MVJ COLLEGE OF ENGINEERING
Department of Chemistry
Scheme of Teaching and Examination 2019-20
Outcome Based Education(OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2019-20

I SEMESTER B.E./B.Tech (CHEMISTRY GROUP)

S No	Course and Course code		Course Title	Teaching Department	Teaching hours/week			Total Marks				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total marks	
					L	T	P					
1	BSC	19MAT11	Calculus and Linear Algebra	Mathematics	3	2	0	3	40	60	100	4
2	BSC	19CHE12	Engineering Chemistry	Chemistry	3	2	0	3	40	60	100	4
3	ESC	19CPS13	C Programming for Problem Solving	Computer Science & Engineering	2	2	0	3	40	60	100	4
4	ESC	19ELN14	Basic Electronics	Electronics & Communication Engineering	2	2	0	3	40	60	100	3
5	ESC	19ME15	Elements of Mechanical Engineering	Mechanical Engineering	2	2	0	3	40	60	100	3
6	BSC	19CHEL16	Engineering Chemistry Lab	Chemistry	0	0	2	3	40	60	100	1
7	ESC	19CPL17	C Programming Lab	Computer Science & Engineering	0	0	2	3	40	60	100	1
8	HSMC	19EGH18	Technical English I	Humanities	0	2	0	3	40	60	100	1

Note: BSC: Basic Science, PCC: Professional Core, HSMC: Humanity and Social Science, NCMC: Non-credit mandatory course.
Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs

MVJ COLLEGE OF ENGINEERING
Department of Chemistry
Scheme of Teaching and Examination 2019-20
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II SEMESTER B.E./B.Tech (CHEMISTRY GROUP)

S No	Course and Course code		Course Title	Teaching Department	Teaching hours/week			Total Marks				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total marks	
					L	T	P					
1	BSC	19MAT21	Calculus and Linear Algebra	Mathematics	3	2	0	3	40	60	100	4
2	BSC	19CHE22	Engineering Chemistry	Chemistry	3	2	0	3	40	60	100	4
3	ESC	19CPS23	C Programming for Problem Solving	Computer Science & Engineering	2	2	0	3	40	60	100	4
4	ESC	19ELN24	Basic Electronics	Electronics & Communication Engineering	2	2	0	3	40	60	100	3
5	ESC	19ME25	Elements of Mechanical Engineering	Mechanical Engineering	2	2	0	3	40	60	100	3
6	BSC	19CHEL26	Engineering Chemistry Lab	Chemistry	0	0	2	3	40	60	100	1
7	ESC	19CPL27	C Programming Lab	Computer Science & Engineering	0	0	2	3	40	60	100	1
8	HCMC	19EGH28	Technical English I	Humanities	0	2	0	3	40	60	100	1

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Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs

MVJ COLLEGE OF ENGINEERING
Department of Physics
Scheme of Teaching and Examination 2019-20
Outcome Based Education(OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2019-20

I SEMESTER B.E./B.Tech (PHYSICS GROUP)

S No	Course and Course code		Course Title	Teaching Department	Teaching hours/week			Total Marks				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total marks	
					L	T	P					
1	BSC	19MAT11	Calculus and Linear Algebra	Mathematics	3	2	0	3	40	60	100	4
2	BSC	19PHY12	Engineering Physics	Physics	3	2	0	3	40	60	100	4
3	ESC	19ELE13	Basic Electrical Engineering	Electrical & Electronics Engineering	2	2	0	3	40	60	100	3
4	ESC	19CIV14	Elements of Civil Engineering &Mechanics	Civil Engineering	2	2	0	3	40	60	100	3
5	ESC	19EGDL15	Engineering Graphics	Mechanical Engineering	2	0	2	3	40	60	100	4
6	BSC	19PHYL16	Engineering Physics Lab	Physics	0	0	2	3	40	60	100	1
7	ESC	19ELE17	Basic Electrical Engineering Lab	Electrical & Electronics Engineering	0	0	2	3	40	60	100	1
8	HSMC	19EGH18	Technical English I	Humanities	0	2	0	3	40	60	100	1

Note: BSC: Basic Science, PCC: Professional Core, HSMC: Humanity and Social Science, NCMC: Non-credit mandatory course.
Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs

MVJ COLLEGE OF ENGINEERING
Department of Physics
Scheme of Teaching and Examination 2019-20
Outcome Based Education(OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2019-20

II SEMESTER B.E./B.Tech (PHYSICS GROUP)

S No	Course and Course code		Course Title	Teaching Department	Teaching hours/week			Total Marks				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total marks	
					L	T	P					
1	BSC	19MAT21	Calculus and Linear Algebra	Mathematics	3	2	0	3	40	60	100	4
2	BSC	19PHY22	Engineering Physics	Physics	3	2	0	3	40	60	100	4
3	ESC	19ELE23	Basic Electrical Engineering	Electrical & Electronics Engineering	2	2	0	3	40	60	100	3
4	ESC	19CIV24	Elements of Civil Engineering &Mechanics	Civil Engineering	2	2	0	3	40	60	100	3
5	ESC	19EGDL25	Engineering Graphics	Mechanical Engineering	2	0	2	3	40	60	100	4
6	BSC	19PHYL26	Engineering Physics Lab	Physics	0	0	2	3	40	60	100	1
7	ESC	19ELE27	Basic Electrical Engineering Lab	Electrical & Electronics Engineering	0	0	2	3	40	60	100	1
8	HSMC	19EGH28	Technical English I	Humanities	0	2	0	3	40	60	100	1

Note: BSC: Basic Science, PCC: Professional Core, HSMC: Humanity and Social Science, NCMC: Non-credit mandatory course.
Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs

ENGINEERING MATHEMATICS-I

B.E., I Semester,

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	**19MAT101**	CIE	50
Number of Lecture Hours/Week	**04**	SEE	**50**
Total Number of Lecture Hours	**50** (**10** Hours per Module)	Credits	04

Course Learning Objectives: This course Engineering Mathematics-I will enable students:

- To familiarize the important tools of calculus and differential equations that are essential in all branches of engineering.
- To develop the knowledge of matrices and linear algebra in a comprehensive manner.

Modules	**RBT Level**
Module-1	
Differential Calculus-1: Review of elementary differential calculus, Polar curves - angle between the radius vector and tangent, angle between two curves, pedal equation. Curvature and radius of curvature- Cartesian and polar forms; Centre and circle of curvature (All without proof-formulae only) –applications to evolutes and involutes.	L1 & L2
Module-2	
Differential Calculus-2: Taylor's and Maclaurin's series expansions for one variable (statements only), indeterminate forms - L'Hospital's rule. Partial differentiation; Total derivatives-differentiation of composite functions. Maxima and minima for a function of two variables; Method of Lagrange multipliers with one subsidiary condition. Applications of maxima and minima with illustrative examples. Jacobians-simple problems.	L1 & L2
Module-3	
Integral Calculus: Review of elementary integral calculus. Multiple integrals: Evaluation of double and triple integrals. Evaluation of double integrals- change of order of integration and changing into polar co-ordinates. Applications to find area volume and centre of gravity Beta and Gamma functions: Definitions, Relation between beta and gamma functions and simple problems.	L1 & L2
Module-4	
Ordinary differential equations(ODE's)of first order: Exact and reducible to exact differential equations. Bernoulli's equation. Applications of ODE's-orthogonal trajectories, Newton's law of cooling and L-R circuits. Nonlinear differential equations: Introduction to general and singular solutions ; Solvable for p only; Clairaut's and reducible to Clairaut's equations only.	L1,L2 & L3
Module-5	
Linear Algebra: Rank of a matrix-echelon form. Solution of system of linear equations – consistency. Gauss-elimination method, Gauss –Jordan method and Approximate solution by Gauss-Seidel method. Eigen values and eigen vectors-Rayleigh's power method. Diagonalization of a square matrix of order two.	L1,L2 & L3

Course Outcomes: On completion of this course, students are able to:

- Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.
- Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians.
- Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.
- Solve first order linear/nonlinear differential equation analytically using standard methods.
- Make use of matrix theory for solving system of linear equations and compute eigenvalues and eigen vectors required for matrix diagonalization process.

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons,10th Ed., 2015.

Reference Books:

1. N.P.Bali and Manish Goyal: A Text Book of Engineering Mathematics, Laxmi Publishers, 7th Ed., 2010.
2. B.V.Ramana: "Higher Engineering Mathematics" Tata McGraw-Hill, 2006.
3. H. K. Dass and Er. Rajnish Verma: "Higher Engineering Mathematics", S. Chand publishing, 1st edition, 2011.

Web Link and Video Lectures:

1. http://nptel.ac.in/courses.php?disciplineID=111
2. http://www.khanacademy.org/
3. http://www.class-central.com/subject/math

ENGINEERING MATHEMATICS-II

B.E., II Semester,

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	19MAT201	CIE	**50**
Number of Lecture Hours/Week	04	SEE	**50**
Total Number of Lecture Hours	50 (10 Hours per Module)	Credits	**04**

Course Learning Objectives: This course aims to prepare the students:

- To familiarize the important tools of vector calculus, ordinary/partial differential equations and power series required to analyze the engineering problems.
- To apply the knowledge of interpolation/extrapolation and numerical integration technique whenever analytical methods fail or very complicated, to offer solutions.

