

Sardar Patel College of Engineering, Andheri (West), Mumbai 400058
Year: 2017-18

FIRST YEAR B.Tech.
(CIVIL /MECHANICAL /ELECTRICAL)

Sem. I

COURSE CONTENT

Year: 2017-18

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Course:- Engineering Mathematics I
(AY 2017-18)

BT101 Engineering Mathematics-I

Prerequisites: -

Course Objectives:

The main objectives of the course are

- To introduce Differential Calculus.
- To introduce Partial Differentiations and its applications to find Maxima and Minima, Jacobian.
- To introduce Complex Numbers and its applications to find roots of equations.
- To introduce Vector Calculus.

Course Outcomes:

At the end of the course the students shall be able to

1. Find n^{th} order derivative and expansions of functions.
2. Find partial derivatives of functions of more than one variable.
3. Find roots of algebraic equations and logarithm of complex numbers.
4. Find angle between two surfaces.

Course Content

Module No	Details	Hrs
1	Differential Calculus 1.1. Successive differentiations, n^{th} -derivative of Exponential, Trigonometric & Algebraic functions. 1.2. Leibnitz's theorem (without proof) and related examples.	05
2	2.1 Expansion of functions, Taylor's series, Maclaurin's series and examples. 2.2 Indeterminate forms $\frac{0}{0}, \frac{\infty}{\infty}, 0 \times \infty, \infty - \infty, 1^{\infty}, \infty^{\infty}, 0^0$ Evaluation of limits using L' Hospital rule, Evaluation of limits using expansions of functions.	06
3	Partial Differentiations 3.1 Partial differentiation, Partial derivatives of first and higher order, Total Differentiation, Differentiation of Composite & Implicit functions. 3.2 Homogeneous Functions, Euler's Theorem on Homogeneous function with two & three independent variables (with proof), Deductions from Euler's Theorem.	07
4	4.1 Maxima & Minima of a function of two independent variables. 4.2 Jacobian, Jacobian of Implicit functions.	04
5	Complex Numbers 5.1 Complex Numbers. Cartesian, Polar and exponential form of complex numbers. De- Moivre's Theorem. 5.2 Expansion of $\sin(n\theta), \cos(n\theta)$ in terms of powers of $\sin\theta$ and $\cos\theta$. Expansion of $\sin^n\theta, \cos^n\theta$ in terms of $\sin(n\theta), \cos(n\theta)$.	06
6	6.1 Circular and Hyperbolic functions. Inverse Circular and Inverse	04

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	Hyperbolic functions. 6.2 Logarithmic functions, Roots of complex numbers.	
7	Vector differentiation 7.1 Scalar and vector point functions 7.2 Gradient, Divergence and Curl, Solenoidal and Irrotational Vector Field. Directional Derivative, Angle between two surfaces.	04

Text Books:-

1. Shanti Narayan (2005), "Differential Calculus", S.Chand Publications, 30th Edition, ISBN 8121904714, 572 Pages
2. B S Grewal (2014), "Higher Engineering Mathematics", Khanna Publications, 43rd Edition, ISBN 8174091955, 1315 Pages

Reference Books:-

1. Erwin Kreyszig (2010), "Advanced Engineering Mathematics" Wiley Eastern Limited, Singapore 10th edition, ISBN 8126554231, 1148 Pages.

Course:- Basic Electrical and Electronics I
(AY 2017-18)

BT102 Basic Electrical and Electronics I

Prerequisites: Standard XII Physics

Course Objectives:

- Introduction to electrical circuits and its analysis.
- To impart knowledge on solving electrical circuits using network theorems.
- To draw phasor diagrams and to make analysis of three phase circuits.
- Introduction to single phase transformers motors and meters.

Course Outcomes:

The course will give the students

1. Ability to analyse electrical circuits
2. Ability to apply circuit theorems
3. Ability to analyse ac and dc electrical circuits
4. Aware of electrical machines and meter.

Course Contents:

Module	Details	Hrs.
1.	D.C. circuits :(Only independent sources) Voltage divider rule, current divider rule, power dissipation in resistance, Star delta transformation, Mesh and nodal analysis, source transformation.	04
2.	D.C. Circuits Theorems: Superposition, Thevenin's, Norton's and Maximum power transfer theorems.	06
3.	A.C. Circuits: A.C. through resistance, inductance and capacitance, R-L, R-C, R-L-C series and parallel circuits, phasor diagrams, power and power factor. Problems by analytical as well as graphical methods.	07
4.	Three Phase Circuits: Three phase voltage and current generation, star and delta connections(Balanced load), Relationship between phase and line current and voltages, phasor diagrams, Measurement of power by two wattmeter method Problems by analytical as well as graphical methods.	07
5.	Single Phase Transformer: Construction, working principal, Emf equation, Ideal and practical transformer, phasor diagrams, Equivalent circuit, O.C. and S.C. test, efficiency and regulation, All day efficiency.	05
6.	Electrical Motors (No numerical expected): D.C. Motors: construction, working principal, Characteristics, emf equation, A.C. Motors: Rotating magnetic field theory, 3- ϕ Induction Motor. Single phase induction motor: Construction, working principal, double field revolving theory, split phase and capacitor start motors.	05
7.	Study of Meters: Study of Tachometer, voltmeter, ammeter, multi-meter, wattmeter etc.	02

Text Books:-

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- 1) Mittle and Mittle (2005), 'Basic Electrical Engineering', Tata McGraw Hill.
- 2) B.L. Theraja- 'A Text Book of Electrical Technology', Vol-1, S. chand & co. New-Delhi, 1st Edition (re Print), ISBN-81-219-2440-5
- 3) V.K.Mehta – 'Basic Electrical Engg. & electronics', S. chand & co. New-Delhi, 5th Edition, ISBN-81-219-0871-X, 903 pages.

Reference Books:-

- 1) Vincent Deltoro (1986), 'Electrical Engineering fundamentals', Pearson Education 2nd Edition New Delhi, ISBN 0132471310, 896 Pages.
- 2) H. Cotton (2011), 'Advanced Electrical Technology', Wheeler Publication, Alahabad, ISBN 8190630717, 1293 Pages
- 3) Joseph A. Edminster (1965), 'Electrical Circuits', Tata McGraw Hill, New Delhi, 4th Edition, ISBN 0070189749

Course:-Engineering Graphics-I
(AY 2017-18)

BT103 Engineering Graphics-I

Prerequisites: Standard XII Physics and Mathematics

Course Objectives:

- To understand the fundamental principles of solid geometry, this is the base of engineering Graphics.
- To understand the concepts of projections of an object and various ways of projection for visualization of various engineering parts and components.
- To develop competence in correct expression of the visualized objects. 4. To develop competence in use of Autocad as an effective tool for Engineering Graphics.
- To provide an insight of the technical drawing.

Course Outcome:

- Students will be able to draw & solve the problems on curves, lines, planes, solids, section of solids and development.
- Students will be able to identify the various geometries.
- Students will be able to differentiate line, planes, solids etc.
- Students will be able to represent the intricacies of section of solids & development of solids

Course Contents:

Module No.	Details	No.of Hrs
1.	Engineering Curves: Conics-Parabola, Ellipse, Hyperbola. Involute, Cycloidal Curves: Cycloid, Epicycloid, Hypocycloid. Spirals, Helix etc.	4
2.	Projection of points & lines inclined to both the reference planes.	4
3.	Traces of the Lines on the Reference Planes.	2
4.	Projection of Planes inclined to both the Reference Planes	4
5.	Projection of Right regular Solids: Regular Polyhedrons (Tetrahedron), Prisms, Pyramids, Cylinders, Cones inclined to both the Reference Planes.	5
6.	Sections of solids cut by inclined planes.	4
7.	Development of Lateral surfaces of solids cut by inclined plane and curved plane	5
TOTAL		28

Termwork:

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Term work shall comprise of total five A2 size drawing sheets consisting of 2 to 3 problems on each module and class assignments.

