Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING
(Government Aided Autonomous Institute under Mumbai University)
Andheri (W), Mumbai - 400058

COURSE CONTENTS

Sem. I

F. Y. B.Tech. (CIVIL /MECHANICAL /ELECTRICAL) ENGINEERING

Academic Year: 2018-19

List of Courses

Course Code: BS-BT101 Course:-Engineering Mathematics I (AY 2018-19)

Prerequisites: ---

Course Objectives:

The main objectives of the course are

To introduce Differential Calculus.

To introduce Partial Differentiationsand 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

Find n^{th} order derivative and expansions of functions.

Find partial derivatives of functions of more than one variable.

Find roots of algebraic equations and logarithm of complex numbers.

Find angle between two surfaces.

Course Content

Module No	Details	Hrs
1	**Differential Calculus** Successive differentiations, n^{th} -derivative of Exponential, Trigonometric & Algebraic functions. Leibnitz's theorem (without proof) and related examples.	05
2	Expansion of functions, Taylor's series, Maclaurin's series and examples. 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.	07
3	**Partial Differentiations** Partial differentiation,Partialderivativesoffirstandhigherorder, Total Differentiation, Differentiation of Composite & Implicit functions. Homogeneous Functions, Euler's Theorem on Homogeneous function with two& three independent variables (with proof), Deductions from Euler's Theorem.	08
4	Maxima & Minima of a function of two independent variables. Jacobian, Jacobian of Implicit functions.	04
5	**Complex Numbers** Complex Numbers. Cartesian, Polar and exponential form of complex numbers. De- Moivre's Theorem. Expansion of sin(nθ), cos(nθ) in terms of powers of sinθ and cosθ. Expansion of $\sin^n\theta$,$\cos^n\theta$ in terms of sin(nθ), cos(nθ).	06
6	Circular and Hyperbolic functions. Inverse Circular and Inverse Hyperbolic functions. Logarithmic functions, Roots of complex numbers.	06

7	**Vector differentiation** Scalar and vector point functions Gradient, Divergence and Curl, Solenoidal and Irrotational Vector Field. Directional Derivative, Angle between two surfaces.	06

Text Books:-

Shanti Narayan (2005), "Differential Calculus", S.Chand Publications,30th Edition, ISBN 8121904714, 572 Pages

B S Grewal (2014), "Higher Engineering Mathematics", Khanna Publications, 43rd Edition, ISBN 8174091955, 1315 Pages

Reference Books:-

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

Course Code: ES-BT102 Course:-Basic Electrical Engineering (AY 2018-19)

Prerequisites: Standard XII Physics

Course Objectives:

1. Discuss various laws/ theorems to compute voltages and currents in DC circuits.
2. Introduce AC circuit analysis.
3. Introduce construction and working principle of single phase transformers and Motors (DC and Induction)
4. Discuss three phase circuits for balanced load

Course Outcomes: Students will demonstrate ability to

1. Analyse DC circuits.
2. Analyse single and three phase AC circuits
3. Understand single phase transformer and Motors(DC and Induction)

Course Contents:

Module No	Details	Hrs.
1	DC Networks Kirchhoff's laws, node voltage and mesh current methods; Delta-star and star delta conversion; Classification of Network Elements, Superposition principle, Thevenin's and Norton's theorems, Maximum Power Transfer theorem	06
2	A.C. Circuits: A.C. through resistance, inductance and capacitance, R-L, R-C, R-LC series and parallel circuits, phasor diagrams, power and power factor. Problems by analytical as well as graphical methods	06
3	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.	04
4	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.	**06**
5	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.	**06**

Text Books:-

Joseph A. Edminster (1965), 'Electrical Circuits', TataMcGraw Hill, New Delhi, 4 th Edition, ISBN 0070189749
Mittle and Mittle (2005), 'Basic Electrical Engineering',Tata McGraw Hill.
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
V.K.Mehta –'Basic Electrical Engg.& electronics', S. Chand & Co. New-Delhi, 5th Edition, ISBN-81-219-0871-X, 903 pages.

Reference Books:-

1) H. Cotton (2011), 'Advanced Electrical Technology', Wheeler Publication, Alahabad, ISBN 8190630717, 1293 Pages

2) Vincent Deltoro (1986), 'Electrical Engineering fundamentals', Pearson Education 2 nd Edition New Delhi, ISBN 0132471310, 896 Pages

Course Code: ES-BT103 Course:-Engineering Graphics-I (AY 2018-19)

Prerequisites: Standard XII Physics and Mathematics

Course Objectives:

1. To impart and inculcate proper understanding of the theory of projection.
2. To improve visualization skill of various engineering objects.
3. To teach the basic utility of computer aided drafting (CAD) tool.

Course Outcomes:

Students will be able to….