Modules	RBT Level
Module-1	
Vector Calculus:- **Vector Differentiation:** Scalar and vector fields. Gradient, directional derivative; curl and divergence-physical interpretation; solenoidal and irrotational vector fields-Illustrative problems. **Vector Integration:** Line integrals, Theorems of Green, Gauss and Stokes (without proof). Applications to work done by a force and flux.	L1 & L2
Module-2	
Differential Equations of higher order:-Second order linear ODE's with constant coefficients-Inverse differential operators, method of variation of parameters; Cauchy's and Legendre homogeneous equations. Applications to oscillations L-C-R circuits.	L1, L2 & L3
Module-3	
Partial Differential Equations(PDE's):- Formation of PDE's by elimination of arbitrary constants and functions. Solution of non- homogeneous PDE by direct integration. Homogeneous PDEs involving derivative with respect to one independent variable only. Solution of Lagrange's linear PDE. Derivation of one dimensional heat and wave equations and solutions by the method of separation of variables.	L1, L2 & L3
Module-4	
Infinite Series: Series of positive terms- convergence and divergence. Cauchy's root test and D'Alembert's ratio test(without proof)- Illustrative examples. **Power Series solutions-**Series solution of Bessel's differential equation leading to $J_n(x)$- Bessel's function of first kind-orthogonality. Series solution of Legendre's differential equation leading to $P_n(x)$-Legendre polynomials. Rodrigue's formula (without proof), problems.	L1 & L2
Module-5	
Numerical Methods: Finite differences. Interpolation/extrapolation using Newton's forward and backward difference formulae, Newton's divided difference and Lagrange's formulae (All formulae without proof). Solution of polynomial and transcendental equations – Newton-Raphson and Regula-Falsi methods(only formulae)- Illustrative examples. **Numerical integration:** Simpson's (1/3)th and (3/8)th rules, Weddle's rule (without proof) – Problems.	L1, L2 & L3

Course Outcomes: On completion of this course, students are able to:

- Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the inter dependence of line, surface and volume integrals.
- Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
- Construct a variety of partial differential equations and solution by exact methods/method of separation of variables.
- Explain the applications of infinite series and obtain series solution of ordinary differential equations.
- Apply the knowledge of numerical methods in the modeling of various physical and engineering phenomena.

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons,10th Ed., 2015.

Reference Books:

4. N.P.Bali and Manish Goyal: A Text Book of Engineering Mathematics, Laxmi Publishers, 7th Ed., 2010.
5. B.V.Ramana: "Higher Engineering Mathematics" Tata McGraw-Hill, 2006.
6. H. K. Dass and Er. Rajnish Verma: "Higher Engineering Mathematics", S. Chand publishing, 1st edition, 2011.

Web Link and Video Lectures:

4. http://nptel.ac.in/courses.php?disciplineID=111
5. http://www.khanacademy.org/
6. http://www.class-central.com/subject/math

ENGINEERING CHEMISTRY

B.E., I/II Semester,

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	**19CHE12/22**	CIE	**50**
Number of Lecture Hours/Week	**04**	SEE	**50**
Total Number of Lecture Hours	**50** (**10** Hours per Module)	Credits	**04**

Course Objectives: This course will enable students to:

- Master the basic knowledge of engineering chemistry for building technical competence in industries, research and development.
- To develop knowledge in the fields of use of free energy in chemical equilibrium, electrochemistry and energy storage system, corrosion and metal finishing.
- To understand the importance of energy system, environmental pollution, waste management, water chemistry, instrumental methods of analysis and Nano-materials

Modules	**RBT Level**
Module-1	
Use of free energy in chemical equilibria: Thermodynamic functions: Definitions of free energy and entropy. Cell potential, derivation of Nernst equation for single electrode potential, numerical problems on E, E_0, and Ecell **Electrochemical energy systems:** Reference electrodes: Introduction, construction, working and applications of Calomel electrode. Ion-selective electrode -Definition, construction and principle of Glass electrode and determination of pH using glass electrode. Electrolyte concentration cells, numerical problems **Energy storage systems:** Introduction, classification -primary, secondary and reserve batteries. Construction, working and applications of Ni-MH and Li-ion batteries	L1, L2, L3
Module-2	
Corrosion: Introduction, Electrochemical theory of corrosion, Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of corrosion product, nature of medium – pH, conductivity and temperature. Types of corrosion - Differential metal and differential aeration - pitting and water line). Corrosion control: Anodizing – Anodizing of aluminium, Cathodic protection - sacrificial anode and impressed current methods, Metal coatings – Galvanization **Metal finishing:** Introduction, Technological importance. Electroplating: Introduction, principles governing electroplating-Polarization, decomposition potential and overvoltage. Electroplating of chromium (hard and decorative). Electroless plating: Introduction, electroless plating of nickel & copper, distinction between electroplating and electroless plating processes	L1, L2, L3
Module-3	
Chemical Fuels: Introduction, classification, definitions of CV, LCV, and HCV determination of calorific value of solid/liquid fuel using bomb calorimeter, numerical problems. Knocking of petrol engine -Definition, mechanism, ill effects and prevention. Power alcohol, unleaded petrol and biodiesel Cracking, ,FCC , Reforming reactions ,Octane No. , Cetane No. **Fuel Cells:** Introduction, differences between conventional cell and fuel cell, limitations & advantages. Construction, working & applications of methanol-oxygen fuel cell with ~S04 electrolyte, and **Solar Energy:** Photovoltaic cells-introduction, construction and working of a typical PV cell, Preparation of solar grade silicon by Union Carbide Process/Method. Advantages & disadvantages of PV cells	L1, L2,

Module-4	
Water Chemistry: Introduction, sources and impurities of water; boiler feed water, boiler troubles with disadvantages -scale and sludge formation, boiler corrosion (due to dissolved O_2 CO_2 and MgCn). Sources of water pollution, Sewage, Definitions of Biological oxygen demand (BOD) and Chemical Oxygen Demand (COD), determination of COD, numerical problems on COD & BOD **Chemical analysis of water:** Sulphates (gravimetry) and Fluorides (colorimetry). Sewage treatment: Primary, secondary (activated sludge) and tertiary methods. Softening of water by ion exchange process. Desalination of sea water by reverse osmosis. Determination of Hardness, Alkalinity, DO and Numerical problems on Hardness and Alkalinity, DO	L1, L2, L3
Module-5	
Instrumental methods of analysis: Theory, Instrumentation and applications of Colorimetry, Flame Photometry, Atomic Absorption Spectroscopy, Potentiometry, Conductometry (Strong acid with a strong base, weak acid with a strong base, mixture of strong acid and a weak acid with a strong base) **Nanomaterials**: Introduction, size dependent properties (Surface area, Electrical, Optical, Catalytic and Thermal properties). Synthesis of nanomaterials: Top down and bottom up approaches, Synthesis by Sol-gel, precipitation and chemical vapour deposition, Nanoscale materials: Fullerenes, Carbon nanotubes and graphenes-properties and applications	L1, L2, L3

Course outcomes: On completion of this course, students are able to:

- Use of free energy in equilibria, rationalize bulk properties and processes using thermodynamic considerations, electrochemical energy systems..
- Causes and effects of corrosion of metals and control of corrosion. Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc by electroplating and electroless plating.
- Production and consumption of energy for industrialization of country and living standards of people. Electrochemical and concentration cells. Classical & modern batteries and fuel cells. Utilization of solar energy for different useful forms of energy.
- Analysis of water quality parameters and various sewage treatment methods
- Different techniques of instrumental methods of analysis. Fundamental principles of nano materials.

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 16 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. R.V. Gadag & A. Nityananda Shetty., "Engineering Chemistry", I K International Publishing House Private Ltd. New Delhi (2018- Edition).

2. B. Jaiprakash, R. Venugopal, Sivakumaraiah and Pushpa Iyengar, Chemistry for Engineering Students, Subhash Publications, Bengaluru, (2018- Edition)

3. O.G. Palanna, "Engineering Chemistry", Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint (2015- Edition).

Reference Books:

1.P.C.Jain & Monica Jain "Engineering Chemsitry", Dhanpat Rai publications, New Delhi(2015 Edition)

2.S.S.Dara,A textbook of Engineering Chemistry, 10th Edition, S Chand& Co.Ltd,New Delhi,2014

3.Physical Chemistry, by P.W. Atkins, Oxford publications(Eighth edition-2006)

Web Link and Video Lectures:

1. http://nptel.ac.in/courses.php?disciplineID=111
2. http://www.khanacademy.org/

ENGINEERING PHYSICS

B.E., I & II Semester,

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	**19PHY12/22**	CIE	**50**
Number of Lecture Hours/Week	**04**	SEE	**50**
Total Number of Lecture Hours	**50** (**10** Hours per Module)	Credits	**04**

Course Objectives: This course will enable students to:

- Learn the basic concepts in physics which are very essential in understanding and solving engineering related Challenges
- Gain better knowledge of newer concepts in modern Physics for the better appreciation of modern technology.