Recommended Books

1. N.D.Bhatt (2011), 'Elementary Engineering Drawing', Charotar Publishing House, ISBN9380358172, 728 Pages
2. T.Jeyapovan (2010), 'Engineering Drawing and Graphics', Vikas Publishing House Pvt. Ltd. 3rd Edition, ISBN 8125940006, 712 Pages
3. K.L.Narayana&P.Kannaiah (1988), 'Engineering Graphics', Tata McGraw-Hill Co .Ltd., New Delhi, ISBN 0074517902, 544 Pages

Reference Books:-

1. K.Venugopal (2007), 'Engineering Drawing and Graphics', New Age International Publishers, ISBN 8122415458, 410 Pages
2. Giesecke, Mitchell, Spencer & Hill (2011), 'Technical Drawing', Macmillan Publishing Co. Inc. 14th Edition, ISBN 0135090490, 936 Pages
3. Warren H .Luzadder (1976) , 'Fundamentals of Engineering Drawing', Prentice Hall of India Pvt.Ltd., New Delhi 7th Edition, ISBN 0133383687, 620 Pages
4. M.B.Shah&B.C.Rana (2009), 'Engineering Drawing', Pearson Education 2nd Edition, ISBN 8131710564, 580 Pages
5. M.L.Dabhade (2004), 'Engineering Graphics', Association of Technical Authors, ISBN 8187575751, 772 Pages

Course:- Engineering Mechanics-I
(AY 2017-18)

BT104 Engineering Mechanics

Course Objectives:

The main objectives of the course are

- To introduce the students to the principles and methods of statics (mechanics), and to apply those fundamentals to solve the problems on statics.
- To prepare the base for the students to study other engineering/structural engineering courses such as Mechanics-II, Strength of Materials, Structural Analysis-I etc. at a later stage.

Course Outcomes:

At the end of the course the students shall be able to

1. Determine the resultant of coplanar and non coplanar system of forces.
2. Solve the problems involving equilibrium of coplanar and non coplanar system of forces. Analyse determinate beams using the principle of virtual work.

Course Contents:

Module No.	Details	Hrs.
1	System of Coplanar forces: Introduction to coplanar & non-coplanar force system. Forces and their components. Moment of the force about a point, couple.	02
2	Resultant of coplanar force system: Resultant of concurrent forces, parallel forces, non-concurrent non-parallel system of forces. Varignon's theorem.	06
3	Equilibrium of coplanar force system: Meaning of equilibrium, free body diagrams, equilibrium of concurrent, parallel and non-concurrent non-parallel (general) system of forces. Types of supports, determination of reactions at supports for various types of determinate beams.	06
4	Forces in space: Rectangular components of forces in space, Resultant of concurrent forces, moment of a force about a point, moment of a force about a given axis, resultant of general force system, Equilibrium of a particle in space.	06
5	Analysis of pin jointed frame / truss: Perfect truss, Imperfect truss, Analysis of truss by method of joints and method of section.	06
6	Friction: Laws of friction, angle of friction, angle of repose, cone of friction, Equilibrium of bodies on rough horizontal and inclined plane, application to problems involving wedges, ladder. Belt friction, flat belts on the flat pulleys.	06
7	Principle of virtual work: Application to determine the reactions of determinate beams with / without internal hinges.	04

Reference Books:-

1. B. N. Thadani(1966); “Engineering Mechanics”, Asia Publishing House, ISBN 0210269405, 655 pages
2. Beer & Johnson (2013), “Engineering Mechanics”, Tata McGraw Hill, ISBN 1259062919, 470 pages
3. F. L. Singer (1975), “Engineering Mechanics”, Harper & Row Publication, ISBN 0060462329, 724 pages
4. A. Nelson (2009), “Engineering Mechanics”, Tata McGraw Hill, ISBN 0070146143
5. Shames (2006), ‘Engineering Mechanics’, Prentice Hall, India, ISBN 8177581236, 837 pages

Text Books:-

1. R. C. Hibbeler (2007); “Engineering Mechanics”, Pearson Education Inc., ISBN 0132215098, 656 pages
2. A. K. Tayal (2010), ‘Engineering Mechanics’, Umesh Publication, ISBN 9380117388
- Kumar(1956), “Engineering Mechanics”, Tata McGraw Hill, ISBN 0070681813, 673 pages.

BT105 Applied Physics-I

Prerequisites: Standard XII physics

Course Objectives

- To explain and interpret basic properties involved in thin film interference and diffraction.
- To explain working principles of optical fibers and lasers.
- To explain various methods of production of ultrasonic waves and its applications.
- To introduce students to Quantum mechanics basic concepts and introduce Schrodinger's equations and their applications.

Course Outcomes:

At the end of this course, students will be able to:

1. Analyse the thin film interference patterns, Fraunhofer diffraction through single, double slits and diffraction grating.
2. Analyse working principles of lasers using different pumping schemes, working principle of optical fibers using total internal reflection and study about their types and applications in Engineering.
3. Understand methods of production of ultrasonic waves and describe the working of transducer to produce ultrasonic waves and its various applications.
4. Learn basic differences between Newtonian mechanics and Quantum mechanics, wave-particle duality, Heisenberg's uncertainty principle and Schrodinger's equations and applications of these equations.

Course Contents:

Module No.	Details	Hrs.
1	Interference: Interference in thin films- equal thickness and wedge shaped films, Newton's rings. Applications.	6
2	Diffraction: Types of diffraction, Fraunhofer diffraction through a single slit and diffraction grating, grating spectra, resolving power of a grating.	8
3	LASERS and OPTICAL FIBRES Absorption, spontaneous and stimulated emission, Einstein's coefficients. Terms Associated with Lasers: population inversion, metastable state, pumping and pumping schemes, active medium, and resonant cavity. Ruby laser, He-Ne Laser, semiconductor diode laser. Applications: Holography. Optical fiber: Propagation of light in an optical fiber- TIR, Angle of Acceptance; Numerical Aperture; Types of Fibers; Advantages of Optical Fiber, Applications.	6
4	Ultrasonics Ultrasonic Waves; Methods of production of ultrasonic waves -	4

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	Piezoelectric Oscillator & Magnetostriction Oscillator; low and high frequency applications.	
5	Quantum Mechanics Introduction, Wave particle duality, de Broglie wavelength; experimental verification of de Broglie theory; properties of matter waves; wavepacket, group velocity and phase velocity; Wave function, Physical interpretation of wave function; Heisenberg's uncertainty principle; Electron diffraction experiment and Gamma ray microscope experiment; Applications of uncertainty principle; Schrodinger's time dependent wave equation, time independent wave equation, Motion of free particle, Particle trapped in one dimensional infinite potential well.	8

Reference Books:-

1. Halliday and Resnick (2013), 'Fundamentals of Physics', Wiley Eastern Limited, 10th Edition, ISBN 1118230647, 1232 Pages
2. Jenkins & White (2001), 'Fundamentals of optics', McGraw-Hill Int., 4th Edition, ISBN0072561912, 768 Pages
3. Arthur Beiser (2009), 'Concepts of Modern Physics', TataMcGraw Hill, 6th Edition, ISBN 0070151555
4. K. Thyagarajan and AjoyGhatak (2010), 'Lasers theories and application', Springer, 2nd Edition, ISBN 1441964410, 650 Pages
5. AjoyGhatak and K Thyagarajan (2006), 'Fiber Optics and LASERs the two revolutions', McMillan India, ISBN 1403930112, 248 Pages

Text Books:-

1. Kshirsagar and Avadhanulu (1992), 'A textbook of Engineering Physics', S. Chand Publications, ISBN 8121908175, 758 Pages.
2. A.S. Vasudeva (2008), 'Modern Engineering Physics', S. Chand Publications, ISBN 8121917573, 383 Pages.
3. Hitendra K. Malik and AK Singh (2013), 'Engineering Physics', Mc Graw Hill Publications ISBN 0070671532.
4. G Vijayakumari (2006), 'Engineering Physics', Vikas Publishing House, ISBN 9788125924098, 425 pages.

