I & II Semester
Scheme & Syllabus
(2020 Scheme)

SCHEME AND SYLLABUS

Common to all branches

GLOBAL ACADEMY OF TECHNOLOGY
Autonomous institution affiliated to VTU, Belagavi.
Raja Rajeshwari Nagar, Bengaluru-560098.

GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)

Scheme of Teaching and Examination 2020–21

(Effective from the academic year 2020 – 21)

I SEMESTER B.E. (PHYSICS GROUP)

Sl. No	Course and Course Code		Course title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical / Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	BSC	20MAT11	**Engineering Mathematics - I**	Mathematics	3	2	--	05	50	50	100	4
2	BSC	20PHY12	**Engineering Physics**	Physics	2	2	--	04	50	50	100	3
3	ESC	20CSE13	**C Programming**	CS/IS	2	2	--	04	50	50	100	3
4	ESC	20CIV14	**Engineering Mechanics**	Civil	2	2	--	04	50	50	100	3
5	ESC	20MEGL15	**Computer Aided Engineering Drawing**	Mechanical	2	--	2	04	50	50	100	3
6	ESC	20ELN16	**Basic Electronics Engineering**	EC	2	2	--	04	50	50	100	3
7	BSC	20PHYL17	**Engineering Physics Laboratory**	Physics	--	--	2	02	50	50	100	1
8	ESC	20CSEC18	**C Programming Laboratory**	CS/IS	--	--	2	02	50	50	100	1
9	HSMC	20ENG19	**English for Engineers -I**	Humanities	2	---	----	02	50	50	100	--
				TOTAL	**15**	**10**	**08**	**31**	**450**	**450**	**900**	**21**

Note: BSC- Basic Science Course, ESC- Engineering Science Course, HSM- Humanity, Social Science and Management course

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GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)

Scheme of Teaching and Examination 2020 – 21

(Effective from the academic year 2020 – 21)

I SEMESTER B.E. (CHEMISTRY GROUP)

Sl. No	Course and Course Code		Course title	Teaching Department	Teaching Hours /Week			Examination				Credits
					L	T	P	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	BSC	20MAT11	**Engineering Mathematics - I**	Mathematics	3	2	--	05	50	50	100	4
2	BSC	20CHE12	**Engineering Chemistry**	Chemistry	2	2	--	04	50	50	100	3
3	ESC	20CSE13	**C Programming**	CS/IS	2	2	--	05	50	50	100	3
4	ESC	20ELE14	**Basic Electrical Engineering**	E&E	2	2	--	04	50	50	100	3
5	ESC	20MEE15	**Elements of Mechanical Engineering**	Mechanical	2	2	--	04	50	50	100	3
6	ESC	20ELEL16	**Basic Electrical Engineering Laboratory**	Electrical	--	--	2	02	50	50	100	1
7	BSC	20CHEL17	**Engineering Chemistry Laboratory**	Chemistry	--	--	2	02	50	50	100	1
8	ESC	20CSCL18	**C Programming Laboratory**	CS/IS	--	--	2	02	50	50	100	1
9	HSMC	20ENG19	**English for Engineers -I**	Humanities	2	---	----	02	50	50	100	--
				TOTAL	**14**	**10**	**06**	**30**	**450**	**450**	**900**	**19**

Note: BSC- Basic Science Course, ESC- Engineering Science Course, HSMC- Humanity, Social Science and Management course

GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)

Scheme of Teaching and Examination 2020–21

(Effective from the academic year 2020 – 21)

II SEMESTER B.E. (PHYSICS GROUP)

Sl. No	Course and Course Code		Course title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical / Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	BSC	20MAT21	**Engineering Mathematics - II**	Mathematics	3	2	--	05	50	50	100	4
2	BSC	20PHY22	**Engineering Physics**	Physics	2	2	--	04	50	50	100	3
3	ESC	20CSE23	**Programming in Python**	CS/IS	2	2		03	50	50	100	3
4	ESC	20CIV24	**Engineering Mechanics**	Civil	2	2	--	04	50	50	100	3
5	ESC	20MEGL25	**Computer Aided Engineering Drawing**	Mechanical	2	--	2	04	50	50	100	3
6	ESC	20ELN26	**Basic Electronics Engineering**	EC	2	2	--	04	50	50	100	3
7	BSC	20PHYL27	**Engineering Physics Laboratory**	Physics	--	--	2	02	50	50	100	1
8	ESC	20CSPL28	**Programming in Python Laboratory**	CS/IS	--	--	2	02	50	50	100	1
9	HSMC	20ENG29	**English for Engineers -II**	Humanities	2	---	----	02	50	50	100	--
				TOTAL	**15**	**10**	**06**	**31**	**450**	**450**	**900**	**21**

Note: BSC- Basic Science Course, ESC- Engineering Science Course, HSM- Humanity, Social Science and Management course

GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)

Scheme of Teaching and Examination 2020 – 21

(Effective from the academic year 2020 – 21)

II SEMESTER B.E. (CHEMISTRY GROUP)

Sl. No	Course and Course Code		Course title	Teaching Department	Teaching Hours /Week			Examination				Credits
					L	T	P	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	BSC	20MAT21	**Engineering Mathematics - II**	Mathematics	3	2	--	05	50	50	100	4
2	BSC	20CHE22	**Engineering Chemistry**	Chemistry	2	2	--	04	50	50	100	3
3	ESC	20CSE23	**Programming in Python**	CS/IS	2	2		03	50	50	100	3
4	ESC	20ELE24	**Basic Electrical Engineering**	E&E	2	2	--	04	50	50	100	3
5	ESC	20MEE25	**Elements of Mechanical Engineering**	Mechanical	2	2	--	04	50	50	100	3
6	ESC	20ELEL26	**Basic Electrical Engineering Laboratory**	Electrical	--	--	2	02	50	50	100	1
7	BSC	20CHEL27	**Engineering Chemistry Laboratory**	Chemistry	--	--	2	02	50	50	100	1
8	ESC	20CSPL28	**Programming in Python Laboratory**	CS/IS	--	--	2	02	50	50	100	1
9	HSMC	20ENG29	**English for Engineers -II**	Humanities	2	---	----	02	50	50	100	--
				TOTAL	**14**	**10**	**06**	**30**	**450**	**450**	**900**	**19**

Note: BSC- Basic Science Course, ESC- Engineering Science Course, HSMC- Humanity, Social Science and Management course

SEMESTER – I

SUBJECT: Engineering Mathematics – I

Subject Code	**20MAT11**	**CIE Marks**	**50**
Hours/Week (L: T: P)	**3:2:0**	**SEE Marks**	**50**
No. of Credits	**04**	**Examination Hours**	**03**

Course Objectives: To enable students to apply the knowledge of Mathematics in various fields of engineering by making them to learn

CLO1	Polar curves, Curvature and Radius of curvature
CLO2	Partial derivatives and Jacobians
CLO3	Multiple integrals and Beta-Gamma functions
CLO4	First and second order ordinary differential equations
CLO5	Solution of system of equations and Eigen values

Content	No. of Hours/ RBT levels
Module 1 **Differential Calculus -1:** Polar Curves - angle between the radius vector and tangent, angle between two curves, Pedal equation of polar curves. Derivative of arc length - Cartesian, Parametric and Polar forms (without proof) - problems. Curvature and Radius of Curvature – Cartesian, Polar and forms (without proof) – problems, Centre and circle of curvature. **Assignment Problems (Self Learning):** Evolutes and Involutes	10 Hours L 2
Module 2 **Differential Calculus -2** Taylor's and Maclaurin's theorems for function of one variable (statement only)- problems. Evaluation of Indeterminate forms. Partial derivatives – Definition and simple problems, Euler's theorem (without proof) – problems, total derivatives, partial differentiation of composite functions- problems. Definition and evaluation of Jacobians, Maxima and Minima of two variables, Lagrange's method of undetermined multipliers **Assignment Problems (self-Learning):** Applications of maxima and minima	10 Hours L 2
Module 3 **Integral calculus:** Multiple integrals -Double integrals-introduction, direct evaluation, change of order of integration, change of variables. Triple integrals-introduction and direct evaluation.	10 Hours L 2