Modules	**RBT Level**
Module-1	
Oscillations and Waves **Free oscillations**: Definition of SHM, Derivation of Equation for SHM, Mechanical simple harmonic Oscillators, (Mass suspended to spring), Complex notation and phasor representation of SHM, Equation of motion for Free oscillations , natural frequency of oscillations, **Damped oscillations.** Theory of damped oscillations: over damping, critical damping and under damping, Quality factor. Theory of Forced oscillations: Resonance, Sharpness of Resonance: Example of mechanical Resonance. **SHOCK WAVES:** Mach number, properties of shock waves, Control volume, Laws of conservation of mass, energy and momentum. Construction and working of Reddy shock tube Applications of shock waves **Self Learning topics:** LC oscillations.	L1, L2, L3
Module-2	
Elastic Properties of materials Elasticity : Concept of elasticity, Plasticity, Stress, Strain, Tensile stress, Shear stress, Strain hardening and strain softening, failure (fracture/ fatigue), Hooks law, different elastic moduli: Poisson ratio, Expression for Young's Modulus (Y), Bulk Modulus (K), and Rigidity modulus (n) in terms of β. Relation between Y,n, K, Limits of Poission's Ratio **Bending of Beams**: Definition of beams, different types of beams, Definition of neutral surface/plane and neutral axis, bending moment expression for bending moment in terms of moment of inertia ,bending moment for circular and rectangular cross sections single cantilever derivation of expression for Young's Modulus **Torsion of a cylinder:** Expression for couple per unit twist for a solid cylinder (Derivation), Torsional pendulum, Expression of period of Oscillations. **Self Learning topics:** Young's Modulus of materials by Uniform Bending Method	L1, L2, L3
Module-3	
Maxwell's equations, EM waves and optical fibers **Maxwell's equations**: Fundamentals of vector calculus. Divergence and curl of electric field and magnetic fields (static), Gauss divergence theorem and stokes theorem. Description of laws of electrostatics, magnetism and Faraday's laws of EMI. Current density and equation of continuity; displacement current (with derivation) Maxwell's equation in vacuum. **EM Waves**: The wave equation in differential form in free space(derivation of the equation using Maxwell's equation) , plane EM waves in vacuum, their transverse nature, polarisation of EM waves (Qualitative)	L1, L2, L3

Optical fibers: Propagation mechanism, angle of acceptance. Numerical aperture. Modes of propagation and types of optical fibers. Attenuation: causes of attenuation and mention of expression for attenuation coefficient. Discussion of block diagram of Point to Point communication. Merits and demerits. Numerical problems **Self learning topics:** Optical amplifiers.	
Module-4	
Quantum Mechanics and Lasers: **Quantum Mechanics:** Failure of classical mechanics**,** Introduction to Quantum mechanics, Wave nature of particles, Heisenberg's uncertainty principle and applications (non confinement of electrons in the nucleus, Schrodinger's time independent wave equation ,Significance of Wave function ,Normalization, particle in a box energy Eigen values of particle in a box ,probability densities. **Lasers:** Review of spontaneous and stimulated processes, Einstein's coefficients (derivation of expression for energy density), Requisites of a Laser system, Principle, construction and working of CO_2 laser Semiconductor Lasers. Application of Lasers in Defence (Laser range finder), And Engineering (Data storage),Numerical problems **Self learning topics**: Failure of classical mechanics, Laser welding, cutting, Drilling.	L1, L2, L3
Module-5	
Material science **Quantum free electron theory of metals:** Review of classical free electron theory, Mention of failures. Assumption of quantum Free electron theory, Mention of expression for energy of states, Fermi- Dirac statistics (qualitative), Fermi Factor, Fermi Level, Derivation of the expression for Fermi Energy, Success of QFET. **Physics of Semiconductor:** Fermi Level in intrinsic Semiconductors, Expression for Concentration of Electrons in conduction band, Hole concentration in valance band(Only mention the expression), Conductivity of semiconductors (Derivation), Hall Effect, Expression for Hall Coefficient (Derivation), Application of hall effect. **Dielectric materials:** Polar and non polar dielectrics, internal fields in a solid, clausius-Mosotti equation (Derivation), Mention of solid, Liquid and Gaseous dielectrics with one example each. Application of dielectrics in transformers. Numerical Problems. **Self learning topics :** Hall sensors	L1, L2, L3

Course outcomes: On completion of this course, students are able to:

- Understand various types of oscillations and their implications, the role of Shock waves in various fields and Recognize the elastic properties of materials for engineering applications
- Realize the interrelation between time varying electric fields and magnetic field, the transverse nature of the EM waves and their role in optical fiber communication
- Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation
- Apprehend theoretical background of laser, construction and working of different types of laser and its applications in different fields
- Understand various electrical and thermal properties of materials like conductors, semiconductors and dielectrics using different theoretical models

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. A Text book of Engineering Physics- M.N. Avadhanulu and P.G. Kshirsagar, 10th revised Ed, S. Chand & Company Ltd, New Delhi
2. Engineering Physics-Gaur and Gupta-Dhanpat Rai Publications-2017
3. Concepts of Modern Physics-Arthur Beiser: 6 th Ed;Tata McGraw Hill Edu Pvt Ltd- New Delhi 2006.

Reference Books:

1. 1. Introduction to Mechanics — MK Verma: 2nd Ed, University Press(India) Pvt Ltd, Hyderabad 2009
2. Lasers and Non Linear Optics – BB laud, 3rd Ed, New Age International Publishers 2011
3. Solid State Physics-S O Pillai, 8th Ed- New Age International Publishers-2018
4. Shock waves made simple- Chintoo S Kumar, K Takayama and KPJ Reddy: Willey India Pvt. Ltd. New Delhi2014
5. Introduction to Electrodynamics- David Griffiths: 4th Ed, Cambridge University Press 2017

Web Link and Video Lectures:

1. https://nptel.ac.in/courses/122107035/
2. https://ocw.mit.edu/courses/physics/
3. http://engineeringvideolectures.com/video/1107

C PROGRAMMING FOR PROBLEM SOLVING

B.E., I/II Semester,

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	**19CPS13/23**	CIE	**50**
Number of Lecture Hours/Week	**3- 2- 0**	SEE	**50**
Total Number of Lecture Hours	**60**	Credits	**04**

Course objectives:

This course(19CPS13/23) will enable students to:

- Familiarize with writing of algorithms, fundamentals of C and philosophy of problem solving.
- Implement different programming constructs and decomposition of problems into functions.
- Use and implement data structures like arrays and structures to obtain solutions
- Define and use of pointers with simple applications.

Modules	**RBT Level**
Module-1	
Introduction to computer Hardware and software: Computer types, bits, bytes and words, Basic organization of a computer, Types of Memory, Computers in a network, Network hardware, Software basics, software types. **Introduction to algorithms and flowchart.** **Overview of C**: Basic structure of C program, executing a C program. Constant, variable and data types, Operators and expressions.	L1, L2
Module-2	
Pre-processor Directives: Introduction to pre-processor, Macro substitution and file inclusion directives **Managing Input and output operations**:Formatted/Unformatted input and output functions. **Decision Making and Branching:**Conditional Branching, Unconditional branching and Loops. Example programs, Finding roots of a quadratic equation, plotting of Pascal's triangle and pattern printing programs like * 1 * * 2 3 * * * 4 5 6	L1, L2
Module-3	
Arrays: Arrays (1-D, 2-D) Example programs, Matrix - Addition, Multiplication, and Transpose. Character arrays and Strings, Basic Algorithms: Searching andSorting Algorithms (Linear search, Binary search, Bubble sort and Selection sort).	L1, L2, L3
Module – 4	
Functions: Library function and user defined function. Elements of user defined function, Categories of user defined function, Parameter passing Techniques (Call by Value and Call by reference),Storage Classes in C, Recursion. Example programs, Finding Factorial of a positive integers and Fibonacci series.	L1, L2, L3
Module-5	
Structure: Defining and declaring a structure, Accessing structure members, Array of structures, Array within structure, structure within structure, Unions. **Pointer**: Declaring and initializing pointer variable, chain of pointers, pointers and arrays, pointers as function arguments..	L1, L2, L3

Course Outcomes:

- Illustrate simple algorithms from the different domains such as mathematics, physics etc.
- Construct a programming solution to the given problem using C
- Understand the concept of arrays.
- Identify and correct the syntax and logical errors in C programs
- Modularize the given problem using functions and structures.

Question paper pattern:

The question paper will have ten questions.

- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGraw-Hill
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall ofIndia.