Course:-Applied Chemistry - I
(AY 2017-18)

BT106 Applied Chemistry-I

Prerequisites: Standard XII Chemistry

Course Objectives:

The main objective of the course is:

- To introduce the students to basic knowledge of chemistry of water, lubricant, polymer and steel.
- To introduce the student to theory, principles and mechanism of chemical processes. To introduce the application of chemistry in engineering and technology.

Course Outcomes:

After successful completion of this course, the student will able to:

1. Analyse water quality.
2. Determine chemical behavior of different types of lubricant.
3. Find out characteristic properties of polymer.
4. Explore use of nano material and its application.

Course Content:-

Module No.	Details	Hrs.
1.	Water: Hardness of water, types of hardness, units of Hardness, determination of hardness by EDTA method and numerical problems. Internal treatment of hard water. External Treatment of hard water by i) lime soda method with equations in general & Numerical problems. ii) Zeolite or permutit process & numerical problems. iii) Ion exchange method.	06
2	Water: Desalination of BRACKISH WATER - Reverse osmosis Ultra filtration and it's industrial applications. Methods to determine extent of water pollution i) BOD. ii) COD Chemical Analysis of water with special reference to Total Dissolved Salts-TDS Methods to control water pollution – activated sludge process for sewage treatment, flow sheet diagram for sewage treatment.	04
3	Lubricants: Definition, classification, functions, characteristic properties of an ideal lubricant with special reference to flash point, fire point, cloud point, pour point, Acid Value, saponification value and numerical problems on acid value & saponification value	04

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4	Steels Plain Carbon Steel-Limitations Introduction to Alloy Steels, Special Steels	04
5	Polymers Conducting-polymers, electrical properties & liquid crystal properties of Polymers. Energy: Classification of sources of energy-Renewable(Non-Conventional) & Non-Renewable Or(Conventional) Energy Sources, Biomass Energy, Solar Energy-production of electricity using solar energy with schematic diagrams. Hydrogen as a fuel, fuel cells. Rechargeable alkaline storage Batteries-Nickel Hydrogen Batteries, Rechargeable Lithium ion Batteries (Diagram, charging, discharging reactions, advantage & applications).	04
6	Classification of sources of energy-Renewable(Non-Conventional) & Non-Renewable Or(Conventional) Energy Sources, Biomass Energy, Solar Energy-production of electricity using solar energy with schematic diagrams. Hydrogen as a fuel, fuel cells. Rechargeable alkaline storage Batteries-Nickel Hydrogen Batteries, Rechargeable Lithium ion Batteries (Diagram, charging, discharging reactions, advantage & applications).	06
7	Nano –Materials: Graphite, Fullerenes, Carbon Nanotubes, Nanowires, Nanocones Haeckelites-structure & their electronic and mechanical properties Applications of Nanomaterials in – i) Medicine ii) Catalysis iii) Environmental Technologies iv) Electronics & related fields v) Mechanics	04

Reference Books:-

1. P.C.Jain & Monica Jain (2004), 'Engineering Chemistry', DhanpatRai publishing company Pvt. Ltd, 15th Edition, ISBN 8187433175, 1288 Pages
2. Emil Roduner (2006), 'Nano Scopic Materials', RSC Publishing, ISBN 0854048571, 285 Pages
3. VasantGowarikar (1986), 'Polymer science', New Age International Pvt Ltd, ISBN 0852263074, 505 Pages
4. Cotlon (1994), 'Basic Inorganic Chemistry', Wiley India, 3rd Edition, ISBN 0471505323, 856 Pages

Text Books:-

1. S. S. Dara & Dara (1986), 'Engineering Chemistry', S. Chand & Company Ltd, 12th Edition, ISBN 8121903599, 992 Pages
2. O.P. Khanna (2010), 'Material Science for engineering students', DhanpatRai, Publications (p) Ltd., ISBN 8189928317, 1179 Pages

Course:-Communication Skills
(AY 2017-18)

BT107 Communication Skills

Course Objectives:

- To create an understanding of the basics of communication through English application for the various models of Verbal and Non-Verbal communication in the Social and Professional sphere.
- To identify the basics of grammar so as to help improve communication and speak a neutral and correct form of English. The focus is to assist the students entering the technical field to acquire proficiency in Business English.
- To acquire strategic competence to use spoken and written language in a wide range of communication strategies and respond appropriately in different socio-cultural and professional contexts.
- To increase students' ability to improve and utilize the skills necessary to be a competent interpersonal communicator, increase the students understanding of his or her own communication behavior and that of others.

Course Outcomes:

Learners will be able to:

1. Acquire knowledge about the various principles of communication understand its various stages and the role of audience and purpose, deal with the barriers that affect communication in a professional setup.
2. Explain the different channels that are functional at the workplace so as to be able to execute their work behavior in an organization and familiarize them with business writings of Business Organizations.
3. Learn the importance of verbal and nonverbal communication in the professional word along with its uses.
4. Imbibing the knowledge of effective public speaking skills and soft skills to demonstrate their understanding of being effective communicators in a professional and social set up.
5. Learning the nuances of effective Reading, Writing, Speaking and Listening skills.

Course Content:

Module No.	Details	Hrs.
01	Summarization, Comprehension & Building Advanced Vocabulary: Techniques to comprehend and summarise a given technical, scientific or industry oriented text, questions to test analytical skills and expressions. Synonyms and Antonyms, One-word substitutes, Words often Confused. Homophones and Homonyms. (To test vocabulary and the ability to present the written matter in a brief and concise manner).	02

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02	Communication theory: Concept and meaning of Communication, Objectives of Communication, Barriers to communication, Methods of communication: Verbal and Non-Verbal, Barriers to communication.	09
03	Communication in a Business Organization: Types and channels of communication (Internal, External, Upward, Downward, Horizontal, Grapevine), Problems and Solutions.	03
04	Basic Technical Writing: Framing definitions, writing instructions, language exercises based on types of expositions (description of an object, explanation of a process).	02
05	Techniques to Improve Communication: Reading, writing, Speaking, Listening. 5.1. Reading Skills – Barriers to Reading and Techniques to improve reading 5.2. Speaking Skills – Voice Modulation, Pronunciation, -Speaking without Fear, Role plays in different Situations. How to present effective speeches using Talk power program 5.3. Listening Skills – Benefits of active listening, Kinds of listening, factors that hamper listening, Advantages of active listening. 5.4. Writing Skills: Importance of writing, writing tips, and drawbacks of written communication	06
06	Business Correspondence: Principles of Business Correspondence, Parts of a business letter, Formats (full block/modified block/ semi block), types of letters: Enquiry and replies to enquiry (enquiry about a product, services and information, asking for quotation, placing an order, and replies to the same), Letters of claim and adjustment.	06
07	Soft Skills: Developing Positive Attitude, Forming Values and Ethics,	04

