DAYANANDA SAGAR COLLEGE OF ENGINEERING

AN AUTONOMOUS INSTITUTE
AFFILIATED TO VTU
APPROVED BY AICTE & UGC
ACCREDITED BY NAAC WITH 'A' GRADE
ACCREDITED BY NBA

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

FIRST YEAR BE SCHEME OF TEACHING AND SYLLABUS 2020-2021

Dayananda Sagar College of Engineering

Shavige Malleshwara Hills, Kumaraswamy Layout,
Banashankari, Bangalore-560078, Karnataka
Web - http://www.dayanandasagar.edu

Vision & Mission of the Institute

Vision of the Institute

- To impart quality technical education with a focus on Research and Innovation emphasizing on Development of Sustainable and Inclusive Technology for the benefit of society.

Mission of the Institute

- To provide an environment that enhances creativity and Innovation in pursuit of Excellence.
- To nurture teamwork in order to transform individuals as responsible leaders and entrepreneurs.
- To train the students to the changing technical scenario and make them to understand the importance of Sustainable and Inclusive technologies.

DAYANANDA SAGAR COLLEGE OF ENGINEERING

Accredited by National Assessment & Accreditation Council (NAAC) with 'A' Grade

(An Autonomous Institution affiliated to Visvesvaraya Technological University, Belagavi)

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

FIRST YEAR BE SCHEME OF TEACHING AND EXAMINATION 2020-2021

I SEMESTER Bachelor of Engineering

Three week long mandatory non- credit Induction Program

For the UG students entering the institution, right at the start. Normal classes start only after the Induction program is completed.

Preamble

Engineering institutions are set up to generate well trained manpower in engineering with a feeling of responsibility towards oneself, one's family, and society. However, often, the incoming undergraduate students are driven by their parents and society to join engineering without understanding their own interests and talents. As a result, most students fail to link up with the goals of their own institution.

Students who enter an institution, will have come with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large and nature, and inculcate in them the ethos of the institution with a sense of larger purpose.

The graduating student must have knowledge and skills in the area of his/her study. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed.

Therefore, a Program is needed to

- help the newly joined students feel comfortable,
- sensitize them towards exploring their academic interests and activities,
- train them to work for excellence,
- build relations between teachers and students,
- impart a broader view of life,
- build character,
- develop awareness and sensitivity to Human Values,
- create feeling of equality, compassion and oneness,
- develop attention to society and nature.

An induction program for the UG students entering the institution, right at the start, serves the purpose. The program also makes them reflect on their relationship with their families and extended family in the college (with hostel staff and others). It also connects students with each other and with teachers so that they can share any difficulty they might be facing and seek help.

The Induction Program can also be used to rectify some critical lacunas, for example, English background, for those students who have deficiency in it.

Activities of the induction program

Induction program includes;

Physical Activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to Local Area, Familiarization to Department/Branch and Innovations, etc.

For more details refer to "A Guide to Induction Program", Page – 31, Model Curriculum for Undergraduate Degree Courses in Engineering and Technology, January 2018, Volume I, published by AICTE, New Delhi.

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FIRST YEAR BE SCHEME OF TEACHING AND EXAMINATION 2020-2021

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

Sl. No	Course and Course Code		Course Title	Teaching Department	Paper Setting Board	Teaching Hours /Week			Examination				Credits
						Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P					
1	BSC	19MA1ICMAT	Engineering Mathematics I	Mathematics	Mathematics	3	2	--	03	50	50	100	4
2	BSC	19PH1ICPHY	Engineering Physics	Physics	Physics	4	--	--	03	50	50	100	4
3	ESC	19EE1ICBEE	Basic Electrical Engineering	E and E Engineering	E and E Engineering	2	2	--	03	50	50	100	3
4	ESC	19CV1ICECV	Elements of Civil Engineering and Mechanics	Civil Engineering	Civil Engineering	3	--	--	03	50	50	100	3
5	ESC	19ME1ICEME	Elements of Mechanical Engineering	ME, Auto & IEM Engineering	Mechanical Engineering	3	--	--	03	50	50	100	3
6	BSC	19PH1ILPHY	Engineering Physics Laboratory	Physics	Physics	--	--	2	03	50	50	100	1
7	ESC	19ME1ILMEL	Mechanical Engineering Laboratory	ME Engineering	Mechanical Engineering	--	--	2	03	50	50	100	1
8	HSMC	19HS1ILEGL	Language Laboratory –I (English)	Humanities	Humanities	--	--	2	-	50	-	50	1
					TOTAL	**15**	**04**	**06**	**21**	**400**	**350**	**750**	**20**

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

Sl. No	Course and Course Code		Course Title	Teaching Department	Paper Setting Board	Teaching Hours /Week			Examination				Credits
						Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P					
1	BSC	19MA2ICMAT	Engineering Mathematics II	Mathematics	Mathematics	3	2	--	03	50	50	100	4
2	BSC	19CH2ICCHY	Engineering Chemistry	Chemistry	Chemistry	4	--	--	03	50	50	100	4
3	ESC	19CS2ICPIC	C Programming for Problem Solving	Computer Science and Engineering	Computer Science and Engineering	3	--	--	03	50	50	100	3
4	ESC	19EC2ICBEE	Basic Electronics	ECE/E and I/ TC	E and C Engineering	3	--	--	03	50	50	100	3
5	ESC	19ME2ICEGR	Engineering Graphics	ME, Auto & IEM Engineering	Mechanical Engineering	2	--	2	03	50	50	100	3
6	BSC	19CH2ILCHY	Engineering Chemistry Laboratory	Chemistry	Chemistry	--	--	2	03	50	50	100	1
7	ESC	19CS2ILPIC	C Programming Laboratory	Computer Science and Engineering	Computer Science and Engineering	--	--	2	03	50	50	100	1
8	HSMC	19HS2ILEGL	Language Laboratory –II (English)	Humanities	Humanities	--	--	2	-	50	-	50	1
					TOTAL	**15**	**02**	**08**	**21**	**400**	**350**	**750**	**20**

Note: BSC: Basic Science, ES: Engineering Science, HSMC: Humanity and Social Science.

Definition of Credit:	1 hour Lecture (L) per week per semester = 1 Credit 2 hour Tutorial (T) per week per semester = 1 Credit 2 hour Practical/Laboratory/Drawing (P) per week per semester = 1 Credit.

