MVJ College of Engineering, Whitefield, Bangalore

An Autonomous Institution, Affiliated to VTU, Belagavi

Scheme of Teaching and Examination 2020-21

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

Effective from the academic year 2020-21

I SEMESTER B.E. (PHYSICS GROUP)

S No	Course		Course Title	Teaching Department	Teaching hours/week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total marks	
	Type	Code			L	T	P					
1	BSC	MVJ20MAT11	Calculus and Linear Algebra-Mathlab	Mathematics	3	0	2	3	50	50	100	4
2	BSC	MVJ20PHY12	Engineering Physics	Physics	3	0	2	3	50	50	100	4
3	ESC	MVJ20EE13	Basic Electrical Engineering	Electrical & Electronics Engineering	2	2	0	3	50	50	100	3
4	ESC	MVJ20CV14	Elements of Civil Engineering &Mechanics	Civil Engineering	2	2	0	3	50	50	100	3
5	ESC	MVJ20ME15	Engineering Graphics	Mechanical Engineering	2	0	2	3	50	50	100	3
6	BSC	MVJ20PHYL16	Engineering Physics Lab	Physics	0	0	2	3	50	50	100	1
7	ESC	MVJ20EEL17	Basic Electrical Engineering Lab	Electrical & Electronics Engineering	0	0	2	3	50	50	100	1
8	HSMC	MVJ20EGH18	Technical English-I	Humanities	0	2	0	3	50	50	100	1
				Total	12	10	4	24	400	400	800	20

Note: BSC: Basic Science, ESC: Engineering Science, HSMC: Humanity and Social Science

II SEMESTER B.E. (PHYSICS GROUP)

S No	Course		Course Title	Teaching Department	Teaching hours/week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total marks	
	Type	Code			L	T	P					
1	BSC	MVJ20MAT21	Advanced Calculus and Numerical Analysis-Math lab	Mathematics	3	0	2	3	50	50	100	4
2	BSC	MVJ20PHY22	Engineering Physics	Physics	3	0	2	3	50	50	100	4
3	ESC	MVJ20EE23	Basic Electrical Engineering	Electrical & Electronics Engineering	2	2	0	3	50	50	100	3
4	ESC	MVJ20CV24	Elements of Civil Engineering &Mechanics	Civil Engineering	2	2	0	3	50	50	100	3
5	ESC	MVJ20ME25	Engineering Graphics	Mechanical Engineering	2	0	2	3	50	50	100	3
6	BSC	MVJ20PHEL26	Engineering Physics Lab	Physics	0	0	2	3	50	50	100	1
7	ESC	MVJ20EEL27	Basic Electrical Engineering Lab	Electrical & Electronics Engineering	0	0	2	3	50	50	100	1
8	HSMC	MVJ20EGH28	Technical English-II	Humanities	0	2	0	3	50	50	100	1
				Total	12	10	4	24	400	400	800	20
Note: BSC: Basic Science, ESC: Engineering Science, HSMC: Humanity and Social Science												

Course Title	**Calculus and Linear Algebra-Math Lab**	**Semester**	I
Course Code	MVJ20MAT11	**CIE**	50
Total No. of Contact Hours	50 L : T : P :: 3 : 1 : 1	**SEE**	50
No. of Contact Hours/week	5	**Total**	100
Credits	4	**Exam. Duration**	3 Hours

Course objective is to:

This course Calculus and Linear algebra will enable students:

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

Module-1	**L1 & L2**	**10 Hours**

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 –applications to evolutes and involutes.

Laboratory Sessions- Plotting of standard Cartesian curves using Python

Applications: Differential Calculus is applied in all Science and Engineering
Video link ;
https://www.khanacademy.org/
https://www.youtube.com/watchv=s6F5yjY6jWk&list=PLMLsjhQWWlUqBoTCQDtYlloI-o-9hxp11

Module-2	**L1 & L2**	**10 Hours**

Differential Calculus-2: Maclaurin's series expansions for one variable, indeterminate forms - L'Hospital's rule. Partial differentiation; Total derivatives-differentiation of composite functions. Jacobians , Method of Lagrange multipliers with one subsidiary condition ,Maxima and minima for a function of two variables- Applications with illustrative examples.

Laboratory Sessions: Obtaining partial derivative of some standard functions using Python
Applications: Differential Calculus is applied in all Science and Engineering.

Video link:
https://www.khanacademy.org/
https://www.youtube.com/watch?v=s6F5yjY6jWk&list=PLMLsjhQWWlUqBoTCQDtYlloI-o-9hxp11

Module-3	**L1,L2 &L3**	**10 Hours**

Integral Calculus: Double and triple integrals. Evaluation of double integrals- change of order of integration and changing into polar co-ordinates. Applications to find area and volume.

Beta and Gamma functions: Definitions, Relation between beta and gamma functions and problems.

Laboratory Sessions: Evaluation of the double integral using Python

Applications: Several physical applications of the definite integral are common in engineering and physics

like Areas between Curves, Arc length of curve and surface area.

Video link :

https://www.youtube.com/watchv=db7d_a0wiUg&list=PLU6SqdYcYsfLoKyzF_dwxAQf8lIi6VC54

https://www.khanacademy.org/math/ap-calculus-ab/ab-integration-new/ab-6-1/v/introduction-to-integral-calculus

Module-4	**L1,L2 & L3**	**10 Hours**

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.

Nonlinear differential equations: Introduction to general and singular solutions; Solvable for p; Clairaut's and reducible to Clairaut's equations.

Laboratory Sessions: Problems on Ordinary differential equation using Python

Applications: Cooling/Warming Law, series circuit, Survivability with AIDS, Draining a tank, Determining the current or charge in the circuit.

Video link: https://users.math.msu.edu/users/gnagy/teaching/ode.pdf

https://www.mathsisfun.com/calculus/differential-equations.html

Module-5	**L1,L2 & L3**	**10 Hours**

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 eigenvectors-Rayleigh's power method. Diagonalization of a square matrix of order two.

Laboratory Sessions: Solving system of Linear equations using Python

Applications: Used in all science and Engineering Like-Heat Distribution, Coding Theory, Games Networking, Image compression

Video link :https://www.math.ust.hk/~machas/matrix-algebra-for-engineers.pdf

https://www.khanacademy.org/math/linear-algebra

Course outcomes:	
CO1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve
CO2	Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians.
CO3	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.
CO4	Solve first order linear/nonlinear differential equation analytically using standard methods.
CO5	Make use of matrix theory for solving system of linear equations and compute eigenvalues and eigenvectors required for matrix diagonalization process.