List of Assignments:

1. 2 assignments on vocabulary, comprehension and summarization
2. 2 assignments on techniques to improve communication
3. 2 practical session through public speaking, Speeches and Presentation
4. 2 Assignments on Communication Theory
5. 2 case studies on communication in a business organization
6. 4 assignments on Business Correspondence
7. 2 assignments on technical writing
8. Group Activity and role play
9. Case studies on soft skills and documentation in the form of assignments

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Text Books:

1. Meenakshi Raman and Dr. Sangeeta Sharma, “Communication Skills”, Oxford University Press.

Reference Books:

1. Sharma, R.C., and Krishna Mohan; “Business Correspondence and Report Writing”, Tata McGraw Hill Publications, 3rd Edition.
2. Meenakshi Sharma and Prakash Singh, (2006); “Business Communication”, Oxford University Press.
3. Adler Ronald B. and Rooman George, “Understanding Human Communication”, Oxford University Press, 9th Edition.
4. Rai Urmila and Rai S.M., “Business Communication”, Himalaya Publishing House.
5. Sinha, K.K., “Business Communication”.
6. Locker, Kitty O. and Stephen Kyo Kaczmarek, “Business Communication: Building Critical Skills”, McGraw Hill.
7. Mastering communication by Nicky Stanton, Palgrave Master

Course:- Basic Electrical and Electronics I Lab
(AY 2017-18)

BT152 Basic Electrical and Electronics I Lab

Prerequisites: Standard XII Physics

Course Objective:

- To impart knowledge on solving electrical circuits using network theorems practically.
- To draw phasor diagrams and make analysis of AC circuits.
- To perform simple Experiments like oc and sc test, load test on single phase transformers.
- To Perform experiments on two wattmeter method.
- Introduction to motors and meters.

Course Outcomes:

The students will have

1. Ability to analyse electrical circuits
2. Ability to apply circuit theorems
3. Aware of electrical machines and meters

List of Experiments:

Demonstration Experiments:

1. Study of meters (Tachometer, voltmeter, ammeter, multi-meter, wattmeter etc.)
2. Use of two wattmeter method to measure Power in a three phase system.
3. Study Load Characteristic of D. C. Shunt Motor.

Experiments to be performed:

1. To analyze Mesh and Nodal circuits.
2. To verify Superposition Theorem to given circuit.
3. To verify Thevenin's & Norton's Theorems to given circuit.
4. To plot Graph between Power & Load using Maximum power transfer theorem.
5. To Determine Inductance & Internal Resistance of R-L circuits.
6. To Determine Capacitance of R-C circuits.
7. To plot Curves for Efficiency & Regulation by direct Loading of single phase transformer.
8. To carry out O.C. and S.C. test on a single phase transformer.

Note: Practical examination will be as follows:

Attendance 20%, Practical performed during semester and graded Journals 40%,
Practical/Mini Project 40%

Course:-Engineering Mechanics-I Lab
(AY 2017-18)

BT154 Engineering Mechanics-I Lab

Prerequisites: Standard XII Physics

Course Objectives:

The main objectives of the course are

- To introduce the students to the experimental methods to verify the principles and methods of statics (mechanics).

Course Outcomes:

At the end of the course the students shall be able to

1. Experimentally verify the principles of statics (mechanics).

List of Experiments:

1. To find reactions of simply supported beam (Parallel force system)
2. To verify polygon law of forces (Concurrent force system)
3. To verify Lami's theorem using simple jib crane
4. Equilibrium of non-concurrent non parallel force system
5. To verify moment equilibrium condition using bell crank lever
6. To determine coefficient of friction using friction plane
7. To determine coefficient of friction using angle of repose method

Course:- Applied Physics –I Lab
(AY 2017-18)

Prerequisites: Standard XII Physics

Laboratory objectives (General)

- To setup state of the art physics laboratory so as to master basic physics concepts
- To help the students develop a broad array of basic skills and tools of experimental physics.
- To help students develop collaborative learning skills that are vital to success in the field of engineering.
- To setup theory related laboratory experiments on optics and Lasers so as to apply his/her theoretical knowledge to a practical situation.

Laboratory Outcomes:

At the end of this course, students will be able to:

1. Explain the applications of thin film interference using Wedge shaped films experiment and Newton's Rings.
2. Explore the visible spectrum using a diffraction spectrometer and find the wavelength range.
3. Understand the use of Lasers and Optical fibers in the field of Physics and Engineering.
4. Measure velocity of sound in any liquid using ultrasonic instruments.

List of Experiments: (Minimum 5 to be performed)

1. Wedge shaped films: to find the wedge angle and thickness of paper.
2. Newton's rings: to find radius of curvature of given lens.
3. Spectrometer: to find wavelength of mercury spectrum/grating element using diffraction grating.
4. Ultrasonic interferometer: to find velocity of sound in a given liquid.
5. Ultrasonic distance meter: to find carpet area and volume of the room using ultrasonic distance meter.
6. He-Ne laser: to find grating element of diffraction grating/wavelength of He-Ne laser.
7. Optical fiber: to find numerical aperture of optical fiber/ Fiber optic communication

Course:-Applied Chemistry – I Lab
(AY 2017-18)

BT156 Applied Chemistry – I Lab

Prerequisites: Standard XII Chemistry

Course Objectives:

The main objective of the course are

1. To introduce the students to basic knowledge of material chemistry.
2. To correlate theory with experiment.
3. Application of chemistry in engineering and technology.

Course Outcomes:

After successful completion of this course, the student will able to :

1. Carry out water analysis.
2. Analyse properties of oil.
3. Prepare nano materials.

LIST OF EXPERIMENTS-(Minimum 5 to be performed)

1. To Determine Total, Temporary & Permanent hardness of water sample.
2. Removal of hardness of water by Ion-Exchange Column.
3. To Determine COD of an effluent sample.
4. CO₂ from air by Orsat's method.
5. To Determine Acid-Value of the given Lubricating Oil.
6. To Determine Saponification-Value of the given Lubricating Oil.
7. To Determine Flash-Point/Fire-Point of lubricating oil
8. To determine the conductance of the polymer.
9. To Determine Melting Point/Glass Transition Temperature of a polymer.
10. To prepare Nano-Oxide using combustion method.

Course:- Workshop - I
(AY 2017-18)

BT199 Workshop - I

Prerequisites: Basic knowledge of carpentry, smithy, fitting and welding

Course Objectives:

- To impart knowledge to students to develop their technical skill sets for creating entities from raw material.
- To give “hands on” training and practice to students for use of various tools, devices, machines.
- To develop ability of students to understand, plan and implement various processes and operations to be performed on the raw material to create object of desired shape and size.
- To give exposure to inter disciplinary domains.

Course Outcome:

1. Thorough knowledge of various tools, machines, devices used in engineering practice for creating objects from material.
2. Thorough knowledge of carrying out various operations in basic engineering shops
3. Ability of interpretation of job drawing, application of processes and operations to produce basic components from raw material.