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FIRST YEAR BE SCHEME OF TEACHING AND EXAMINATION 2020-2021

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

Sl. No	Course and Course Code		Course Title	Teaching Department	Paper Setting Board	Teaching Hours /Week			Examination				Credits
						Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P					
1	BSC	19MA1ICMAT	Engineering Mathematics I	Mathematics	Mathematics	3	2	--	03	50	50	100	4
2	BSC	19CH1ICCHY	Engineering Chemistry	Chemistry	Chemistry	4	--	--	03	50	50	100	4
3	ESC	19CS1ICPIC	C Programming for Problem Solving	Computer Science and Engineering	Computer Science and Engineering	3	--	--	03	50	50	100	3
4	ESC	19EC1ICBEE	Basic Electronics	ECE/E and I/ TC	E and C Engineering	3	--	--	03	50	50	100	3
5	ESC	19ME1ICEGR	Engineering Graphics	ME, Auto & IEM Engineering	Mechanical Engineering	2	--	2	03	50	50	100	3
6	BSC	19CH1ILCHY	Engineering Chemistry Laboratory	Chemistry	Chemistry	--	--	2	03	50	50	100	1
7	ESC	19CS1ILPIC	C Programming Laboratory	Computer Science and Engineering	Computer Science and Engineering	--	--	2	03	50	50	100	1
8	HSMC	19HS1ILEGL	Language Laboratory –I (English)	Humanities	Humanities	--	--	2	-	50	-	50	1
					TOTAL	**15**	**02**	**08**	**21**	**400**	**350**	**750**	**20**

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

Sl. No	Course and Course Code		Course Title	Teaching Department	Paper Setting Board	Teaching Hours /Week			Examination				Credits
						Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P					
1	BSC	19MA2ICMAT	Engineering Mathematics II	Mathematics	Mathematics	3	2	--	03	50	50	100	4
2	BSC	19PH2ICPHY	Engineering Physics	Physics	Physics	4	--	--	03	50	50	100	4
3	ESC	19EE2ICBEE	Basic Electrical Engineering	E and E Engineering	E and E Engineering	2	2	--	03	50	50	100	3
4	ESC	19CV2ICECV	Elements of Civil Engineering and Mechanics	Civil Engineering	Civil Engineering	3	--	--	03	50	50	100	3
5	ESC	19ME2ICEME	Elements of Mechanical Engineering	ME, Auto & IEM Engineering	Mechanical Engineering	3	--	--	03	50	50	100	3
6	BSC	19PH2ILPHY	Engineering Physics Laboratory	Physics	Physics	--	--	2	03	50	50	100	1
7	ESC	19ME2ILMEL	Mechanical Engineering Laboratory	ME Engineering	Mechanical Engineering	--	--	2	03	50	50	100	1
8	HSMC	19HS2ILEGL	Language Laboratory – II (English)	Humanities	Humanities	--	--	2	-	50	-	50	1
					TOTAL	**15**	**04**	**06**	**21**	**400**	**350**	**750**	**20**

Note: BSC: Basic Science, ES: Engineering Science, HSMC: Humanity and Social Science.

Definition of Credit:	1 hour Lecture (L) per week per semester = 1 Credit 2 hour Tutorial (T) per week per semester = 1 Credit 2 hour Practical/Laboratory/Drawing (P) per week per semester = 1 Credit

ENGINEERING MATHEMATICS-I

UG – First Semester (common to all branches)

Course code: 19MA1ICMAT **Credits: 04**

L: P: T: S: 3: 0: 2: 0 **CIE Marks: 50**

Exam Hours: 03 **SEE Marks: 50**

Course Objectives:

1. Use Matrices and Linear Algebra to develop the essential tool for solving system of linear equation.
2. Understand the concept of Calculus and apply it appropriately in solving Engineering problems.
3. Recall Integration formulae and explain the method of evaluating double and triple integrals.

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

CO1	Develop the essential tool of matrices and Linear Algebra in a comprehensive manner.
CO2	Understand and apply the knowledge of Differential Calculus and its application in bending of the curve.
CO3	Learn the concept of Partial Differentiation to calculate rate of change of multivariate function and its application
CO4	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.
CO5	Model and Solve engineering problems using the concept of Ordinary Differential Equations

Mapping of Course outcomes to Program outcomes:

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

Module	Contents of the Module	Hours	COs
1	**LINEAR ALGEBRA:** Rank of a matrix-echelon form. Solution of system of linear equations (Homogeneous and Non Homogeneous) – consistency. Gauss-elimination method. Application of system of equations in balancing Chemical equations. Eigen values and eigen vectors-Rayleigh's power method. Diagonalization of a 2×2 square matrix. (**RBT Levels:L1&L2)**	08	CO1
	Tutorial – Miscellaneous problems	02	
	• **Eigen Values and Eigen vectors.** • **Guass Jordan method.** • **LU decomposition method.**		
2	**DIFFERENTIAL CALCULUS:** Polar Curves- Angle between radius vector and tangents, Angle between two curves Curvature, Radius of curvature (Cartesian and Polar form).Centre and circle of curvature (formulae only)-evolutes and involutes- applications to conics. Taylor's and Maclaurin's Series expansions for a function of one variable (statement only) – problems. (**RBTLevels: L1&L2)**	08	CO2
	Tutorial – Miscellaneous problems	02	
	• **Derivation of nth derivative of some elementary functions.** • **Leibnitz Theorem (without proof) – Problems.** • **Tracing of Curves.**		
3	**PARTIAL DIFFERENTIATION**: Partial differentiation; Total derivatives-differentiation of composite functions, Jacobians (without properties) - Problems. Taylor's series for a function of two variables, Maxima and Minima of functions of two variables, Differentiation under integral sign- Leibnitz rule.(**RBTLevels:L1&L2)**	08	CO3
	Tutorial – Miscellaneous problems	02	
	• Method of Lagrange multipliers with one subsidiary condition. • Errors and approximations		
4	**INTEGRAL CALCULUS:** **Multiple integrals:** Evaluation of double integrals, changing the order of integration and changing into polar co-ordinates. Evaluation of triple integrals. Applications to find area, volume. **Beta and Gamma functions**- Relation between Beta and Gamma Integral, Duplication formula proof – Problems.(**RBTLevels:L1&L2)**	08	CO4
	Tutorial – Miscellaneous problems	02	
	• **Reduction formulae:** $\int sin^n x dx, \int cos^n x dx, \int sin^m x cos^n x dx$**.where m and n is a positive integer-problem.** • **Definite integrals- Limit as a sum.**		

5	**ORDINARY DIFFERENTIAL EQUATIONS:** Solution of first order and first degree Differential equations: Bernoulli's Differential equations, Exact Differential equations, Reducible to Exact Differential equations. Applications of ODE's-orthogonal trajectories, Newton's law of cooling and L-R circuits. Nonlinear differential equations: Introduction to general and singular solutions. Solvable for p only, Clairaut's equation.**(RBTLevels:L1&L2)**	08	CO5
	Tutorial – Miscellaneous problems	02	
	• **Law of Natural decay.** • **Law of Natural growth.** • **Flow of electricity.**		

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10thEd.(Reprint), 2016.
3. E. Kreyszig: Advanced Engineering Mathematics Volume I, John Wiley & Sons, 2014.
4. E. Kreyszig: Advanced Engineering Mathematics Volume II, John Wiley & Sons, 2014.

Referencebooks:

1. C. Ray Wylie, Louis .C. Barrett:" Advanced EngineeringMathematics",6th Edition, McGraw-Hill Book Co.,New York, 1995.
2. N. P. Bali and Manish Goyal: A Text Book of Engineering Mathematics, Laxmi Publishers, 7thEd., 2010.
3. B.V.Ramana:"Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Veerarajan T.," Engineering Mathematics for First year", Tata McGraw-Hill, 2008.
5. Thomas G.B. and Finney.R.L."Calculus and Analytical Geometry"9thEdition, Pearson, 2012.