Reference Books:

1. Sumitabha Das, Computer Fundamentals & C Programming, Mc Graw Hill Education.
2. Gary J Bronson, ANSI C Programming, 4th Edition, Ceneage Learning.
3. Vikas Gupta: Computer Concepts and C Programming, Dreamtech Press 2013.
4. R S Bichkar, Programming with C, University Press, 2012.
5. V Rajaraman: Computer Programming in C, PHI, 2013.
6. Basavaraj S. Anami, Shanmukhappa A Angadi, Sunilkumar S. Manvi, Computer Concepts and C Programming: A Holistic Approach to Learning C, Seond edition, PHI India, 2010.

Web Link and Video Lectures:

1. https://www.digimat.in/nptel/courses/video/106105171/L01.html
2. https://nptel.ac.in/courses/106105171/2
3. https://nptel.ac.in/courses/106105171/53
4. https://nptel.ac.in/courses/106105171/55

Basic Electrical Engineering

B.E., I/II Semester,

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	**19ELE13/23**	CIE	**50**
Number of Lecture Hours/Week	**03**	SEE	**50**
Total Number of Lecture Hours	**50** (**10** Hours per Module)	Credits	**03**

Course Objectives:

- To explain Ohm's law and Kirchhoff's laws used for the analysis of DC circuits.
- To explain fundamentals of AC circuits and the behaviour of R, L and C and their combinations in AC circuits.
- To discuss three phase balanced circuits.
- To introduce concepts of electrical wiring, circuit protecting devices and earthing.
- To explain principle of operation, construction and performance of electrical machines such as single-phase transformer, DC machines, three-phase induction motor and synchronous generator.

Modules	**RBT Level**
Module-1	
D.C. Circuits: Ohm's law, Kirchhoff's laws, analysis of series, parallel and series-parallel circuits excited by independent voltage sources, power and energy, Maximum power transfer theorem. **Electromagnetism:** Faraday's laws, Lenz's law, Fleming's rules, statically and dynamically induced emfs, self inductance, mutual inductance and coupling coefficient. Energy stored in a magnetic field**.**	L1, L2, L3, L4
Module-2	
Single phase AC circuits: Generation of sinusoidal voltage, definition of average value, r.m.s. value, form factor and peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities, analysis with phasor diagram of R-L, R-C and R-L-C circuits, real power, reactive power, apparent power and power factor	L1, L2, L3, L4
Module-3	
Three phase AC circuits: Necessity and advantages of three phase systems, generation of three phase power, phase sequence, relationship between line and phase quantities in balanced star and delta connections, power in three phase circuits, measurement of three phase power using two wattmeters **Domestic wiring**: Service mains, meter board and distribution board, conduit wiring, two-way and three-way control of a lamp, brief discussion on fuse and MCB, precautions against electric shock, necessity of earthing, energy efficient lamps **Non-conventional energy resources**: Elementary discussion on solar P-V and wind power generation, roof top solar panels for domestic power generation.	L1, L2, L3, L4
Module-4	
D.C. machines: Working principle of a D.C. machine as a generator and a motor, constructional details in brief D.C. motor: Working principle, back emf, torque equation, Series and shunt DC motors, their characteristics and applications, necessity of starter for a DC motor **Transformers**: Principle of operation and construction of single phase transformers (core and shell types), EMF equation, losses and efficiency, definition of voltage regulation of a transformer	L1, L2, L3

Module-5	
Synchronous generators: Principle of operation, types and constructional features, EMF equation, concept of winding factor (no derivation for coil span and distribution factors) **Three phase induction motors**: Principle of operation, concept of rotating magnetic field, slip, constructional details, types and applications, necessity of a starter	L1, L2, L3

Course Outcomes

At the end of the course the student will be able to:

- Analyze DC Circuits and magnetic circuits.
- Analyze the fundamental principles of AC circuits
- Explain the basics of domestic wiring, protective devices and non-conventional energy resources
- Explain the principle of operation and construction of DC machines and single phase transformers
- Explain the principle of operation and constructional details of Synchronous and Induction machines.

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 16 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Book

- Basic Electrical Engineering, D C Kulshreshtha, Tata McGraw Hill, Revised first Edition.

Suggested References Books

- Electrical Technology, E. Hughes, International Students 9th Edition, Pearson, 2005.
- Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Tata McGraw Hill, 2017.
- Non Conventional Energy Resources, Shobh Nath Singh, Pearson India, 2018.

BASIC ELECTRONICS

B.E., I/II Semester,

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	**19ELN14/24**	CIE	**50**
Number of Lecture Hours/Week	**03**	SEE	**50**
Total Number of Lecture Hours	**50** (**10** Hours per Module)	Credits	**03**

Course objectives: This course will enable students to :

- Understand the characteristics , operation and applications of the diodes.
- Understand the working,Characteristics of Bipolar Junction Transistors.
- Understand the working of SCR and operational amplifiers in electronic circuits.
- Understand different number systems and working of fundamental blocks of digital circuits.
- Understand the principle of basic communication system , mobile phones and transducers.

Modules	**RBT Level**
Module-1	
Semiconductor Diodes and Applications : p-n junction diode, Characteristics and Parameters, Equivalent circuit of Diode, DC load line analysis, Breakdown mechanisms, Zener diode operation and applications Zener diode as voltage regulators; Half-wave rectifier, Full-wave rectifier, Bridge rectifier with and without capacitor filter circuit,IC 7805 Voltage Regulator. **Activity 1:** Experiment AC to DC conversion using PN diodes. **Text Book 1:Chapter 2(2-1 to 2-4,2-9),Chapter 3 (3-1 to 3-4,3-6)** **RBT:L1,L2**	L1, L2, L3
Module-2	
Transistors :Bipolar Junction Transistors: Construction, Operation, Amplification, Common Base, Common Emitter and Common Collector Characteristics, Biasing , Types of Biasing circuits, BJT Applications,Silicon Controlled Rectifier (SCR) – Operation, Construction, Characteristics, Applications. **Activity 2:** Verify the function of transistor as a switch. **Text book 1 :Chapter 5(5-10)** **Text book 1: Chapter 4(4-1 to 4-6), Chapter 5(5-1 to 5-4), Chapter 19 (19-1 to 19-3)** **RBT:L1,L2**	L1, L2, L3
Module-3	
Operational Amplifiers and Applications: Introduction to Op-Amp,Characteristics of Ideal Op-Amp , Concept of Virtual Ground; Op-Amp input modes, Op-Amp parameters,Pin Configuration of 741 Op-Amp. Applications of Op-Amp: Inverting Amplifier, Non- Inverting Amplifier, Summer, Voltage follower, Integrator, Differentiator, Comparator. **Activity 3:**Perform addition and subtraction using IC 741. **Text book 1: Chapter 14(14-1 to 14-7,14-9)** **RBT:L1,L2**	L1, L2, L3
Module-4	
Digital Electronics Fundamentals : Difference between Analog and Digital signal, Number Systems Conversion, Complement of Binary Numbers,Basic and Universal gates, De Morgan's theorem, Boolean Algebraic Simplification,NAND and NOR Implementation , Half adder, Full adder, Multiplexer, decoder, SR and JK flip flops. **Activity 4:**Verify the truth Tables of Logic gates. **Text book 2: Chapter 1(1.1 to 1.9), Chapter(2.1 to 2.8)** **RBT:L1,L2**	L1, L2, L3

Module-5	
Communication Systems : Introduction, Elements of Communication Systems, Modulation and Demodulation:Amplitude modulation ,Frequency Modulation,Phase Modulation–A comparison,Introduction to mobile spectrum, Principles of operation of mobile phone ,Evolution of Mobile Generation Technologies. **Activity 5:**Perform Frequency modulation and find its modulation factor. **Text Book 3: Chapter 1(1.1 to 1.3),Chapter 3(3.1 , 3.2), Chapter 4(4.2,4.3)** **Reference Book 4:Chapter 2 (2.1,2.2),** **RBT:L1,L2**	L1, L2

Course outcomes: On completion of this course, students are able to:

After studying this course, students will be able to:

- Appreciate the significance of electronics in different applications,
- Understand the applications of diode in rectifiers and filter circuits
- Apply the concept of diode in rectifiers, filters circuits
- Design simple circuits like amplifiers (inverting and non inverting), comparators, adder, integrator and differentiator using OPAMPS,
- Compile the different building blocks in digital electronics using logic gates and implement simple logic function using basic universal gates, and
- Understand the functioning of a communication system, and different modulation technologies, and
- Understand the basic principles of different types of Transducers.

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 16 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5th Edition, 2008.
2. M.Morris mano "Digital Design ",4th Edition ,Prentice Hall of India Pvt. Ltd., 2008/Pearson education (singapore)Pvt. Ltd.,New Delhi,2003.
3. Simon Haykins & Moher, "Communicatio Systems",5th Edition, John Willey, India Pvt. Ltd, 2010, ISBN 978 – 81 – 265 – 2151 – 7.