Course Content:

Module No.	Details	Hrs.
01	Fitting (Compulsory):- <ul style="list-style-type: none">• Use and settings of fitting hand tools for marking, chipping, cutting, filing, centre punching, hammering, drilling, tapping.• Term work to include one job:- Male –female joint involving above operations.	12
02	Carpentry (Compulsory):- <ul style="list-style-type: none">• Use and setting of carpentry hand tools like hacksaws, jackplanes, chisels and gauges for construction of various joints. Term work to include one job involving a use of tools and operations:- Half Check joint.	12
03	Carpentry (Demonstration):- <ul style="list-style-type: none">• Wood turning Demonstration.	03
04	Forging / Smithy (Demonstration):- <ul style="list-style-type: none">• One job: - Lifting Hook and Handle to be demonstrated by instructor to a	04

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	batch.	
05	Welding (Demonstration):- <ul style="list-style-type: none">• Edge preparation for welding jobs, arc welding, different types of joints such as Lap Welding, Butt Welding etc.• One job each involving Lap welding and Butt welding of two plates to be demonstrated by instructor to a batch.	04
06	Machine Shop (Demonstration):- <ol style="list-style-type: none">1. One turning job to be demonstrated by instructor to a batch.	04
07	Electrical Board Wiring (Demonstration):- <ol style="list-style-type: none">2. House wiring, staircase wiring for fluorescent tube light, go-down wiring and three phase wiring for electrical motors.	03

Termwork:

Every student has to perform one job from one compulsory trade and attend demonstration in two trades in each of semester I and II. Term work shall comprise of 01 compulsory job and demonstration jobs (any two) performed in the semester.

The syllabus of Basic Workshop Practice and term work to be done in Semester –I & II are given together. The jobs for practice and demonstration are designed with the work of the course spread over two semesters. In each semester every student has to perform a job in one compulsory trade and attend demonstrations in other two trades

FIRST YEAR B.Tech.
(CIVIL /MECHANICAL /ELECTRICAL)
Sem. II
COURSE CONTENT
Year: 2017-18

Course:-Engineering Mathematics-II
(AY 2017-18)

BT201 Engineering Mathematics-II

Prerequisites:

Course Objectives:

The main objectives of the course are

- To introduce first order and first degree ordinary differential equations and higher order linear differential equations with constant coefficients.
- To introduce Gamma and Beta functions.
- To introduce Curve tracing and rectification of curves.
- To introduce multiple integrals.

Course Outcomes:

At the end of the course the students shall be able to

1. Classify and solve differential equations in terms of ordinary/partial, Order, Exact, Linear.
2. Find the general solution of linear higher order linear differential equation with constant coefficients.
3. Evaluate integrals using Gamma functions, Beta functions.
4. Evaluate multiple integrals and apply them to find area, mass and volume.

Course Contents:

Module	Details	Hrs
1	First Order and First Degree Ordinary Differential Equations 1.1 Exact differential equations, Differential Equations which are reducible to the exact form by using integrating factors. 1.2 First order linear differential equations and differential equations reducible to the linear form.	05
2	Higher Order Linear Differential Equations 2.1 Higher Order Linear differential equations with constant coefficients. Complimentary Functions, Particular Integrals of differential equations of the type $F(D)y = Q(x)$. 2.2 Cauchy's homogenous linear differential equations and Legendre's Differential Equations.	06
3	Applications of Differential Equations, Gamma and Beta functions 3.1 Simple applications of differential equations of first and second order to Engineering problems. 3.2 Gamma function, reduction formula. 3.3 Beta function. Duplication formula, Relation between Gamma and Beta Functions and examples.	09
4	Rectification	03

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	4.1 Curve tracing in Cartesian and Polar Coordinates. 4.2 Rectification of plane curves.	
5	Double Integrals 5.1 Introduction to Double Integrals, Change of order of double integral. 5.2 Evaluation of double integral by changing to polar coordinates.	06
6	Triple Integrals 6.1 Introduction to Triple Integrals, 6.2 Evaluation of Triple Integrals using Cartesian, Cylindrical and Spherical polar coordinates.	04
7	Applications of Multiple Integrals 7.1 Applications double integrals to find area and mass of lamina 7.2 Applications of Triple Integrals to find volume.	04

Text Books:-

1. Richard Bronson (2010), "Schaum's Outline of Differential Equations", McGraw Hill Education; 4th edition ISBN 978-0071824859, 408 pages
2. Shanti Narayan (2005), "Integral Calculus", S.Chand Publications, 35th Edition, ISBN 8121906814, 360 Pages
3. B S Grewal (2014), "Higher Engineering Mathematics", Khanna Publications, 43rd Edition, ISBN 8174091955, 1315 Pages
4. Vinod kumar Sharma "Applied Mathematics-II" 2ND edition TechMax Publications.

Reference Books:-

1. Erwin Kreyszig (2010), "Advanced Engineering Mathematics" Wiley Eastern Limited, Singapore 10th edition, ISBN 8126554231, 1148 Pages.
2. George Simmons (2002), "Differential Equations with Applications and Historical Notes" McGraw Hill Education; 2nd edition, ISBN 978-0070530713, 656 pages

Course:-Basic Electrical and Electronics II
(AY 2017-18)

BT202 Basic Electrical and Electronics II

Prerequisites: Std. XII Physics

Course Objectives:

- Introduction to Electronics Devices (Construction, Modes and Characteristics).
- Comparison of different Electronics Devices.
- To create awareness amongst students regarding the application of different Electronics devices.

Course Outcomes:

Students will be able-

1. To understand the working of Various Electronics devices.
2. To Analyze & make use of Electronics devices in day to day work

Course Contents:

Module No	Details	Hrs.
1.	Diode : LED, Photodiode, Zener and avalanche breakdown ,	02
2.	Diode Applications: Half wave, Full wave, Bridge Rectifiers, Specifications of the devices required for C, LC, and CLC filter, Zener as a regulator.	08
3.	Bipolar Junction (BJT): BJT configurations such as CE, CC, CB, Characteristics, BJT as a switch, BJT as an amplifier.	07
4.	Field Effect Transistors FET: JFET construction, characteristics (CS), FET as an amplifier.	06
5.	Silicon Controlled Rectifier: Principle of operation of SCR, SCR Characteristics, SCR as Full Wave Controlled Rectifier.	03
6.	Digital Electronics Fundamentals: Difference between analog & digital signals, Basic & Universal Gates, Boolean algebra, Truth tables, Expressions, Logic simplification.	05
7.	Op amp: Op amp as a basic block. Op amp as a inverting and on inverting Amplifier. Applications like adder, subtractor, voltage follower, etc.	05

Text Books:-

1. B.L. Theraja- 'A Text Book of Electrical Technology', Vol-IV (EDC), S. chand & co. New-Delhi, 23rd Edition (re Print), ISBN-91-219-2667-X, 2736 pages.
2. Jain R.P. (2003), 'Modern Digital Electronics', Tata McGraw Hill, ISBN0070494924, 611 Pages
3. Bhargava, Kulshreshtha, Gupta (1984), 'Basic Electronics and Linear Circuits', TTTIChandigarh, TMH, ISBN 0074519654, 490 Pages

Reference Books:-

1. Robert Boylestad and Louis Nashelsky (2009), 'Electronic devices and circuits', Prentice Hall of India 10th Edition, ISBN 0135026490, 894 Pages
2. Mottershed Allen (1973), 'Electronic Devices and Circuits an Introduction', Prentice Hall of India, 1st Edition, ISBN 8120301245, 656 Pages

Course:-Engineering Graphics-II
(AY 2017-18)

BT203 Engineering Graphics-II

Prerequisites: Engineering Graphics I

Course Objectives:

- The course aims at understanding the tools and techniques of AutoCAD package and appreciate AutoCAD as a powerful tool for creation of fast & error free drawings
- To understand the concepts of projections of an object and various ways of projection for visualization of various engineering parts and components.
- To develop competence in correct expression of the visualized objects.
- To provide an insight of the technical drawing.