Weblinks andVideo Lectures:

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

ENGINEERING PHYSICS

Course Code : 19PH1ICPHY/19PH2ICPHY **Credits : 4**

L:P:T:S : 4:0:0:0 **CIE Marks : 50**

Exam Hours : 3 **SEE Marks : 50**

Unit	Course content	Hours
1	**Modern Physics:** Black body radiation spectrum, Weins law, Rayleigh Jeans law, Planck's Law, Derivation of Weins law and Rayleigh Jeans law from Planck's law, Wave Particle dualism, de-Broglie hypothesis**,** Compton effect and its Physical significance. Matter waves and their characteristic properties. Problems. **Quantum Mechanics:** Heisenberg's uncertainty principle and its physical significance and proof of non-existence of electrons in the nucleus. Wave function, properties and physical significance of wave function, Probability density and Normalization of wave function. Setting up of one dimensional time independent Schrodinger wave equation. Eigen values and Eigen functions. Application of Schrodinger wave equation: Energy Eigen values for a particle in a potential well of infinite depth. Problems.	**10**
2	**LASERS:** Interaction of radiation with matter, Einstein's coefficients; expression for energy density (derivation). Requisites of a Laser system. Conditions for laser action. Principle, construction and working of CO_2 Laser and explanation based on energy level diagram. Construction and working of a semiconductor Laser. Industrial applications of Laser: Laser welding, cutting and drilling. Problems. **Optical Fibers:** Propagation mechanism in optical fibers. Angle of acceptance and Numerical aperture (derivation), Types of optical fibers and modes of propagation, Absorption coefficient (qualitative), Application of optical fiber: Block diagram and explanation of point to point communication. 3 advantages of optical fibre communication, Problems.	**10**
3	**Mechanics:** Stress and strain, Hook's law and stress-strain diagram, Young's modulus (Y) Bulk modulus (K), Rigidity modulus (n), Poisson Ration (σ),Relation between elastic constants, Relation between shearing strain, Enlongated strain and compression strain, Relation between Y, n and σ, Relation between K, Y and σ, Relation between K, n and Y Relation between K, n and σ, Limiting values of σ, work done per unit volume in elongation strain. Bending of beams, bending moment of a beam: Rectangular cross section, Problems.	**10**

	Oscillation and waves: Terminologies: Amplitude, displacement, Frequency, Angular frequency, Period, Simple Harmonic Motion, Relation between γ and T, ω and T, Equation of SHM, Restoring force and force constant, Natural frequency of free vibration (Derivation), Analytical treatment of free vibrations, Problems.	
4	**Electromagnetic Theory:** Charge density, Linear, surface and volume, Divergence, Curl, Gradient, Gauss divergence Theorem, Stoke's theorem, Superposition principle, Poisson's and Laplace equation, Gauss theorem differential form, Ampere's circuital Law, Continuity equation (derivation), Maxwell's equations in differential forms, derivation of first equation, second, third and fourth equation. Significance of Maxwell's equation. **Superconductivity:** Introduction to Superconductivity, Temperature dependence of resistivity, Effect of magnetic field on resistance (Meissner effect), Type I superconductor and Type II superconductors with examples, BCS theory, High Temperature Superconductors (HTSC), Applications: MAGLEV vehicles.	**10**
5	**Thin films and devices:** Thin films, Stages of thin film growth: nucleation, agglomeration and continuous film with diagrams. Thin film deposition process using vacuum evaporation. Schematic of thin film unit with block diagram. **Nanoscience:** Introduction to Nanoscience, Mesoscopic state, Density of states in 0D, 1D, 2D and 3D structures. Synthesis: Top–down and Bottom–up approach examples: Ball Milling and Sol–Gel methods explanations with diagrams. Carbon nano tubes: Types, properties and applications.	**10**

Self-Study Component:

NOTE: 1. Questions for CIE and SEE not to be set from Self Study Component.

2. Assignment Questions should be only from Self Study Component.

UNIT 1: Self-study component: Davisson Germer Experiment, Group velocity and phase velocity.
UNIT 2: Self-study component: Other applications of LASER: atmospheric pollutant analysis, Types of attenuation.

UNIT 3: Self-study component: Bending moment of a beam of circular cross section. Analytical treatment or general solution of damped vibrations. Three cases for $b^2 > \omega^2$,$b^2 = \omega^2$ and $b^2 < \omega^2$. Analytical treatment or general solution of forced vibrations. Resonance, sharpness of resonance, applications of resonance: acoustic cavity, LCR and LASER.

UNIT 4: Self-study component: Electrostatic boundary conditions, Maxwell's displacement current, Electromagnetic energy density. Maxwell's equation in integral form, Recent developments in Superconductivity, SQUID and MRI.

UNIT 5: Self-study component: Synthesis of Carbon nano tubes, Applications of thin films: solar cells, LEDs, OLED and applications, flexible wearables and displays, Protective coatings.

Text books:

1. Hitendra K Malik and A K Singh, Engineering Physics, Tata McGraw Hill, India.
2. B V Narayana Rao, Engineering Physics, Wiley Eastern Ltd., India

Reference books:

1. S P Basavaraju, Engineering Physics, Subhas Publications, India.
2. K.L. Chopra, Thin film Phenomena, Mc Graw Hill, New York.

ENGINEERING PHYSICS LAB

Course Code : 19PH1ILPHY/19PH2ILPHY
L:P:I:S : 0:2:0:0
Exam Hours : 3

Credit : 1
CIE Marks : 50
SEE Marks : 50

No	Course content	Hours
1	**List of Experiments:** 1. Determination of Planck's constant using LEDs. 2. Newton's Rings (Determination of radius of curvature of plano convex lens).	**4**
2	**List of Experiments:** 3. Characteristics of a Transistor (Study of Input and Output characteristics and calculation of input resistance, output resistance and amplification factor). 4. Determination of resistivity of a semiconductor using a four probe technique. 5. Photo Diode Characteristics (Study of I–V characteristics in reverse bias and variation of photocurrent as a function of reverse voltage and intensity). 6. I–V Characteristics of a Zener Diode. (Determination of knee voltage and Zener voltage). 7. Uniform bending (Determination of Young's Modulus, Y)	**10**
3	**List of Experiments:** 8. Diffraction grating (Measurement of wavelength of laser source using diffraction grating).	**2**
4	**List of Experiments:** 9. Dielectric constant (Measurement of dielectric constant using charging and discharging of a capacitor). 10. Series and parallel LCR Circuits (Determination of resonant frequency and quality factor).	**4**

5	**List of Experiments:** 11. Determination of Fermi energy. (Measurement of Fermi energy in copper).	**2**

*Note: Ten experiments compulsory (Expt. Nos. 1-10).

Reference books

1. **Lab Manual**, Department of Physics, DSCE.
2. **Engineering Physics**, N.H. Ayachit and P.K. Mittal, IK International Publishing house Pvt. Ltd.