1. Draw & solve the problems on curves, lines, planes, solids.
2. Identify the various geometries.
3. Differentiate line, planes, solids etc.

Use AutoCAD tool to draw different views of a 3D object.

Course Contents:

Module No.	Details	Hrs.
1.	Engineering Curves: Conics-Parabola, Ellipse, and Hyperbola. Involutes, Cycloidal Curves: Cycloid, Epicycloid, Hypocycloid. Spirals, Helix etc.	**4**
2.	Projection of points & lines inclined to both the reference planes.	**3**
3.	Traces of the Lines on the Reference Planes.	**2**
4.	Projection of Planes inclined to both the Reference Planes – Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular planes.	**3**
5.	Projection of Solids - Prism, Pyramid, Cylinder, Tetrahedron, Hexahedron and Cone. Solid projection with the axis inclined to HP and VP.	**4**
6.	Orthographic Projections - Different views of a simple machine part as per the first angle projection method, Drawing of orthographic projections using Auto CAD.	**6**
7.	Isometric Projections using Natural Scale, four center method, method of points using AutoCAD	**6**
	TOTAL	**28**

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. 3 Rd Edition, ISBN 8125940006, 712 Pages.
3. N.D. Bhatt & V.M. Panchal, "Machine Drawing", Charotar Publishing House Pvt. Ltd.

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
6. Prof. Sham Tickoo (Purdue University) &GauravVerma, "(CAD Soft Technologies) : Auto CAD 2012 (For engineers and Designers)", Dreamtech Press NewDelhi.

Prerequisites: Standard XII Physics

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.

Course Outcomes:

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

- Determine the resultant of coplanar system of forces.
- Solve the problems involving equilibrium of coplanar system of forces.
- Analyze 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. **Resultant of coplanar force system:** Resultant of concurrent forces, parallel forces, non-concurrent non-parallel system of forces.Varignon's theorem.	07
2	**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.	07
3	**Analysis of pin jointed frame / truss:** Perfect truss, Imperfect truss, Analysis of truss by method of joints and method of sections.	05
4	**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(Only problems, no derivation of formula).	05
5	**Principle of virtual work:** Application to determine the reactions of determinate beams with / without internal hinges.	04

Text Books:

R. C. Hibbeler (2007); "Engineering Mechanics", Pearson Education Inc., ISBN 0132215098, 656 pages

A. K. Tayal (2010), 'Engineering Mechanics', Umesh Publication, ISBN 9380117388

Kumar (1956), "Engineering Mechanics", Tata McGraw Hill, ISBN 0070681813, 673

pages.

Reference Books:

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

1 **Prerequisites:** XII Physics, Mathematics of differential equations

Course Objectives:

To explain particle related properties of waves and wave related properties of particles, introduce students to Quantum mechanics basic concepts.
To explain Schrodinger's time dependent and time independent equations.
To analyse basic working principles of semiconductors and learn physics behind them.
To explore different crystal structures, crystal plane orientations in cubic structures, and determine crystal properties using X-rays.

Course Outcomes:

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

Learn basic differences between Newtonian mechanics and Quantum mechanics, analyse particle properties of waves and wave nature of particles from different experiments, concept of wave function and analyse Heisenberg's ucertainty principle with the aid of examples.
Learn Schrodinger's time dependent and time independent equations and applications of these equations.
Differentiate between the types of solids based on their band structure and understand the physics behind working of semiconductors and Hall effect in semiconductors.
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.

Course Contents:

Module No.	Details	Hrs.
1	**Particle properties of waves** Black body radiation, Photoelectric effect, Compton effect, X-ray diffraction, types of X-rays, continuous and characteristic spectrum.	6
2	**Wave nature of particles** 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 Gama ray microscope experiment; Applications of uncertainty principle.	6
3	**Quantum Mechanics:** Schrodinger's time dependent form, steady state form of Schrodinger's equation, Motion of free particle, Particle trapped in one dimensional infinite potential well.	8

4	**Introduction to solids**: 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 denisty and continuity equations.	5
5	**Crystal Physics** 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. Bragg's X-ray spectrometer, Applications in crystallography.	5

Reference Books

Arthur Beiser (2009), 'Concepts of Modern Physics', Tata McGraw Hill, 6th Edition, ISBN0070151555, 623 pages.

Robert Eisberg, Robert Resnick (2006), 'Quantum Physics of atoms, molecules, solids, nuclei and particles', Wiley India pvt. Ltd, 2nd Edition, ISBN 9788126508181

Charles Kittel (2004), 'Introduction to Solid State Physics', John Wiley & Sons, 8th Edition, ISBN 0471415268, 704 pages.

S.O. Pillai (2010), 'Solid State Physics', 6th Edition, New Age International Publishers, ISBN 9788122427264, 832 Pages.