Beta and Gamma functions: Definition, relation between beta and gamma function, problems. **Assignment Problems (self-Learning):** Area, volume of solids and Centre of gravity using double and triple integrals	
Module 4 **Differential Equations:** Solution of first order and first-degree differential equations – Exact, reducible to exact and Bernoulli's differential equations. Second order linear ODE's with constant coefficients-Inverse differential operators, method of variation of parameters, Cauchy's and Legendre's Linear differential equations. **Assignment Problems (self-Learning):** Orthogonal trajectories (Cartesian and polar form), L-R Circuits, Newton's law of Cooling, oscillations of a spring and L-C-R circuits	10 Hours L 2
Module 5 **Solution of equations and Eigen value problems:** Solution of algebraic and transcendental equations using Regula-Falsi and Newton-Raphson method. Solution of linear system of equations: Gauss –Jordan method and Gauss-Seidel method. Eigen values and Eigen vectors, Rayleigh's power method to find the largest Eigen value and the corresponding Eigen vector. Linear transformation, diagonalization of a square matrix. **Assignment Problems (self-Learning):** Rank of a matrix by elementary transformations.	10 Hours L 2

Course Outcomes: At the end of the course students are able to

CO1	Apply the knowledge of differential calculus to solve problems related to curvature, maxima & minima of a function and Jacobians.
CO2	Find area and volume of solids using multiple integrals
CO3	Evaluate definite integrals using beta and gamma functions
CO4	Solve linear differential equations of first and second order with constant/variable coefficients.
CO5	Solve algebraic and transcendental equations, system of linear equations and Eigen values problems

Textbooks:

1. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2016.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.

Reference books:

1. H.K. Das and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand publishing, 1st edition, 2011.

2. C. Ray Wylie, Louis C. Barrett, Advanced Engineering Mathematics, McGraw-Hill, 6th Edition 1995.
3. S. S. Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India, 4th Edition 2010.
4. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill, 11th Edition, 2010.
5. N. P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, Laxmi Publications, 6th Edition, 2014.
6. Srimanta Pal et.al. Engineering Mathematics, Oxford University Press, 3rd Edition,2016

SEMESTER – I/II

SUBJECT: Engineering Physics

Subject Code	**20PHY12/22**	**CIE Marks**	**50**
Hours/Week (L: T: P)	**3:2:0**	**SEE Marks**	**50**
No. of Credits	**04**	**Examination Hours**	**03**

Course Objectives: The course will enable the students to

CLO1	Familiarize with time independent Schrodinger's equation, analyze the types of LASER & it's working.
CLO2	Understand induced electric and magnetic fields leading to electromagnetic waves, concept of polarization.
CLO3	Acquaint with the Hooke's Law and to study the moduli of elasticity and its applications.
CLO4	Analyze the motion of a mass on a spring, free, damped and forced vibrations.
CLO5	Describe the electrical properties of materials & physical techniques involved in material science.

Content	No. of Hours/ RBT levels
Module 1 **Quantum mechanics & LASERs Quantum mechanics** Introduction to Quantum mechanics, Heisenberg's uncertainty principle, application of uncertainty principle, significance and properties of wave function. Schrodinger's time independent wave equation and its application (particle in a box). Introduction to Quantum Computation. **LASERs:** Interaction of radiation with matter, Einstein's coefficients, Requisites and condition for laser action. Semiconductor and Nd-YAG LASER, application of lasers, numericals.	10 Hours L3
Module 2 **Maxwell's equations, electromagnetic waves** Fundamentals of vector calculus, Gauss divergence theorem, Stokes' theorem, Ampere's law, Biot-Savart's law and Faraday's laws of electromagnetic induction. Maxwell-Ampere's law, Maxwell's equations in differential form and in vacuum. Wave equation using Maxwell's equations, polarization, numericals. **Optical fibers** Total Internal Reflection, angle of acceptance and numerical aperture (NA). Modes of propagation, V number and types of optical fibers. Attenuation mechanisms, attenuation coefficient, applications, merits and de-merits, numericals.	10 Hours L2

Module 3 **Elasticity:** Fundamentals of elasticity. Relation between different moduli of elasticity. Beams, expression for bending moment, expression for Young's modulus using single cantilever, couple per unit twist for a solid cylinder, applications, numericals.	10 Hours L3
Module 4 **Free, damped and forced oscillations**: Introduction, SHM, expression for force constant, theory of free, damped and forced oscillations, quality factor, significance & applications, numericals. **Shock waves**: Fundamentals of shock waves, Reddy shock tube, applications, numericals.	10 Hours L3
Module 5 **Material Science** **Quantum free electron theory**: Review of classical free electron theory, explanation of quantum free electron theory, Fermi energy, Fermi factor, electrical conductivity, success of quantum free electron theory, numericals. **Physics of semiconductor**: Fermi energy and energy gap for an intrinsic semiconductor, expression for electrical conductivity, numericals. **Dielectrics**: Polar and non-polar dielectrics, types of polarization, dielectric constant of a dielectric material, applications, numericals. **Physical Techniques in Materials Science:** Qualitative description of X-ray diffractometer, Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM), Scanning Tunnelling Microscope (STM), Atomic Force Microscope (AFM), Fourier Transform Infrared spectroscopy (FTIR), Thermo gravimetric Analysis (TGA)	10 Hours L2

Course Outcomes: The students will be able to:

CO1	Compute eigen values and eigen functions of subatomic particles using 1-D Schrodinger's equation.
CO2	Explain the principles, applications of LASER and optical fibers.
CO3	Develop the relation between electric-magnetic fields and transverse nature of electromagnetic waves.
CO4	Establish the relation between different moduli of elasticity.
CO5	Interpret the types of vibrations and shock waves.
CO6	Describe the electrical properties of conductors, semiconductors and dielectric materials.

Textbooks:

1. M N Avadhanulu, P G Kshirasagar, A textbook of Engineering Physics, 10th revised Ed, S Chand Ltd, New Delhi 2013
2. Gaur & Gupta, Engineering Physics, Dhanpath Rai publications, 2017

3. Arthur Beiser, Concepts of Modern Physics, 6th Ed: Tata Mc Graw Hill Edu Pvt. Ltd, New Delhi, 2006

Reference books:

1. M K Verma, Introduction to Mechanics, 2nd Ed, Univ. Press (India) Pvt, Ltd, Hyderabad, 2009
2. B B Laud, Lasers & non-linear optics, 3rd Ed., New Age International publishers, 2011
3. S O Pillai, Solid State Physics, 8th Ed, New Age International publishers, 2018
4. Chintoo S kumar, K Takayama & K P J Reddy, Shock waves made simple, Wiley India Pvt. Ltd. New Delhi, 2014
5. David Griffiths, Introduction to Electrodynamics, 4th Ed. Cambridge Univ. Press, 2017
6. S Amelinckx, D van Dyck, J. van Landuyt, G van Tendeloo, Handbook of Microscopy: Applications in Materials Science, Solid-State Physics, and Chemistry. Methods II, Wiley, 2008
7. Fox M W, Quantum Optics: An Introduction, Oxford University Press, 2009

SEMESTER I

SUBJECT: C Programming

Subject Code	20CSE13	CIE Marks	50
Hours/Week (L: T: P)	3:2:0	SEE Marks	50
No. of Credits	04	Examination Hours	03

SEMESTER – I/II

SUBJECT: Basic Electrical Engineering

Subject Code	20ELE14/24	CIE Marks	50
Hours/Week (L: T: P)	2:2:0	SEE Marks	50
No. of Credits	03	Examination Hours	03

Course Objectives: At the end of the course the student should be able to

CLO1	Understand the global energy scenario.
CLO2	Know the structure of Electrical Energy System.
CLO3	Explain the analysis of dc & ac circuits.
CLO4	Discuss Three-phase balanced circuits and understand about domestic wiring.
CLO5	Explain the principle of operation and performance of AC machines.

