

2013

B.TECH SYLLABUS.



Administrator

BHAGWANT UNIVERSITY

BHAGWANT UNIVERSITY

Sikar Road, Ajmer

Rajasthan



Syllabus

(1st & 2nd Semesters)

Institute of Engineering & Technology

B. Tech.

(Common to all branches of Engineering)

1st Semester

| Subject Code | Subject Name | Teaching Hours Per Week | | | | Distribution of Maximum Marks | | | | | | |
|---------------------|--|-------------------------|---|---|-------|-------------------------------|---|----------|-------|----------------|----------|-------|
| | | L | T | P | Total | Theory Exam | | | | Practical Exam | | |
| | | | | | | Internal | | External | Total | Internal | External | Total |
| | | | | | | Mid Terms marks | Assignments / Seminar Presentation / Group Discussion | | | | | |
| 01BTC101 | Communication Techniques | 3 | 0 | 0 | 3 | 15 | 25 | 60 | 100 | - | - | - |
| 01BTC102 | Engg. Mathematics-I | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 | - | - | - |
| 01BTC103 | Engineering Physics-I | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 | - | - | - |
| 01BTC104 | Chemistry & Environmental Engineering-I | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 | - | - | - |
| 01BTC105 | Engg. Mechanics | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 | - | - | - |
| 01BTC107 / 01BTC108 | Instrumentation Engg / Agriculture Engineering-I | 3 | 0 | 0 | 3 | 15 | 25 | 60 | 100 | - | - | - |
| 01BTC201 | Communication Lab (English) | 0 | 0 | 2 | 1 | - | - | - | - | 50 | 50 | 100 |
| 01BTC202 | Engineering Physics Lab-I | 0 | 0 | 4 | 2 | - | - | - | - | 50 | 50 | 100 |
| 01BTC203 | Chemistry & Environmental Engineering Lab-I | 0 | 0 | 4 | 2 | - | - | - | - | 50 | 50 | 100 |

| | | | | | | | | | | | | |
|--------------------|---|-----------|----------|----------|-----------|-----------|------------|------------|------------|------------|------------|-------------|
| 01BTC205 | Practical Geometry | 0 | 0 | 3 | 2 | - | - | - | - | 50 | 50 | 100 |
| 01BTC301 | Discipline & Co-Curricular Activities | 0 | 0 | 4 | 1 | - | - | - | - | 100 | - | 100 |
| GRAND TOTAL | | 18 | 4 | 8 | 30 | 90 | 150 | 360 | 600 | 300 | 200 | 1100 |

Grand Total Marks - 1100

2nd Semester

| Subject Code | Subject Name | Teaching Hours Per Week | | | | Distribution of Maximum Marks | | | | | | |
|---------------------|---|-------------------------|---|---|-------|-------------------------------|---|----------|-------|----------------|----------|-------|
| | | L | T | P | Total | Theory Exam | | | | Practical Exam | | |
| | | | | | | Internal | | External | Total | Internal | External | Total |
| | | | | | | Mid Terms marks | Assignments / Seminar Presentation / Group Discussion | | | | | |
| 02BTC101 | Communicative English | 3 | 0 | 0 | 3 | 15 | 25 | 60 | 100 | - | - | - |
| 02BTC102 | Engg. Mathematics-II | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 | - | - | - |
| 02BTC103 | Engineering Physics-II | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 | - | - | - |
| 02BTC104 | Chemistry & Environmental Engineering-II | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 | - | - | - |
| 02BTC105 | Computer System And Programming | 3 | 0 | 0 | 3 | 15 | 25 | 60 | 100 | - | - | - |
| 02BTC106 / 02BTC107 | Electrical & Electronics Engineering / Agriculture Engineering-II | 3 | 0 | 0 | 3 | 15 | 25 | 60 | 100 | - | - | - |
| 02BTC201 | Engineering Physics Lab-II | 0 | 0 | 4 | 2 | - | - | - | - | 50 | 50 | 100 |
| 02BTC202 | Chemistry & Environmental Engineering Lab-II | 0 | 0 | 2 | 1 | - | - | - | - | 50 | 50 | 100 |

| | | | | | | | | | | | | |
|-----------------------|---|-----------|----------|----------|-----------|-----------|------------|------------|------------|------------|------------|-------------|
| 02BTC203 | Computer Programming Lab | 0 | 0 | 2 | 1 | - | - | - | - | 50 | 50 | 100 |
| 02BTC204 | Workshop Practice | 0 | 0 | 4 | 2 | - | - | - | - | 50 | 50 | 100 |
| 02BTC205/ 02BTC206 | Electrical & Electronics Lab / Agriculture Engg Lab | 0 | 0 | 3 | 2 | - | - | - | - | 50 | 50 | 100 |
| 02BTC301 | Discipline & Co-Curricular Activities | 0 | 0 | 4 | 1 | - | - | - | - | 100 | - | 100 |
| GRAND TOTAL | | 18 | 3 | 9 | 30 | 90 | 150 | 360 | 600 | 350 | 250 | 1200 |