A.J Dekker (2000), 'Solid State Physics', Mcmillan India, 1st Edition, ISBN 0333918339, 556 Pages.

M. Ali Omar (1999), 'Elementary Solid State Physics', Pearson Education Publication, 5th Edition, ISBN 8177583778, 669 Pages.

Jenkins & White (2001), 'Fundamentals of Optics', McGraw-Hill Int., 4th Edition, ISBN0072561912, 786 Pages.

Text books

Kshirsagar and Avadhanulu (1992), 'A textbook of Engineering Physics', S. Chand Publications, ISBN 8121908175,758 Pages.

A.S. Vasudeva (2008), 'Modern Engineering Physics', S. Chand Publications, ISBN 8121917573, 383 Pages.

Hitendra K Malik and AK Singh (2013), 'Engineering Physics', McGraw Hill Publications, ISBN 0070671532

G Vijayakumari (2006), 'Engineering Physics', Vikas Publishing house, ISBN 9788125924098, 425 Pages.

2 **Prerequisites:** Standard XII Chemistry

Course Objectives:
The main objectives of the course are To introduce the students to basic knowledge of chemistry of water and lubricants To introduce the student with different characterization technique To introduce the student to theory, principles and mechanism of chemical processes. To introduce the application of chemistry in engineering and technology
Course Outcomes:
At the end of the course the students shall be able to Analyse water quality. List major chemical reactions that are used in the synthesis of molecules Able to characterize material with different technique Determine chemical behavior of different types of lubricant. Learn 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. 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	06
2	**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
3	**Spectroscopic techniques and applications** Principles of spectroscopy and selection rules. Electronic spectroscopy. UV, Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomicmolecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging,surface characterization techniques. Diffraction and scattering.	06
4	**Intermolecular forces and potential energy surfaces (4 lectures)** Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3, H_2F and HCN and trajectories on these surfaces.	04

5	**Nano –Materials:** Graphite, Fullerenes, Carbon Nanotubes, Nanowires, NanoconesHaeckelites-srtucture& their electronic and mechanical properties Applications of Nanomaterials in – i) Medicine ii) Catalysis iii) Environmental Technologies iv) Electronics & related fields v) Mechanics	04

Text Books:-

S. S. Dara&Dara (1986), 'Engineering Chemistry', S. Chand & Company Ltd, 12th Edition, ISBN 8121903599, 992 Pages

O.P. Khanna (2010), 'Material Science for engineering students', DhanpatRai, Publications (p) Ltd., ISBN 8189928317, 1179 Pages

University chemistry, by B. H. Mahan

Reference Books:-

P.C.Jain& Monica Jain (2004), 'Engineering Chemistry', DhanpatRai publishing company Pvt. Ltd, 15th Edition, ISBN 8187433175, 1288 Pages

Emil Roduner (2006), 'Nano Scopic Materials', RSC Publishing, ISBN 0854048571, 285 Pages

VasantGowarikar (1986), 'Polymer science', New Age International Pvt Ltd, ISBN 0852263074, 505 Pages

Cotlon (1994), 'Basic Inorganic Chemistry', Wiley India, 3rd Edition, ISBN 0471505323, 856 Pages

Fundamentals of Molecular Spectroscopy, by C. N. Banwell

Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane

Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan

Course Code: ES-BT152 Course:- Basic Electrical Engineering Lab (AY 2018-19)

Prerequisites: Standard XII Physics

Course Objective:

1. Understand use of various network laws/ theorems.
2. Analyse AC circuits
3. To perform experiments such as OC SC test, Load test on single phase transformer

Course Outcomes: Students will demonstrate ability to

1. Apply circuit laws/ theorems for DC circuit analysis
2. Analyse AC circuits and determine different parameters
3. Perform tests on single phase transformer to find equivalent circuit and efficiency of transformer with load variation..

List of Experiments:

Demonstration Experiments:

1. Study of meters (Tachometer, voltmeter, ammeter, multi-meter, wattmeter etc.)

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.

The work shall comprise of five A2 size drawing sheets and printouts of Autocad drawings consisting of 1 to 2 problems on each module(AutoCAD syllabus mention in point no 2 to 4).

1. To draw all problems taught in the classroom in Sketch book.
2. Drawing Sheet- A2 size drawing sheets consisting of 3 to 4 problems on curves/ lines.
3. Drawing Sheet - A2 size drawing sheets consisting of 3 to 4 problems on lines.
4. Drawing Sheet - A2 size drawing sheets consisting of 3 to 4 problems on solids.
5. Drawing Sheet - Orthographic Projections using AutoCAD software (3 problems).
6. Drawing Sheet - Isometric Views using AutoCAD software (3 problems).

Note:- Submission of duly signed Sketch Book is compulsory.

Course Code: ES-BT154 Course:-Engineering Mechanics-I Lab (AY 2018-19)

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 Experimentally verify the principles of statics (mechanics).