Course Outcome:

1. Students will be able to draw & convert Orthographic views from pictorial views
2. Students will be able to draw & convert isometric views from orthographic views
3. Students will understand & interpret the given orthographic views to draw the Missing view.
4. Students will able to practice the drawing of orthographic, isometric, missing views & machine parts like nuts, bolt, screws etc views using AUTOCAD software.

Course Contents:

Module No.	Details	Hrs.
1	Introduction to Auto CAD package	2
2	Orthographic Projections	2
3	Sectional views of Orthographic Projections	2
4	Isometric Projections using Natural Scale, four center method, method of points, typical practical problems	2
5	Isometric Projections using Isometric Scale	2
6	Missing views	2
7	Introduction to M/C Parts: Types of nuts, bolts, screws, studs and riveted joints	1

Text Books:-

1. N.D.Bhatt (2011), 'Elementary Engineering Drawing', Charotar Publishing House, ISBN 9380358172, 728 Pages
2. T.Jeyapovan (2010), 'Engineering Drawing and Graphics, Vikas Publishing House Pvt. Ltd. 3rd Edition, ISBN 8125940006, 712 Pages

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3. K.L.Narayana&P.Kannaiah (1988), 'Engineering Graphics', Tata McGraw-Hill Co .Ltd., New Delhi, ISBN 0074517902, 544 Pages

Reference Books:-

1. K.Venugopal (2007), 'Engineering Drawing and Graphics', New Age International Publishers, ISBN 8122415458, 410 Pages
2. Giesecke, Mitchell, Spencer & Hill (2011), 'Technical Drawing', Macmillan Publishing Co. Inc. 14th Edition, ISBN 0135090490, 936 Pages
3. Warren H .Luzadder (1976) , 'Fundamentals of Engineering Drawing', Prentice Hall of India Pvt.Ltd., New Delhi 7th Edition, ISBN 0133383687, 620 Pages
4. M.B.Shah&B.C.Rana (2009), 'Engineering Drawing', Pearson Education 2nd Edition, ISBN 8131710564, 580 Pages
5. M.L.Dabhade (2004), 'Engineering Graphics', Association of Technical Authors, ISBN 8187575751, 772 Pages

BT204 Engineering Mechanics-II
Prerequisites: Standard XII Physics

Course Objectives:

The main objectives of the course are

- To introduce the students to the principles and methods of dynamics (mechanics), and to apply those fundamentals to solve the problems on dynamics.
- To prepare the base for the students to study other engineering/structural engineering courses at a later stage.

Course Outcomes:

At the end of the course the students shall be able to

1. Find the centroid and moment of inertia of plane areas.
2. Solve the problems on kinematics of particles and kinematics of rigid bodies.
3. Solve the problems on kinetics of particles and kinetics of rigid bodies.

Course Contents:

Module No.	Details	Hrs.
01	Centroid of Plane Areas: Concept of Centroid of plane areas. Centroid of areas by integration. Centroid of composite areas.	04
02	Moment of Inertia: Moment of inertia of plane areas, parallel axis theorem. Introduction to polar moment of inertia, product of inertia and mass moment of inertia.	03
03	Kinematics of particle: Velocity and acceleration in terms of rectangular coordinate system, rectilinear motion, motion along plane curved path, tangential and normal component of acceleration, acceleration - time , velocity- time, graphs and their use, relative velocity, projectile motion, simple harmonic motion.	10
04	Kinematics of rigid bodies: Translation, pure rotation and plane motion of rigid bodies, instantaneous centre of rotation for the velocity for bodies in plane motion, link mechanisms (upto two links).	06
05	Kinetics of particles: Newton's laws of motion, D'Alembert's principle, equation of dynamic equilibrium, linear motion, curvilinear motion.	04
06	Energy and Momentum principles: Work done by a force, potential and kinetic energy, power, work energy equation, principle of conservation of energy, momentum, impulse and momentum principle, principle of conservation of momentum, impact of	07

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	solid bodies, elastic impact, semi-elastic impact and plastic impact.	
07	Kinetics of rigid bodies: D'Alembert's principle for bodies under translational motion, rotational motion about a fixed axis and plane motion. Application to motion of bars, cylinders, spheres.	06

Reference Books:-

1. B. N. Thadani(1966); "Engineering Mechanics", Asia Publishing House, ISBN 0210269405, 655 pages
2. Beer & Johnson (2013), "Engineering Mechanics", Tata McGraw Hill, ISBN 1259062919, 470 pages
3. F. L. Singer (1975), "Engineering Mechanics", Harper & Row Publication, ISBN 0060462329, 724 pages
4. A. Nelson (2009), "Engineering Mechanics", Tata McGraw Hill, ISBN 0070146143
5. Shames (2006), 'Engineering Mechanics', Prentice Hall, India, ISBN 8177581236, 837 pages

Text Books:-

1. R. C. Hibbeler (2007); "Engineering Mechanics", Pearson Education Inc., ISBN 0132215098, 656 pages
2. A. K. Tayal (2010), 'Engineering Mechanics', Umesh Publication, ISBN 9380117388
3. Kumar(1956), "Engineering Mechanics", Tata McGraw Hill, ISBN 0070681813, 673 pages

Course:-Applied Physics II
(AY 2017-18)

BT205 Applied Physics II

Prerequisites: Standard XII Physics, Applied Physics I

Course Objectives:

- To explore different crystal structures, crystal plane orientations in cubic structures, and determine crystal properties using X-rays
- To analyse and explain magnetism in different types of magnetic materials.
- To study theory of static electric and magnetic fields using principles of divergence and curls.
- To analyse basic working principles of semiconductors.

Course Outcomes:

At the end of this course, students will be able to:

1. Explain types of crystal structures using unit cell properties and crystal planes in cubic structures and learn the application of X-rays for determining these crystal structures and crystal planes.
2. Understand classes of magnetic materials and their properties.
3. Analyse electrostatic and magnetostatic fields by principles of divergence and curls.
4. Differentiate between the types of solids based on their band structure and understand the physics behind working of semiconductors and Hall effect in semiconductors.

Course Contents:

Module No.	Details	Hrs.
1	Crystallography: Basic concepts: Seven basic types of crystal systems, lattice, basis, crystal axes, unit cells, lattice parameters, co-ordination number, atomic packing factor, void space. Crystal structures: SC, BCC, FCC, Diamond and NaCl. Crystal planes and directions: Miller indices, drawing of crystal planes and directions in a simple cubic unit cell, interplanar spacing between planes, important planes of SC,BCC and FCC structures.	6
2.	X-rays: Production of X-rays in laboratory, Types of X-rays, Continuous and characteristic X-ray spectrum, X-ray diffraction and Bragg's law, Bragg's X-ray spectrometer, Applications in crystallography.	6
3	Magnetic materials: Prerequisite: different types of magnetic materials. Atomic origin of magnetization, magnetic moment of atom, paramagnetic, diamagnetic and ferromagnetic materials. Langevin's theory of paramagnetism and Curie's law, Curie-Weiss law. Hysteresis and hysteresis loss.	8

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4	Electrostatics: Concept of gradient, divergence and curl. Fundamental theorems: of calculus, for gradients, for divergences and for curls. Divergence and curl of electrostatic fields, Gauss' law, introduction to scalar potential, relation of potential with field. Magnetostatics: Divergence and curl of B, BiotSavart law, magnetic vector potential. Comparison of Electrostatics and magnetostatics.	8
5	Semiconductor Physics: Band formation in solids and classification based on band theory. Fermi-Dirac statistics, concept of Fermi level and its variation with temperature, impurity and applied voltage. Carrier concentrations: intrinsic and extrinsic, carrier drift mobility, resistivity and Hall effect, carrier diffusion, Einstein's relations, current density and continuity equations.	8