Grand Total Marks - 1200

01BTC101**COMMUNICATION TECHNIQUES****Unit 1 Elements of Communication**

1. Communication: Meaning, Importance and Process
2. Objectives of Communication
3. Media and Types of Communication

Unit 2 Basics of Communication

1. Verbal and Non-Verbal Communication
2. Formal and Informal Channels of Communication
3. Qualities of Good Communication

Unit 3 Skills of Communication

1. Barriers to Communication
2. Professional Communication
3. Interpersonal Communication and methods to improve it

Unit 4 Grammar

1. Subject-Verb Agreement (Concord)
2. Linking Words (Conjunctions)
3. Relative Clauses
4. Common Errors

Unit 5 Composition

1. Resume Writing
2. Business Letter Writing: Sales, Credit, Enquiry, Order, Claim, Complaint, Job Applications, etc.
3. E-mail messages
4. Telephone Etiquettes

REFERENCE BOOKS:

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma and Binod Mishra, PHI Learning Pvt. Ltd.(New Delhi)
2. English Grammar and Composition, Gurudas Mukherjee, Ane Books Pvt. Ltd.(New Delhi)
3. Current English Grammar and Usage with Composition, R.P. Sinha, Oxford University Press (New Delhi)
4. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw Hill (New Delhi)
5. Business Communication, Meenakshi Raman & Prakash Singh, Oxford University Press (New Delhi)
6. Professional Communication, Aruna Koneru, Tata McGraw Hills, New Delhi.
7. A Practical Course for Developing Writing Skills in English, J.K. Gangal, PHI Learning Pvt. Ltd., New Delhi.

8. “Communicative English for Engineers and Professionals”, by Nitin Bhatnagar & Mamta Bhatnagar, Pearson (New Delhi).
9. “The Ace of Soft Skills”, by Gopalswamy Ramesh & Mahadevan Ramesh, Pearson (New Delhi)

01BTC102**ENGINEERING MATHEMATICS-I****Unit 1**

Differential Calculus: Asymptotes (Cartesian Coordinates Only), Curvature (Cartesian Coordinates Only), Concavity, Convexity and Point of Inflexion (Cartesian Coordinates Only), Curve Tracing (Cartesian and Standard Polar Curves-Cardioids, Lemniscates of Bernoulli, Limacon, Equiangular Spiral).

Unit 2

Differential Calculus: Partial Differentiation, Euler’s Theorem on Homogeneous Functions, Approximate Calculations, Maxima & Minima of Two and More Independent Variables, Lagrange’s Method of Multipliers.

Unit 3

Integral Calculus: Surface and Volumes of Solids of Revolution, Double Integral, Double Integral by changing into polar form, Areas & Volumes by Double Integration, Change of Order of Integration, Beta Function and Gamma Function (Simple Properties).

Unit 4

Differential Equations: Differential Equations of First Order and First Degree - Linear Form, Reducible to Linear form, Exact Form, Reducible to Exact Form, Linear Differential Equations of Higher Order with Constant Coefficients Only.

Unit 5

Differential Equations: Second Order Ordinary Differential Equations with Variable Coefficients, Homogeneous and Exact Forms, Change of Dependent Variable, Change of Independent Variable, Method of Variation of Parameters.

REFERENCE BOOKS:

1. Engineering Mathematics II, Adarsh Mangal, Anil Maheswari, Dhanpat Rai & co Delhi
2. Engg Mathematics II, Dr Gokhroo & others, Unique Books Ajmer

01BTC103**ENGINEERING PHYSICS-I****Unit 1 Interference of light**

Michelson's Interferometer: Production of circular & straight line fringes, Determination of wavelength of light, Determination of wavelength separation of two nearby wavelengths. Newton's rings and measurement of wavelength of light.

Optical technology: Elementary idea of anti-reflection coating and interference filters.

Unit 2 Polarization of light

Plane circular and elliptically polarized light on the basis of electric (light) vector, Malus law.

Double Refraction: Qualitative description of double refraction phase retardation plates, quarter and half wave plates, construction, working and use of these in production and detection of circularly and elliptically polarized light.

Optical Activity: Optical activity and laws of optical rotation, Specific rotation and its measurement using half-shade and bi-quartz devices.

Unit 3 Diffraction of light

Single slit diffraction: Quantitative description of single slit, position of maxima / minima and width of central maximum, intensity variation.

Diffraction Grating: Construction and theory, Formation of spectrum by plane transmission grating, Determination of wavelength of light using plane transmission grating.

Resolving power: Geometrical & Spectral, Raleigh criterion, Resolving power of diffraction grating and telescope.