Text Books:	
1	B.S. Grewal, "Higher Engineering Mathematics" Khanna Publishers, 43rd Edition, 2013.
2	Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley-India publishers, 10thedition,2014.
3	G. B. Gururajachar: Calculus and Linear Algebra, Academic Excellent Series Publication, 2018-19
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. RajnishVerma: "Higher Engineering Mathematics",S. Chand publishing, 1stedition, 2011.

CIE Assessment:

CIE is based on quizzes, tests, assignments/seminars and any other form of evaluation. Generally, there will be: Three Internal Assessment (IA) tests during the semester (30 marks each), the final IA marks to be awarded will be the average of three tests

- Quizzes (10 marks)
- Assignments (10 Marks)

SEE Assessment:

i. Question paper for the SEE consists two parts i.e. Part A and Part B. Part A is compulsory and consists of objective type or short answer type questions of 1 or 2 marks each for total of 20 marks covering the whole syllabus.

ii. Part B also covers the entire syllabus consisting of five questions having choices and may contain sub-divisions, each carrying 16 marks. Students have to answer five full questions.

iii. One question must be set from each unit. The duration of examination is 3 hours.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	0	3	0	0	0	0	0	0	1	1
CO2	2	3	0	3	0	0	0	0	0	0	1	1
CO3	2	2	0	2	0	0	0	0	0	0	1	0
CO4	3	2	0	3	0	0	0	0	0	0	0	1
CO5	3	3	0	2	0	0	0	0	0	0	0	0

High-3, Medium-2, Low-1

Course Title	**Advanced Calculus and Numerical Methods -Math Lab**	**Semester**	II
Course Code	MVJ20MAT21	**CIE**	50
Total No. of Contact Hours	50 L : T : P :: 3 : 1 : 1	**SEE**	50
No. of Contact Hours/week	5	**Total**	100
Credits	4	**Exam. Duration**	3 Hours

Course objective is:

- 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

Module-1	**L1 & L2**	**10 Hours**

Vector Calculus:-

Vector Differentiation: Scalar and vector fields. Gradient, directional derivative; curl and divergence-physical interpretation; solenoidal and irrotational vector fields- Illustrative problems; Vector identities.

Vector Integration: Line integrals, Theorems of Green, Gauss divergence and Stokes. Applications to work done by a force and flux

Laboratory Sessions-To demonstrate the physical interpretation of gradient, divergence and curl using Python

Applications: Vector Calculus is applied in all Science and Engineering .Used in 2-D and 3-D gaming theory.

Video link ; https://www.slideshare.net/raghuram401/vector-calculus-20955340
https://www.slideshare.net/jacobblackvampire/rajatshukla
https://www.youtube.com/watch?v=sO9Z2RSeH4s

Module-2	**L1 & L2**	**10 Hours**

Differential Equations of higher order:

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 L-C-R circuits.

Laboratory Sessions:Finding complementary function of constant coefficient second and higher order ordinary differential equations using Python

Applications: Differential equation has highest application in all field of science and engineering

Videolink:https://www.slideshare.net/ayeshajavednoori/application-of-higher-order-differential-equations
https://www.math24.net/topics-higher-order-differential-equations/

Module-3	L1,L2 & L3	10 Hours

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. Derivation of one dimensional heat and wave equations and solutions by the method of separation of variables.

Laboratory Sessions:.Solutions to the problems on different types of Partial differential equations using Python

Applications: Tangent Plane and Linear approximation .To find Local Maxima and Minima

Video link : http://tutorial.math.lamar.edu/Classes/DE/IntroPDE.aspx

https://www.khanacademy.org/PDE

http://www.nptelvideos.in/

https://www.classcentral.com/

Module-4	L1,L2 & L3	10 Hours

Infinite Series: Series of positive terms- convergence and divergence. P-series test, comparison test, Cauchy's root test and D'Alembert's ratio test- Illustrative examples.

Power Series solutions-Recurrence relation, Series solution of Bessel's differential equation leading to Jn(x)- Bessel's function of first kind-orthogonality. Series solution of Legendre's differential equation leading to Pn(x)-Legendre polynomials. Rodrigue's formula, problems.

Laboratory Sessions: Illustration of convergent, divergent and oscillatory sequences using Python.

Applications: Series solution helps in understand the derivative in term of series solution using Power series and Frobenius Method.

Video link: http://easymathseasytricks./Infinite Series

https://www.khanacademy.org/Infinite Series

Module-5	L1,L2 & L3	10 Hours

Numerical Methods:

Finite differences. Interpolation and extrapolation using Newton's forward and backward difference formula, Newton's divided difference and Lagrange's formula. Solution of polynomial and transcendental equations – Newton-Raphson and Regula-Falsi methods- Illustrative examples.

Numerical integration: Simpson's (1/3)rd and (3/8)th rules, Weddle's rule – Problems.

Laboratory Sessions: Solving algebraic equation (Regula-Falsi and Newton-Raphson methods) using Python

Applications: Use of Numerical Methods help in reducing the theoretical work

Video link **:**

https://www.khanacademy.org/Finite Differences

http://www.nptelvideos.in/numerical methods

Course outcomes:

CO1	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.
CO2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
CO3	Construct a variety of partial differential equations and solution by exact methods/method of separation of variables.
CO4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
CO5	Apply the knowledge of numerical methods in the modeling of various physical and engineering phenomena.

Text Books:	
1	Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley-India publishers, 10th edition, 2014.
2	G. B. Gururajachar: Advanced calculus and Numerical Methods, Academic Excellent Series Publication, 2018-19.
Reference Books:	
1	Ramana B. V., "Higher Engineering Mathematics", Tata McGraw-Hill, 2006.
2	B.S. Grewal, "Higher Engineering Mathematics" Khanna Publishers, 43rd Edition, 2013..

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SEE Assessment:

iv. Question paper for the SEE consists two parts i.e. Part A and Part B. Part A is compulsory and consists of objective type or short answer type questions of 1 or 2 marks each for total of 20 marks covering the whole syllabus.

v. Part B also covers the entire syllabus consisting of five questions having choices and may contain sub-divisions, each carrying 16 marks. Students have to answer five full questions.

vi. One question must be set from each unit. The duration of examination is 3 hours.