Content	No. of Hours/ RBT levels
Module 1 Global Energy Scenario **Energy Resources**: Conventional and Non-Conventional Energy Resources - Energy units - Demand for electricity and national grid perspective - National and International Energy Trends - Global Warming and Greenhouse effects - Concept, definition of Distributed Generation and Smartgrid.	08 Hours/ L1, L2
Module 2 Structure of Electrical Energy System **Generation of Electrical Power:** Classification of Conventional and Non-conventional power generation schemes - Basic structure, principle, and variants in Hydro, Thermal, Nuclear, solar, wind and biogas energy generation systems **Transmission and Distribution**: Typical structure of electric supply systems - Classification of transmission and distribution system - Voltage levels – Types of loads in power systems.	08 Hours/ L1, L2
Module 3 DC and AC Circuits **DC Circuits**: Ohm's Law - Kirchhoff's laws – Series, Parallel and Series-Parallel circuits – Numericals. **Fundamentals of AC Circuits**: Generation of Alternating quantity - Basic terminology - Analysis of single-phase R, L, C, RL, RC & RLC Series and Parallel circuits – Numericals.	08 Hours/ L1, L2

Module 4 Three Phase Circuits and Domestic Wiring **Three Phase Circuits:** Advantages of three phase circuits - Star and Delta connections - Two wattmeter method – Numericals. **Domestic Wiring:** Basic Wiring concepts - Residential wiring diagrams - Symbols of switches, Two- and Three-way switch, Fuse, MCB - Concept of Earthing - Plate and Pipe Earthing - Digital Energy Meters.	08 Hours/ L1, L2
Module 5 AC Machines & it's Applications **Synchronous Generator:** Principle of operation and Construction of Synchronous Generator - Types - EMF equation - Numericals. **Transformers:** Principle of operation and Construction of Transformers - Types - EMF Equation - Losses and Efficiency calculations - Numericals. **Induction Motors:** Principle of operation and Construction of Induction Motors - Types - Concept of Rotating Magnetic Field - Significance of Slip - Numericals.	08 Hours/ L1, L2

Course Outcomes: The students will be able to:

CO1	Outline the global Energy scenario and its impact.
CO2	Understand the generation, transmission, distribution, and structure of electrical power.
CO3	Describe the behavior of DC circuits and single-phase AC circuits.
CO4	Discuss the behavior of three phase AC circuits and concepts of domestic wiring.
CO5	Explain the constructional details and working principle of AC Machines.

Textbooks:

1. Kulshreshtha, D.C., Basic Electrical Engineering. Tata McGraw Hill, 2012.
2. Ghosh, Smarajit, Fundamentals of Electrical and Electronics Engineering. PHI Learning, 2007.
3. Hughes, E., Hiley, J., Brown, K., and Smith, I.M., Hughes electrical and electronic technology. Pearson education, 2008.
4. Del Toro, Vincent. Electrical engineering fundamentals. Prentice Hall, 1972.

Reference books:

1. Theraja, B.L., Fundamentals of Electrical Engineering and Electronics in SI System of Units (including Rationalized MKSA System). S. Chand, 2006.
2. Khan, B. H. Non-conventional energy resources. Tata McGraw-Hill Education, 2006.
3. Gupta, B. R. Generation of electrical energy. S. Chand Publishing, 2017.
4. Abbasi, Tasneem, and S. A. Abbasi. Renewable energy sources: Their impact on global warming and pollution. PHI Learning Pvt. Ltd., 2011.

SEMESTER –I

SUBJECT: Engineering Mechanics

Subject Code	**20CIV14/24**	**CIE Marks**	**50**
Hours/Week (L: T: P)	**2:2:0**	**SEE Marks**	**50**
No. of Credits	**03**	**Examination Hours**	**03**

Overview: The course is designed for the I/II semester engineering students of all branches. It covers fundamental concepts and principles of engineering mechanics, application of these basics principles to solve static equilibrium problems related to **Civil, Mechanical, Automobile, Biomedical, Mechatronics, Robotics and other allied engineering branches** where analysis for forces and displacement of particles or rigid bodies is involved. It also introduces the reals life problems involving the forces and computer applications to solve engineering mechanics problems. The knowledge of basic mathematics and physics is essential for the course.

Course Objectives: At the end of the course the student should be able to

CLO1	Understand the scalar presentation of forces and moments, apply the principles of engineering mechanics to particles and rigid bodies in equilibrium subjected to coplanar system of forces
CLO2	Realize the mechanical and sectional properties of engineering materials
CLO3	Understand the laws of motion. The kinematics of motion and the interrelationship

Content	No. of Hours/ RBT levels
Module-1 Statics of particles **Introduction to Engineering Mechanics:** Basic idealization and principles in engineering mechanics. Newton's laws of motion, units and dimensions, scalar and vectors Force and systems of forces, Moment of a force and couple, Varignon's theorem, Lami's theorem. Resolution and composition of forces – Coplanar concurrent and non-concurrent force system	8 Hours L1, L2, L3
Module 2 Equilibrium of Rigid bodies **Equilibrium of Forces:** Free body diagrams, equations of equilibrium for coplanar concurrent and non-concurrent force systems. Forces in space, equilibrium in space **Support Reactions:** Types of loads and supports, statically determinate and indeterminate beams. Support reactions for statically determinate beams at different loading conditions	8 Hours L2, L3

Exercise: *Computer application/Demonstration of physical models*	
Module 3 Applications of equilibrium equations **Analysis of Simple trusses**: Types of trusses, Analysis of statically determinate trusses using method of joints and sections **Friction:** Types and laws of friction. Coulombs friction; Single and connected bodies on normal and inclined planes, ladder friction andbelt friction **Exercise**: *Computer application/Site visit/Demonstration of support system and trusses*	8 Hours L2, L3
Module 4 Engineering materials: Mechanical and sectional properties **Centroid and Moment of Inertia:** Centroid of planar and built-up sections. Moment of Inertia and radius of gyration; Plane and built-up sections Simple stress and strain, Hooke's Law, Mechanical properties of materials, Elastic Constants **Exercise**: *Computer application/Display of engineering materials and visit to laboratory for demonstration*	8 Hours L2, L3, L4
Module 5 Kinematics and Kinetics of particles **Kinematics**: Definitions, concepts, Newton's Laws of motion. Rectilinear and curvilinear motion, motion under gravity, projectile motion, relative motion **Kinetics** of Rigid Body: Introduction, Force, Mass and Acceleration, Work and Energy, Impulse and Momentum, D'Alembert's principles and dynamic equilibrium **Exercise**: *Computer application/Demonstration of principles with real life examples*	8 Hours L2, L3, L4

Course Outcomes: The students will be able to:

CO1	Categorise the system of forces and analyse for resultant of forces acting on structural elements
CO2	Write the equations of equilibrium and analyse the determinate structure for forces and moments
CO3	Analyse the truss using equilibrium equations and mechanical systems for frictional resistance
CO4	Evaluate centroid and moment of inertia of plane and composite sections and realise its mechanical properties and the stress-strain relationship
CO5	Analyse the bodies in motion for motion characteristics and understand work energy principles

Textbooks:

1. Kumar, K. L., Kumar, V. Engineering Mechanics, Pub.: Tata McGraw Hill, 2011
2. R.S.Khurmi, N. Khurmi, A Textbook of Engineering Mechanics, S Chand Publishing; 22nd edition, 2018

Reference books:

1. F. P. Beer and E. R. Johnston et.al., Vector Mechanics for Engineers - Statics and Dynamics, McGraw-Hill; 12th edition, **2019**
2. R.C. Hibbler, Engineering Mechanics: Statics and Dynamics, Pearson Education; 14th edition, **2017**
3. S. Timoshenko, D.H. Young, J.V. Rao, Sukumar Pati, Engineering Mechanics (In SI Units), McGraw Hill Education; 5thedition, **2017**
4. S. Rajasekharan, G. Sankarsubramanian, "Engineering Mechanics- Statics and Dynamics" - Vikas Publishing House, 2011
5. Bansal R.K., A Textbook of Engineering Mechanics, Laxmi Publications; 6th edition, 2015

SEMESTER –I

SUBJECT: Computer Aided Engineering Drawing

Subject Code	**20MEGL15/25**	**CIE Marks**	**50**
Hours/Week (L: T: P)	**2:0:2**	**SEE Marks**	**50**
No. of Credits	**03**	**Examination Hours**	**03**

Overview: The course is designed for the I/II semester engineering students of all branches. It covers fundamental concepts and principles of engineering drawing with the emphasis on laboratory use of drafting software. Engineering drawing is a graphical medium of expression of technical details without the barrier of a language and also termed as universal language of engineers. Engineering drawings are important in conveying useful information to other engineers with standardized conventions, rules and regulations. The end goal of an engineering drawing is to convey all the required technical information that will allow a manufacturer to produce any kind of component in all the fields of engineering.

Course Objectives: At the end of the course the student should be able to

CLO1	Understand the concept of BIS conventions in engineering drawing.
CLO2	Apply the theoretical concepts to sketch orthographic projections in different positions.
CLO3	Understand the concepts of isometric projections of combination of solids.
CLO4	Use CAD tools for creation of engineering drawings.

Content	No. of Hours/ RBT levels
Module 1: Introduction to Computer Aided Engineering Drawing Introduction, Drawing Instruments and their uses, BIS conventions and standards. Types of Lines, dimensioning system, Geometrical constructions, Co-ordinate system and reference planes HP, VP, RPP& LPP of 2D/3D environment. Introduction to drafting software, Commands used for Engineering Drawing.	4 Hours L1, L2
Module 2: Orthographic Projections Introduction, Definitions - Planes of projection, reference line, Quadrants and conventions employed. **Projections of points** in all the four quadrants. **Projections of straight lines (First angle projection only)**: Introduction, Line inclined to both the planes, true and apparent lengths, true and apparent inclinations to reference planes. Application problems as demonstration only.	8 Hours L1, L2
Module 3: Projections of plane surfaces(First angle projection only) Introduction, Projections of regular plane surfaces–triangle, square, rectangle, pentagon, hexagon and circle-in simple positions inclined to both the planes,	8 Hours L1, L2

planes in different positions by change of position method only.	
Module 4: Projections of Solids Introduction, Type of solids, Projections of right regular prisms like square, hexahedron(cube), pentagon, hexagon and pyramids like square, pentagon, hexagon, cone & tetrahedron in different positions (Inclined to both HP and VP)	12 Hours L1, L2
Module 5: Isometric Projection (using isometric scale only) Introduction, Isometric scale, Isometric projection of combinations of solids (Maximum of two solids) like cube, regular prisms, cylinders, pyramids, cone, tetrahedron, frustum of pyramids, cone & sphere. Application of conversion of isometric/pictorial views to orthographic views of simple components.	8 Hours L1, L2

Problems from the above units should also be practiced on computer aided drafting software

Course Outcomes: Upon completion of this course, students will be able to

CO1	Demonstrate the usage of CAD tools to represent orthographic and isometric projections.
CO2	Sketch the orthographic projections of points, lines and planes in different positions.
CO3	Sketch the orthographic projections of solids and isometric projection of combination of solids.

Textbooks:

1. N.D. Bhatt & V.M. Panchal, Engineering Drawing, Charotar Publishing House, Gujarat, 48th edition, 2005
2. K.R. Gopala Krishna, Engineering Graphics, Subhas Publishers, Bangalore, 32nd edition, 2005.

References:

1. Luzadder Warren J., Duff John M., Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production, Prentice Hall of India Pvt. Ltd., New Delhi, Eastern Economy Edition, 2005.
2. P. L. Varghese, Engineering Graphics McGraw Hill Education (India) Pvt. Ltd, and New Delhi.
3. N.S. Parthasarathy & Vela Murali, Engineering Drawing, Oxford University Press, 2015.

SEMESTER – I/II

SUBJECT: Elements of Mechanical Engineering

Subject Code	20MEE15/25	CIE Marks	50
Hours/Week (L: T: P)	2:0:2	SEE Marks	50
No. of Credits	03	Examination Hours	03

Overview: The course is intended to be delivered to the I/II semester engineering students of all branches as a basic course. It covers the fundamental concepts and principles of various topics under mechanical domain involving manufacturing systems, engine systems and advanced manufacturing principles.

Course Objectives: This course enables the students to

CLO1	Learn the fundamental concepts of the manufacturing process
CLO2	Comprehend the basic concepts of Design and Power Transmission
CLO3	Understand the concepts of Internal Combustion engines, Boilers, Turbines and Refrigeration
CLO4	Understand the concepts of Automation and Robotics in Industry
CLO5	Enumerate the knowledge of Materials, Joining process and additive manufacturing

Content	No. of Hours/ RBT levels
Module 1 **Primary Manufacturing Processes:** Casting, forging, rolling, drawing, extrusion, press tool work, plastic moulding and powder metallurgy (discussion on process and applications only) **Secondary Manufacturing Processes:** Operations on lathe Machine - Turning, Facing, Knurling, Thread Cutting, Drilling, Operations on Drilling Machine – Drilling, Boring, Counter boring, Countersinking, Reaming and Operations on Milling machine - plane milling, end milling, slot milling, angular milling, form milling, straddle milling, and gang milling. *Demonstration of handheld and power tools and operations on machine tools machining of simple turning models* *Generation of gear tooth using the milling machine*	8 Hours L1, L2, L3
Module 2 **Introduction**: Design Process: Definition of design, phases of design **Belt drives:** Open & crossed belt drives, Definitions - slip, creep, velocity ratio, the ratio of tension in flat belt drives, advantages and disadvantages of V belts and timing belts, simple numerical problems. (No derivation)	8 Hours L1, L2