Unit 4 Elements of Material Science

Bonding in Solids: Covalent bonding and Metallic bonding. Classification of Solids as Insulators, Semiconductors and Conductors.

Semiconductors: Conductivity in Semiconductors, Determination of Energy gap of Semiconductor.

X-Ray diffraction and Bragg's Law.

Hall Effect: Theory, Hall Coefficient and applications.

Unit 5 Special Theory of Relativity

Postulates of special theory of relativity, Lorentz transformations, relativity of length, mass and time.

Relativistic velocity addition and mass-energy relation, Relativistic Energy and momentum.

REFERENCE BOOKS:

1. Fundamental of Optics, Jenkins and White, Fourth Edition, McGraw Hill.
2. Optics, Ajoy Ghatak, Third Edition, Tata McGraw Hill.
3. Concept of Modern Physics, A. Baiser, Fifth Edition, McGraw Hill.
4. Modern Physics, J. Morrison, Edition 2011, Elsevier.
5. Elements of Material Science and Engineering, Van Vlack, Sixth Edition, Pearson.

01BTC104**CHEMISTRY & ENVIRONMENTAL ENGINEERING-I****Unit 1**

General Aspects of Fuel: Organic fuels, Origin, classification and general aspects of fossil fuels. Solid fuels, Coal, carbonization of coal, manufacturing of coke by Beehive oven and by product oven method. Liquid fuels, Composition of petroleum, advantages and refining of petroleum. Cracking, reforming, polymerization and isomerization of refinery products. Synthetic petrol, Bergius and Fischer Tropsch process. Knocking, octane number and anti-knocking agents. Gaseous fuels, Advantages, manufacturing, composition and calorific value of coal, gas and oil gas.

Unit 2

Fuels Analyses: Ultimate and proximate analysis of coal, Determination of calorific value of solid and gaseous fuels by bomb and Junker's Calorimeter respectively. Calculations of calorific value based on Dulong's formula. Combustion, requirement of oxygen/ air in combustion process. Flue gas analysis by Orsat's apparatus and its significance.

Unit 3

Polymers: Different methods of classification, basic ideas of polymerization mechanisms. Elastomers: Natural rubber, vulcanization, Synthetic Rubbers viz. Buna-S, Buna-N, Butyl and neoprene rubbers. Applications of elastomers & plastics. New Engineering Materials: Fullerenes: Introduction, properties, preparation and applications. Organic Electronic Materials (including conducting polymers- poly (p-phenylene), polythiophenes, Polyphenylene, vinylenes, polypyrroles, polyaniline). Lubricants: Introduction, classification and uses of lubricants. Types of lubrication. Viscosity & viscosity index, flash and fire point, cloud and pour point, steam emulsification number, precipitation number and neutralization number

Unit 4

Basics of Environment: Environmental Pollution, Environmental Acts and Regulations, Environmental Impact Assessment (EIA), Necessity and methodology of EIA. Renewable sources of energy, Potential & present status of renewable sources of energy in India. Functional concepts of Ecology, Basics of species, Ecosystem, Hydrological and chemical cycles, Energy flow in ecosystems. Biodiversity, population dynamics.

Unit 5

Solid Waste Management, Classification of solid waste, Collection, transportation, treatment, and disposal of solid waste. Economic recovery of solid waste. Sanitary landfill, on site sanitation.

01BTC105**ENGINEERING MECHANICS****Unit 1**

System of forces, Fundamental laws of mechanics, Composition of forces

Free body diagram, Lami's theorem

Moments and couple, Varignon's theorem, condition of equilibrium

Types of support and loading, reaction, Analysis of simple trusses by methods of joints and method of sections

Unit 2

Laws of Coulomb friction, Ladder, Wedges

Belt friction and rolling

Principle of virtual work and its applications

Unit 3

Location of centroid and center of gravity, area moment of inertia, mass moment of inertia

Law of machines, Variation of mechanical advantages, efficiency, reversibility of machine

Pulleys, wheel and axle, wheel and differential axle

Transmission of power through belt and rope

Unit 4 Kinematics of Particle

Rectilinear motion, plane curvilinear motion

Projectile motion

Constrained motion of connected particles

Dynamics of Particle and Rigid Body

Newton's law of motion

D'Alembert's principle

Unit 5 Work and Energy

Work, energy (Potential, Kinetic and Spring)

Work Energy relation

Law of conservation of energy

Impulse and Momentum

Impulse, momentum

Impulse Momentum relation, Impact

Vibration

Un-damped Free vibrations

REFERENCE BOOKS:

Engineering Mechanics : R.K.Bansal,Laxmi Publication

Engineering Mechanics: R.S.Khurmi,S Chand Publishers

Engineering Mechanics: Domkundwar& Domkundwar,Dhanpat Rai Publishers

Engineering Mechanics: ashish Dutt Sharma ,CBC Publishers

Engineering Mechanics: sanjeev sipani ,CBC Publishers
Engineering Mechanics

01BTC107**INSTRUMENTATION ENGINEERING****Unit 1** Theory of Errors

Accuracy and precision, repeatability, limits of errors
Systematic & random errors. modeling of errors, probable errors & standard deviation
Gaussian error analysis, combination of errors

Unit 2 Electronic Instruments for Measuring Basic Parameters

Electronic voltmeter, electronic multi-meters, digital voltmeters, vector impedance meter
RF power & voltage measurement, introduction to shielding and grounding

Unit 3 Oscilloscopes

CRT construction, basic CRO circuits, CRO probes
Oscilloscope techniques for measurement of frequency, phase angle and time delay

Unit 4 Signal Generation

Introduction to oscillators, sine wave generators
Frequency synthesized signal generator, sweep frequency generators

Unit 5 Transducers

Classification, selection criteria, characteristic, construction, working principle, application of following transducers RTD, thermocouples, thermistors, LVDT, strain gauges, bourdon tubes, tacho generators, load cell, piezoelectric transducers

REFERENCE BOOKS:

Electronic Instrumentation: H.S.Kalsi—Tata Mc-Graw Hill Publishing Ltd.,New Delhi MC Graw Hill New Delhi

Fundamental Of Instrumentation: R.A. Gupta Ajay Bansal V.Sangtani –Neel kanth publishers Jaipur

Instrumentation: Sandeep Joshi –College Book Centre

Instrumentation: Dr. Rajeev Gupta,Vikash Soni ,--Genius Publication Jaipur

01BTC108**AGRICULTURE ENGINEERING-I****Unit 1**

Introduction to the agriculture farm mechanization –Introduction ,Sources of farm power ,status of farm power in India concept of farm mechanization ,scope of farm mechanization .benefits & limiting factors in farm mechanization. Status of farm mechanization in India, Energy efficient equipments, Mechanization in farming operations

Unit II

Thermodynamics Cycle, Principle & Working of I. C. Engines

Engine Components :- Cylinder, Cylinder block, cylinder head, cylinder liner, piston, piston ring, connecting rod, crankshaft, flywheel, camshaft

Unit III

Measurement of engine power:-Bore, Stroke, Stroke Bore ratio, Swept volume, Compression Ratio, Power, Brake Power, Belt Power, Drawbar power, Mechanical efficiency.

Unit IV

Tillage Implements:- Introduction ,Classification& Types of Tillage ,Mould board ploygle, forcing acting on Tillage ,Implements

Seeding and Fertilizer Equipments: - Seedling methods Harvesting and threshing equipments and processing equipments

Unit V

Soil plant water relationship:- water relation of soils, soil moisture and plant growth, water requirement.

Water resources utilization in India: - surface water resources, ground water resources, need for planned utilization of water resources, economic of water resources utilization

REFERENCE BOOKS:

Elements of Agriculture Engg : Jagdishwar Sahay , Slandered Publishers

01BTC201**COMMUNICATION LAB**

1. Phonetic symbols and transcription
2. One word for many
3. Synonyms and antonyms
4. Word forms
5. Words commonly mis-spelt and mis-pronounced
6. Affixes
7. Seminar Presentations

8. Group Discussions

01BTC202**ENGINEERING PHYSICS LAB-I**

1. To determine the wave length of monochromatic light with the help of Fresnel's biprism.
2. To determine the wave length of sodium light by Newton's Ring.
3. To determine the specific rotation of Glucose (Sugar) solution using a polarimeter.
4. To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer.
5. To convert a Galvanometer in to an ammeter of range 1.5 amp. and calibrate it.
6. To convert a Galvanometer in to a voltmeter of range 1.5 volt and calibrate it.
7. To study the variation of a semiconductor resistance with temperature and hence determine the Band Gap of the semiconductor in the form of reverse biased P-N junction diode.
8. To study the variation of thermo e.m.f. of iron copper thermo couple with temperature.
9. To determine coherent length and coherent time of laser using He-Ne Laser.

01BTC203**CHEMISTRY & ENVIRONMENTAL ENGINEERING-I LAB**

Any Seven to be performed by the students

1. Proximate analysis of solid fuel.
2. Experiments based on Bomb Calorimeter.
3. To determine the strength of Ferrous Ammonium sulphate solution with the help of $K_2Cr_2O_7$ solution.
4. To determine the strength of $CuSO_4$ solution with the help of hypo solution.
5. To determine the strength of NaOH and Na_2CO_3 in a given alkali mixture.
6. Determination of Na/K/Ca by flame photometer in a given sample.
7. Determination of turbidity in a given sample.
8. To determine the flash and fire point of a given lubricating oil.
9. To determine the viscosity of a given lubricating oil by Redwood viscometer.
10. To determine Flash & Fire point of lubricants.