BASIC ELECTRICAL ENGINEERING

Course Code: 19EE1ICBEE /19EE2ICBEE **Credits: 03**

L: P: T: S: 2:0:2:0 **CIE Marks: 50**

Exam Hours: 03 **SEE marks: 50**

Course Objectives:

Course Objectives are:

1. To provide the basic knowledge about the Magnetic and A.C Circuits.
2. To instill the knowledge of working principle of operation and other concepts of different electrical machines.
3. To impart the basic knowledge about various measuring instruments and domestic wiring.

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

CO1	Analyze basic magnetic and A.C circuits.
CO2	Explain the working principles and basic other important concepts of different electrical machines and transformers.
CO3	Classify and discuss the different types of measuring instruments and domestic wiring schemes.
CO4	Build the experimental setup and measure different parameters of electrical quantities.

Mapping of Course Outcomes to Program Outcomes:

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

SYLLABUS			
Unit	**Contents of the unit.**	**Hours**	**CO's**
1	**Magnetic Circuits:** Basic definitions, Magnetic field due to electric current flow, force on a current carrying conductor placed in a magnetic field, Faradays laws of electromagnetic induction, Lenz's law, Fleming's rules and its applications. Statically and dynamically induced EMF'S. Self, mutual inductance and coefficient of coupling. Energy stored in magnetic field. Illustrative examples.	**8**	**CO 1**
2	**Single-phase A.C Circuits:** Principle and Generation of sinusoidal voltage, definition of average value, root mean square value, form factor and peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities. Analysis, with phasor diagrams, of R, L, C, and series RL, RC & RLC circuits, real power, reactive power, apparent power and power factor. Illustrative examples.	**8**	**CO1**
3	**Basic Instruments:** Introduction, classification of instruments, Single phase Induction type energy meter. ***Physical demonstration of different basic instruments** **Three Phase A.C Circuits:** Necessity and advantages of three phase systems, definition of Phase sequence, balanced supply and balanced load. Relationship between line and phase values of balanced star and delta connections. Illustrative examples. ***Measurement of power by two-wattmeter method with physical demonstration**. **Domestic Wiring**: Introduction, Service mains, meter board and distribution board. Types of Cables used in domestic wiring, power requirement calculation for domestic applications. Types of domestic wiring. Electric shock, precautions against electric shock, Earthing: Pipe and Plate. ***Two-way and three-way control of a lamp with physical experiment**	**8**	**CO1, CO3,CO4**

4	**DC motors:** Construction of DC machine, DC motor working principle, Back EMF and its significance. Torque equation, Types of DC motors, Problems on Torque equation, Characteristics of DC motors, applications, Necessity of starter. Three-point starter. Introduction to BLDC motors- working principle, applications. **Three Phase Synchronous Generators:** Principle of operation. Types and constructional features, EMF equation. Concept of winding factor (excluding derivation of distribution and pitch factors) Illustrative examples on EMF equation. ***Demonstration of cut section of DC Machine.** ***Experimental demonstration of torque speed characteristics of d.c motors.**	**8**	**CO2, CO4**
5	**Introduction to Transformers**: Definition, need and classification, Construction, Working principle, EMF equation, losses, Regulation and efficiency, Condition for maximum efficiency, Problems on EMF equation and efficiency. ***Demonstration of transformer cut section** **Three Phase Induction motors**: Construction of 3-phase induction motor, Concept of rotating magnetic field. Working principle, types, Slip and its significance, applications, necessity of starter, Star-Delta starter, Illustrative examples on slip calculation. ***Demonstration of induction motor cut section**	**8**	**CO2,CO4**

****The topics will be covered during tutorial classes along with practical exposure/experiments.***

<u>NOTE:</u> 1. Questions for CIE and SEE not to be set from self-study component.

2. Assignment Questions should be from self-study component only.

Self Study component:

Unit 1: DC Circuits: Introduction to DC circuits, active and passive two terminal elements, ohms law, behavior of resistor, inductor, capacitor, Kirchhoff's laws, mesh analysis in simple DC circuits excited by independent voltage sources, concept of power and energy.

Unit-2: Analysis of series parallel circuits with phasor diagrams.

Unit-3: Operating principles, essential features of measuring instruments (basics only), moving coil permanent magnet (PMMC) instruments, Principle, Construction & Operation of dynamometer type Wattmeter. Elementary discussion on fuse and Miniature Circuit Breaker (MCB's).

Unit-4: DC Generators: Principle and operation of DC generators. Types of DC generators, EMF equation of DC generator, basics of armature reaction.

Unit-5: Phasor diagram of Single-phase Transformer on no-load. Introduction and Concepts of single phase induction motors.

Text Books:

1. "Basic Electrical Engineering" D. C. Kulshreshtha, TMH 1st Edition, Revised.
2. "Basic Electrical Engineering", D.P. Kothari & I.J. Nagrath, Tata Mc Graw Hill Education.

Reference Books:

1. "Problems in Electrical Engineering", S.S. Parker Smith & NN Parker Smith.
2. "Basic Electrical Engineering", Jimmie J.Cathey, Syed A. Nasar, Schaum's Outline Series in Engineering, McGraw-Hill Book Company.
3. "Electrical & Electronics Technology", E. Hughes, PHI Publishers, 10th Edition.

Assessment Pattern

CIE – Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Tests**	**Assignments**	**Quiz**
Marks (out of 50)	**30**	**10**	**10**
Remember	5	2	2
Understand	10	3	3
Apply	10	3	3
Analyze	5	2	2
Evaluate			
Create			

SEE- Semester End Examination (50 Marks)

Bloom's Category	**Marks (50)**
Remember	10
Understand	10
Apply	15
Analyze	10
Evaluate	5
Create	

ELEMENTS OF CIVIL ENGINEERING & ENGINEERING MECHANICS

Course Code	**: 19CV1ICECV/19CV2ICECV**	**Credits**	**: 3**
L:P:T:S	**: 3:0:0:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**
Hours/Week	**: 03**	**Total hours**	**: 40**

Course Objectives: In this course, the student will be able to

1) Identify various branches of Civil Engineering and its role for infrastructural National development of Nation.
2) Identify the components of buildings and materials used for construction.
3) Apply principles of mechanics for solving engineering problems.
4) Analyse the objects subjected to various force systems.
5) Determine the centroid and analyse the moment of Inertia of simple plane sections.