Gear drives: Types-spur, helical, bevel, worm and rack and pinion. Velocity ratio, advantages and disadvantages over belt drives, simple numerical problems on velocity ratio. *Demonstration on Belt drives* *Demonstration of gears and gear drives*	
Module 3 **Introduction to automotive systems**: Classification, I.C. Engines parts, 4 stroke petrol and 4-stroke diesel engines, simple problems on Indicated power, Brake power and mechanical efficiency, Green fuels(Bio-diesel, CNG), Working principle of Electric and hybrid vehicles. **Boilers:** Introduction to boilers, classification, Working principle of water tube and fire tube boilers, Layout of Thermal power plant. **Turbines:** Classification, Hydraulic Turbines - Principles and operation of Pelton wheel turbine, Francis turbine and Kaplan turbine. **Refrigeration**: Principle and working of vapour compression refrigeration and vapour absorption refrigeration. Types of air conditioners. *Demonstration and identification of Components in Automobile* *Demonstration of hydraulic turbines* *Demonstration of Components of the refrigerating unit.*	8 Hours L1, L2
Module 4 **Computer Numerical Control (CNC):** Introduction, components of CNC, open-loop and closed-loop systems, advantages of CNC, CNC Machining centres and Turning centres. **Robotics:** Robot anatomy, joints and links, common robot configurations. Applications of Robots in material handling, processing and assembly and inspection. *Demonstration on CNC Machines* *Preparation of simple model on robot configurations*	8 Hours L1, L2
Module 5 **Metals and alloys**: Ferrous: Cast Iron, tool steels and stainless steels, Nonferrous: Aluminum, Brass, and Bronze (Composition and applications). **Composites:** Fibre-reinforced composites, Metal Matrix Composites, Ceramic matrix composites. **Joining Processes**: Soldering, Brazing and Welding. Definitions. Working principle of arc welding, oxy-acetylene welding. **Introduction to additive manufacturing:** Definitions and stages involved in additive manufacturing. *Demonstration of Additive Manufacturing* *Practice on metal arc welding (running bead)*	8 Hours L1, L2, L3

Course Outcomes: Upon completion of this course, students will be able to

CO1	Classify the manufacturing processes such as casting, forging, rolling, drawing, extrusion, Turning, milling and drilling on the basis of the primary and secondary manufacturing process.
CO2	Understand the core concept of power transmission elements such as belt drives and gear drives
CO3	Describe the working principle of various types of IC Engines, Boilers and refrigeration systems.
CO4	Explain the working principle of CNC Machines and different robot configurations along with applications.
CO5	Classify the different types of ferrous and nonferrous metals and alloys, composite materials
CO6	Describe the working principles of soldering, brazing welding process and additive manufacturing process

Textbooks:

1. Rao, P.N. "Manufacturing Technology", Metal Cutting and Machine Tools, Tata McGraw–Hill, New Delhi, 2003 (Module 1)
2. K R Gopalkrishna, Sudhir Gopalakrishna, Dr. Girish H.N, Elements of Mechanical Engineering, Subhas publications, 2019 (Module 2)
3. Hajra Choudhry S K , Elements of Workshop Technology, Vol 1 and 2 ,2009
4. Mikell P Groover, Automation, Production systems and computer-integrated manufacturing, Pearson learning, 4th Edition, 2015 (Module 4 & 5)
5. V K Manglik, Elements of Mechanical Engineering, PHI Publications, 2013 (Module – 1,2,3,5)

Reference books:

1. R K Rajput, Elements of Mechanical Engineering, Laxmi Publications Pvt Ltd, 2005
2. M. L. Sharma and R. P. Mathur, Internal Combustion Engines, Dhanpat Rai Publications, 2014
3. P. Radhakrishnan, CAD/CAM/CIM, 3rd edition, New Age International Publishers, New Delhi, 2008
4. B K Agarwal, Introduction to Engineering Materials, Mc Graw Hill publication, New Delhi, 2007
5. Wayne Smith, Boiler operator, LSA Publishers, 2013
6. V Ganesan, Internal Combustion Engines, Tata McGraw Hill Publication, 2017
7. David Allan Low, An Introduction to Steam Boilers, Copper Press Publisher, 2012

SEMESTER – I/II

SUBJECT: Basic Electrical Engineering Laboratory

Subject Code	20ELEL16/26	CIE Marks	50
Hours/Week (L: T: P)	0:0:2	SEE Marks	50
No. of Credits	01	Examination Hours	03

Course Objectives: This course provides students with practical knowledge of

CLO1	Common electrical equipment/devices.
CLO2	Measuring power and power factor of single and three phase circuits.
CLO3	Measuring impedance in RL and RC circuits.
CLO4	Measuring earth resistance and methods of controlling of lamps.

S. No.	Experiments	No. of Hours/ RBT levels
1	Verification of KCL and KVL for DC circuits.	02 Hours/ L1, L2
2	Measurement of current, power and power factor of incandescent lamp, Fluorescent lamp, and LED lamp.	02 Hours/ L1, L2
3	Two way and three-way control of lamp and formation of truth table.	02 Hours/ L1, L2
4	Determination of phase and line quantities in three phase star and delta Connected loads.	02 Hours/ L1, L2
5	Measurement of three phase power using two wattmeter method.	02 Hours/ L1, L2
6	Measurement of resistance and inductance of a choke coil using 3 voltmeter Method.	02 Hours/ L1, L2
7	Measurement of earth resistance.	02 Hours/ L1, L2
8	Determination of efficiency for a given 1-phase transformer by conducting open and short circuit test.	02 Hours/ L1, L2
9	Characteristics of fuse and MCB.	02 Hours/ L1, L2
10	Measurement of Voltage, Current and Power in a Solar cell.	02 Hours/ L1, L2
	Demonstration Experiments	
1	Demonstration of cut-out sections of electrical machines (DC machines, Induction Machines, and synchronous machines).	02 Hours/ L1, L2

2	Understanding the connection and working of Uninterrupted Power Supply (UPS).	02 Hours/ L1, L2
3	Demonstration and working of Domestic Energy meters.	02 Hours/ L1, L2

Course Outcomes: Upon successful completion of this course, student will be able to

CO1	Verify KCL and KVL for DC circuits and voltage-current relationship for single and three phase circuits.
CO2	Compare power factor of incandescent, fluorescent, and LED lamps.
CO3	Determine impedance, power and power factor of an electrical circuit and earth resistance.
CO4	Understand the operation of solar cell and two way and three-way control of lamps.
CO5	Demonstrate the effect of open and short circuit in electrical circuits.

Reference books:

1. Sharma, D.K., and Sharma, P., Viva-voce in Electrical Engineering. CBS Publishers and Distributors Private Limited, 2010.
2. Kulshreshtha, D.C., Basic Electrical Engineering. Tata McGraw Hill, 2012.
3. Ghosh, Smarajit, Fundamentals of Electrical and Electronics Engineering. PHI Learning, 2007.
4. Hughes, E., Hiley, J., Brown, K., and Smith, I.M., Hughes electrical and electronic technology. Pearson education, 2008.
5. Del Toro, Vincent. Electrical engineering fundamentals. Prentice Hall, 1972.
6. Theraja, B.L., Fundamentals of Electrical Engineering and Electronics in SI System of Units (including Rationalized MKSA System). S. Chand, 2006.

SEMESTER –I/II

SUBJECT: Engineering Physics Laboratory

Subject Code	20PHYL17/27	CIE Marks	50
Hours/Week (L: T: P)	0:0:2	SEE Marks	50
No. of Credits	01	Examination Hours	03

Course Objectives: The course will enable the students to

CLO1	Apprehend the phenomena of interference, diffraction and total internal reflection.
CLO2	Recognize the concept of electrical resonance and earth's magnetic field.
CLO3	Calculate the force constant, moduli of elasticity of an elastic material.
CLO4	Estimate the acceleration due to gravity.