List of Experiments:

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

Prerequisites: XII Physics, Applied Physics I (BT105) theory

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.

Laboratory Objectives:
To setup theory related laboratory experiments on optics, Lasers and semiconductors 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: Explain unit cell properties of different crystal structures studied in the theory and identify different crystal plane orientations. Explain Hysteresis phenomenon in ferromagnetic materials plotting hysteresis curve. Explain Hall effect in semiconductors

List of experiments conducted: (Any five to be performed)

Demonstration of unit cell properties of different cubic structures.
Demonstration of important plane orientations and planar atomic densities of cubic planes.
Hall Effect in semiconductors.
Ultrasonic interferometer- measuring velocity of ultrasonic waves in a given medium.
Demonstration of using CRO and Lissajous figures.

Prerequisites: Standard XII Chemistry

Course Objectives:

The main objective of the course are

To introduce the students to basic knowledge of material chemistry.

To correlate theory with experiment.

Application of chemistry in engineering and technology.

Course Outcomes:

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

Carry out water analysis.

Analyse properties of oil.

Prepare nano materials.

LIST OF EXPERIMENTS-(Minimum 5 to be performed)

To Determine Total, Temporary & Permanent hardness of water sample.

Removal of hardness of water by Ion-Exchange Column.

To Determine COD of an effluent sample.

CO2 from air by Orsat's method.

Determine Acid-Value of the given Lubricating Oil.

To Determine Saponification-Value of the given Lubricating Oil

To Determine Flash-Point/Fire-Point of lubricating oil

To Determine Melting Point/Glass Transition Temperature of a polymer.

To prepare Nano-Oxide using combustion method.

Determination of chloride content of water

Prerequisites: Basic knowledge of carpentry, smithy, fitting, electrical wiring 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 Outcomes:

Upon successful completion of the course the student will be able to

1. Have thorough knowledge of various tools, machines, devices used in engineering practice for creating objects from raw material.
2. Have thorough knowledge of carrying out various operations in basic engineering shops.
3. Interpret job drawings, plan and execute processes and operations to produce basic components from raw material.

Course Content:

Module No.	Details	Hrs.
01	Fitting (Compulsory):- • Use and settings of fitting hand tools for marking, chipping, cutting, filing, center punching, hammering, drilling and tapping. • Term work to include one job:- Male –female joint involving above operations.	**18**
02	Carpentry (Compulsory):- • 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.	**18**
03	Forging / Smithy (Demonstration):- • One job: - Lifting Hook and Handle to be demonstrated by instructor to a batch	**09**
04	Welding (Demonstration):- • 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.	**09**
05	Electrical Board Wiring (Demonstration):- • House wiring, staircase wiring for fluorescent tube light, go-down wiring and three phase wiring for electrical motors.	**09**
06	Carpentry (Demonstration):- • Wood turning Demonstration to be demonstrated by instructor to a batch.	**09**

07	Machine Shop (Demonstration):- • One turning job to be demonstrated by instructor to a batch	**09**

Term-work:

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.

COURSE CONTENTS

Sem. II

F. Y. B.Tech. (CIVIL /MECHANICAL /ELECTRICAL) ENGINEERING

Academic Year: 2018-19

Course Code: BS-BT201 Course:-Engineering Mathematics-II (AY 2018-19)

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

Classify and solve differential equations in terms of ordinary/partial, Order, Exact, Linear.

Find the general solution of linear higher order linear differential equation with constant coefficients.

Evaluate integrals using Gamma functions, Beta functions.

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** Exact differential equations, Differential Equations which are reducible to the exact form by using integrating factors. First order linear differential equations and differential equations reducible to the linear form.	06
2	**Higher Order Linear Differential Equations** Higher Order Linear differential equations with constant coefficients. Complimentary Functions, Particular Integrals of differential equations of thetype $F(D)y = Q(x)$. Cauchy's homogenous linear differential equations and Legendre's differentialequations.	07
3	**Applications of Differential Equations, Gamma and Beta functions** Simple applications of differential equations of first and second order toEngineering problems. Gamma function, reduction formula. Beta function. Duplication formula , Relation between Gamma and Beta Functions and examples.	09
4	**Rectification** Curve tracing in Cartesian and Polar Coordinates. Rectification of plane curves.	04

5	**Double Integrals** Introduction to Double Integrals, Change of order of double integral. Evaluation of double integral by changing to polar coordinates.	07
6	**Triple Integrals** Introduction to Triple Integrals, Evaluation of Triple Integrals using Cartesian, Cylindrical and Spherical polar coordinates.	05
7	**Applications of Multiple Integrals** Applications double integrals to find area and mass of lamina Applications of Triple Integrals to find volume.	04