Reference Books:-

1. Charles Kittel (2004), 'Introduction to Solid State Physics', John Wiley & Sons; 8th Edition, ISBN 0471415268, 704 Pages
2. S.O. Pillai (2010), 'Solid State Physics', 6th Edition, New Age International Publishers, ISBN 9788122427264, 832 pages.
3. A.J Dekker (2000), 'Solid State Physics', Macmillan India 1st Edition, ISBN 0333918339, 556 Pages
4. M. Ali Omar (1999), 'Elementary Solid State Physics', Pearson Education Publication 5th Edition, ISBN 8177583778, 669 Pages
5. Arthur Beiser (2009), 'Concepts of Modern Physics', TataMcGraw Hill, 6th Edition, ISBN 0070151555
6. David J. Griffiths (2012), 'Introduction to Electrodynamics', PHI Publications 4th Edition, ISBN 8120347765

Text Books:-

1. Kshirsagar and Avadhanulu (1992), 'a Textbook of Engineering Physics', S. Chand Publications, ISBN 8121908175, 758 pages
2. A.S. Vasudeva (2008), 'Modern Engineering Physics', S. Chand Publications, ISBN 8121917573, 383 Pages
3. Hitendra K. Malik and AK Singh (2013), 'Engineering Physics', Mc Graw Hill Publications, ISBN 0070671532
4. G Vijayakumari (2006), 'Engineering Physics' Vikas Publishing House, ISBN 9788125924098, 425 Pages

Course:-Applied Chemistry-II
(AY 2017-18)

BT206 Applied Chemistry-II

Prerequisites: Standard XII chemistry, Applied Chemistry I

Course Objectives:

The main objective of the course is

- To introduce the students to basic knowledge of alloy, fuel, green chemistry, corrosion and its protection.
- To introduce the student to theory, principles and mechanism of chemical processes.
- To introduce the application of chemistry in engineering and technology.

Course Outcomes:

After successful completion of this course, the student will be able to :

1. Analyse process corrosion and its protection methods.
2. Classify different types of alloy and their properties.
3. Determine fuel characteristics, properties and their application.
4. Implement use of green chemistry.

Course Contents:

Module No.	Details	Hrs.
1	Corrosion: Definition, Types of corrosion-Dry or Chemical Corrosion, Wet or Electrochemical corrosion, Bi-metallic corrosion, Concentration cell corrosion-differential Aeration corrosion, Pitting Corrosion, Water Line Corrosion, stress Corrosion, Inter-granular Corrosion. Polarization, over voltage, Passivity, Factors affecting rate of corrosion. Electrochemical & Galvanic series.	06
2	Protection from Corrosion - Cathodic and Anodic Protection, Cathodic and Anodic coatings, Galvanising & Tinning, Metal-Cladding, electroplating. Corrosion in electronic devices and photonic devices.	04
3	Composite Materials: Introduction, classification, constitution & characteristic properties of particle, fibre reinforced composites, structural composites. Applications of Composite Materials.	04
4	Alloys: Alloys of Al, Cu and Pb - their composition, properties & uses.	04
5	Powder Metallurgy: Methods of Metal Powder Formation, Cermets-Metal-Ceramic	04

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	Powders, technology of Powder Metallurgy, applications of Powder Metallurgy.	
6	Fuel: Calorific Value-Gross and Net Calorific Value, Conversion & numerical problems.Proximate and Ultimate Analysis of Fuels, numerical problems.Combustion-Calculations for given Solid, Liquid, Gaseous Fuel Biodiesel-Methods to obtain Biodiesel. Cracking, Knocking, Octane Value of Petrol, Cetane Value of Diesel, Anti-Knocking Agents.Recent technologies for catalytic converter.	06
7	Green-Chemistry: Goal, Significance and 12-Principles of Green Chemistry with examples, Green Path Green-Reagents, SCFE, SC-CO ₂ ,green propellent – ultra pure H ₂ O ₂ . Industrial applications of Green-Chemistry. Numerical problems on percentage atom economy.	06

Reference Books:-

1. P.C.Jain& Monica Jain (2004), 'Engineering Chemistry', DhanpatRai publishing company Pvt. Ltd, 15th Edition, ISBN 8187433175, 1288 Pages
2. Emil Roduner (2006), 'Nano Scopic Materials', RSC Publishing, ISBN 0854048571, 285 Pages
3. VasantGowarikar (1986), 'Polymer science', New Age International Pvt Ltd, ISBN 0852263074, 505 Pages
4. Cotlon (1994), 'Basic Inorganic Chemistry', Wiley India, 3rd Edition, ISBN 0471505323, 856 Pages

Text Books:-

1. O.P. Khanna (2010), 'Material Science for engineering students', DhanpatRai, Publications (p) Ltd., ISBN 8189928317, 1179 Pages.
2. S. S. Dara&Dara (1986), 'Engineering Chemistry', S. Chand & Company Ltd, 12th Edition, ISBN 8121903599, 992 Pages

Course:-Computer Programming
(AY 2017-18)

BT207 Computer Programming

Prerequisites: Basic Knowledge of computers

Course Objectives:

1. Master basic procedural programming constructs for decision and iteration.
2. Understand principles like decomposition, information hiding, and use of parameters and return values to create flexible components.
3. Understand major concept of object oriented programming like encapsulation, inheritance and polymorphism

Course Outcomes:

1. Remember Data types and apply basics of Control Structures to programming.
2. Design programs using functions, arrays, strings.
3. Understand and apply the knowledge of OOPS to write programs

Course Contents:-

Module No	Details	Hrs
1.	Basics of Programming: Defining problem statement, solution development using Algorithmic approach. Basic concepts of computer structure and program execution	05 03
2	Basic Data Type: Concept of Variables and constants, Data types, expressions, and assignment, Input / Output from console and file.	05
3	Control Structure: Conditional execution – if/else, Switch, Break, Continue. Iteration – Do, for, while	04 03
4	Functions: Defining Functions- Procedural decomposition of problems, localizing variables, parameter passing– value and reference, return values.	08
5	Arrays: Arrays – one-dimensional, Multidimensional Strings	06 03
6	Principles of Object Oriented Programming: Introduction to Object Oriented Language – classes, Constructor and Destructors. Inheritance – Access specifiers, Types of Inheritance	05 04
7	Polymorphism: Compile time polymorphism: Function and operator overloading. Runtime Polymorphism: Virtual Functions.	06

Text Books:

- 1) BalaguruSwami (2008), "Object Oriented Programming with C++", Tata McGraw-Hill Publishing Company Ltd., 3 rd Edition, ISBN 0070669074, 624 Pages
- 2) Bjarne Stroustrup (2013) , "The C++ Programming Language", Addison Wesley Publishing Company, 4 th Edition, ISBN 0321563840, 1368 Pages.