Reference Books:

1. Muhammad H Rashid , " Electronic Devices and Circuits", Cengage Learning 2014.
2. Boylestead,Nashelskey",Electronic Devices and Circuit Theory",Pearson Education,9th Edition 2007/11th edition,2013.
3. George Kennedy "Electronic Communication System"TMH Publication,5th Edition,2015.
4. Theodore S.Rappaport "Wireless Communication"Prentice Hall of India Pvt. Ltd., 2008/Pearson education Pvt. Ltd.,New Delhi,2007.

Web Link and Video Lectures:

1. https://nptel.ac.in/courses/117103063/5
2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-002-circuits-and-electronics-spring-2007/video-lectures/lecture-20/
3. https://www.allaboutcircuits.com/video-lectures/digital-concepts-terms/

Basic Engineering Mechanics

B.E., I Semester,

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	**19MCV14/24**	CIE	**50**
Number of Lecture Hours/Week	04	SEE	**50**
Total Number of Lecture Hours	50 (10 Hours per Module)	Credits	**03**

Course Objectives: This course will enable the students to

- Learn the basics of Engineering Mechanics Concepts
- Verify the Equilibrium condition of Coplanar Force System
- Solve the problems associated with Forces / Loads and Moments with different support conditions
- Calculate the First and Second area moment for regular geometrical cross sections
- Predict the effect of force and motion of bodies under kinematics

Modules	**RBT Level**
Module-1	
Mechanics: Historical development of Engineering Mechanics, Units and dimensions, rigid body, continuum, Idealization of bodies-particle, Newton's laws of motion, gravitational law of motion, Concept of force, force Characteristics, internal and external force, force system and types of force systems, Parallelogram law concept and Numerical Problems, Principle of Transmissibility of force, Principle of Superposition and physical independence. Resolution and composition of force, resultant of coplanar concurrent forces - concept and Numerical Problems. Moment of a force about a point and about an axis, couple, characteristics of couple, moment of couple, equivalent force couple system- Numerical Problems. Resultant of concurrent and non-concurrent forces by Graphical method	L1, L2,L3, L4
Module-2	
Resultant of coplanar forces: Varignon's theorem, resultant of coplanar non-concurrent forces by method of resolution- Numerical Problems. **Equilibrium:** Concept of equilibrium, Free body diagram, conditions of equilibrium of concurrent and non-concurrent co planar force system. Triangle law-concept, and Polygon law of forces-concept, Lame's Theorem-concept and Numerical Problems. Equilibrium of coplanar concurrent and non-concurrent force systems by Graphical method	L2,L3,L4 L4
Module-3	
Support Reactions: Types of Loads and Supports, statically determinate and indeterminate beams, Numerical Problems on support reactions for statically determinate beams (point load, uniformly distributed load, uniformly varying loads and moments). **Centroids and Centre of gravity**: concept, centroid of line and regular geometrical area, centroid of irregular lamina by method of integration, centroids of composite Areas and built up sections- Numerical Problems. Model Setup for Support Reactions	L1,L2,L3, L4
Module-4	
Moment of inertia of regular shapes by integration method, polar moment of inertia, radius of gyration, Parallel and Perpendicular axis theorem, moment of inertia of composite areas and built up sections – Numerical Problems. **Friction:** Introduction , coefficient of friction, limiting friction, angle of friction, angle of repose, cone of friction; laws of Dry (Coulomb) friction, Numerical Problems on single and multi-body system on horizontal and incline planes and ladder friction. Model Setup for Rolling Friction	**L3,L4,L5**

Module-5		
Kinematics: Definitions, Displacement, Average velocity, Instantaneous velocity, Speed, Acceleration, Average acceleration, Variable acceleration, Acceleration due to gravity, Rectilinear motion- Numerical Problems. **Dynamics:** D' Alembert's principle and its application in plane motion and connected bodies including pulleys-Numerical Problems. Model Setup for Linear Motion		**L3,L4,L5**

Course outcomes:

On completion of the course, students would be able to

1. Explain the basic concepts of Engineering Mechanics
2. Compute the action of Forces, Moments and other loads on rigid bodies
3. Calculate the support reactions of statically determinate beams and centroid of regular geometrical area
4. Compute the moment of inertia of composite areas and apply the concepts of friction
5. Comprehend the basics of dynamic analysis with D' Alembert's Principle

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 16 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Internal Marks:

Average of Three CIE is considered for 30 Marks, Innovative Learning for 10 Marks in any one of the form of Graphical computation, Model Making and Experimental Study, Remaining 10 Marks for Open Assignment.

Text Books:

1. Russell C. Hibbeler, "Engineering Mechanics: Statics & Dynamics", Pearson Education India (2013).
2. Bansal R. K, "Engineering Mechanics", Laxmi Publications Pvt Ltd (2011).

Reference Books:

1. A Nelson, "Engineering Mechanics: Statics and Dynamics", McGraw Hill Education (India) Pvt. Ltd, New Delhi (2017).
2. S S Bhavikatti, "Elements of civil engineering and mechanics", New age international publishers (2009).
3. B. K. Kolhapure, "Elements of civil engineering and engineering mechanics", Eastern book promoters Belgaum, Belagavi (2010).
4. Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004).
5. Egor P Popov, "Engineering Mechanics of Solids", 2nd Edition, Pearson Publishing

Web Link and Video Lectures:

1. https://nptel.ac.in/courses/122104015/

ELEMENTS OF MECHANICAL ENGINEERING

B.E., I/II Semester

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Course Code:	**19EME15 / 25**	CIE	**50**
Teaching Hours / Week (L:T:P):	**3:2:0**	SEE	**50**
Total Number of Lecture Hours	**50**	Credits	**04**

COURSE OBJECTIVES: This course will enable students to:

- Learn the fundamental concepts of energy, its sources and conversion.
- Comprehend the basic concepts of thermodynamics.
- Understand the concepts of boilers, turbines, pumps, internal combustion engines and refrigeration.
- Understand the engineering applications of advanced materials and different metal joining techniques.
- Enumerate the knowledge of working with conventional machine tools, their specifications.

Modules	**RBT Level**
MODULE 1 **9 Hours**	
Sources of Energy : Introduction and application of energy sources like fossil fuels, hydel, solar, wind, nuclear fuels and bio-fuels; environmental issues like global warming and ozone depletion. **Basic concepts of Thermodynamics:** Introduction, states, concept of work, heat, temperature; Zeroth, 1st, 2nd and 3rd laws of thermodynamics. Concept of internal energy, enthalpy and entropy (simple numerical). **Steam:** Formation of steam and thermodynamic properties of steam (simple numerical).	L1, L2, L3
MODULE 2 **9 Hours**	
Boilers: Introduction to boilers, classification, Lancashire boiler, Babcock and Wilcox boiler. Introduction to boiler mountings and accessories (no sketches). **Turbines:** Hydraulic Turbines – Classification and specification, Principles and operation of Pelton wheel turbine, Francis turbine and Kaplan turbine (elementary treatment only). **Hydraulic Pumps:** Introduction, classification and specification of pumps, reciprocating pump and centrifugal pump, concept of cavitation and priming.	L1, L2, L3
MODULE 3 **10 Hours**	
Internal Combustion Engines Classification, I.C. Engines parts, 2 and 4 stroke petrol and 4-stroke diesel engines. P-V diagrams of Otto and Diesel cycles. Simple problems on indicated power, brake power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency and specific fuel consumption. **Refrigeration and Air conditioning** Refrigeration - Definitions - Refrigerating effect, Ton of Refrigeration, Ice making capacity, COP, relative COP, Unit of Refrigeration. Refrigerants, Properties of refrigerants, List of commonly used refrigerants. Principle and working of vapor compression refrigeration and vapour absorption refrigeration. Domestic refrigerator. Principles and applications of air conditioners, window and split air conditioners.	L1, L2, L4

MODULE 4 **11 Hours**	
Properties, Composition and Industrial Applications of engineering materials Conventional Materials: Classification of Materials, Composites - Fibre reinforced composites, Metal Matrix Composites Smart materials – Piezoelectric materials, shape memory alloys, semiconductors and insulators, Nano materials, Bio-Materials. **Joining Processes:** Soldering, Brazing and Welding Definitions. Classification and methods of soldering, brazing and welding. Brief description of arc welding, oxy-acetylene welding, TIG welding, and MIG welding.	L1, L2, L4
MODULE 5 **11 Hours**	
Lathe - Principle of working of a centre lathe. Parts of a lathe. Operations on lathe - Turning, Facing, Knurling, Thread Cutting, Drilling, Taper turning by Tailstock offset method and Compound slide swivelling method, Specification of Lathe. **Special Machining Processes –** Introduction to special machining processes such as, milling, shaping, broaching and grinding. (Layout sketches of the above machines need not be dealt. Sketches need to be used only for explaining the operations performed on the machines) **Introduction to Advanced Manufacturing Systems** **Computer Numerical Control (CNC):** Introduction, components of CNC, open loop and closed loop systems, advantages of CNC, CNC Machining centers and Turning centers. **Robots:** Robot anatomy, joints and links, common robot configurations. Applications of Robots in material handling, processing and assembly and inspection.	L1, L2, L3

Course outcomes: On completion of this course:

- Students will be able to identify different sources of energy and their conversion process.
- Students will be able to explain the working principle of hydraulic turbines, pumps, IC engines and refrigeration.
- Student will be able to recognize various metal joining processes.
- Students will be able to understand the properties of common engineering materials and their applications in engineering industry.
- Students will be able to discuss the working of conventional machine tools, machining processes, advanced manufacturing systems and accessories.