01BTC205**PRACTICAL GEOMETRY**

1. 1. Lines, Lettering and Dimensioning
2. Scales: Representative factor, plain scales, diagonal scales, scale of chords
3. Conic Sections: Construction of ellipse, parabola and hyperbola by different methods.
Normal and Tangents
4. Special Curves: Cycloid, Epicycloids, Hypo-cycloid, Involute, Archimedean and logarithmic spirals
2. 1. Projections: Types of projection, Orthographic projection, First angle and third angle projection
3. Projection of points and lines, True inclinations and true length of straight lines, Traces of straight lines, Auxiliary planes

4. Projection of planes and solids: Projection of planes, Projection of polyhedra, Pyramids, Cylinder and Cone
5. • Sections of Solids: Section of right solids by normal and inclined planes
6. Development of Surfaces: Parallel line and radial line method for right solids
7. • Isometric Projections: Isometric Scale, Isometric axes, Isometric projections of planes and solids

2nd Semester**02BTC101****COMMUNICATIVE ENGLISH****Unit 1 Grammar**

1. Tenses
2. Passive Voice
3. Indirect Speech
4. Conditional Sentences
5. Modal Verbs

Unit 2 Composition

1. Dialogue Writing
2. Paragraph and Precis Writing
3. Report, its importance and Report Writing

Unit 3 Short Stories

1. The Luncheon: W.S. Maugham
2. How Much Land Does a Man Need?: Leo Tolstoy
3. The Last Leaf: O. Henry

Unit 4 Essays

1. On the Rule of the Road: A. G. Gardiner
2. The Gandhian Outlook: S. Radhakrishnan
3. Our Own Civilisation: C.E.M. Joad

Unit 5 Poems

1. The Unknown Citizen: W. H. Auden
2. The Character of A Happy Life: Sir Henry Wotton
3. No Men are Foreign: James Kirkup
4. If : Rudyard Kipling

REFERENCE BOOKS:

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma & Binod Mishra, PHI Learning Pvt. Ltd.
2. English for Engineers: Made Easy, Aeda Abidi & Ritu Chaudhary, Cengage Learning, (New Delhi)
3. A Practical Course for Developing Writing Skills in English, J.K. Gangal, PHI Learning Pvt. Ltd., New Delhi.
4. Intermediate Grammar, Usage and Composition, Tickoo, A. E. Subramaniam & P. R. Subramaniam, Orient Longman (New Delhi)
5. The Written Word , Vandana R. Singh, Oxford University Press (New Delhi)

6. The Great Short Stories edited by D.C. Datta, Ram Narain Lal Publishers (Allahabad)
7. Professional Communication, Kavita Tyagi & Padma Misra, PHI Learning Pvt. Ltd., New Delhi.
8. “Learn Correct English: Grammar, Usage and Composition” by Shiv K. Kumar & Hemalatha Nagarajan, Pearson (New Delhi).
9. “Current English Grammar and Usage with Composition” by R.P. Sinha, Oxford University Press (New Delhi).
10. “Grammar of the Modern English Language”, by Sukhdev Singh & Balbir Singh, Foundation Books (New Delhi).

02BTC102**ENGINEERING MATHEMATICS-II****Unit 1**

Coordinate Geometry of Three Dimensions: Equation of a sphere, Intersection of a sphere and a plane, tangent plane, Intersection of two spheres, orthogonality of two spheres, Right circular cone. Right circular cylinder.

Unit 2

Matrices: Rank of a matrix, Rank of matrix by reducing to normal forms, Consistency of systems of linear simultaneous equations and its solution, Eigen values and Eigen vectors, Cayley Hamilton theorem (without proof), Diagonalization of matrix.

Unit 3

Vector Calculus: Scalar and vector field, differentiation & integration of vector functions, Gradient, Divergence, Curl and Differential Operator, Line, Surface and volume Integrals.

Unit 4

Application of Vector Calculus: Green’s Theorem in a Plane, Gauss’s and Stoke’s Theorem (without proof) and their Applications.

Fourier Series: Expansion of simple functions in Fourier Series, half range Fourier sine and cosine series, change of interval. Harmonic Analysis.

Unit 5

Differential Equations: Series Solutions of Second Order Linear Differential Equations with Variable Coefficients (Complementary Functions only), Partial Differential Equations of First Order : Lagrange’s Form, Standard Forms, Charpit’s Method .

REFERENCE BOOKS:

1. Engineering Mathematics I , Adarsh Mangal, Anil Maheswari, Dhanpat Rai & co Delhi
2. Engg Mathematics I Dr Gokhroo & others ,Unique Books Ajmer

02BTC103**ENGINEERING PHYSICS-II****Unit 1**

Quantum Mechanics: Compton effect & quantum nature of light, Derivation of time dependent and time independent Schrödinger's Wave Equation, Physical interpretation of wave function and its properties, boundary conditions, Particle in one-dimensional box.