Course Outcomes: At the end of the course the students will be able to:

	Course Outcome
CO 1	Description of various branches of Civil Engineering and their role in development of infrastructure.
CO 2	Description of various components of buildings and materials used for construction
CO 3	Construct Free Body Diagrams for the systems and inspect for its conditions
CO 4	Determine the beam reactions for different load conditions
CO 5	Determine the Centroid and compute moment of Inertia of Plane Lamina
CO 6	Analyze static body under simple stress & strain and frictional effects on horizontal and inclined surfaces

Mapping of Course outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3					1	1					
CO 2	3					2	1					
CO 3	3	3		2								
CO 4	3	3										
CO 5	3	3										
CO 6	3	3										

Module	Content of the Module	Hours	CO's
1	**Introduction to Civil Engineering** Scope of different fields of Civil Engineering, Role of Civil Engineer in development of Infrastructure. Building materials and components – Properties and Engineering applications of Stones, Bricks, Construction materials - Cement, Concrete, concept of Reinforced Cement Concrete (RCC). Concept of Sub Structure Components- Masonry Foundation; Isolated RCC footing; End bearing piles and friction piles. Concept of Super structure components– Components and types of walls, Roofs, Flooring. *Self-Study:* Raft Foundation, Doors, Windows, stairs	**8**	**CO1** **CO2**
2	**Introduction to Engineering Mechanics:** Force and its characteristics, Classification of force systems, Laws of mechanics. Couple, Moment of a force, Equivalent force - couple system. Numerical problems. **Concurrent & Non-Concurrent force system:** Definitions, Composition and resolution of forces, Resultant, Composition of coplanar concurrent & non-concurrent force system. Varignon's principle of moments. Numerical problems. *Self-Study:* Force system concept in 3D	**8**	**CO3**
3	**Equilibrium of forces** **Equilibrium of concurrent and non-concurrent forces:** Definition of Equilibrant; Conditions of static equilibrium for different force systems, Free Body Diagrams, Lami's theorem; Numerical problems **Support Reactions:** Beams, Types of Loads and Supports, support reactions for statically determinate beams with point loads and uniformly distributed loads. *Self-Study:* Numerical Problems on moving loads.	**8**	**CO3** **CO4**
4	**Centroids and Moments of Inertia** Centroid of triangle, semi-circle, sector of a circle, computing centroid for I, T, L and composite sections Numerical problems. **Moment of Inertia:** Parallel axis theorem, Perpendicular axis theorem, Moment of Inertia of simple and compound sections. Radius of gyration, Numerical problems. *Self-Study:* Centroid and moment of inertia for punched out sections,	**8**	**CO5**
5	**Friction, stress and strain:** Definitions, Types of friction, Laws of static friction, Limiting friction, Angle of friction, Angle of repose; Impending motion on horizontal and inclined planes, Ladder friction; Numerical Problems on single planes. Hooke's law, Stress Strain behaviour of mild steel and concrete; Analysis of bars of uniform and varying cross sections - Numerical problems. *Self-Study*: Friction on two inclined planes. Analysis of bars Tapering and stepped bars	**8**	**CO6**

NOTE: 1. Questions for CIE and SEE not to be set from self-study component.
2. Assignment Questions should be from self-study component only.

Text Books

1. Ferdinand P.Beer and E.Russel Johnston Jr, "Mechanics for Engineers – Statics", McGraw Hill book Inc., U.S.A, 4th Edition, 2009, ISBN- 007100135.

2. Engineering Mechanics-Statics and Dynamics by A Nelson, Tata McGraw Hill Education Private Ltd, New Delhi, 1st Edition, 2010. ISBN-10-0-07-014614-4, ISBN-13:978-0-07-014614-3.

3. Sushil Kumar, "Building Construction", Standard Publishers ,20th Edition, 2016, ISBN: 9788180141683

References

1. Engineering Mechanics by S.Timoshenko,D.H.Young, and J.V.Rao, TATA McGraw-Hill Book Company, New Delhi.

2. Shames I H, "Engineering Mechanics – Statics & Dynamics"- PHI – 2009.

Assessment Pattern:

CIE: Continuous Internal Evaluation Pattern for theory: (50 Marks)

Blooms Category	Tests	Assignment	AAT
Marks (out of 50)	30	10	10
Remembrance			
Understand		02	02
Apply	10	04	04
Analyze	10	04	04
Evaluate	10		
Create			

***AAT – Alternate Assessment Tool: Technical writing, Report writing etc**

SEE – SEM End Examination Theory (50 Marks)

Blooms Category	Theory Marks (50)
Remembrance	
Understand	10
Apply	10
Analyze	20
Evaluate	10
Create	

Elements of Mechanical Engineering

Subject code: 19ME1ICEME/19ME2ICEME

Course and Course Code		Course Title	Teaching Department	Paper Setting Board	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
ESC	19ME1ICEME/ 19ME2ICEME	Elements of Mechanical Engineering	ME, Auto &IEM Engineering	Mechanical Engineering	3	0	--	03	50	50	100	3

Course outcomes: At the end of the semester, students will be able to

CO.1	Understand various machine tools, their specifications and modern manufacturing systems
CO.2	Understand various metal joining and additive manufacturing processes
CO.3	Understand the fundamentals of various power transmission systems
CO.4	Understand the generation & application of steam in various engineering systems and also comprehend the working of hydraulic turbines
CO.5	Understand the working of Internal combustion engines
CO.6	Understand the working of various refrigeration cycles

Unit	Contents	Hours	COs
	Introduction to Mechanical Engineering	**1**	
1	**Lathe:** Classification, Principle of operation, Parts of a center Lathe, lathe specification, Lathe operations: Turning, facing, knurling, thread cutting, Taper Turning by swivelling compound rest. **Drilling machine:** Principle and Classification of drilling machines, Bench drilling machine, Radial drilling machine, Operations on drilling machine-Drilling, Boring, Reaming, Tapping, Counter Sinking, Counter boring and Spot facing. **Computer Numerical Control (CNC):** Introduction, Components of CNC, open loop and closed loop systems, advantages and disadvantages of CNC. **Robotics:** Introduction, Classification based on robot configuration: Polar, Cylindrical, Cartesian and jointed arm configuration. Application, Advantages and disadvantages of robots	**7**	**1**
	Demonstration of Lathe operations(Turning, Taper Turning) and Drilling operations(Drilling), C.N.C machine in Machine shop Laboratory and R &D Centre respectively	**1**	

2	**Joining Process** **Soldering:** Principle of soldering, Surface preparation, Methods of soldering, Applications **Brazing:** Principle of brazing, methods of brazing, Applications **Welding:** Definition, Classification, Applications of welding, Flux and its functions, Description of arc welding, Electrodes used in arc welding, Description of oxyacetylene welding, Types of flames produced in gas welding, Comparison between welding, soldering and Brazing, Welding Defects. **Additive Manufacturing:**Basic principle, need and advantages of additive manufacturing, Procedure for product development in additive manufacturing, Difference between Additive and Subtractive Manufacturing, Classification of additive manufacturing process, Materials and softwares used, Applications and Limitations, Principle and Applications of 3D Printing	**7**	**2**
	Demonstration on welding, soldering and 3D Printing in the Workshop Practice Laboratory	**1**	
3	**Power Transmission** **Belt drives**-Terminology of a belt drive, open and cross belt drives, Derivations on length of open and cross belt, Angle of contact, Ratio of belt tensions (no derivation), Centrifugal tension, Power transmitted by a belt drive, Maximum Tension in the Belt, Condition for Maximum Power Transmission (no derivation), Initial Tension in the Belt, Stepped pulley, Jockey pulley, Fast and Loose pulley. Definitions-Slip, Creep, velocity ratio. Applications, Advantages and Disadvantages of flat belt drive, Numericals on belt drives. **Gear Drives:** Types of Gears and applications, Advantages and disadvantages of gear drive, Gear Tooth Nomenclature, Velocity ratio of simple and compound gear train, Numericals on Gear drives	**7**	**3**
	Demonstration of Belt & Gear drives in the Machine shop Laboratory	**1**	
4	**Steam:** Formation of steam, Types of steam, Steam properties-Enthalpy, dryness fraction, wetness fraction, latent heat, sensible heat, Internal energy, Specific volume, External work of evaporation, degree of superheat, amount of superheat, saturated and	**7**	**4**