Question Paper Pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks.
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. **Elements of Mechanical Engineering**, K. R. Gopalakrishna, Subhas Publications, Bangalore, 2008.
2. **Elements of Mechanical Engineering**, Vol.-1 & 2, Hajra Choudhury, Media Promoters, New Delhi, 2001.
3. **A Text Book of Elements of Mechanical Engineering**", S. Trymbaka Murthy, 3rd revised edition 2006, I .K. International Publishing House Pvt. Ltd., New Delhi.

Reference Books:

1. **Elements of Mechanical Engineering**, R.K. Rajput, Firewall Media, 2005.
2. **Elements of Mechanical Engineering**, Dr. A. S. Ravindra, Best Publications, 7th edition, 2009.
3. **Introduction to Robotics: Mechanics And Control**, Craig, J. J., 2nd Ed.Addison-Wesley Publishing Company, Readong, MA, 1989.
4. **Introduction to Engineering Materials**", B.K. Agrawal ,Tata McGraHill Publication, New Delhi.
5. **Thermal Science and Engineering**", Dr. D.S. Kumar, S.K. Kataria & sons Publication, New Delhi

. **Assignment:**

Assignments should be submitted by students on materials, sources of energy, global warming, welding processes, Drive Systems, Robots and Automation systems. This assignments should be given due credit in awarding continuous internal evaluation of 10 Marks.

Note:

• To illustrate the concepts of operations of turbines, pumps, conventional machines like lathe, drilling, milling, grinding etc., the instructions should be blended with video presentations and visit to the laboratories/ machine shop concerned.

• Demonstration of soldering, brazing and welding should be arranged in the workshop.

• To illustrate the fundamentals of CNC machining and turning centers and robots, video presentations should be adapted in addition to class room instructions.• The boiler mountings and accessories should be shown in the engine lab.

Functional model is mandatory for all students based on syllabus (10 marks). Each group should have 4 students.

Web Link and Video Lectures:

1. https://examupdates.in/elements-of-mechanical-engineering/
2. https://www.youtube.com/watch?v=Ew_xRvXorKU
3. https://www.youtube.com/watch?v=6QXtnmB1vqk
4. https://www.youtube.com/watch?v=F_NmS-Wy2lE
5. https://www.youtube.com/watch?v=dHdlH3l8FkM

MECHANICAL ENGINEERING GRAPHICS

B.E., I/II Semester

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Course Code:	**19MEG15 / 25**	CIE:	**50**
Teaching Hours / Week (L:T:P):	**3:0:2**	SEE:	**50**
Total Number of Lecture Hours	**50**	Credits	**04**

COURSE OBJECTIVES: This course will enable students to:

- Engineering drawing is an important tool for all Engineers and for many others professionals. It is the language of Engineers. Engineering Drawing communicates all needed information from the engineer who designed a part to the workers who will manufacture it.
- The aim of the subject is to equip students with the fundamentals of Computer Aided Engineering Drawing and to further the ability to communicate information by graphical means.

Modules	RBT Level
MODULE 1	
Introduction to Engineering Graphics: Orthographic projection- principles-Principal planes-First angle projection-projection of points. **Projection of lines and plane surface** Projection of straight lines (only First angle projections) inclined to both the principal planes – Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surf aces) inclined to both the principal planes by rotating object method. **Note: using mini-Drafter and drawing sheets.**	L1, L2, L3
MODULE 2	
Orthographic Projections: Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in first quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems). Orthographic Projections of Plane Surfaces (First Angle Projection Only).Introduction, Definitions - projections of plane surfaces–triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates). **Note: From module-2 onwards, the practice will be followed using sketch book and computer.**	L1, L2, L3
MODULE 3	
Projections of Solids (First angle Projection only): Introduction, Definitions - Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions (No problems on octahedrons and combination solid).	L1, L2, L4
MODULE 4	
Sections and Development of Lateral Surfaces of Solids: Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. (No problems on sections of solids). Development of lateral surfaces of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).	L1, L2, L5

MODULE 5	
Isometric Projection (Using Isometric Scale Only): Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of three solids).	L1, L2, L4

Course outcomes: On completion of this course:

- Students will be able to demonstrate the usage of CAD software.
- Students will be able to demonstrate competence in the basics of Orthographic Projections of points, lines, planes and Solids for their presentation in the three Principal Views.
- Student will be able to develop lateral surfaces of solids.
- Students will be able to visualize and draw Orthographic projections, Sections of solids and Isometric views of solids.
- Students are evaluated for their ability in applying various concepts to solve practical problems related to engineering drawing.

Question Paper Pattern:

- Module -1 is only for practice and for CIE.
- Question paper for each batch of students will be sent online and has to be downloaded before the commencement of Examination of each batch. The answer sheets will have to be jointly evaluated by the Internal & External examiners.
- A maximum of THREE questions will be set as per the following pattern (No mixing of questions from different Modules).

Continuous Internal Evaluation (CIE):

Evaluation Method	**Course with Assignment**
Manual Drawing Test (3 CIE to be conducted - Best of two CIE should be considered)	**30**
Print out of exercises in regular classes monitored Periodically + Drawing sheets of Module-1	**10**
Mock Test	**10**
Total	**50**

Scheme of Evaluation:

Question No.	**From Module's**	**Marks Allocated**
1	Module 2(Choice between (Points & Lines or Planes)	**30**
2	Module 3 [Solids]	**40**
3	Module 4 [Developments] or Module 5 [Isometric]	**30**
Total		**100**

Question No.	**Solutions & Sketching in the Sketch Book**	**Computer Display & Printout**	**Total Marks**
1	**18**	**12**	**30**
2	**24**	**16**	**40**
3	**18**	**12**	**30**
Total Marks	**60**	**40**	**100**

- Students have to submit the binded drawing sheets at the time of examination.
- Students have to submit the computer printouts and the sketches at the end of the examination. Both Internal Examiner and External Examiner have to jointly evaluate the solutions (sketches) and computer display and printouts of each student for 100 marks (60 marks for solutions & sketches + 40 marks for computer display & printouts).
- Each batch must consist of a maximum of 12 students.
- Examination can be conducted in parallel batches, if necessary.

Text Books:

1. Engineering Drawing - N.D. Bhatt & V.M. Panchal, 48th edition, 2005- Charotar Publishing House, Gujarat.

2. Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Prem Kumar Fifth edition, New Age International Publishers.

Reference Books:

1. Computer Aided Engineering Drawing - S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition- 2006.

2. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore.

3. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production- Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005- Prentice-Hall of India Pvt. Ltd., New Delhi.

4. A Primer on Computer Aided Engineering Drawing-2006, Published by VTU, Belgaum.

Web Link and Video Lectures:

1. https://www.youtube.com/watch?v=n5Ba6OtDpTU
2. https://www.youtube.com/watch?v=fK4h5gM73w8
3. https://www.youtube.com/watch?v=FtugLo9DMw8
4. https://www.youtube.com/watch?v=6l764RCCsrw
5. http://www.me.umn.edu/courses/me2011/handouts/engg%20graphics.pdf
6. http://www.sdcpublications.com/pdfsample/978-1-58503-610-3-1.pdf

ENGINEERING CHEMISTRY LAB

SEMESTER – I/II(ALL BRANCHES)

[As per Choice Based Credit System (CBCS) Scheme]

Laboratory Code	**19CHEL16/26**	CIE	**50**
Number of Lecture Hours/Week	**01** Hr Tutorial (Instructions) **02** Hours Laboratory	SEE	**50**
RBT Level	L1, L2, L3	Credits	**01**

Course objectives: To provide students with practical knowledge of

- Quantitative analysis of materials by classical method of analysis.
- Instrumental methods for developing experimental skills in building technical competence.

1.Estimation of FAS potentiometrically using standard $K_2Cr_2O_7$.

2.Estimation of Copper colorimetrically.

3.Estimation of Acids in acid mixture conductometrically.

4.Determination of pKa value of a weak acid using pH meter.

5.Determination of viscosity coefficient of a liquid using Ostwald's viscometer.

6.Estimation of Total hardness of water by EDTA complexometric method.

7. Estimation of CaO in cement solution by rapid EDTA method.

8.Determination of chemical oxygen demand (COD) of the given industrial waste water sample.