Unit 2

Applications of Schrödinger's Equation, Particle in three-dimensional box and Degeneracy, Barrier penetration and tunnel effect, Tunneling probability, Alpha Decay, Sommerfeld's Free electron gas model Postulates, Density of energy states, Fermi energy level.

Unit 3

Coherence and Optical Fibres, Spatial and temporal coherence, Coherence length, Coherence time and 'Q' factor for light, Visibility as a measure of coherence, Spatial Coherence and size of the source, Temporal coherence and spectral purity, Optical fiber as optical wave-guide, Numerical aperture, maximum angle of acceptance and applications of Optical Fiber.

Unit 4

Lasers and Holography: Theory of laser action, Einstein's coefficients, Components of a laser, Threshold conditions for laser action; Theory, Design and applications of He-Ne and semiconductor lasers; Holography versus photography, Basic theory of holography, Basic requirement of a holographic laboratory; Applications of holography in microscopy and interferometry.

Unit 5

Nuclear Radiation Detectors, Characteristics of gas filled detectors: general considerations, Constructions, Working and properties of: Ionization chamber, proportional counter, G. M. Counter and Scintillation Counter.

REFERENCE BOOKS:

1. Fundamental of Optics, Jenkins and White, Fourth Edition, McGraw Hill.
2. Optics, Ajoy Ghatak, Third Edition, Tata McGraw Hill.
3. Quantum Mechanics, Schiff, Third Edition, McGraw Hill.
4. Quantum Mechanics, Merzbacher, Third Edition, Wiley India.
5. Nuclear Physics: Principles and Applications, John Lilley, Wiley India.

02BTC104**CHEMISTRY & ENVIRONMENTAL ENGINEERING-II****Unit 1**

Water: Common Impurities of water Hardness of water, Determination of hardness by Clark's test and complexometric (EDTA) method, Numerical based on hardness and EDTA method,

Municipal Water Supply: Requisites of potable water, Steps involved in purification of water, Sedimentation, coagulation, Filtration and Sterilization, Break point chlorination.

Unit 2

Water Treatment: Softening of water, Lime-Soda, Permutit (Zeolite) and Deionization (Demineralization) methods, Boiler troubles their causes, disadvantages and prevention: Formation of solids (Scale and Sludge), Carry over (Priming and Foaming), Corrosion and Caustic, Embrittlement. Numerical problems based on Lime-Soda and Zeolite softening methods.

Unit 3

Cement: Definition, Composition, basic constituents and their significance, Manufacturing of Portland cement by Rotary Kiln Technology, Chemistry of setting and hardening of cement and role of gypsum.

Glass: Definition, Properties, Manufacturing of glass and importance of annealing in glass making, Types of silicate glasses and their commercial uses and industrial applications. Optical fiber grade glass.

Unit 4

Refractory: Definition, classification, properties, Requisites of good refractory and manufacturing of refractory. Preparation of Silica and fire clay refractory with their uses. Seger's (Pyrometric) Cone Test and RUL Test

Corrosion: Definition and its significance. Mechanisms of Chemical (Dry) and Electrochemical (Wet) corrosion. Protection from corrosion, Protective coatings, cathodic protection, sacrificial anode and modification in designs.

Unit 5

Air Pollution, Noise Pollution and Solid Waste Management: Air Pollution, Harmful effects of Air Pollution, Control of Air Pollution. Noise Pollution, Harmful effects of noise pollution, control of noise pollution. Global warming, Acid rain, Ozone depletion.

Water Pollution: Water pollution, Harmful effects of water pollution, control of water pollution. Waste water management, Treatment & disposal of wastewater. Reuse and saving in use of water, rain water harvesting. anode and modification in designs.

REFERENCE BOOKS:

1. Chemistry of water treatment, Samuel Faust & Osman M Aly, CRC Press
2. Boilers water treatment. Principles and Practice, Colin Frayne, CRC Press
3. Corrosion Understanding the Basic, by Joseph R Davis, ASM International
4. Atmospheric pollution, by W Buch , Tata McGraw Hill(TMh)
5. Introduction to Environmental Science, by G Tyler Miller and Scott Spoolman, Cengage Learning
6. Introduction to Environmental Engineering, by Mackenzie L Davis and David A Cornwell, Tata McGraw Hill(TMh)

02BTC105**COMPUTER SYSTEMS AND PROGRAMMING****Unit 1**

Types of computers and generations
Basic architecture of computers and its building blocks
Input-Output devices, Memories

Unit 2 Number Systems

Binary, octal, decimal and hexadecimal representation of numbers
Integers and floating point numbers
Representation of characters, ASCII and EBCDIC codes
Binary Arithmetic: addition, subtraction, complements