S. No.	Experiments	No. of Hours/ RBT levels
1	Determination of spring constants in Series and Parallel combination	2 / L3
2	Determination of Magnetic field intensity at the center of a circular coil carrying current (by deflection method)	2 / L2
3	n & I by Torsional pendulum (radius of the wire, mass and dimensions of the regular bodies to be given).	2 / L3
4	Young's modulus of a beam by single cantilever experiment (breadth and thickness of the beam to be given)	2 / L3
5	Radius of curvature of planoconvex lens using Newton's rings (wavelength of light to be given)	2 / L2
6	Study Series and parallel LCR resonance and hence Calculate inductance, band width and quality factor using series LCR Resonance	2 / L3
7	Determine acceptance angle and numerical aperture of an optical fiber	2 / L2
8	Determine wavelength of semiconductor laser using LASER diffraction by calculating grating constant.	2 / L2
9	Estimation of Fermi energy of Copper	2 / L2
10	Calculation of Dielectric constant by RC charging and Discharging	2 / L3
11	Determine the energy gap of a semiconductor	2 / L3
12	Determine acceleration due to gravity using bar pendulum	2 / L2

Course Outcomes: Upon successful completion of this course, student will be able to

CO1	Demonstrate the phenomenon of interference, diffraction and total internal reflection.
CO2	Interpret the electric and magnetic properties of materials.
CO3	Examine the spring constant and elastic properties of materials.
CO4	Determine acceleration due to gravity

Textbooks:

1. H Sathyaseelan, Laboratory manual in applied Physics, 3rd edition, New Age International (P) limited, publishers, 2008
2. S P Basavaraju, Engineering Physics practicals, 1999

Reference book:

1. C L Arora, BSC Practical Physics, S Chand & Co, New Delhi, 2007

SEMESTER – I/II

SUBJECT: Basic Electrical Engineering Laboratory

Subject Code	20ELEL16/26	CIE Marks	50
Hours/Week (L: T: P)	0:0:2	SEE Marks	50
No. of Credits	01	Examination Hours	03

Course Objectives: This course provides students with practical knowledge of

CLO1	Common electrical equipment/devices.
CLO2	Measuring power and power factor of single and three phase circuits.
CLO3	Measuring impedance in RL and RC circuits.
CLO4	Measuring earth resistance and methods of controlling of lamps.

S. No.	Experiments	No. of Hours/ RBT levels
1	Verification of KCL and KVL for DC circuits.	02 Hours/ L1, L2
2	Measurement of current, power and power factor of incandescent lamp, Fluorescent lamp, and LED lamp.	02 Hours/ L1, L2
3	Two way and three-way control of lamp and formation of truth table.	02 Hours/ L1, L2
4	Determination of phase and line quantities in three phase star and delta Connected loads.	02 Hours/ L1, L2
5	Measurement of three phase power using two wattmeter method.	02 Hours/ L1, L2
6	Measurement of resistance and inductance of a choke coil using 3 voltmeter Method.	02 Hours/ L1, L2
7	Measurement of earth resistance.	02 Hours/ L1, L2
8	Determination of efficiency for a given 1-phase transformer by conducting open and short circuit test.	02 Hours/ L1, L2
9	Characteristics of fuse and MCB.	02 Hours/ L1, L2
10	Measurement of Voltage, Current and Power in a Solar cell.	02 Hours/ L1, L2
	Demonstration Experiments	
1	Demonstration of cut-out sections of electrical machines (DC machines, Induction Machines, and synchronous machines).	02 Hours/ L1, L2

2	Understanding the connection and working of Uninterrupted Power Supply (UPS).	02 Hours/ L1, L2
3	Demonstration and working of Domestic Energy meters.	02 Hours/ L1, L2

Course Outcomes: Upon successful completion of this course, student will be able to

CO1	Verify KCL and KVL for DC circuits and voltage-current relationship for single and three phase circuits.
CO2	Compare power factor of incandescent, fluorescent, and LED lamps.
CO3	Determine impedance, power and power factor of an electrical circuit and earth resistance.
CO4	Understand the operation of solar cell and two way and three-way control of lamps.
CO5	Demonstrate the effect of open and short circuit in electrical circuits.

Reference books:

7. Sharma, D.K., and Sharma, P., Viva-voce in Electrical Engineering. CBS Publishers and Distributors Private Limited, 2010.
8. Kulshreshtha, D.C., Basic Electrical Engineering. Tata McGraw Hill, 2012.
9. Ghosh, Smarajit, Fundamentals of Electrical and Electronics Engineering. PHI Learning, 2007.
10. Hughes, E., Hiley, J., Brown, K., and Smith, I.M., Hughes electrical and electronic technology. Pearson education, 2008.
11. Del Toro, Vincent. Electrical engineering fundamentals. Prentice Hall, 1972.
12. Theraja, B.L., Fundamentals of Electrical Engineering and Electronics in SI System of Units (including Rationalized MKSA System). S. Chand, 2006.

SEMESTER – II

SUBJECT: Basic Electronics Engineering

Subject Code	20ELN16/26	CIE Marks	50
Hours/Week (L: T: P)	2:2:0	SEE Marks	50
No. of Credits	03	Examination Hours	03

Course Objectives: At the end of the course the student should be able to

CLO1	Understand the operation of Diode, Zener diode and Bipolar Transistors.
CLO2	Design a Rectifier, Zener regulator circuits and amplifier using electronic devices.
CLO3	Discuss the various applications of operational amplifiers.
CLO4	Acquire the basic knowledge of digital logic land application of knowledge to understand digital electronics circuits.
CLO5	Understand the fundamental concepts of communication.

Content	No. of Hours/ RBT levels
Module 1 **Semiconductors Diodes and Applications:** P-N junction diode, Characteristics, Parameter and Diode Approximations. Applications: Rectifiers: Operation of Half Wave Rectifier, Full Wave Centre tapped Rectifier, Bridge Rectifier with and without capacitor filter, Regulators: Zener diode as voltage regulator with numerical, DC voltage Doubler. Block Diagram of a DC Power Supply, UPS and SMPS.	8 Hours L1, L2
Module 2 **BJT and its Applications:** BJT operation, BJT Voltage and currents. BJT Amplification, BJT switching, BJT Common Base and Common Emitter characteristics **BJT Biasing:** DC Load Line with bias point, Base bias and Voltage Divider Bias with analysis (includes numerical). Single Stage Common Emitter Amplifier, Block diagram of negative Feedback Amplifier, advantages and its disadvantages. **Oscillators:** Berkhausen criteria, BJT phase shift oscillator and BJT Hartley oscillator.	8 Hours L1, L2
Module 3 **Op-Amps and Applications:** Block diagram of op-amp , Ideal and practical Op-Amp, Op-Amp parameters, Applications: Inverting Amplifier, Non-Inverting	8 Hours L1, L2, L3

Amplifier, Voltage Follower, Summer, Difference Amplifier, Integrator and Differentiator (Ideal case only with equations and numerical). Block diagram of 555 Timer, Types of Multivibrator, working of Astable Multivibrator.	
Module 4 **Digital Electronics Fundamentals:** Difference between analog and digital signals, Introduction to Number Systems, Boolean Algebra, Logic Gates, Simplification of Boolean Expressions. Combinational logic Circuits: Half Adder, Full Adder, Multiplexer, Demultiplexer.	8 Hours L1, L2
Module 5 **Communication Systems:** Basic Block Diagram of Communication System, Need for modulation Introduction to Modulation techniques, Computer communication networks (TCP & OSI model), Fundamentals of wireless communication: wireless communication system, Types of wireless communication systems, wireless networks. Transducers: Introduction, Electrical Transducer, Selection of Transducers, LVDT.	8 Hours L1, L2

Course Outcomes: The students will be able to:

CO1	Analyze the operation of semiconductor devices and its applications.
CO2	Evaluate BJT transistor biasing circuits for applications.
CO3	Design Op-Amp circuits for various applications
CO4	Illustrate the concept of number system, Logic gates, and Combinational circuits.
CO5	Understand the basic concept of communication, networks and transducers.