	superheated temperature, Numericals on steam. **Boilers:** Classification of Boilers, Babcock and Wilcox Boiler, Lancashire Boiler, Boiler mountings and accessories (no sketches) Steam Turbines: Classification, Principle operation of Impulse and reaction turbines, Delaval's turbine, Parson's turbine **Water turbines:** Classification, Principles and operations of Pelton wheel, Francis turbine, Kaplan turbine.		
	Demonstration of Boiler models and working of Water Turbines in Heat Transfer Laboratory and Fluid Machinery Laboratory	**1**	
5	**Internal combustion (I.C) engines:** I.C. Engines parts, 2 Stroke and 4 stroke petrol engines, 4 stroke diesel engines. P-V diagrams of Otto and Diesel cycles, Numericals on indicated power, brake power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency and specific fuel consumption. **Refrigeration**: Definitions –Refrigeration, Ton of Refrigeration, Unit of Refrigeration, Refrigerating effect, Ice making capacity, COP, Relative COP, Properties of refrigerants, list of commonly used refrigerants, Principle and working of Vapour Compression Refrigeration and Vapour Absorption Refrigeration	**7**	**5,6**
	Demonstration of working of I.C Engines and Vapour Compression Refrigeration test rig in Energy Conversion and Heat Transfer Laboratory	**1**	

Note:

1. **Questions for CIE and SEE not to be set from self-study topics**
2. **Assignment questions should be from self-study component only**

Self-study topics

Unit 1: Principle of Casting, forging, extrusion, rolling, Grinding and milling

Unit 2: TIG welding, MIG welding, Friction welding

Unit 3: Clutches & Differentials

Unit 4: Solar energy, wind energy, bio energy

Unit 5: Room Air-conditioner, Rating of fuels, Knocking in SI and CI engines, Emission standards-Bharat and Euro norms

Text Books

1. Elements of Mechanical Engineering, K. R. Gopalakrishna, Subhas Publications, Bangalore, 2008.
2. Elements of Mechanical Engineering, Vol.-1 & 2, HajraChoudhury, Media Promoters, New Delhi, 2001.

Reference Books

1. Mikell P. Groover, "Fundamentals of Modern Manufacturing" Fourth Edition, JOHN WILEY & SONS, INC.
2. Bharat Vinjamuri, ManjunathShettar, "Computer Integrated Manufacturing" Sunstar Publisher, 2016

ENGINEERING GRAPHICS

Course Code: **19ME1ICEGR/19ME2ICEGR** Credits: 3
L: P: T: S: 2: 2: 0: 0 CIE Marks: 50
Exam Hours: 03 SEE Marks: 50

Sl. No	Course and Course Code		Course Title	Teaching Department	Paper Setting Board	Teaching Hours /Week			Examination				Credits
						Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P					
5	ESC	19ME1ICEGR/ 19ME2ICEGR	Engineering Graphics	ME, Auto & IEM Engineering	Mechanical Engineering	2	--	2	03	50	50	100	3

Course Outcomes: At the end of the semester Students will be able to

CO.1	Make use of drafting tools in creating engineering drawing.	1
CO.2	Know and understand the conventions and the methods of engineering drawing.	2
CO.3	The student will be able to identify the position of the object and draw the views using orthographic projection technique in their respective quadrants.	3
CO.4	Construct the appropriate drawing satisfying the constraints given.	3
CO.5	Apply the knowledge of isometric projection to show pictorial view of an object	4
CO.6	Improve their visualization skills so that they can apply these skills in design and developing new products.	4

Unit	Contents of Course	Hours	COs
1	**Introduction to Computer Aided Sketching** Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tool bars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line conventions, material conventions and lettering.	3	CO1 CO2

2	**Orthographic projections** Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems). **Orthographic Projections of Plane Surfaces (First Angle Projection Only)** Introduction, Definitions–projections of plane surfaces–triangle, square, rectangle, pentagon, hexagon and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates).	08	CO3 CO4
3	**Projections of Solids (First angle Projection only)** Introduction, Definitions – Projections of right regular prisms, pyramids, cylinders and cones in different positions (No problems on tetrahedron, cube, octahedron, combination of solids and suspended solids).	12	CO3 CO4 CO6
4	**Sections and Development of Lateral Surfaces of Solids** Introduction, Section planes, Sections, Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. (No problems on sections of solids) Development of lateral surfaces of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).	08	CO4 CO6
5	**Isometric Projection** Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of two solids).	08	CO4 CO5

Text Books:

1) N.D. Bhatt & V.M. Panchal, **Engineering Drawing**, Charotar Publishing House, Gujarat, 48th edition, 2005.
2) A Primer on **Computer Aided Engineering Drawing**, Published by VTU, Belgaum, 2006

Reference Books:

1) K.R. Gopalakrishna, **Engineering Graphics,** Subash Publishers Bangalore, 32nd edition, 2005.
2) Primer Solution Book, Published by VTU, Belgaum, 2006

CIE for 50 marks

1. Assignment/sketch book/Print out	25 Marks
2. Surprise test/Mid semester test	10 Marks
3. Test conducted towards the end of semester	15Marks

Question paper pattern for SEE:

1. Module -1 is only for practice and not for examination.
2. Question paper for each batch of students will be set separately by the examination authority. The answer sheets will have to be jointly evaluated by the Internal & External examiners.
3. A maximum of THREE questions will be set as per the following pattern (No mixing of questions from different Modules).

Q. No.	**From Chapters**	**Marks Allotted**
1	Module 2	30
2	Module 3	40
3	Module 4 & 5	30
Total		**100**

Q. No.	**Solutions and Sketching in the Graph Book**	**Computer Display and Printout**	**Total Marks**
1	15	15	30
2	20	20	40
3	15	15	30
Total Marks	**50**	**50**	**100**

Students have to submit the computer printouts and the sketches drawn on the graph sheets at the end of the examination. Both Internal & External examiners have to jointly evaluate the solutions (sketches) and computer display & printouts of each student for 100 marks (50 marks for solutions & sketches + 50 marks for computer display and printouts) and submit the marks list along with the solution (sketches) on graph sheets & computer printouts in separate covers.

4. Each batch must consist of a minimum of 10 students and a maximum of 12 students.
5. Examination can be conducted in parallel batches, if necessary.

