition Angle control. Parallel operation of HVAC & DC system.Problems & advantages.

Unit-V

Travelling waves on transmission systems, Their shape, Attenuation and distortion, effect of junction and termination on propagation of traveling waves. Over voltages in transmission system. Lightning, switching and temporary over voltages: Control of lighting and switching overvoltages

Reference:

1. S. Rao,- "EHV AC &DC Transmission" Khanna pub.
2. Kimbark,-"HVDCTransmission"jo◌hnwilly&sonspub.
3. Arrillaga,-"HVDC Transmission"2 nEdition ,IEE londanpub.
4. Padiyar, -"HVDC Transmission" 1t Edition ,Newage international pub.
5. T.K. Nagsarkar,M.S. Sukhiza, -"Power System Analysis", Oxford University
6. Narain.G. Hingorani, l. Gyugyi-"Undustanding of FACTS concept and technology", John Wiley &sons
7. P.Kundur- "H.V.D.C. Transmission" McGraw HillPub.

YBEE803 Major Project

COURSE GUIDELINES

The objectives of the course 'Major Project' are

To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.

To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems.

To give students an opportunity to do some thing creative and to assimilate real life work situation in institution.

To adapt students for latest developments and to handle independently new situations.

To develop good expressions power and presentation abilities in students.

The focus of the Major Project is on preparing a working system or some design or understanding of a complex system using system analysis tools and submit it the same in the form of a write-up i.e. detail project report. The student should select some real life problems for their project and maintain proper documentation of different stages of project such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan. Each student is required to prepare a project report and present the same at the final examination with a demonstration of the working system (if any).

The faculty and student should work according to following schedule:

i) Each student undertakes substantial and individual project in an approved area of the subject and supervised by a member ofstaff.

ii) Thestudentmustsubmitoutlineandactionplanfortheprojectexecution(timeschedule) And the same be approved by the concerned faculty.

iii) At all the steps of the project, students must submit a written report of the same.

YBEE804 – MODELLING & SIMULATION LAB

1. **Study of various Electrical Toolbox i.ePower System,Power Electronics, Control system,**
   Electrical Measurement ,Flexible AC Transmission.
2. DevelopingSimulationModels forsingleandthreephaseRectifier, Inverter,andConverter for different loadmodels.
3. Developing Simulation Models using FACTs Devices i.e STATCOM, SVC,TCSC,SSSC, IPFC ,UPFC in power system transmissionlines.

REFERENCE

1. Shailendra Jain "Modeling **and Simulation** using **MATLAB Simulink"** wileyindia& sons