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CO1	3	3	0	2	0	0	0	0	0	0	1	1
CO2	3	3	0	2	0	0	0	0	0	0	1	1
CO3	3	3	0	3	0	0	0	0	0	0	0	1
CO4	2	2	0	3	0	0	0	0	0	0	1	1
CO5	2	2	0	2	0	0	0	0	0	0	0	1

High-3, Medium-2, Low-1

Course Title	**ENGINEERING PHYSICS**	Semester	I/II
Course Code	MVJ20PHY12/22	**CIE**	50
Total No. of Contact Hours	60 L : T : P :: 50 :00 : 10	**SEE**	50
No. of Contact Hours/week	4	**Total**	100
Credits	4	**Exam. Duration**	3 HOURS

Course objective is to: Enable students

- 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.

Module-1	**RBT Level**	**Hrs.**
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. 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:** forced oscillations, LC oscillations. **Laboratory Sessions/ Experimental learning:** 1. Verification of Hooke's law 2. Calculating the time period of oscillations of springs in Series and parallel **Applications:** Introduction to aerospace engineering(AE) ,Aerodynamics-I(AS), Engineering Geology(CV), Earthquake engineering (CV),Dynamics of Machines(ME), Advanced Vibrations(ME) **Video link / Additional online information:** https://www.youtube.com/watch?time_continue=29&v=olTD-mpsU4E&feature=emb_logo https://www.youtube.com/watch?time_continue=420&v=T3XguAI-	L1, L2, L3	10

I5c&feature=emb_logo https://www.youtube.com/watch?v=bO2Z308uFpo		
Module-2	**RBT Level**	**Hrs.**
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 **Experimental learning:** Model making of types of beams. **Applications:** Mechanics of Materials(AE)Aerospace Materials(AE),Material Science(CH), Strength of Materials(CV), MECHANICS OF MATERIALS(ME), MARERIAL SCIENCE(ME), THEORY OF ELASTICITY (Elective)(ME), **Video link / Additional online information:** https://youtu.be/ITuWnrl3aKI https://youtu.be/JGK8i0X55Mc https://www.youtube.com/watch?v=R6yC-rkrYz4	L1, L2, L3	10

Module-3	RBT Level	Hrs.
Quantum Mechanics **Wave Mechanics:** Phase velocity, group velocity, Relation between, relation between phase velocity and group velocity, De-Broglie hypothesis, matter waves, characteristics of matter waves. **Quantum Mechanics:** Black body radiation, Wien's law, Wien's displacement law, Rayleigh jeans law, Planck's law of Radiation, Compton effect. 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. **Applications:** Introduction to astrophysics and Space Environment(AS) Electron Devices/ digital electronics(ECE) **Video link / Additional online information:** https://nptel.ac.in/courses/115101107/ https://nptel.ac.in/courses/115102023/ https://nptel.ac.in/courses/115104096/ https://oyc.yale.edu/physics/phys-201/lecture-19 https://ocw.mit.edu/courses/physics/8-05-quantum-physics-ii-fall-2013/video-lectures/lecture-1-wave-mechanics/	L1, L2, L3	10
Module-4	**RBT Level**	**Hrs.**
Lasers and optical fibers 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 CO2 laser Semiconductor Lasers. Application of Lasers in Defence (Laser range finder), And Engineering (Data storage),Numerical problems Optical fibers: Propagation mechanism, angle of acceptance. Numerical	L1, L2, L3	10

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. **Experimental learning:** 1. Demonstration of directionality of Laser light. 2. Model of point to point communication. **Applications:** , Space vehicle Design(AS) – Laser cutting Highway Engineering(CV)—laser drilling, cutting of metals, Optical fibre communication -(ECE) **Video link / Additional online information:** https://www.youtube.com/watch?v=PK4yFaGHSFc&list=PLU0oJASIjGxdZMtypwhvGrnmuzNnNdcKt https://www.youtube.com/watch?v=saVE7pMhaxk https://www.youtube.com/watch?v=urbZ8CTceu0 https://www.youtube.com/watch?v=_qixt0NLc9I		
Module-5	**RBT Level**	**Hrs.**
Crystals and Nano Science Crystals: Review of Bravais lattices, directions and planes in crystals, Miller indices, expression for inter planar spacing, coordination number, atomic packing factor(Sc, FCC, BCC) Nano-Science: Introduction to Nanoscience, mesoscopic state, Density of states in 1D, 2D, 3D structures, Top-down and Bottom –up approach. Ball milling and sol-gel methods. CNT-Properties, synthesis, Arc discharge and Pyrolysis methods, Applications of CNT. SEM: Principle, construction, working and applications **Self learning topics:** TEM,STEM(Scanning tunnelling electron microscope) **Experimental learning:** 1. Model making of different crystal structures. 2. Demo of sol-gel method of synthesis of nano particles (Zn O) **Applications:** Composite of Materials(AE), MATERIAL SCIENCE(CH),	L1, L2, L3	10

Solid Waste Management (CV), MARERIAL SCIENCE(ME). **Video link / Additional online information:** https://www.youtube.com/watch?v=J8Bo9BHxesE https://www.youtube.com/watch?v=1vsNxkdlcXw https://www.youtube.com/watch?v=k61wjab7iUs https://www.youtube.com/watch?v=ebO38bbq0_4&list=PLbMVogVj5nJTdeiLvuGSB_AE8hloTAHWJ https://www.youtube.com/watch?v=mC0rYNlMz9Q		

Course outcomes:	
CO1	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.
CO2	Recognize the elastic properties of materials for engineering applications.
CO3	Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation.
CO4	Apprehend theoretical background of laser, construction and working of different types of laser and its applications in optic fibers.
CO5	Understand various concepts of crystal structure and the basics of Nano science.

Reference Books:	
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	Nano: The Essentials: Understanding Nanoscience and Nanotechnology- T. Pradeep, Tata McGraw Hill- 2008 Ed

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	3
CO2	3	2	-	-	-	1	-	-	-	-	-	3
CO3	3	1	-	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	-	-	-	-	-	3
CO5	3	-	-	-	-	1	-	-	-	-	-	3

High-3, Medium-2, Low-1

Course Title	Basic Electrical Engineering	Semester	I/II
Course Code	MVJ20EE13/ MVJ20EE23	CIE	50
Total No. of Contact Hours	40	SEE	50
No. of Contact Hours/week	4, 2:1:1 (L:T:P)	Total	100
Credits	3	Exam. Duration	3 Hours

Course objective is to:

- Introduction to electric power system and renewable energy sources.
- Application of Ohm's law and Kirchhoff's laws to DC circuits.
- Analysis of single phase AC series circuits and three phase balanced circuits.
- Construction, working and performance of electrical machines and transformer.
- Concepts of electrical wiring, circuit protecting device and earthing.
- Introduction to moving coil and moving iron type measuring instruments

Module-1	L1,L2	08Hrs.