Reference Books:

- 1) Mahesh Bhave and Sunil Patekar (2012), "Object- Oriented Programming with C+ + , Pearson Education, 1 st Edition, ISBN 8131798585, 688 Pages.
- 2) Robert Lafore (2001), "Object-Oriented Programming in C++", Sams Publishing 4 th Edition, ISBN 0672323087, 1040 Pages

Course:- Basic Electrical and Electronics II Lab
(AY 2017-18)

BT252 Basic Electrical and Electronics II Lab

Prerequisites: Basic Electrical and Electronics II

Course Objective

- To aware the students about the experimental methods to plot characteristics of various Electronics devices.
- To make use of Electronics devices for various applications

Course Outcomes

At the end of the course the students will be able to –

- 1) Able to design various Electronics circuits

List of Experiments:

1. To plot V-I characteristics for PN junction diode and Zener diode.
2. To understand the performance of Rectifier without & with filters.
3. To Build Voltage regulator using Zener diode.
4. To Plot Input & Output Characteristics of BJT (CE- configuration).
5. To Plot Transfer & Drain Characteristics of FET .
6. To find Voltage Gain of Single Stage CE amplifier.
7. To find Voltage Gain of CS amplifier.
8. To verify truth table of Logic gates.
9. To Implement basic gates using universal gates.
10. To study Op-amp. As Inverting amplifier, Non-Inverting amplifier & Buffer.

Course:-Engineering Graphics-II Lab
(AY 2017-18)

BT253 Engineering Graphics-II Lab

Prerequisites: Engineering Graphics-II

Termwork:

Term work shall comprise of printouts of Autocad drawings consisting of 2 to 3 problems on each module. The class assignments and each Autocad drawing shall have equal weightage in termwork marks.

Course:- Applied Physics – II Lab
(AY 2017-18)

BT255 Applied Physics – II Lab

Prerequisites: Applied Physics - II

Laboratory objectives

- To setup state of the art physics laboratory so as to master basic physics concepts
- To help the students develop a broad array of basic skills and tools of experimental physics.
- To help students develop collaborative learning skills that are vital to success in the field of engineering.
- To setup theory related laboratory experiments on crystal physics and magnetism so as to apply his/her theoretical knowledge to a practical situation.

Laboratory Outcomes:

At the end of this course, students will be able to:

1. Explain unit cell properties of different crystal structures studied in the theory and identify different crystal plane orientations.
2. Understand ferromagnetism on the basis of Hysteresis curve.
3. Use a C.R.O for voltage and frequency measurements and obtain Lissajous figures using the same.
4. Understand Hall effect in semiconductors.

List of Experiments: (Minimum 5 to be performed)

1. To identify crystal structures: SC, BCC, FCC, Diamond, HCP, NaCl.
2. To identify crystal planes (100), (110) and (111) for SC, BCC and FCC crystal structures.
3. Hall Effect: to find hall voltage of a given semiconductor.
4. Hysteresis: to plot the hysteresis curve for a ferromagnetic material and determine retentivity and coercivity.
5. Introduction to C.R.O: to measure a.c. voltage and frequency.
6. Lissajous figures using a C.R.O.
7. e/m apparatus: to find e/m ratio.

Course:- Applied Chemistry –II Lab
(AY 2017-18)

BT256 Applied Chemistry –II Lab

Prerequisites: Applied Chemistry -II

Course Objectives:

The main objective of the course is

1. To introduce the students to basic knowledge of material chemistry.
2. To correlate theory with experiment.
3. Application of chemistry in engineering and technology.

Course Outcomes:

After successful completion of this course, the student will be able to :

1. Find out composition of metals in different alloy.
2. Prepare and characterize new composite material.
3. Prepare bio-diesel from edible oil.

TERM-WORK:

List of Experiments: (Minimum 5 to be performed)

1. Estimation of Cu iodometrically.
2. Estimation of Zn complexometric titration.
3. Estimation of Ni complexometric titration.
4. Estimation of Al complexometric titration.
5. Calorific value of solid or liquid fuel using Bomb calorimeter.
6. Preparations of membranes for filter any one Demo.
7. CO₂ from air by Orsat's method.
8. Estimation of Fe by gravimetric method.
9. Estimation of Ni by gravimetric method.
10. Estimation of Sn iodometrically.
11. Preparation of biodiesel from edible oil.
12. Synthesis of simple layered materials and their characterization.
13. Preparing simple composites and their characterization.

Course:- Computer Programming Lab
(AY 2017-18)

BT257 Computer Programming Lab

Prerequisites: Computer Programming

Course Objectives:

1. Write and debug small programs.
2. Manipulate various Data types and Apply basic programming concepts like loops, functions, arrays in programs.
3. Apply Object Oriented programming approach to various problem statements.

Course Outcomes:

1. Construct programs using Control Structures.
2. Implement the use of functions and Arrays in C++ language.
3. Carry out programming using different features of OOPs.

List of experiments: (preferably six to be performed)

1. To Write C-Programs Using Operators and Expressions (any-4).
2. To Write C-Programs Using If-Else statement.
3. To Write C-Program Using While, Do-While loops.
4. To Write C-Program Using FOR loop.
5. To Write C-Program Using Functions.
6. To Write C-Program Using Arrays.
7. To Write C-Program Using Strings.
8. To Write C-Program Using classes and objects.
9. To Write C-Program based on Compile time polymorphism.
10. To Write C-Program Using Inheritance.
11. To Write C-Program based on run time polymorphism

Course:- Workshop - II
(AY 2017-18)

BT299 Workshop - II

Prerequisites: Workshop I

Course Objectives:

- To impart knowledge to students to develop their technical skill sets for creating entities from raw material.
- To give “hands on” training and practice to students for use of various tools, devices, machines.
- To develop ability of students to understand, plan and implement various processes and operations to be performed on the raw material to create object of desired shape and size.
- To give exposure to inter disciplinary domains.

Course Outcomes:

1. Thorough knowledge of various tools, machines, devices used in engineering practice for creating objects from material.
2. Thorough knowledge of carrying out various operations in basic engineering shops
3. Ability of interpretation of job drawing, application of processes and operations to produce basic components from raw material.

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Course Contents:

Module No.	Details	Hrs.
01	Fitting (Compulsory):- <ul style="list-style-type: none"> • Use and settings of fitting hand tools for marking, chipping, cutting, filing, centre punching, hammering, drilling, tapping. • Term work to include one job:- Male –female joint involving above operations. 	12
02	Carpentry (Compulsory):- <ul style="list-style-type: none"> • Use and setting of carpentry hand tools like hacksaws, jackplanes, chisels and gauges for construction of various joints. Term work to include one job involving a use of tools and operations:- Half Check joint. 	12
03	Carpentry (Demonstration):- <ul style="list-style-type: none"> • Wood turning Demonstration. 	03
04	Forging / Smithy (Demonstration):- <ul style="list-style-type: none"> • One job: - Lifting Hook and Handle to be demonstrated by instructor to a batch. 	04
05	Welding (Demonstration):- <ul style="list-style-type: none"> • Edge preparation for welding jobs, arc welding, different types of joints such as Lap Welding, Butt Welding etc. • One job each involving Lap welding and Butt welding of two plates to be demonstrated by instructor to a batch. 	04
06	Machine Shop (Demonstration):- <ol style="list-style-type: none"> 1. One turning job to be demonstrated by instructor to a batch. 	04
07	Electrical Board Wiring (Demonstration):- <ol style="list-style-type: none"> 2. House wiring, staircase wiring for fluorescent tube light, go-down wiring and three phase wiring for electrical motors. 	03

Termwork:

Every student has to perform one job from one compulsory trade and attend demonstration in two trades in each of semester I and II. Term work shall comprise of 01 compulsory job and demonstration jobs (any two) performed in the semester.

The syllabus of Basic Workshop Practice and term work to be done in Semester –I & II are given together. The jobs for practice and demonstration are designed with the work of the course spread over two semesters. In each semester every student has to perform a job in one compulsory trade and attend demonstrations in other two trades.