Textbooks:

1. David A. Bell, Electronic Devices and Circuits, Oxford University Press, 5th Edition, 2008.
2. D Roy Choudhury, Shail B Jain, Linear Integrated Circuits, New Age International (P) Limited, 3rdEdition, 2007.
3. Morris Mano, Digital Logic and Computer Design, Prentice Hall India Publication, 54th Edition, 2007.

Reference Books:

1. George Kennedy, Bernard Davis, SRM Prasanna, Electronic Communication Systems, McGraw Hill India, Fifth Edition, 2017
2. M D Singh, K B Khanchandani, Power Electronics, Tata McGraw-Hill Education, Second Edition, 2007
3. H S Kalsi, Electronic Instrumentation, Tata McGraw-Hill Education, Third Edition, 2015.
4. Sunilkumar S. Manvi, Mahabaleshwar S. Kakkasageri, Wireless and Mobile Networks: Concepts and Protocols John Wiley & Sons, 2010.
5. Behrouz A Forouzan, Data Communication and Networking, McGraw Hill Education (India) Private Limited, Fourth Edition, 2017.
1. M. L. Sharma and R. P. Mathur, Internal Combustion Engines, Dhanpat Rai Publications, 2014

2. P. Radhakrishnan, CAD/CAM/CIM, 3rd edition, New Age International Publishers, New Delhi, 2008
3. B K Agarwal, Introduction to Engineering Materials, Mc Graw Hill publication, New Delhi, 2007
4. Wayne Smith, Boiler operator, LSA Publishers, 2013
5. V Ganesan, Internal Combustion Engines, Tata McGraw Hill Publication, 2017
6. David Allan Low, An Introduction to Steam Boilers, Copper Press Publisher, 2012

SEMESTER – I

SUBJECT: C Programming Laboratory

Subject Code	A20CSCL18	CIE Marks	50
Hours/Week (L: T: P)	0:0:2	SEE Marks	50
No. of Credits	01	Examination Hours	03

Course Objectives: The course will enable students to:

CLO1	Write algorithms, flowcharts and programs
CLO2	Familiarize the processes of debugging and execution
CLO3	Implement basics of C programming Language
CLO4	Illustrate solution to the laboratory programs

S. No.	Programs	No. of Hours/ RBT levels
1	**Program 1** a) Write a C program to find roots of the quadratic equation. b) Write a C program to check whether the entered number is a palindrome or not.	02 L3
2	**Program 2** a) Write a program to generate Fibonacci sequence. b) Write a C program to check whether the entered number is Armstrong or not.	02 L3
3	**Program 3** Write a program using switch case to find the sum of elements stored in an array and search the key element using linear search.	02 L3
4	**Program 4** Write a C program to arrange the elements of an array using BUBBLE SORT algorithm.	02 L3
5	**Program 5** Write a C program to search for an element in an array using BINARY SEARCH algorithm. Print appropriate message if the element is not found.	02 L3
6	**Program 6** a) Write a C program to transpose a given matrix. b) Write a C program to add two matrices and ensure the rules of multiplication are checked. Print appropriate message if addition is not possible.	02 L3
7	**Program 7**	02

	a) Write a C program using functions to generate all the prime numbers between 1 and n, where n is a value supplied by the user. b) Write a C program using function to find the value of binomial coefficient (nCr).	L3
8	**Program 8** Write a C program to calculate gross salary and net salary of N employees. Your program should input names of N employees and their basic salary. Gross salary=BASIC+HRA+DA. Net Salary=Gross Salary-Deductions. HRA=25% of BASIC while DA=75% of BASIC. Deductions are PT (Rs. 200) and PF – 12% of (BASIC+DA). Pertaining to each employee display the output in the following format: **NAME OF AN EMPLOYEE, GROSS SALARY, NET SALARY**	02 L3
9	**Program 9** Write a C program using user defined functions for string copy, concatenation and length.	02 L3
10	**Program 10** Write a C program to count number of the lines, words and characters in a given text file.	02 L3

Note:

1) Every program should have algorithm / flowchart before writing the program.
2) Code should be traced with minimum two test cases
3) To be implemented using UBUNTU as OPEN SOURCE (Either GEDIT or VI Editor)

Course Outcomes: Upon successful completion of this course, student will be able to

CO1	Apply the concept of Control Structures for writing programs to solve problems
CO2	Apply the concept of arrays to solve problems related to searching, sorting and matrix operations
CO3	Write programs using concept of user defined functions and structures
CO4	Apply the concept of Strings for writing programs using files.

Textbooks:

1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGraw-Hill.

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Prentice Hall of India.
2. Sumitabha Das, "Computer Fundamentals & C Programming", McGraw Hill Education.
3. Guruprasad Nagraj, "C Programming for Problem Solving", Himalaya Publishing House

SEMESTER –I

SUBJECT: English for Engineers - I

Subject Code	**20HSMC19**	**CIE Marks**	**50**
Hours/Week (L: T: P)	**0:2:0**	**SEE Marks**	**50**
No. of Credits	**01**	**Examination Hours**	**03**

Course Objectives: The course will enable the students to

CLO1	To impart basics of English Grammar and reading skills
CLO2	Improve language proficiency
CLO3	To enhance writing, reading skills
CLO4	To expose students of general speaking and listening skill sets

Content	No. of Hours/ RBT levels
Module-1 **Grammar:** Agreement, Time and Tense, Parallel construction, Relative pronouns, Determiners, Prepositions, Modals, Adjectives, Voice, Transformation, Question tags, Phrasal verbs **Vocabulary:** Synonyms, Antonyms, Odd Word, One Word, Jumbled letters, Homophones, Spelling, Contextual meaning, Analogy	4 Hours L1, L2, L3
Module 2 **Reading Comprehension:** Content/ideas, Vocabulary, Referents, Idioms/ Phrases, Reconstruction (rewording) **Composition:** Rearrangement, Paragraph Unity, Linkers/Connectives	3 Hours L3
Module 3 **Verbal Reasoning** Analogy - Correspondence. A particular relationship is given and another similar relationship has to be identified from the alternatives provided. Classification: To assort the items of a given group on the basis of certain common quality they possess and then spot the odd option out. Series Completion: Here series of numbers or letters are given and one is asked to either complete the series.	3 Hours L1, L2, L3
Module 4 **Reading-** Analysis of reading passages – Articles, Text, Online reading material;	8 Hours L2, L3

Types of reading- skimming, scanning, critical reading; comprehension, analysis, response; Familiarization- pronunciation, accent, intonation. **Writing-** Structures- grammar and usage competence, writing a paragraph, writing an evaluative response, writing an argumentative response, writing a creative response, writing a critical response; Composition-editing and writing; Vocabulary building – etymology, words of foreign origin; Sensitivity in communication- Social Networks and Public communication – Etiquette	
Module 5 Discussion and debates on contemporary topics – current affairs, scientific enquiry, philosophical debates, literary sensibilities, socio-political awareness and cultural sensitivity; Exploring multiple perspectives- critical reasoning, constructive feedback, persuasive arguments and effective interpersonal communication. **Listening -** Response to audio/video texts- comprehension, analysis, critical evaluation; listening to groups and individuals- active listening, feedback and response.	8 Hours L2, L3

Course Outcomes: Upon completion of the course, the students will be able to:

CO1	Identify and understand the use of grammar in formal English communication.
CO2	Imply the skill set of reading comprehensions, varied techniques of compositions
CO3	Write a literature critique with no grammatical errors
CO4	Demonstrate his/her ability to write error free, making an optimum use of Vocabulary
CO5	Stimulate their Critical thinking by designing and developing clean and lucid writing, speaking skills

Reference books:

1. Raman, M & Sharma, S., Technical Communication: Principles and Practice. Oxford University Press, New Delhi 2014.
2. Swan, Michael, Practical English Usage, (4e) Oxford University Press, London 2017.
3. Lewis, Norman, Word Power Made Easy 2010.
4. Balasubramanian. P., Phonetics for Indian Students, (2e), Mc Milan, Mumbai 2013.
5. J Rutherford, Basic Communication Skills for Technology, Pearson Education Asia.
6. K. R. Lakshmi Narayanan, English for Technical Communication, Vol. 1 & 2, Sci tech. Publications.
7. P. Eliah, A Handbook of English for Engineers & Technologists, B. S. Publications.
8. Francis Soundararaj, Speaking and Writing for Effective Business Communication, MacMillan India Ltd., 2007.