Introduction to Electrical Power system: Introduction to generation, transmission and distribution of electrical power. AC and DC power. Concept of grid and need for interconnection of grids, conditions for grid connection, types of loads.

Non-conventional energy resources: Definition of Renewable and non-renewable energy systems, Integration of renewable energy sources to grid - conditions and benefits. Elementary discussion on solar P-V, roof top solar panels for domestic power generation.(explanation with block diagram)

Laboratory Sessions/ Experimental learning: Assembling of a solar lamp.

Applications: Understanding different source for generation of electric sources.

Web Link and Video Lectures:

1. https://www.khanacademy.org/
2. http://www.nptelvideos.in/
3. https://www.classcentral.com/

Module-2	L1,L2,L3	08Hrs.

D.C. Circuits: Ohm's law, Kirchhoff's laws, current and voltage division rule, analysis of series, parallel and series-parallel circuits excited by independent voltage sources, power and energy.

Single phase AC circuits: Generation of sinusoidal voltage, definition of average value, r.m.s. value, form factor and peak factor of sinusoidal varying voltage and current, phasor representation of alternating quantities, analysis with phasor diagram of R-L, R-C and R-L-C series circuits, real power, reactive power, apparent power and power factor.

Laboratory Sessions/ Experimental learning: Simulation of circuits using software.

Applications: Analysis of electrical circuits.

Web Link and Video Lectures:

1. https://www.khanacademy.org/
2. http://www.nptelvideos.in/
3. https://www.classcentral.com/

Module-3	**L1,L2,L3**	**08Hrs.**

D.C. machines: Faraday's laws, Lenz's law, Fleming's rules, statically and dynamically induced emfs, working principle of a D.C. machine as a generator and a motor, constructional details in brief

D.C. motor: Back emf, torque equation, type of DC motors and applications, necessity of starter for a DC motor

Transformers: Self-inductance, mutual inductance and coupling coefficient, Principle of operation and construction of single phase transformers (core and shell types), EMF equation, losses and efficiency.

Laboratory Sessions/ Experimental learning: Demonstration of machines.

Application: Understanding the fundamental operation of different electrical machines.

Web Link and Video Lectures:

1. https://www.khanacademy.org/
2. http://www.nptelvideos.in/
3. https://www.classcentral.com/

Module-4	**L1,L2,L3**	**08Hrs.**

Three phase AC circuits: Necessity and advantages of three phase systems, phase sequence, relationship between line and phase quantities in balanced star and delta connections, power in three phase circuits.

Three phase induction motors: Constructional details, production of rotating magnetic field, principle of operation, slip, types and applications, necessity and types of starter.

Laboratory Sessions/ Experimental learning:

1. Measurement of power for 3-phase circuits using software.
2. Rating and energy calculations of common house hold electrical appliances (Computation of energy bill as per BESCOM Tariff structure

Application: Understanding the fundamental operation of mostly used industrial machine.

Web Link and Video Lectures:

1. https://www.khanacademy.org/
2. http://www.nptelvideos.in/
3. https://www.classcentral.com/

Module-5	**L1,L2,L3**	**08Hrs.**

Measuring Instruments: Construction and working of moving iron type and moving coil type instruments, advantages and disadvantages, Construction and working of wattmeter, energy meter and megger.

Domestic wiring: Service mains, meter board and distribution board, necessity of earthing, energy efficient lamps.

Laboratory Sessions/ Experimental learning:

1. Demonstration of measuring instruments.
2. Layout of house wiring with following requirements:

   No. of Rooms-02. Each room has 1 distribution board, 2 fans or 1 AC, 3 lamp loads and 2 power sockets.

Application: Understanding the fundamentals electrical wiring.

Web Link and Video Lectures:

1. https://www.khanacademy.org/
2. http://www.nptelvideos.in/
3. https://www.classcentral.com/

Course outcomes:

C103.1	Understand the concepts of generation, transmission and distribution of electric power and different types of energy sources
C103.2	Analyse DC and single phase AC circuits.
C103.3	Understand the construction and principle of operation of electrical machines and single phase transformers.
C103.4	Understand three phase AC circuits and principle of operation of induction motor.
C103.5	Understand the working of measuring instruments and house wiring.

Text Books:

1	D C Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, Revised first Edition.
2	E. Hughes, "Electrical And Electronic Technology", Pearson, International Students Tenth Edition.

Reference Books:

1	Ashfaq Husain, "Fundamentals of Electrical Engineering", Dhanpat Rai & Co. Third Edition
2	M V Rao, "Basic Electrical Engineering".

CIE Assessment:

CIE is based on quizzes, tests, assignments/seminars and any other form of evaluation. Generally, there will be: Three Internal Assessment (IA) tests during the semester (30 marks each), the final IA marks to be awarded will be the average of three tests

- Quizzes/mini tests (4 marks)
- Mini Project / Case Studies (8 Marks)
- Activities/Experimentations related to courses (8 Marks)

SEE Assessment:

vii. Question paper for the SEE consists two parts i.e. Part A and Part B. Part A is compulsory and consists of objective type or short answer type questions of 1 or 2 marks each for total of 20 marks covering the whole syllabus.

viii. Part B also covers the entire syllabus consisting of five questions having choices and may contain sub-divisions, each carrying 16 marks. Students have to answer five full questions.

ix. One question must be set from each unit. The duration of examination is 3 hours.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C103.1	3	1	1	-	-	1	3	-	2	-	-	1
C103.2	3	3	2	-	-	-	-	-	2	-	-	2
C103.3	3	2	1	-	-	-	-	-	-	-	-	1
C103.4	2	1	-	-	-	-	-	-	-	-	-	2
C103.5	2	1	-	-	-	-	-	-	2	-	-	1

High-3, Medium-2, Low-1

Course Title	**ELEMENTS OF CIVIL ENGINEERING & MECHANICS**	Semester	I/II
Course Code	MVJ20CV14/24	**CIE**	50
Total No. of Contact Hours	40 L : T : P :: 2 : 2 : 0	**SEE**	50
No. of Contact Hours/week	4	**Total**	100
Credits	3	**Exam. Duration**	3 Hrs

Course objective is to:

- Learn Scope of various fields of Civil Engineering, basics of EngineeringMechanics Concepts.
- Verify the Equilibrium condition of Coplanar Concurrent ForceSystem
- Solve the problems associated with Forces / Loads and Moments with differentsupport conditions
- Analyze the force and motion of bodies underkinematics
- Calculate the First and Second area moment for regular geometrical crosssections

Prerequisites: *Knowledge of Mathematics (Integration, Vector Algebra), Knowledge of Physics-Units and Measurements, Motion in a Straight Line, Centroid, forces.*

Module-1	**L1,L2, L3**	**8 Hrs.**

Introduction: Application of Mechanics in various disciplines of Engineering. (Online Mode)

Scope of different fields of Civil Engineering: Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural *Engineering*, Hydraulics Engineering, Transportation Engineering. (onlineMode)

Engineering Mechanics: Introduction - Idealization of bodies - particle, Continuum, rigid body, point force, Newton's laws of motion, Concept of force & its Characteristics, internal and external force, force system & types of force systems, Parallelogram law: concept and Numerical Problems, Principle of Transmissibility of forces, Principle of Superposition and Physical independence of forces. 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, Numerical Problems.