Mechanical Engineering Laboratory

SEMESTER - I/II

Sub. Code: 19ME1ILMEL/19ME2ILMEL	**CIE: 50**
Hrs./ Week: 3 hour.	**SEE: 50**
Total Hrs.: 36	**Credits: 01**

Course Outcomes: At the end of the semester Students will be able to,

CO1	Create Basic geometrical models using CAD software package
CO2	Use 3D printers for printing the models
CO3	Create basic mechanisms and analyze
CO4	Demonstrate the Knowledge on workshop tools and their use in preparing models
CO5	Draw development drawings and prepare models using sheet metal tools
CO6	Prepare different weld joints by using electric arc welding setup.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		1		3				2	1			2	1	1
CO2	2		1		3				2	1			2	1	1
CO3	2		1						2	1			2	1	1
CO4	2		1						2	1			2	1	1
CO5	2		1						2	1			2	1	1
CO6	2		1						2	1			2	1	1

SYLLABUS

Part A: 3D modeling and printing of mechanisms

1. **3D Modeling**
   1.1. Introduction
2. **3D Printing**
   2.1. Introduction
   2.2. 3D printer
3. **Mechanisms**
   3.1. Introduction
   3.2. Pantograph: Introduction, Parts, Assembly, Working, Application
   3.3. Gear Train: Introduction, Parts, Assembly, Working, Application
   3.4. Geneva Mechanisms: Introduction, Parts, Assembly, Working, Application
   3.5. Cam follower Mechanism: Introduction, Parts, Assembly, Working, Application

Part B: Preparation of Sheet metal and Welding models

1. **Introduction to workshop practice:** Demonstration on use of hand Tools and equipment used in fitting, welding and sheet metal work
2. **Sheet Metal Work: Development &Preparation of the models**: Frustum of cone, Pentagonal prism, Truncated square prism and tray
3. **Welding**: Preparation of weld Models: Butt Joint and T- joint.

Part C: Study and demonstration of Power Tools

Continuous Internal Evaluation

		Marks
1	Models + Record	25
2	Introduction - Record	15
3	Test + Viva voce (Viva voce on Sheet metal work and Welding only)	10
	Total	**50**

CIA Test: Scheme

		Marks
Q1.	Part A / Part B (Write up + Model)	4
Q2	Welding model (Write up + Model)	2
	Viva-Voce (on Sheet metal work and Welding only)	4
	Total	**10**

Semester End Examination: 50 Marks

Question		Models	Marks
1	3D Printing - Modeling, Printing, & Motion study of Mechanisms	(Group work) Any one model	30
OR			
	Sheet metal work	(Individual) Any one model	30
2	Welding	Any one model	10
3	Viva voce		10
	Total marks		**50**

Total :CIE 50 + SEE 50 = 100 Marks

Note :
No mini Drafters and drawing boards required .Drawings (Developments) can be done on sketch sheets using scale, pencil and geometrical Instruments.

Reference Books

1. S k Hajra Choudhry, A K Hajra choudry , " Elements of Workshop Technology: Vol I : Manufacturing Processes ", Media promoters & publishers Pvt Ltd.,Mumbai. 15th Edition reprinted 2013
2. BEGINNER'S GUIDE TO 3D PRINTINGby THINK3D TEAM:https://www.think3d.in/landing-pages/beginners-guide-to-3d-printing.pdf

ENGLISH LANGUAGE LABORATORY-I

Course Code: 19HS11LEGL **Credits: 1**

L: T: P : 0:0:2 **CIE Marks: 50**

Course Objectives:

1. To assimilate and get familiarized with English vocabulary.
2. To improve both speaking and writing skills.
3. To identify the common errors in spoken and writing English.
4. To provide information on standard technical report writing..
5. To involve students in language lab for hands on experience.
6. To enhance oral communication skills through group activities.

Course Outcomes:

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

CO1	Attain better understanding of nuances of English language through audio-visual experience and group activity.
CO2	Acquire basic proficiency in English reading and listening, comprehensions, writing and speaking skills.
CO3	Write campus recruitment exams, engineering competitive exams and all other general competitive exams.
CO4	Improve business and technical communication skills and technical writing skills.

Mapping of Course outcomes to Program outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO2	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO3	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO4	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**

Unit	Course content	Hours	COs
1	Reading Techniques, Technical Writing and Technical Proposals.	**4**	**CO1 CO2 CO4**
2	Letters, Memos, Email, Reports, Writing Introductions and Conclusion.	**4**	**CO1 CO2 CO3 CO4**
3	The Art of Condensation (Precise Writing), Organizing principles of paragraphs in documents, Comprehensions, Paragraphs & Essays.	**4**	**CO2 CO3 CO4**
4	Workplace Communication. i) Business Letters: Types, Layouts, Structure. ii) Reports: Purpose, Types, Structure.	**6**	**CO2 CO3 CO4**
5	Research Paper, Dissertation and Thesis: Types, Layouts, Structure, Referencing and Styling	**4**	**CO2 CO4**
6	Employment Communication: Resume' & Cover Letter.	**4**	**CO2 CO3 CO4**

Note:

Each student admitted to the B.E program needs to register for these mandatory courses. There is no Semester End Examination (SEE) for the mandatory courses. The Pass Grade / Not Passed will be awarded to the student based on the performance in the Continuous Internal Evaluation (CIE). Students who do not secure the Pass Grade for the mandatory courses are not eligible for the award of the degree.

Text books:

1. Technical Communication- Principles and Practice, Third Edition, Meenakshi Raman and Sangeetha Sharma, Oxford University Press, 2015.
2. High School English Grammar & Composition, Wren & Martin (Upgraded Format), Revised by N D V Prasad, S Chand & Company Ltd, 2015.
3. English for Technical Communication, N.P. Sudharshana and C. Savitha, Cambridge University Press, India Pvt Ltd, 2017.
4. Communication Skills, Sanjay Kumar and Pushpa Lata, Oxford University Press, 2011.
5. Exercises in Spoken English, Parts I-III, CIEFL, Hyderabad, Oxford University Press, 2015

Reference books:

1. Soft Skills and Employability Skills, Sabina Pillai and Agna Fernandez, Cambridge University Press, India Pvt Ltd, 2017.
2. Soft skills for everyone, Jeff Butterfield, Cengage learning India Pvt Ltd, 2017.
3. Business Communication (Connecting at Work), Hory Sankar Mukerjee, Oxford University Press, 2017.
4. Remedial English Grammar, F.T.Wood, Macmillan, 2007.
5. Books relating to GRE, TOFEL, GATE, SSC/CDS/SSB, IBPS<IES and other state and National level Exams (UPSC & KPSC).

Web Links and Video Lectures

www.unacademy.com/lesson/future-perfect-tense/YQ9NSNQZ
https://goo.gl/mne8
Banking adda English – https://t.me/adda247youtube For All the
www.india.oup.com/orcs/9780199457496
https:goo.gl/LLAkQE
www.india.oup.com/orcs/9780199457069
https://www.youtube.com/channel/UCzGB...
https://www.youtube.com/watch?v=dSeLyms1YVM
https://www.ets.org/toe
Videos &lectures relating to IELTS, GRE, TOFEL and others exams

Assessment Pattern:

CIE –Continuous Internal Evaluation

Bloom's Category	**Tests**	**Assignments**	**AAT1**	**AAT2**
Marks	**50**	-	-	-
Remember	10			
Understand	20			
Apply	10			
Analyze	05			
Evaluate	-			
Create	05			

ENGINEERING MATHEMATICS-II

UG –Second Semester (commonto all branches)

Course code: 19MA2ICMAT **Credits: 04**

L: P: T: S: 3: 0:2: 0 **CIE Marks: 50**

ExamHours: 03 **SEE Marks: 50**

CourseObjectives:

1. To build the concrete foundation of ODE, PDE and infinite series.
2. Explain Vectors to analyze the applications of multivariate calculus.
3. To develop the skills in solving various physical and engineering problems using numerical methods.