Text Books:-

Richard Bronson (2010), " Schaum's Outline of Differential Equations", McGraw Hill Education; 4th edition ISBN 978-0071824859, 408 pages

Shanti Narayan (2005), "Integral Calculus", S.Chand Publications,35th Edition, ISBN 8121906814, 360 Pages

B S Grewal (2014), "Higher Engineering Mathematics", Khanna Publications, 43rd Edition, ISBN 8174091955, 1315 Pages

Vinod Kumar Sharma "Applied Mathematics-II" 2ND edition TechMax Publications**.**

Reference Books:-

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

George Simmons (2002), " Differential Equations with Applications and Historical Notes" McGraw Hill Education; 2nd edition, ISBN 978-0070530713, 656 pages

Course Code: ES-BT202 Course:-Basic Electronics Engineering (AY 2018-19)

Prerequisites: Std. XII Physics

Course Objectives:

1. Discuss Electronics DevicesDiodes, BJT , FET and their applications
2. Introduce Operational amplifier and its applications as an amplifier, adder, subtractor and voltage follower.
3. Introduce, Gates, Boolean Algebra and logic simplification

Course Outcomes: Students will demonstrate ability to

1. Understand the characteristics of electronic devices like Diode, BJT and FET.
2. Appreciate use diodes in rectifiers and filters.
3. Design Operational amplifier applications
4. Apply Boolean Algebra and implement digital circuits using basic gates.

Course Contents:

Module No	Details	Hrs.
1.	Diode Applications: Half wave, Full wave, Bridge Rectifiers, Specifications of the devices required for C, LC, and CLC filter, Zener as a regulator.	08
2.	BJT configurations such as CE, CC, CB, Characteristics, BJT as a switch, BJT as an amplifier.	06
3.	Field Effect Transistors FET: JFET construction, characteristics (CS), FET as an amplifier	05
4.	Op amp as a basic block. Op amp as a inverting and on inverting Amplifier. Applications like adder, subtractor, voltage follower, etc.	05
5.	Digital Electronics Fundamentals: Difference between analog & digital signals, Basic & Universal Gates, Boolean algebra, Truth tables, Expressions, Logic simplification	04

Text Books:-

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1. Jain R.P. (2003), 'Modern Digital Electronics', Tata McGraw Hill, ISBN0070494924, 611 Pages
2. Bhargava, Kulshreshtha, Gupta (1984), 'Basic Electronics and Linear Circuits', TTTIChandigarh, TMH, ISBN 0074519654, 490 Pages
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. 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
3. MalvinoandLeach,"DigitalPrincipalandApplication",TataMcGrawHill,sixth edition,2006
4. Bignell Jame sand Donovan Robert," Digital Electronics", Delmar,ThomasLearning2001
   Gayakwad Ramakant," Op-Amps and Linear Integrated Circuits", 4thEdition, PHI publication

Course Code: ES-BT204 Course:-Engineering Mechanics-II (AY 2018-19)

Prerequisites: Standard XII Physics, ES-BT104

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

Find the centroid and moment of inertia of plane areas.

Solve the problems on kinematics of particles and kinematics of rigid bodies.

Solve the problems on kinetics of particles and kinetics of rigid bodies.

Course Contents:

Module No	Details	Hrs
1	**Centroid of Plane Areas:** Concept of centroid of plane areas. Problems on centroid of composite areas.	03
2	**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. Problems on moment of inertia of composite areas.	03
3	**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, relative velocity, projectile motion. (no derivations of formulas)	08
4	**Kinetics of particles:** Newton's laws of motion, D'Alembert's principle, equation of dynamic equilibrium, linear motion, curvilinear motion. **Energy principles:** Work done by a force, potential and kinetic energy, power, work energy equation, principle of conservation of energy.	03 04
5	**Momentum principles:** Momentum, impulse and momentum principle, principle of conservation of momentum, impact of solid bodies, elastic impact, semi-elastic impact and plastic impact. **Kinetics of rigid bodies:** D'Alembert's principle for bodies under rotational motion about a fixed axis.	05 02

Text Books:-

R.C.Hibbeler (2007);"Engineering Mechanics",Pearson Education Inc.,ISBN 0132215098, 656 pages

A. K. Tayal (2010), 'Engineering Mechanics',Umesh Publication, ISBN 9380117388 740 pages

Kumar(1956), "Engineering Mechanics",Tata McGraw Hill, ISBN 0070681813,673 pages

Reference Books:-

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

Course Code: BS-BT205 Course:-Applied Physics II (AY 2018-19)

Prerequisites: XII Physics, Mathematics of vector calculus

Course Objectives:
To understand differential operator Del, theory of static electric and magnetic fields using

principles of divergence and curls. To understand Electromagnetic waves in vacuum. To explain and interpretbasic properties involved in thin film interference and diffraction. To explain working principles of LASERs.
Course Outcomes: At the end of this course, students will be able to: Explain concepts of gradient, divergence, curls and to explain Gauss' law and Ampere's law in integral and differential form and the comparison between Electrostatic and magnetostatic fields. Analyse wave equations, explain concepts of Poynting vector and reflection and transmission of electromagnetic waves in vacuum at normal incidence. Analyse thin film interference pattern using the concepts of wedge shaped fringes and Newton's rings and analyseFraunhofer diffraction using single, double slits and a diffraction grating. Explain different absorption and emission processes, population inversion condition and pumping schemes which differentiate LASERs from normal light sources and explain working of certain LASERs using these concepts and further explain application of LASERs in holography.