Laboratory Sessions/ Experimental learning: (Self-Learning)

- Determination of Resultant of concurrent and non-concurrent forces by graphicalmethod

Applications: (Self-Learning)

- Resultant force for Ship Movement
- Resultant moment of a Couple

Module-2	**L1,L2, L3**	**8 Hrs.**

Resultant of coplanar forces: Varignon's theorem (Principle of moments) (Online Mode): 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 (Online Mode) and Numerical Problems. Graphical Method to find Resultant of concurrent and non-concurrent forces Graphical Method to justify the Equilibrium of coplanar concurrent and non-concurrent force systems.

Laboratory Sessions/ Experimental learning: (Self-Learning)

- Model Making of Principle of Moment under given loading condition

Applications:(Self-Learning)

- Equilibrium condition of Rigidbody
- Cantilever Beam SupportReaction

Video link / Additional online information: (Self-Learning)

- Varignon’s theorem:https://nptel.ac.in/courses/115104094/
- Equilibrium: https://nptel.ac.in/courses/122104015/

Module-3	**L1,L2, L3**	**8 Hrs.**

Support Reactions:Types of Loads and Supports, Introduction to statically determinate and indeterminate beams (Online Mode), Numerical Problems on support reactions for statically determinate beams (point load, uniformly distributed load, uniformly varying loads and moments).

Friction: Introduction, coefficient of friction, limiting friction, angle of friction, angle of repose, cone offriction; laws of Dry (Coulomb) friction (Online Mode), Numerical Problems on single and multi- body system on horizontal and incline planes and ladder friction.

Laboratory Sessions/ Experimental learning: (Self-Learning)

- Determine the coefficient of friction between different surfaces on an inclinedplane

Applications:(Self-Learning)

- Motion of Piston inCylinder
- Screw Jack for uplifting ofobjects

Video link / Additional online information: (Self-Learning)

- Law of Friction:https://nptel.ac.in/courses/113108083/

Module-4	L1,L2, L3	8 Hrs.

Kinematics: Definitions, Displacement, Average velocity, Instantaneous velocity, Speed, Acceleration, Average acceleration, Variable acceleration, Acceleration due to gravity, rectilinear motion, Projectile Motion (Online Mode) - NumericalProblems.

Dynamics:D' Alembert's principle and its application in plane motion and connected bodies including pulleys (Online Mode) -Numerical Problems.

Laboratory Sessions/ Experimental learning: (Self-Learning)

- Conducting Linear motion of object under given condition of gravitation andProjectiles

Applications:(Self-Learning)

- Motion ofLift
- Lifting of open storagecontainers

Video link / Additional online information: (Self-Learning)

Dynamics: https://nptel.ac.in/courses/112/106/112106180/

Module-5	L1,L2, L3	8 Hrs.

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 (Online Mode) - Numerical Problems.

Moment of inertia: 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 (Online Mode) – Numerical Problems**.** Practical verification of significance of Centroid of different types of lamina.

Laboratory Sessions/ Experimental learning: (Self-Learning)

- Verification of significance of Centroid of different types of planelamina

Applications:(Self-Learning)

- Axis ofSymmetry
- Bending Resistance of theBeam

Video link / Additional online information: (Self-Learning)

Centroid: http://www.nptelvideos.in/2012/12/engineering-mechanics-drgsaravana- kumar.html

Course outcomes: On completion of the course, students would be able to

CO1	Understand and appreciate the applications of Mechanics in various disciplines of Engineering.
CO2	Compute the resultant and the effect of the Forces on bodies.

CO3	Calculate the support reactions of statically determinate beams.
CO4	Comprehend the basics of dynamic analysis with D' Alembert's Principle
CO5	Find the centroid and moment of inertia of composite areas andbuilt-up sections

Scheme of Evaluation:

Details		**Marks**
Average of three Internal Assessment (IA) Tests of 30 Marks each i.e. Σ (Marks Obtained in each test) / 3	**CIE(50)**	**30**
Quizzes		**2x2 = 4**
Activities / Experimentations related to courses		**8**
Mini Projects / Case Studies		**8**
Semester End Examination	**SEE (50)**	**50**
	Total	**100**

Text books:

1.	Shesha Prakash M N, Ganesh B. Mogaveer, "Elements of Civil Engineering and Engineering Mechanics", PHI Learning Private Limited, Delhi, 3rd Edition (2017).
2.	Bhavikatti S S, "Elements of civil engineering and mechanics", New age international publishers, 3rd Edition (2009).

Reference Books:	
1.	Andy Ruina and Rudra Pratap, “Introduction to Statics and Dynamics”, Oxford University Press (2002).
2.	Kolhapure B K, “Elements of civil engineering and engineering mechanics”, Eastern book promoters Belgaum, Belagavi (2010).
3.	Beer, F.P and Johnston Jr. E.R., “Vector Mechanics for Engineers (In SI Units): Statics and Dynamics”, Tata McGraw-Hill Publishing company, New Delhi, 8th Edition (2004).
4.	Egor P Popov, “Engineering Mechanics of Solids”, Pearson Publishing, 2nd Edition (2006)

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	-	-	-	1	-	-	1	-	1
CO2	3	3	1	2	-	-	1	-	-	1	-	2
CO3	3	3	1	2	-	-	-	-	-	1	-	2
CO4	3	3	1	2	-	-	1	-	-	1	-	2
CO5	3	3	1	2	-	-	1	-	-	1	-	2

High-3, Medium-2, Low-1

Course Title	**ENGINEERING GRAPHICS**	Semester	I / II
Course Code	MVJ20EGR15/25	**CIE**	50
Total No. of Contact Hours	L : T : P :20 :0 : 40	**SEE**	50
No. of Contact Hours/week	05	**Total**	100
Credits	03	**Exam. Duration**	3 Hours

Course objective is to:

- To understand the concept of projection systems; standards and conventions.
- To develop the views of basic geometrical entities - points, lines, planes and solids.
- To enhance speed and accuracy in use of drawing instruments and sketching capabilities.
- To acquire the skill of expressing two and three dimensional objects as pictorial views.
- Exposure to Engineering communication.