9. Determination of percentage of Copper in brass using standard sodium thiosulphate solution.

10. Estimation of Iron in haematite ore solution using standard K2Cr2O7 solution by External Indicator method.

11.Estimation of alkalinity(OH^-,CO_3^{2-}& HCO_3^-) of water using standard HCl solution

12.Standardization of potassium permanganate solution using FAS volumetrically.

Course Outcomes:

- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.
- Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.
- Quantification of metals present in different ores and alloys.
- Rapid and efficient methods for monitoring water quality employing simple methods.
- Determination of physical properties of liquids and solutions.

Reference Books:

- G.H Jeffery , J. Basset, J.Mendham and R.C .Denney , " Vogel Text Book of Quantitative Chemical Analysis"
- O.P Vermani and Narula , " Theory and Practice in Applied Chemistry" , New Age International Publisher
- Gary D. Christian , "Analytical Chemistry" , 6 th Edition , wiley India

ENGINEERING PHYSICS LABORATORY

SEMESTER – I/II (ALL BRANCHES)

[As per Choice Based Credit System (CBCS) Scheme]

Laboratory Code	**19PHYL16/26**	CIE	**50**
Number of Lecture Hours/Week	01 Hr Tutorial (Instructions) 02 Hours Laboratory	SEE	**50**
RBT Level	**L1, L2, L3**	Credits	**01**

Course objectives:

- To realise experimentally, the mechanical, electrical and thermal properties of materials of materials, concept of waves and oscillations
- Design simple circuits and hence study the characteristic of semiconductor devices.

Laboratory Experiments:

1. Measurement of wavelength of laser using diffraction grating
2. Study of input and output characteristics of transistor
3. Determination of spring constants In series and Parallel Combination
4. Determination of magnetic field intensity at the center of a circular coil carrying current
5. Determination of resonant frequency and quality factor in series and parallel combinations of LCR Circuit
6. Determination of Fermi energy of given copper wire
7. Determination of dielectric constant of given capacitor
8. Study Of V-I Characteristics of Given Photo Diode In Reverse Bias
9. Determination Of Young's Modulus Of A Given Beam By Single Cantilever Experiment
10. Determination Of Radius Of Curvature Of Given Plano Convex Lens by Newton Rings Method
11. Determination The Acceptance Angle And Numerical Aperture Of An Optical Fibre
12. Determination Of Moment Of Inertia And Rigidity Modulus Of The Given Wire

Additional Experiments

1. Determination of Thickness of a thin object by optical method (parallel fringes)
2. V-I Characteristics of a Zener diode
3. Verification of Stefan's law.

Course Outcomes: On the completion of this laboratory course, the students will be able to:

- Apprehend the concepts of interference of light, the diffraction of light, Fermi energy and magnetic effect of current
- Understand the principles of operations of optical fibers and semiconductor devices such as photo diodes and NPN transistor using simple circuits
- Determine the elastic modulus and moment of inertia of given materials with the help of suggested procedures
- Recognize the resonance concepts and its practical applications
- Understand the importance of measurement procedure honest recording and representing the data, reproduction of final results
- Design and test the basic BJT/FET amplifiers, BJT Power amplifier and oscillators.

Conduct of Practical Examination:

All laboratory experiments are to be included for practical examination. Students are allowed to pick two experiments from the lot.

Strictly follow the instructions as printed on the cover page of answer script for breakup of marks.

- Change of experiment is allowed only once and Marks allotted to the procedure part to be made

SCHEME OF EVALUATION

S.NO.	DESCRIPTION	MAX. MARKS 100	PART:A MARKS FOR FIRST EXPERIMENT	PART:B MARKS FOR SECOND EXPERIMENT
1	WRITE UP: FORMULA, TABULAR COLUMN AND CIRCUIT DIAGRAM/RAY DIAGRAM	16	4+2+2=08	4+2+2=08
2	EXPERIMENTAL SET UP/CIRCUIT CONNECTION	10	05	05
3	CONDUCTION AND READING	40	20	20
4	GRAPH, CALCULATIONS, RESULTS AND ACCURACY	20	2+4+2+2=10	2+4+2+2=10
5	VIVA-VOCE	14	07	07
	TOTAL	100	50	50

The student has to perform TWO experiments during the practical examination of THREE hours duration. The scheme of valuation shall be as follows.

BASIC ELECTRICAL ENGINEERING LABORATORY

SEMESTER – I/II(ALL BRANCHES)

[As per Choice Based Credit System (CBCS) Scheme]

Laboratory Code	**19ELE17/27**	CIE	**50**
Number of Lecture Hours/Week	**02**	SEE	**50**
RBT Level	**L1, L2, L3**	Credits	**01**

Course Objectives:

- To provide exposure to common electrical components such as Resistors, capacitors and inductors, types of wires and measuring instruments.
- To measure power and power factor measurement of different types of lamps and three phase circuits.
- To explain measurement of impedance for R-Land R-C circuits. To determine power consumed in a 3 phase load.
- To determine earth resistance and explain methods of controlling a lamp from different places.

Orientation class for an exposure to:

- Resistors, capacitors, inductors, rheostats, types of wires, measuring instruments voltmeter, ammeter, wattmeter, multi- meter, Regulated power supply, transformer.
- Basic safety precautions while dealing with electricity.

LIST OFEXPERIMENTS

1. Verification of KCL and KVL for DC circuits.
2. Measurement of current, power and power factor of incandescent lamp, fluorescent lamp, and LED lamp.
3. Measurement of resistance and inductance of a choke coil using 3-voltmeter method.
4. Determination of phase and line quantities in three phase star and delta connected loads.
5. Measurement of three-phase power using two-wattmeter method.
6. Two way and three-way control of lamp and formation of truth table.
7. Study of effect of open and short circuit in simple circuits.
8. Inverse time characteristics of fuse and MCB.

Demonstration Experiments (for CIE only):

1. Demonstration of cutout sections of electrical machines (DC machines, Induction machines and synchronous machines).
2. Understanding of UPS and measurement of earth resistance.

Course Outcomes:

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

- Identify the common electrical components and measuring instruments used for conducting experiments in the electrical laboratory.
- Compare power factor of lamps.
- Determine impedance of an electrical circuit and power consumed in a 3-phase load.
- Determine earth resistance and understand two way and three-way control of lamps.

Conduct of Practical Examination:

- All laboratory experiments are to be included for practical examination.
- Breakup of marks and the instructions printed on the cover page of answer script to be strictly adhered by the examiners.
- Students can pick one experiment from the questions lot prepared by the examiners.
- Change of experiment is allowed only once and 15% Marks allotted to the procedure part shall be made zero

C PROGRAMMING LABORATORY

B.E., I/II Semester,

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	**19CPS17/27**	CIE	**50**
Number of Lecture Hours/Week	**0 – 0 - 2**	SEE	**50**
Exam hours	**03**	Credits	**01**

Course objectives:

This course(19CPS17/27) will enable students to:

- Write flowcharts, algorithms and programs.
- Familiarize the processes of debugging and execution.
- Implement basics of C programming Language.
- Illustrate solution to the laboratory programs

Descriptions (if any):

- The laboratory should be preceded or followed by a tutorial to explain the approach or the algorithm being implemented for the problems given.
- Note that experiment 1 is mandatory.
- Questions related with each experiment need to be asked during viva-voice for all experiments.
- Every experiment should have algorithm and flowchart be written before writing the program.
- Code should be traced using minimum two test cases which should be recorded.
- It is preferred to implement using Linux/GCC

Laboratory Programs:

1.Familiarization with computer hardware and programming environment, concept of naming the program files,
storing, compilation, execution and debugging. Taking any simple C- code.

PART A

2 Develop a program to solve simple computational problems using arithmetic expressions and use of each operator leading to simulation of a commercial calculator. (No built-in math function)

3 Develop a program to compute the roots of a quadratic equation by accepting the coefficients.Print
appropriate messages.

4 An electricity board charges the following rates for the use of electricity: for the first 200 units 80 paise per unit: for the next 100 units 90 paise per unit: beyond 300 units Rs 1 per unit. All users are charged a minimum of Rs. 100 as meter charge. If the total amount is more than Rs 400, then an additional surcharge of 15% of total amount is charged. Write a program to read the name of the user, number of units consumed and print out the charges.

5 Develop a program to find the reverse of a positive integer and check for palindrome or not. Display appropriate messages.

6 Develop a Program to compute Sin(x) using Taylor series approximation. Compare your result with the built- in Library function. Print both the results with appropriate messages

7 Develop a program to find the square root of a given number N and execute for all possible inputs with appropriate messages. Note: Don’t use library function sqrt(n).

PART B

8 Introduce 1D Array manipulation and implement Binary search.

9 Develop a program to sort the given set of N numbers using Bubble sort.

10 Develop a program to introduce 2D Array manipulation and implement Matrix multiplication and ensure the rules of multiplication are checked.

11 Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.

12 Implement using functions to check whether the given number is prime and display appropriate messages. (No built-in math function).