Course Contents:

Module No.	Details	Hrs.
1	**Basic vector calculus and Electrostatics:** Concept of gradient, divergence and curl. Fundamental theorems: of calculus, for gradients, for divergences and for curls. Coulomb's law, Gauss' law, divergence and curl of electrostatic fields, introduction to scalar potential, relation of potential with field.	6
2.	**Magnetostatics** Divergence and curl of B, BiotSavart law, magnetic vector potential. Comparison of Electrostatics and magnetostatics.	4
3	**Electromagnetic waves** The wave equation; Plane electromagnetic waves in vacuum, their transverse nature andpolarization; relation between electric and magnetic fields of an electromagnetic wave;energy carried by electromagnetic waves and examples, Poynting vector, Momentum carried byelectromagnetic waves. Reflection and transmission ofelectromagnetic waves from a non-conducting medium-vacuum interface for normalincidence.	10
4	**Optics** Interference in thin films- equal thickness and wedge shaped films, Newton's rings. Applications. Types of diffraction, Fraunhofer diffraction through a single slit and diffraction grating, grating spectra, resolving power of a grating.	5
5	**LASERs** 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, Nd:YAG laser. Holography using LASERs.	5

Reference Books

David J. Griffiths (2012), 'Introduction to Electrodynamics', PHI Publications, 4thEdition, ISBN 8120347765.
Charles Kittel (2004), 'Introduction to Solid State Physics', John Wiley & Sons, 8th Edition, ISBN 0471415268, 704 pages.
S.O. Pillai (2010), 'Solid State Physics', 6th Edition, New Age International Publishers, ISBN 9788122427264, 832 Pages.
K. Thyagarajan and AjoyGhatak (2006), 'Lasers theories and application'Springer, 2nd Edition, ISBN1441964410, 650 pages.

Text books

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

Course Code: BS-BT206 Course:-Applied Chemistry-II (AY 2018-19)

Prerequistes: Standard XII chemistry, Applied Chemistry I

Course Objectives:

The main objectives of the course are

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:

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

Analyse process corrosion and its protection methods

Classify different types of alloy and their properties

Determine fuel characteristics, properties and their application

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 seriesProtection from Corrosion: Cathodic and Anodic Protection, Cathodic and Anodic coatings, Galvanising& Tinning, Metal Cladding, electroplating. Corrosion in electronic devices and photonic devices.	06
2	**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.	6
3	**Stereochemistry (4 lectures)** Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity,absolute configurations and conformational analysis. Isomerism in transitional metal compounds	04
4	**Organic reactions and synthesis of a drug molecule (4 lectures)** Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule.	04
5	**Green-Chemistry:** Goal, Significance and 12-Principles of Green Chemistry with examples, Green Path Green-Reagents, SCFE, SCCO2,green propellant – ultra pure H2O2 . Industrial applications of Green-Chemistry. Numerical problems on percentage atom economy	04

Text Books:-

S. S. Dara&Dara (1986), 'Engineering Chemistry', S. Chand & Company Ltd, 12th Edition, ISBN 8121903599, 992 Pages

O.P. Khanna (2010), 'Material Science for engineering students', DhanpatRai, Publications (p) Ltd., ISBN 8189928317, 1179

University chemistry, by B. H. Mahan

Reference Books:-

P.C.Jain& Monica Jain (2004), 'Engineering Chemistry', DhanpatRai publishing company Pvt. Ltd, 15th Edition, ISBN 8187433175, 1288 Pages

Emil Roduner (2006), 'Nano Scopic Materials', RSC Publishing, ISBN 0854048571, 285 Pages

VasantGowarikar (1986), 'Polymer science', New Age International Pvt Ltd, ISBN 0852263074, 505 Pages

Cotlon (1994), 'Basic Inorganic Chemistry', Wiley India, 3rd Edition, ISBN 0471505323, 856 Pages

Physical Chemistry, by P. W. Atkins

Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Code: ES-BT207 Course:-Computer Programming (AY 2018-19)

Prerequisites: Basic Knowlegde of computers

Course Objectives:

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

Course Outcomes:

Remember Data types and apply basics of Control Structures to programming.
Design programs using functions, arrays, strings.
Understand and apply the knowledge of OOPS to write programs
Apply debugging to already existing codes.