Module-1	**RBT Level** L1, L2	11 Hrs

Introduction to Engineering Graphics: Orthographic projection- Principal planes-First angle projection- projection of points.

Projection of lines and Basic constructions of 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. Midpoint problems. Construction of triangle, square, pentagon and hexagon.

Introduction to software commands and basic constructions of the planes in the software.

Laboratory Sessions/ Experimental learning:

- Prepare models of quadrants with thin sheets of appropriate material to better understand quadrant system, first angle and third angle projections

Applications: Engineering drawing of components in third angle projections

Video link / Additional online information:

https://www.youtube.com/watch?v=TEzGnqhKpFI

https://www.youtube.com/watch?v=kbllxkkmAW0&t=8s

https://www.youtube.com/watch?v=fK4h5gM73w8&list=PLIhUrsYr8yHxEk_Jv8yOatn3Dcr6KYK3j

Module-2	**RBT Level** L1, L2, L3	13 Hrs

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.

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.

Laboratory Sessions/ Experimental learning:

- Preparation of models on different planes like triangle, square, rectangle, pentagon, hexagon, and circular of given size using thin cardboard

Applications: Numerical related to tool post application problems can be given to students.

Video link / Additional online information:

https://www.youtube.com/watch?v=6l764RCCsrw

https://www.youtube.com/watch?v=o1YPja2wCYQ
https://www.youtube.com/watch?v=AoNIOxnxDO0&list=PLIhUrsYr8yHx7TVB51jN3HZVyW3R6RiBg
https://www.youtube.com/watch?v=op-fPNGqOQM&t=27s

Module-3	**RBT Level** L1, L2, L3	14 Hrs

Projections of Solids (First angle Projection only)*:* Introduction, Definitions - Projections of right regular tetrahedron, hexahedron (cube), prisms & pyramids (triangular, square, pentagonal, & hexagonal), cylinders, coneand problems on freely suspended solids.

Laboratory Sessions/ Experimental learning:

- Preparation of models on different solids like prisms and pyramids of triangular, square, rectangular, pentagon, and hexagon along with tetrahedron, hexahedron, circular cone of given size using thin cardboard

Applications: Section of solids can be explained based on the basic concepts of solids.

Video link / Additional online information:

https://www.youtube.com/watch?v=YV4RZNQ2yB8&list=PLIhUrsYr8yHxARPzEFz1nXgt8j6xF_tEm
https://www.youtube.com/watch?v=6grlJ0XS3iA
https://www.youtube.com/watch?v=QHogS8XvfQk

Module-4	**RBT Level** L1, L2, L3	10 Hrs

Development of Lateral Surfaces of Solids: Introduction, development of right regular prisms, pyramids, cylinders and cones resting with base on HP.

Development of lateral surfaces of above solids, their frustums and truncations.

Laboratory Sessions/ Experimental learning:

- Using sheet metal students are advised to prepare models like tray, funnel, cone, cylinder & other real time models given using knowledge of development of lateral surfaces.

Applications: Construction of chimneys, bends, cones/funnels and other hollow channels can be analyzed.

Video link / Additional online information:

https://www.youtube.com/watch?v=hljpRonTkIs&list=PLIhUrsYr8yHwdB96ft6c0Uwc4SDCLuG1v

Module-5	**RBT Level** L1, L2, L3	12 Hrs

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 two solids.

Laboratory Sessions/ Experimental learning:

- Taking measurement and drawing of simple mechanical blocks like Plummer block (bearing housing), tool post of lathe, vice of shaping machine etc and drawing 2D and isometric drawings

Applications:

- Conversion of simple isometric models into orthographic views both in sketch book and solid edge
- Analysis and observation of different views when three or more solids are placed one above the other can be analyzed.

Video link / Additional online information:

https://www.youtube.com/watch?v=77ufJXvXUk4&list=PLIhUrsYr8yHxVky7bfrnbRcdXcHjT_K83

Note: Related to Planes and Solid students will be advised to make model using wood ie. Basics of carpentry can be explained.

Course outcomes:

CO1	Draw orthographic projections of basic geometrical entities in various positions and translate the geometric information of engineering objects into engineering drawings.
CO2	Create sketches and Isometric projections of solids
CO3	Develop lateral surfaces of solids and appreciate their applications in the industry.
CO4	Use modern engineering tool (CAD software) necessary for engineering practice.

Reference Books:

1. **K.R. Gopalakrishna, "*Engineering Graphics*"**, 32nd edition, 2005- Subash Publishers,

	Bangalore.
2.	**S. Trymbaka Murthy**, "***Computer Aided Engineering Drawing***", I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
3.	A Primer on ***Computer Aided Engineering Drawing***-2006, Published by VTU, Belagavi
4.	**Luzadder Warren J., Duff John M.,** "***Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production***", Eastern Economy Edition, 2005- Prentice-Hall of India Pvt. Ltd., New Delhi.
5.	**N.D. Bhatt & V.M. Panchal,"*Engineering Drawing"***, 48th edition, 2005- Charotar Publishing House,Gujarat.
6.	**M H Annaiah, C N Chandrappa and B Sudheer PremKumar**, "***Computer Aided Engineering Drawing***" Fifth edition, New Age International Publishers.

CO-PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	1	2	2	-	-	1	1	1	2
CO2	3	2	3	2	2	2	-	1	1	1	-	1
CO3	1	2	3	3	2	2	-	1	1	1	-	1
CO4	1	2	3	3	3	2	-	1	1	-	1	2

High-3, Medium-2, Low-1

Note: Use of conventional method of drawing using drafter has not been included for the above mentioned syllabus.

Continuous Internal Evaluation (CIE):

Evaluation Method	**Course with Assignment**
Manual Drawing Test (3 CIE to be conducted – Bestof two CIE should be considered)	**30**
Preparation of at least two models in workshop as hands-on sessions	**10**
Mock Test – to be conducted for 100 marks and scaled down to 10	**10**

Total	**50**

Scheme of Evaluation:

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

Course Title	**Engineering Physics Lab**	Semester	I/II
Course Code	MVJ20PHYL16/26	**CIE**	50
Total No. of Contact Hours	01Hr Tutorial (Instructions) + 02 Hours Laboratory	**SEE**	50
No. of Contact Hours/week	2	**Total**	100
Credits	1	**Exam. Duration**	3 HOURS

Course objective is to:

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

Laboratory Experiments
1. Measurement of wavelength of laser using diffraction grating
2. Determination of Planck's constant.
3. Determination of spring constants In series and Parallel Combination
4. Verification of Stefan's law.
5. Determination of resonant frequency and quality factor in series and parallel combinations of LCR Circuit
6. Determination Of Young's Modulus Of A Given Beam By Uniform Bending
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.