13 Implement Recursive functions for Binary to Decimal Conversion

14 Implement structures to read, write, compute average- marks and the students scoring above and below the average marks for a class of N students

15 Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of n real numbers

OPEN ENDED EXPERIMENT

Admission to a professional course is based on following conditions:-

(a) Marks in Maths >=60
(b) Marks in Physics >=50
(c) Marks in Chemistry>=40
(d) Total in all three subject >=200
or
Total in Math and Subjects >=150

Given the marks in the three subjects, write a C program to process the application to list the eligible candidates.

COURSE OUTCOMES (CO's):

- Write algorithms, flowcharts and program for simple problems.
- Correct syntax and logical errors to execute a program.
- Write iterative and whenever possible recursive programs.
- Demonstrate use of functions and arrays in problem solving.
- Demonstrate use of strings, structures and pointers in problem solving.

Conduction of Practical Examination:

- All laboratory experiments excluding the first are to be included for practical examination.
- For questions having only one part: Students are allowed to pick one experiment from the lot and are given equal opportunity.
- For questions having part A and B: Students are allowed to pick one experiment from Part A and one experiment from Part B is given equal opportunity.
- Strictly follow the instructions as printed on the cover page of answer script for breakup of marks.
- Marks distribution:
  i) Part A-Procedure +Execution =5+5=10Marks
  ii) Part B-Procedure+ Execution =5+15=20Marks
  iii) Viva - Voce 20Marks

Change of experiment is allowed only once and marks allotted to the procedure part to be made zero

Technical English I

B.E., I Semester, 19EGH18

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	19EGH18	CIE	**50**
Number of Lecture Hours/Week	**02**	SEE	**50**
Total Number of Lecture Hours	**30 hrs**	Credits	**01**

Course Objectives: This course will enable students,

- To impart basic English grammar and essentials of language skills
- To train to identify the nuances of phonetics, intonation and enhance pronunciation skills
- To enhance with English vocabulary and language proficiency.

Language Lab

Augment LSRW and GV skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems.

Modules	**RBT Level**
Module-1	
Introduction to Technical Communication • Importance of English :How important are the key skills(LSRW) and how they are tested by recruiters and used in careers • Fundamentals of Technical Communication Skill • Barriers to Effective • Communication, Different styles in Technical Communication. Interpersonal Communication Skills • How to improve Interpersonal Communication Skills • Developing Interpersonal Skills • Grammar: Basic English Grammar and Parts of Speech - Nouns, Pronouns, Adjectives, Verbs, Adverbs, Preposition,Articles, Conjunctions.	L1, L2, L3
Module-2	
Introduction to listening skills and Phonetics • Introduction to Phonetics • Sounds Mispronounced • Silent and Non silent Letters • Homophones and Homonyms • Aspiration • Pronunciation of The 'words ending age' • Some plural forms. • Articles: Use of Articles - Indefinite and Defmite Articles	L1, L2, L3
Module-3	
Developing listening skills • Speech Sounds: Vowels and Consonants - Exercises on it. • Preposition, kinds of Preposition and Prepositions often Confused. • Word Accent - Rules for Word Accent, Stress Shift • Question Tags, Question Tags for AssertiveSentences(Statements) - Some Exceptions in Question Tags and Exercise • One Vocabulary - Synonyms andAntonyms, Exercises on it.	L1, L2, L3

Module-4	
Speaking skills and Grammar and vocabulary-1 • Syllables, Structures, Strong and Weak forms of words • Words formation-Prefixes and Suffixes (Vocabulary) • Contractions andAbbreviations. • Spelling Rules and Words often Misspell- Exercises on it. Word Pairs (MinimalPairs) - Exercises • The Sequence of Tenses (Rules in use of Tenses) and Exercises on it	L1, L2, L3
Module-5	
Speaking skills and Grammar and vocabulary-2 • Extempore/Public Speaking, Difference between Extempore/Public Speaking and Guidelines for Practice. • Soft skills : Body Language for being a confident speaker • Listening Comprehension - Exercises • Information Transfer: Oral Presentation Examples. • Common Errors in Pronunciation.	L1, L2, L3
Details of Topics to be covered	**Hours**
Oral Communication Few units involve interactive practice sessions in Language Lab	**P**
Listening Comprehension	
Pronunciation, Intonation, Stress and Rhythm	

Course outcomes:

- Use grammatical English and essentials of language skills and identify the nuances of phonetics, intonation and flawless pronunciation
- Implement English vocabulary at command and language proficiency
- Identify common errors in spoken and written communication
- Understand and improve the non verbal communication and kinesics
- Perform well in campus recruitment, engineering and all other general competitive examinations

Question paper pattern: The SEE question paper will be set for 100 marks and the pattern of the paper will be objective type(MCQ)

Suggested Readings:

English for Technical Communication by N.P.Sudharshana and C.Savitha, Cambridge University Press - 2016.

Technical Communication by Gajendra Singh Chauhan and Et al, Cengage learning India Pvt Limited [Latest Revised Edition} - 2018.

Practical English Usage by Michael Swan, Oxford University Press -2016.

High School English Grammar & Composition by Wren and Martin, S Chandh & Company Ltd - 2015.

Effective Technical Communication - Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private Limited- 2018.

Technical English II

B.E., II Semester, 19EGH28

Common to all Branches [As per Choice Based Credit System (CBCS) scheme]

Subject Code	19EGH28	CIE	**50**
Number of Lecture Hours/Week	**02**	SEE	**50**
Total Number of Lecture Hours	**30 hrs**	Credits	**01**

Course Objectives: This course will enable students,

- To implement English vocabulary at command and ensure language proficiency
  To Achieve better Technical writing and Presentation skills
- Identify the common errors in speakmg and writing English
  Acquire Employment and Workplace communication skills

Language Lab

Augment LSRW and GV skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems.

Modules	**RBT Level**
Module-1	
Introduction to Technical Communication • Subject Verb Agreement (Concord Rules with Exercises) • Common errors in Subject-verb agreement, Noun-pronoun agreement, Adjective, Adverb, Verb,Sequence of Tenses, Misplaced modifiers, Articles and Prepositions, Common errors in Conjunctions • Word Order, Errors due to the Confusion of words, Common errors in the use of Idioms and phrases, Gender, Singular & Plural.	L1, L2, L3
Module-2	
• Organizing Principles of Paragraphs in Documents, Writing Introduction and Conclusion • Importance of Proper Punctuation • The Art of Condensation (Precise writing) • Techniques in Essay writing • Common Errors due to Indianism in English Communication, 1.6 Redundancies & Click.	L1, L2, L3
Module-3	
• Effective Technical Reading and Writing Practices • Technical Reports writing and Technical Proposals Writing. • Grammar - Voice (Active and Passive Voices) • Reported Speech,Listening Comprehension, Spotting Error Exercises • Sentence Improvement Exercises, Cloze Test and Theme Detection Exercises.	L1, L2, L3
Module-4	
• Components of a Formal Letter • Formats and Types of Business Letters • Model Letter of Application (Cover Letter) with Resume • Email writing, Blog Writing, Note Writing, Memo writing • Reading Skills and Reading Comprehension.	L1, L2, L3
Module-5	
• Interpersonal Communication Skills,Non-Verbal Communication Skills (BodyLanguage) • Group Discussion and Employment Interviews -Mock • Presentation skills and Formal Presentations by Students • Dialogues in Various Situations (Practical Sessions by Students).	L1, L2, L3
Details of Topics to be covered	**Hours**
Oral Communication Few units involve interactive practice sessions in Language Lab)	**P**
Listening Comprehension	
Job Interviews	

Course outcomes:

On completion of the course, students will be able to,

CO 1: Identify common errors in spoken and written communication

CO 2: Get familiarized with English vocabulary and language proficiency

CO 3: Improve nature and style of sensible writing and acquire employment and workplace communication skills

CO 4: Improve their Technical Communication Skills through Technical Reading and Writing practices

CO 5: Perform well in campus recruitment, engineering and all other general competitive examinations

Question paper pattern: The SEE question paper will be set for 100 marks and the pattern of the paper will be objective type(MCQ)

Technical Communication by Gajendra Singh Chauhan and Et al, Cengage learning India Pvt Limited [Latest Revised Edition} - 2018.

Communication Skills by Sanjay Kumar and Pushp Lata, Oxford University Press - 2018. **Refer it's workbook** for activities and exercises - "Communication Skills - II (A Workbook)" published by Oxford UniversityPress-2018.

Suggested Readings:

High School English Grammar & Composition by Wren and Martin, S Chandh & Company Ltd- 2015.

English Language Communication Skills - Lab Manual cum Workbook, Cengage learning India Pvt Limited [Latest Revised Edition} - 2018.

Technical Communication - Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharron, Oxford University Press 2017.

Effective Technical Communication - Second Edition by M Ashraf Rizvi,McGrawHillEducation(India)PrivateLimited-2018.

Intermediate Grammar, Usage and Composition by M.L.Tichoo, A.L.Subramanian, P.R.Subramanian, Orient Black Swan - 2016.