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.	01 01
2.	**Basic Data Type:** Concept of Variables and constants, Data types, expressions, and assignment, Input / Output from console. **Control Structure:** Conditional execution – if/else, Switch, Break, Continue. Iteration – do-while, for, while.	02 03 03
3.	**Functions:** Defining Functions- Procedural decomposition of problems, localizing variables, parameter passing– value and reference, return values. **Special Functions Concepts**: Recursive functions and function overloading.	04 03
4.	**Arrays:** Arrays – one-dimensional, Multidimensional Strings	03 02
5.	**Introduction to structures** **Introduction to Object Oriented Programming** Object Oriented Language concepts – classes, objects, Constructor and Destructors. Inheritance – Access specifiers, Types of Inheritance with examples.	01 02 03

Text Books:

1) BalaguruSwami (2008),"Object Oriented Programming with C++", Tata McGraw-Hill PublishingCompany Ltd., 3 rd Edition, ISBN 0070669074, 624 Pages
2) BjarneStroustrup (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)RobertLafore (2001), "Object-Oriented Programming in C++", Sams Publishing 4 th Edition, ISBN 0672323087, 1040 Pages

Course Code: HSM-BT208 Course:-Communication Skills (AY 2018-19)

3 **Prerequisites: -**

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 communicative and business English.

To acquire strategic competence as engineers 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.

To inculcate a positive attitude and develop values and ethics to make them an adaptable and responsible engineers.

Course Outcomes:

Learners will be able to:

Recognize the technical vocabulary and grammar, and build a strong communicative approach for a lifelong learning and assimilate the technical advancements of the society in engineering field

Understand the importance of communication in the professional world, and familiarize with the features of successful professional communication. Learn the importance of communicating effectively in work environment through verbal and nonverbal communication in a professional and societal setup by overcoming the barriers to communication

Explain the different channels and methods that are functional at the workplace so as to be able to execute their work behavior in an organization and familiarize them with business nuances and effective writing in BusinessOrganizations.

Learning the nuances of effecting Reading, Writing, Speaking and Listening skills, explore ways to make speeches and public speaking effective, hone your listening ability, understand the importance of reading in achieving success both in academic and professional life and know the major form of effective writing.

Understand various elements of business writing and acquire knowledge various specific features of effective business correspondence and practice their profession with ethics and be socially responsible.

Course Content:

Module No.	Details	Hrs.
01	**Building advanced vocabulary:** Introduction, Word formation, Synonyms, antonyms, Learning words through situations, one word substitution, Comprehension and summarization of technical passages and building technical vocabulary**.**	06
02	**Fundamentals of Communication:** Meaning, Definitions, Components, Objectives, Importance of communication, Purpose of Professional Communication, Barriers to Communication, Different Forms of communication: Verbal, Non-Verbal, Intrapersonal, Interpersonal, Extra personal, Mass Communication, Media Communication.	08
03	**Communication Network in a Business Organization:** Different types of communication flow: Internal, External, Upward, Downward, Horizontal, Grapevine, Problems and Solutions. Video conferencing and Netiquettes	04
04	**Techniques to Improve Communication: Reading, Writing, Listening and Speaking:** • Reading Skills – Barriers to Reading and Techniques to improve reading • Speaking Skills – Voice Modulation, Good Pronunciation,-Speaking without Fear, -Extempore & Prepared Speaking, role play in different Situations. How to present effective speeches through Talk power Program. • Listening Skills – Barriers to Listening, Listening & Note taking. • Writing Skills – Barriers and Techniques to improve writing skills	06
05	**Business Correspondence: (Letter Writing)** Introduction, Importance, Layout, Elements of style and Language, Principles of Business Correspondence, Types of formats-3, Types of letters: Routine letters, Enquiry and Reply, Order, Complaint and Adjustments, Sales Letters.	06

List of Assignments:

2 assignments on Summarization and Comprehension, One word substitute
3 practical session through public speaking, Speeches and Presentation
3 assignments on Communication Theory, Communication in a business environment
4 assignments on Business Correspondence
Group Activity and role play
Language lab course for vocabulary.

Text Books:

1. Meenakshi Raman and Dr. Sangeeta Sharma, "Communication Skills", Oxford UniversityPress.

Reference Books:

Sharma, R.C., and Krishna Mohan; "Business Correspondence and Report Writing", Tata McGraw Hill Publications, 3rd Edition.
Meenakshi Sharma and Prakash Singh, (2006);"Business Communication", Oxford University Press.

Adler Ronald B. and Rooman George, “Understanding Human Communication”, Oxford University Press, 9th Edition.
RaiUrmila and Rai S.M., “Business Communication”, Himalaya Publishing House.
Sinha, K.K., “Business Communication”.
Locker, Kitty O. and Stephen KyoKaczmarek, “Business Communication: Building Critical Skills”, McGraw Hill.