Unit 3 Classification of Computer Languages

Machine, assembly and high level languages
Brief idea of operating system
Assembler, compiler and interpreter Programming in 'C'
Need of programming languages, Defining problems
Flowcharts and algorithm development

Unit 4

Data types, constants, variables, operators and expressions
Input and output statements, Conditional and control statements, Arrays

Unit 5

Structures and unions
Pointers
File handling

REFERENCE BOOKS:

Computer Programming : E. Balaguruswamy ,ANSI C” TMH
Let Us C : Yaswant Kometkar, CBC Publishers

02BTC106**ELECTRICAL AND ELECTRONICS ENGINEERING****Unit 1**

DC Networks: Kirchoffs Laws, Node Voltage and Mesh Current Analysis; Delta-Star and Star-Delta Transformation, Source Conversion. Classification of Network Elements, Superposition Theorem, Thevenin's Theorem.

Unit 2

Single Phase AC Circuits: Generation of Single Phase AC Voltage, EMF Equation, Average, RMS and Effective Values. RLC Series, Parallel and Series- Parallel Circuits, Complex Representation of Impedances. Phasor Diagram, Power and Power Factor.

Three Phase A.C. Circuits: Generation of Three-Phase AC Voltage, Delta and Star-Connection, Line & Phase Quantities, 3-Phase Balanced Circuits, Phasor Diagram, Measurement of Power in Three Phase Balanced Circuits.

Unit 3

Transformer: Faraday's Law of Electromagnetic Induction, Construction and Operation of Single Phase Transformer, EMF Equation, Voltage & Current Relationship and Phasor Diagram of Ideal Transformer.

Electrical DC Machine: Principle of DC Machines, Types, Different Parts of DC Machines.

Unit 4

Transistor: Bipolar Junction Transistor, Transistor Current Components, Characteristics of CE, CB and CC Transistor Amplifiers.

Thyristors: The four layer diode, Bi-directional thyristors, the uni-junction transistor and its application in thyristor circuits.

Unit 5

Communication System: Introduction to modulation (AM, FM&PM) demodulation, multiplexing. Superhetrodyne radio receiver, television. Elementary concepts of optical, satellite & mobile communication.

REFERENCE BOOKS:

Electrical & Electronics Engg : J.B.Gupta, Katson publication New Delhi

Electrical & Electronics Engg : LK. C. Jain S.Surana –Jain Brothers New Delhi

Dr. K. R. Niazi—genius Publication Jaipur

Electrical & Electronics Engg Work shop : S. K Bishnoi , M.L.Meena& Mahendra Bhadu – Ashirwad Publication Jaipur

02BTC107

AGRICULTURE ENGINEERING-II

Unit I

Farm tractor:- introduction, classification and selection of tractors, basics of hydraulic control system.

Grain driers:- introduction, process of grain drying, principle of grain drying.

Unit II

Mechanical power transmission:- belt drive, chain and sprocket drive, gear drive, bolts, nuts, washers, screws and rivets. Solved examples.

Material and their properties:- cast iron, steel, non ferrous materials.

Unit III

Plant protection equipment:- sprayers, power sprayers, hydraulic sprayers, type of nozzle, care of power sprayers, commercial sprayer, pumps for spraying, dusters.

Unit IV

Dairy equipments:- milking machine, heating and cooling of milk, pasteurization.

Measurement of irrigation water:- method of water measurement, weirs, parashall flumes, orifices, tracer method of water measurement.

Unit V

Salt problems in irrigated agriculture :-salt balance, quality of irrigation water, plant response to saline and alkali soils, reclamation and management of salt affected soils.

REFERENCE BOOKS:

Farm Machinery : -an Approach : S.C..Jain ,Philip ,Standered publishers

Farm Tractor Maintenance& repair s.C.Jain ,Standered Publishers & Rai

02BTC201**ENGINEERING PHYSICS LAB-II**

1. To determine the height of water tank with the help of a Sextant.
2. To determine the dispersive power of material of a Prism for Violet Red and yellow colours of Mercury light with the help of a spectrometer.
3. To measure the Numerical Aperture of an Optical Fibre.
4. To determine the ferromagnetic constants retentivity, permeability and susceptibility by tracing B-H curve using C.R.O.
5. To study the Charge & Discharge of a condenser and hence determine time constant (Both current and voltage graphs are to be plotted).
6. To determine the high resistance by method of leakage, using a Ballistic galvanometer.
7. To verify the expression for the resolving power of a Telescope.
8. To determine the specific resistance of the material of a wire by Carey Fosters bridge.
9. To determine the specific resistance of the material of a wire by Carey Fosters bridge.