Course outcomes:

CO1	Apprehend the concepts of interference of light, the diffraction of light.
CO2	Understand the principles of operations of optical fibers and semiconductor devices such as photo diodes
CO3	Determine the elastic modulus and moment of inertia of given materials with the help of suggested procedures
CO4	Recognize the resonance concepts and its practical applications
CO5	Understand the importance of measurement procedure honest recording and representing the data, reproduction of final results

CO-PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	-	-	-	-	-	2	2	-	3
CO2	3	1	-	-	-	-	-	-	2	2	-	3
CO3	3	1	-	-	-	-	-	-	2	2	-	3
CO4	3	1	-	-	-	-	-	-	2	2	-	3
CO5	3	1	-	-	-	-	-	-	2	2	-	3

High-3, Medium-2, Low-1

Course Title	**Basic Electrical Engineering Laboratory**	**Semester**	I/II
Course Code	MVJ20EEL17/ MVJ20EEL27	**CIE**	50
Total No. of Contact Hours	20	**SEE**	50
No. of Contact Hours/week	4, L : T : P :: 0 : 2 : 2	**Total**	100
Credits	1	**Exam. Duration**	3 Hours

Course objective is to:

- 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.
- Explain methods of controlling a lamp from different places

Sl No	Experiment Name	RBT Level	Hours
1	Verification of KCL and KVL for DC circuits	L3	2
2	Measurement of current, power and power factor of incandescent lamp, fluorescent lamp, and LED lamp.	L3	2
3	Measurement of resistance and inductance of a choke coil using 3-voltmeter method	L3	2
4	Determination of phase and line quantities in three phase star and delta connected loads.	L3	2
5	Measurement of three-phase power using two-wattmeter method.	L3	2
6	Two way and three-way control of lamp and formation of truth table.	L3	2
7	Study of effect of open and short circuit in simple circuits**.**	L3	2
8	Inverse time characteristics of fuse and MCB.	L3	2
Demonstration experiments			
1	Demonstration of cutout sections of electrical machines (DC machines, Induction machines and synchronous machines).	L2	2
2	Understanding of SMPS	L2	2
3	Phase relationship between V and I in single phase RLC circuits.	L2	2

Course outcomes:

C107.1	Identify the common electrical components and measuring instruments used for conducting Experiments in the electrical laboratory.
C107.2	Compare power factor of different types of lamps.

C107.3	Determine impedance of an electrical circuit and power consumed in a 3-phase load.
C107.4	Understand two way and three-way control of lamps.
C107.5	Demonstrate the working of Protective devices

Scheme of Evaluation

SEE :
Examinations will be conducted for 100 marks and scaled-down to 50. The weight age shall be,
Write-up : 20 marks
Conduction : 40 marks
Analysis of results : 20 marks
Viva : 20

CIE :
Regular Lab work :20
Record writing :5
Lab Tests(Minimum 2 tests shall be conducted for 15 marks and average of two will be taken)
Viva 10 marks

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C107.1	3	2	-	1	-	-	-	-	3	2	-	1
C107.2	3	3	-	1	-	-	-	-	3	2	-	1
C107.3	3	2	-	1	-	-	-	-	3	2	-	1
C107.4	3	1	-	1	-	-	-	-	3	2	-	1
C107.5	3	2	-	1	-	-	-	-	3	2	-	1

High-3, Medium-2, Low-1

Course Title	Communication English - I	**Semester**	01
Course Code	MVJ20EGH18	**CIE**	50
Total No. of Contact Hours	02	**SEE**	50
No. of Contact Hours/week	35hours	**Total**	100
Credits	01	**Exam. Duration**	3 Hours

Course objective is to:

- To enhance their English vocabulary and language proficiency
- To communicate effectively and with self-confidence, in any given situation
- To master the Functional aspects of the language
- To acquire proficiency in basic English grammar and essential language skills
- To identify the nuances of phonetics, intonation and enhance their pronunciation skills

Language Lab:

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

Module-1	**RBT Level L1 L2 L3**	**Hours 7 hrs**

Syllabus Content:

Introduction to Technical Communication

1.1 Fundamentals of Communication Skills

1.2 Barriers to effective communication

1.3 The hallmark of effective communication

1.4 Distortion in Communication

1.5 Different styles in Communication – Formal and Informal

1.6 Types of Communication – oral, written, non-verbal

1.7 Interpersonal Communication Skills

1.8 Developing Interpersonal Skills

1.9 Information Transfer: Oral Presentation

Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

https://youtu.be/-Y-R9hDI7IU

Module-2	**RBT Level L1 L2 L3**	**Hours 7 hrs**

Syllabus Content:

Introduction to Listening Skills and Phonetics

1.1 Introduction to Phonetics

1.2 Phonetic symbols and transcription

1.3 Sounds Mispronounced

1.4 Speech Sounds: Vowels, Consonants and Diphthongs

1.5 Silent Letters

1.6 The magic 'e'

1.7 Homophones and Homonyms

1.8 Aspiration and Pronunciation of 'The'

1.9 Listening Comprehension

1.10 Articles: Use of Articles; common errors in the use of Articles

Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

https://youtu.be/T8LXnYpqMc4https://youtu.be/adjaW0YSInUhttps://youtu.be/-8g_TKJ6oiw

Module-3	**RBT Level L1 L2 L3**	**Hours 7 hrs**

Syllabus Content:

Developing Listening Skills

1.1 Importance of listening in communication

1.2. Techniques for effective listening

1.3 Incongruencies in English pronunciation

1.4 Word Accent - Rules for Word Accent, Stress Shift

1.5 Sentence stress

1.6 Standard pronunciation

1.7 Plural forms

1.8 Question forms and intonation

1.9 Preposition, and those Prepositions often confused

1.10 Prepositional phrases

1.11 Listening Comprehension

Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

https://youtu.be/-8g_TKJ6oiw

Module-4	**RBT Level L1 L2 L3**	**Hours 7 hrs**

Syllabus Content:

Speaking Skills and Vocabulary-1

1.1 Vocabulary used in everyday situations

1.2 Words formation - Prefixes and Suffixes

1.3 Contractions

1.4 Words often confused

1.5 Question Tags

1.6 Synonyms

1.7 Antonyms

1.8 Spelling Rules and Words often Misspelt

1.9 The sequence of Tenses

Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

https://youtu.be/w1v3ddhojSs

Module-5	**RBT Level L1 L2 L3**	**Hours 7 hrs**

Syllabus Content:

Speaking Skills and Vocabulary-2

1.1 Extempore Speaking / Public Speaking – Guidelines

1.2 Overcoming fears and inhibitions

1.3 Voice modulation

1.4 Mother Tongue Influence (MTI)

1.5 Techniques for Neutralization of Mother Tongue Influence

1.6 Listening Comprehension

1.7 Common Errors in Pronunciation

1.8 Speaking in given situations – opening bank account, visiting doctor, attending an interview, gathering information, making plans, making choices, congratulating, professing appreciation etc.

Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

https://youtu.be/Y4TbGPhQ7Ikhttps://youtu.be/JIKU_WT0Bls

Course outcomes:	
CO1	Use English that is grammatically correct and identify the nuances of phonetics, intonation and flawless pronunciation
CO2	Enhance the repertoire of English vocabulary
CO3	Identify common errors in spoken and written communication
CO4	Understand and improve non-verbal communication and kinesics
CO5	Perform with confidence at campus recruitment, engineering and all other competitive examinations

Text Books:	
1	**English Communication Made Easy** by Chitra Laxman – Sathyasri Printers Pvt. Ltd.
Reference Books:	
1	**Technical Communication** by Gajendra Singh Chauhan and Et al, Cengage learning India Pvt Limited [Latest Revised Edition} - 2018.
2	**Communication Skills** by Sanjay Kumar and Pushpa Lata, Oxford University Press - 2018
3	**High School English Grammar & Composition** by Wren and Martin, S Chandh& Company Ltd. 2015
4	**English Language Communication Skills - Lab Manual cum Workbook,** Cengage learning India Pvt. Limited [Latest Revised Edition} - 2018
5	**Technical Communication -** Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharron, Oxford University Press 2017
6	**Effective Technical Communication -** Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private Limited - 2018

CIE Assessment:

CIE is based on quizzes, tests, assignments/seminars and any other form of evaluation. Generally, there will be: Three Internal Assessment (IA) tests during the semester (30 marks each), the final IA marks to be awarded will be the average of three tests

- Assignments (20 marks)

SEE Assessment:

x. Question paper for the SEE consists two parts i.e. Part A and Part B. Part A is compulsory and consists of objective type or short answer type questions of 1 or 2 marks each for total of 20 marks covering the whole syllabus.

xi. Part B also covers the entire syllabus consisting of five questions having choices and may contain sub-divisions, each carrying 16 marks. Students have to answer five full questions.

xii. One question must be set from each unit. The duration of examination is 3 hours.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										1		
CO2										1		
CO3										2		
CO4										1		
CO5										3		

High-3, Medium-2, Low-1

Course Title	Communication English - II	**Semester**	02
Course Code	MVJ20EGH28	**CIE**	50
Total No. of Contact Hours	02	**SEE**	50
No. of Contact Hours/week	35hours	**Total**	100
Credits	01	**Exam. Duration**	3 Hours

Course objective is to:

- To use English vocabulary aptly and flawlessly, and ensure languageproficiency
- To achieve better Technical writing and Presentation skills
- To Identify the common errors in Spoken and Written English
- To acquire Employment and Workplace communication skills

Language Lab:

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

Module-1	**RBT Level**	**Hours**

Syllabus Content:

Introduction to Technical Communication

1.1 Subject Verb Agreement (Concord Rules with Exercises)

1.2 Common errors in Subject-verb agreement, Noun-pronoun agreement

1.3 Common errors in the use of Adjectives, Adverbs and Conjunctions; misplaced modifiers

1.4 Word Order, errors due to the confusion of words

1.5 Anagrams, palindromes, puns

1.6 Idioms and phrases – common errors

1.7. Honing reading skills

Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

Module-2	**RBT Level**	**Hours** **7 hrs**

Syllabus Content:

The Nuances of Writing

1.1 Organizing Principles of Paragraphs in Documents

1.2 Developing hints into organized paragraphs

1.3 Dialogue writing

1.4 Contextual vocabulary

1.5 Importance of proper Punctuation

1.6 One-word substitutes

1.7 Polishing writing skills – similes and metaphors

1.8 The Art of Condensation (Precise writing)

1.9 Word collocations

1.10 Redundancy and jargon in writing

1.11 Techniques in creative writing

1.12 Common Errors due to Indianism in English Communication

Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

Module-3	**RBT Level**	**Hours** **7 hrs**

Syllabus Content:

Honing Writing Skills

1.1 Effective Technical Reading and Writing Practices

1.2 Tips for good and effective writing

1.3 Parallelism in sentence structures

1.4 Describing processes

1.5 Interpretation of non-verbal data – pie-charts, flow charts etc.

1.6 Use of Passive Voices in Report writing

1.7 Report writing

1.8 Sentence Improvement Exercises, Cloze Test and Theme Detection Exercises.

Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

Module-4	**RBT Level**	**Hours** **7 hrs**

Syllabus Content:

Writing Emails and Letters

1.1 Components of a Formal Letter

1.2 Formats and Types of Business Letters

1.3 Email Writing – Dos and Don'ts

Practice in writing various types of Emails Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

Module-5	**RBT Level**	**Hours** **7 hrs**

Syllabus Content:

Non-Verbal Communication

1.1 Significance of non-verbal communication

1.2 Body Language

1.3 Group Discussion

1.4. Describing people

1.5. Describing events and scenes

1.4 Presentation skillsand Formal Presentations by Students

Video Links/Any other special information(Papers): (For additional study on the concepts of contents)

Course outcomes:	
CO1	Identify common errors in Spoken and Written communication
CO2	Reach higher levels of perfection in English vocabulary and language
CO3	Improve nature and style of sensible writing and acquire employment and workplace communication skills
CO4	Improve their Technical Communication Skills through Technical Reading and Writing practices
CO5	Perform well at campus recruitment, engineering and other competitive examinations

Text Books:	
1	**English Communication Made Easy** by Chitra Laxman – Sathyasri Printers Pvt. Ltd.
Reference Books:	
1	**Technical Communication** by Gajendra Singh Chauhan and Et al, Cengage learning India Pvt Limited [Latest Revised Edition} - 2018.
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