Course Code: BS-BT255 Course:- Applied Physics – II Lab (AY 2018-19)

Prerequisites: XII Physics, Applied Physics II (BT205) theory

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.

Laboratory Objectives:
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: Explain the applications of thin film interference using Wedge shaped films experiment and Newton's Rings. Explore the visible spectrum using a diffraction spectrometer and find the wavelength range. Understand the use of Lasers and Optical fibers in the field of Physics and Engineering**.** Undertsand Hall effect in semiconductors.

List of experiments conducted: (All five to be performed)

Finding thickness of paper using wedge shaped films setup.
Finding radius of curvature of lens using Newton's rings setup.
Finding wavelength of different colours of mercury spectrum using principle of diffraction through a grating.
Finding grating element using diode lasers.
Hysteresis curve of a ferromagnetic material.

Prerequisites: Applied Chemistry -II

Course Objectives:

The main objective of the course is

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

Course Outcomes:

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

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

List of Experiments: (Minimum 5 to be performed)

Estimation of Cu iodometrically.
Estimation of Zn complexometric titration.
Estimation of Ni complexometric titration.
Estimation of Al complexometric titration.
Calorific value of solid or liquid fuel using Bomb calorimeter.
Thin layer chromatography
Determination of chloride content of water
Estimation of Sniodometrically
.Preparation of biodiesel from edible oil.
Synthesis of simple layered materials and their characterization.
Preparing simple composites and their characterization.

Prerequisites: Computer Programming

Course Objectives:

Write and debug small programs.

Manipulate various Data types and Apply basic programming concepts like loops, functions, arrays in programs.

Apply Object Oriented programming approach to various problem statements.

Course Outcomes:

Construct programs using Control Structures.

Implement the use of functions and Arrays in C++ language.

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.
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 Special Functions
7. To Write C-Program Using Arrays.
8. To Write C-Program Using Strings.
9. To Write C-Program Using classes and objects.
10. To Write C-Program Using Inheritance.
11. To Write C-Program Using friend functions.

Course Code: ES-BT299 Course:- Workshop Practice – II (AY 2018-19)

Prerequisites: Basic knowledge of carpentry, smithy, fitting, electrical wiring 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 Outcomes:

Upon successful completion of the course the student will be able to

1. Have thorough knowledge of various tools, machines, devices used in engineering practice for creating objects from raw material.
2. Have thorough knowledge of carrying out various operations in basic engineering shops.
3. Interpret job drawings, plan and execute processes and operations to produce basic components from raw material.

Course Content:

Module No.	Details	Hrs.
01	Fitting (Compulsory):- • Use and settings of fitting hand tools for marking, chipping, cutting, filing, center punching, hammering, drilling and tapping. • Term work to include one job:- Male –female joint involving above operations.	**18**
02	Carpentry (Compulsory):- • 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.	**18**
03	Forging / Smithy (Demonstration):- • One job: - Lifting Hook and Handle to be demonstrated by instructor to a batch	**09**
04	Welding (Demonstration):- • 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.	**09**
05	Electrical Board Wiring (Demonstration):- • House wiring, staircase wiring for fluorescent tube light, go-down wiring and three phase wiring for electrical motors.	**09**
06	Carpentry (Demonstration):- • Wood turning Demonstration to be demonstrated by instructor to a batch.	**09**

07	Machine Shop (Demonstration):- • One turning job to be demonstrated by instructor to a batch	**09**

Term-work:

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.

Course Code: MC-BT001 Course:- Constitution of India (AY 2018-19)

Prerequisites: ---

Course Objectives: The main objectives of the course are
Course Outcomes: At the end of the course the students shall be able to To understand constitutional ethos and principles. To co-relate with political system and constitutional tenets. To inculcate and pursue the values of civic life. To exercise their rights and duties with rationale.

Course Content

1	Historical background of constitution	1
2	Philosophy of constitution	1
3	Fundamental Rights – Duties	1
4	Directive principles – with respect to issues	1
5	Separation of powers	1
6	Law making procedure	1
7	Party system – Electoral dynamics	1
8	Challenges to constitutional democracy	1
9	Judicial Administration	1
10	Working of quasi – judicial bodies	1
11	Amendment process and language	1
12	Local self government	1
13	Core issues (Uniform civil code, Article 370, Reservation)	1
14	Landmark cases – Nanavati case, Shah Bano, KeshvanandBhartiVishakha Case etc	1

Books Recommended:

[1] D.C. Gupta – Indian Government and Politics

[2] D.D. Basu – Introduction to the Constitution of India

[3] P. M. Bakshi - The Constitution of India

[4] M. V. Pylee - Constitutional History of India