02BTC202**CHEMISTRY & ENVIRONMENTAL ENGINEERING-II LAB**

1. To determine the hardness of water by HCL method.
 2. To determine the hardness of water by EDTA method.
 3. Determination of CO₂ in a water sample.
 4. Measurement of pH of a given sample by pH-meter.
 5. To determine free and residual chlorine in a given water sample.
 6. Measurement of dissolves oxygen in water.
 7. Measurement of conductivity of a given sample by conductivity meter.
- R.T.U., Kota Scheme and Syllabus B.Tech. (1st and 2nd Semesters) effective from Session 2012-13
8. Measurement of fluoride in water.
 9. Measurement of nitrate in water.
 10. Determination of sulphate in water.
 11. Evaluation of Reverse Osmosis(RO) Process by TDS measurement.

02BTC203**COMPUTER PROGRAMMING LAB**

1. Simple input output program integer, real character and string. (Formatted & Unformatted)
2. Conditional statement programs (if, if-else-if, switch-case)
3. Looping Program. (for, while, do-while)
4. Program based on array (one, two and three dimensions)
5. Program using Structure and Union.
6. Program using Function (with and without recursion)
7. Simple programs using pointers.
8. File handling.

02BTC204**WORKSHOP PRACTICE****1. Carpentry Shop**

1. Timber, definition, engineering applications, seasoning and preservation
2. Ply wood and ply boards

2. Foundry Shop

1. Moulding Sands, constituents and characteristics
2. Pattern, definition, materials types, core prints
3. Role of gate, runner, riser, core and chaplets
4. Causes and remedies of some common casting defects like blowholes, cavities, inclusions

3. Welding Shop

1. Definition of welding, brazing and soldering processes and their applications
2. Oxyacetylene gas welding process, equipment and techniques, types of flames and their applications
3. Mould of any pattern
4. Casting of any simple pattern

WELDING SHOP

1. Gas welding practice by students on mild steel flat
2. Lap joint by gas welding
3. MMA welding practice by students
4. Square butt joint by MMA welding
5. Lap joint by MMA welding
6. Demonstration of brazing

MACHINE SHOP PRACTICE

1. Job on lathe with one step turning and chamfering operations
2. Job on shaper for finishing two sides of a job
3. Drilling two holes of size 5 and 12 mm diameter on job used to be used for shaping
4. Grinding a corner of above job on bench grinder

FITTING AND SMITHY SHOP

1. Finishing of two sides of a square piece by filing
2. Tin smithy for making mechanical joint and soldering of joint
3. To cut a square notch using hacksaw and to drill three holes on PCD and tapping

02BTC205**ELECTRICAL AND ELECTRONICS LAB****A. ELECTRICAL LAB**

1. Single line diagram of a power system and a distribution sub-station and basic functional study of main components used in power systems.
2. Make house wiring including earthing for 1-phase energy meter, MCB, ceiling fan, tube light, three pin socket and a lamp operated from two different positions. Basic functional study of components used in house wiring.
3. Study the construction and basic working of ceiling fan, single phase induction motor and three phase squirrel cage induction motor. Connect ceiling fan along with regulator and single phase induction motor through auto-transformer to run and vary speed.
4. (a) Basic functional study and connection of moving coil & moving iron ammeters and voltmeters, dynamometer, wattmeter and energy meter.
(b) Run a 3-phase squirrel cage induction motor at no load and measure its voltage, current, power and power factor. Reverse the direction of rotation.
5. Study the construction, circuit, working and application of the following lamps: (i) Fluorescent lamp, (ii) Sodium vapour lamp, (iii) Mercury vapour lamp, (iv) Halogen lamp and (v) Neon lamp
6. (a) Study the construction and connection of single phase transformer and auto-transformer. Measure input and output voltage and find turn ratio.
(b) Study the construction of a core type three phase transformer. Perform star and delta connection on a 3-phase transformer and find relation between line and phase voltage.

B. ELECTRONICS LAB

7. Identification, testing and applications of resistors, inductors, capacitors, PN-diode, Zener diode, LED, LCD, BJT, FET, UJT, SCR, Photo diode and Photo transistor.
8. (a) Functional study of CRO, analog & digital multi-meters and function/signal generator.
(b) Study the single phase half wave and bridge rectifier and effects of filters on waveform.
9. Study the BJT amplifier in common emitter configuration. Measure voltage gain, plot gain frequency response and calculate its bandwidth.
10. (a) Study the construction and basic working of SCR.
11. (b) Study the single phase half wave and bridge control led rectifier and observe the effect of firing angle on waveform.

02BTC206**AGRICULTURAL ENGINEERING LAB**

1. Study of plant protection equipments.
2. Working and Principle of Grain Driers.
3. Study of hydraulic control system of tractor.
4. Study of pasteurization system.
5. Study of tracer method of water measurements.
6. Study of salt problems in irrigated agriculture.
7. Study of mechanical power transmission system.