SEMESTER – II

SUBJECT: Engineering Mathematics – II

Subject Code	**A20MAT21**	**CIE Marks**	**50**
Hours/Week (L: T: P)	**3:2:0**	**SEE Marks**	**50**
No. of Credits	**04**	**Examination Hours**	**03**

Course Objectives: To enable students to apply the knowledge of Mathematics in various fields of engineering by making them to learn

CLO1	Partial differential equations
CLO2	Vector differentiation and Vector integration
CLO3	Numerical methods for interpolation, differentiation and integration
CLO4	Numerical methods to solve differential equations
CLO5	Solution of Bessel's and Legendre differential equations

Content	No. of Hours/ RBT levels
Module 1 **Partial Differential Equations**: 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. **Assignment Problems (self Learning):** Derivation of one dimensional heat and wave equations and solutions by the method of separation of variables	10 Hours L 2
Module 2 **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, surface and volume integrals. Green's theorem, Stoke's and Gauss Divergence theorems (all theorems without proof) **Assignment Problems (self Learning):** Applications to work done by a force and flux	10 Hours L 2
Module 3 **Interpolation and approximation**: Interpolation with equal intervals – Newton's forward and backward difference formulae. Interpolation with unequal	10 Hours L 2

intervals- Newton's divided difference formula and Lagrange's interpolation formula. **Numerical Differentiation and Integration:** Numerical differentiation based on Newton's forward and backward interpolation, Numerical integration using Simpson's $1/3^{rd}$, $3/8^{th}$, Weddle's rule. **Assignment Problems (self Learning):** Applications of Numerical methods to find velocity and acceleration.	
Module 4 **Initial Value problems for ordinary differential equations:** Numerical solution of ordinary differential equations of first order and first degree using Taylor's series methods, Runge-Kutta method of fourth order, Milne's and Adams-Bashforth predictor and corrector methods. Numerical solution of second order ordinary differential equations using Runge-Kutta method and Milne's method (No derivations of formulae). **Assignment Problems (self -Learning):** Implementation of numerical methods using MATLAB/any programming language	10 Hours L 2
Module 5 **Series Solution of ODE's and Special Functions:** Series solutions, Frobenius method, Series solution of Bessel's differential equation leading to $J_n(x)$-Bessel's function of first kind. Basic properties and orthogonality. Series solution of Legendre's differential equation leading to $P_n(x)$-Legendre Polynomials. Rodrigue's formula, problems. **Assignment Problems (self- Learning):** Examples on Frobenious method	10 Hours L 2

Course Outcomes: At the end of the course students are able to

CO1	Solve partial differential equations.
CO2	Compute Gradient, Divergence and Curl of a scalar/vector field.
CO3	Solve line, surface and volume integrals using Green's, Stokes and Gauss theorem
CO4	Apply numerical techniques to interpolate the data, evaluate definite integrals and to solve ordinary differential equations
CO5	Solve Bessel's and Legendre differential equations

Textbooks:

1. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 10^{th} Edition,2016
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44^{th} Edition, 2017

Reference books:

1. H.K. Das and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand publishing, 1^{st}
   a. edition, 2011.

2. C. Ray Wylie, Louis C. Barrett, Advanced Engineering Mathematics, McGraw-Hill, 6th Edition 1995.
3. S. S. Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India, 4th Edition 2010.
4. B.V.Ramana, Higher Engineering Mathematics, McGraw-Hill, 11th Edition, 2010.
5. N. P. Bali and Manish Goyal A Textbook of Engineering Mathematics, Laxmi Publications, 6th Edition, 2014.
6. Srimanta Pal et.al., Engineering Mathematics, Oxford University Press, 3rd Edition, 2016

SEMESTER – II

SUBJECT: PYTHON PROGRAMMING

Subject Code	20CSE23	CIE Marks	50
Hours/Week (L: T: P)	2:2:0	SEE Marks	50
No. of Credits	03	Examination Hours	03

SEMESTER II

SUBJECT: Programming in Python Laboratory

Subject Code	20CSPL28	CIE Marks	50
Hours/Week (L: T: P)	0:0:2	SEE Marks	50
No. of Credits	01	Examination Hours	03

SEMESTER – II

SUBJECT: English for Engineers - II

Subject Code	**A20HSMC29**	**CIE Marks**	**50**
Hours/Week (L: T: P)	**0:2:0**	**SEE Marks**	**50**
No. of Credits	**01**	**Examination Hours**	**03**

Course Objectives: The course will enable the students to

CLO1	To impart basics of communication and life skills
CLO2	Improve language proficiency
CLO3	To enhance reading, speaking discussion and presentation skills
CLO4	To expose students towards effective team work

Content	No. of Hours/ RBT levels
Module 1: Informal and Formal Communication Speaking – Introducing oneself – exchanging personal information – Language development – Wh questions – asking and answering "yes" or "no" questions. Formal and informal letter writing or personal letters – emails- conversations of personal email	5 Hours L1, L2, L3
Module 2: The Hidden data of communication Dealing with feelings, skill for dealing with feelings, Assertiveness, Techniques to be assertive, Self-confidence – Strategies to develop self-confidence, ignore feelings	5 Hours L3
Module 3: In the World of Teams Team work – Introduction, Basic characteristics of an effective team, stages of team formation, team player styles, trust and communication being the building blocks of effective teams	5 Hours L1, L2, L3
Module 4: Discussions and Decisions Introduction, Top ten time wasters, roles in a structured group discussion, phases in group discussion, types of group discussions, strategies of improving group discussions	5 Hours L2, L3
Module 5: Presentations Initial Planning, Preparation, Outlining, Practice, last minute tasks, the moment of truth, question time.	6 Hours L2, L3

Course Outcomes: Upon completion of the course, the students will be able to:

CO1	Identify techniques of formal English communication
CO2	Use active barriers and non-usage of filters in communication
CO3	Outline working as effective teams
CO4	Demonstrate his/her ability to write participate in effective group discussions
CO5	Outline the etiquette of good presentations

Textbooks:

1. Board of Editors Using English A Coursebook for Undergraduate Engineers and Technologists. Orient Black Swan Limited, Hyderabad: 2015
2. Richards, C. Jack. Interchange Students' Book-2 New Delhi: CUP, 2015

Reference books:

1. Bailey, Stephen. Academic Writing: A practical guide for students. New York: Rutledge, 2011
2. Means, L. Thomas and Elaine Langlois. English & Communication for Colleges. Cengage Learning, USA: 2007
3. Redston, Chris &Gillies Cunningham Face2Face (Pre-intermediate Student's Book & Workbook) Cambridge University Press, New Delhi: 2005