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

CO1	Understand and apply techniques to solve higher order ordinary differential Equations.
CO2	Formulate and learn to solve different types of Partial Differential Equations.
CO3	Illustrate the applications of multivariate calculus to understand the solenoidal and Irrotational vectors and to exhibit the interdependence of line surface and volume integrals.
CO4	Learn the concept of infinite series and obtain series solution of ordinary differential equations.
CO5	Apply numerical techniques in solving engineering problems.

Mapping of Course outcomes to Program outcomes:

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

Module	Contents ofthe Module	Hours	CO's
1	**LINEAR DIFFERENTIAL EQUATIONS WITH CONSTANT COEFFICIENTS:** Second and higher order linear ordinary Differential Equations with Constant coefficients- General solution of Homogeneous Equations, Method of finding Particular Solution- Inverse Differential operator Method. Application - Free oscillations of a spring and L-C-R circuits.**(RBTLevels:L1 &L2)**	08	CO1
	Tutorial – Miscellaneous problems	02	
	• **Solution of simultaneous differential equations of first order.** • **Applications –Damped oscillations of a spring**		
2	**LINEAR DIFFERENTIAL EQUATIONS WITH VARIABLE COEFFICIENTS**: Solution of Cauchy and Legendre Differential Equations. **PARTIAL DIFFERENTIAL EQUATIONS:** Formation of PDE by elimination of arbitrary constants and arbitrary functions. Solution of non-homogeneous PDE by direct integration. Solution of Lagrange's linear PDE. Solution of one dimensional heat and wave equations by variable separable method.**(RBTLevels:L1&L2)**	08	CO2
	Tutorial – Miscellaneous problems	02	
	• **Derivationofonedimensionalheat andwaveequations.** • **Homogeneous PDEs involving derivativewith respect to oneindependent variable.**		
3	**VECTOR CALCULUS:-** **Vector Differentiation: Scalar** and vector fields**.** Gradient, directional derivative; curl and divergence-physical interpretation; solenoidal and irrotational vector fields-problems. **Vector Integration:** Line integrals, Theorems of Green, Gauss and Stokes(without proof). Applications to work done by a force and flux. **(RBTLevels:L1 &L2)**	08	CO3
	Tutorial – Miscellaneous problems	02	
	•**Applicationofvectorcalculus.** •**Vector Identities.**		
4	**INFINITE SERIES:** Sequences, Infinite series, Series of Positive terms. Test for Convergence and divergence - Cauchy's root test , D'Alembert's ratio test, Rabbes's test (without proof)- Problems. Power series solutions of ordinary differential equation for ordinary point. Series solution of Bessel's differential equation leading to $J_n(x)$.Recurrence relations. **(RBT Levels:L1 &L2)**	08	CO4
	Tutorial – Miscellaneous problems	02	
	•**p-Series** •**Frobenius method**		

5	**ELEMENTARY NUMERICAL METHODS:** Finite differences. Interpolation/extrapolation using Newton's forward and backward difference formulae, Newton's divided difference and Lagrange's formulae (All formulae without proof). Solution of Algebraic and transcendental equations–Newton-Raphson and Regula-Falsi methods(only formulae)-Problems. **Numerical integration:** Simpson's $(1/3)^{th}$and $(3/8)^{th}$rules, Weddle's rule (withoutproof)– Problems.**(RBTLevels:L1 &L2)**	08	CO5
	Tutorial – Miscellaneous problems	02	
	•**Bisectionmethod** •**Trapezoidal rule**		

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43^{rd} Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10^{th}Ed.(Reprint), 2016.
3. E. Kreyszig: Advanced Engineering Mathematics Volume I, John Wiley & Sons, 2014.
4. E. Kreyszig: Advanced Engineering Mathematics Volume II,John Wiley & Sons, 2014.

Referencebooks:

1. C.RayWylie, Louis C.Barrett: "Advanced Engineering Mathematics",6^{th}Edition, McGraw-HillBook Co.,New York, 1995.
2. N.P.Baliand Manish Goyal: A Text Book of Engineering Mathematics, Laxmi Publishers, 7^{th}Ed., 2010.
3. B.V.Ramana:"Higher Engineering Mathematics"11^{th}Edition, Tata McGraw-Hill, 2010.
4. VeerarajanT.," Engineering Mathematicsfor Firstyear",TataMcGraw-Hill,2008.
5. Thomas G.B. and FinneyR.L."Calculus and Analytical Geometry" 9^{th}Edition, Pearson, 2012.

Weblinks andVideo Lectures:

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

ENGINEERING CHEMISTRY

Effective from the Academic Year 2019-20

Course code: 19CH1ICCHY/19CH2ICCHY **Credits: 04**

L: P: T: S: 4: 0: 0: 0 **CIE Marks: 50**

Exam Hours: 03 **SEE Marks: 50**

Course Objectives: **Total Hours: 50**

To provide students with knowledge of engineering chemistry for building technical competence in industries, research and development in the following fields.

1. Study the various chemical energy sources and significance of renewable sources of energy.
2. Fundamentals for the conversion of chemical energy to electrical energy and applications in daily life as batteries.
3. Understand the fundamentals of corrosion and methods to protect the metal structures.
4. Appreciate the properties and applications of few important polymers.
5. Evaluate the purity and usage of water for industrial and domestic purposes.
6. Learn the different methods of synthesis of nanomaterials and their applications.

Course outcomes: On completion of this course, students will be able to	
CO1	Identify the terms and processes involved in scientific and engineering applications
CO2	Explain the phenomena of chemistry to describe the methods of engineering processes
CO3	Solve for the problems in chemistry that are pertinent in engineering applications
CO4	Apply the basic concepts of chemistry to explain the chemical properties and processes
CO5	Analyze properties and processes associated with chemical substances in multidisciplinary situations
CO6	Apply the principles of chemical reactivity in industrially relevant processes

Mapping of course outcomes to program outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	---	---	---	---	---	---	---	---	---	---
CO2	3	2	---	---	---	---	---	---	---	---	---	---
CO3	3	1	---	---	---	---	---	---	---	---	---	---
CO4	3	2	---	---	---	---	---	---	---	---	---	---
CO5	3	2	---	---	---	---	---	---	---	---	---	---
CO6	3	2	--	---	---	---	--	---	---	---	---	---

Unit	Course content	Hours	COs
1	**ENERGY SOURCES** **Non renewable Energy Sources:** Introduction, classification of chemical fuels, calorific value-gross and net calorific values, determination of calorific value of a fuel using bomb calorimeter, numerical problems. Cracking: Introduction, fluidized catalytic cracking, Gasoline knocking and its mechanism, reformation of petrol, Octane number and Cetane number, anti- knocking agents, unleaded petrol and power alcohol. Disadvantages of non-renewable energy sources. **Renewable Energy Sources**: Introduction, Biodiesel: Synthesis, Advantages and disadvantages. Photovoltaic cells: Construction and working, advantages and disadvantages of PV cells. Production of solar grade Silicon. Purification of Silicon by zone refining.	**10**	**CO1-CO6**
2	**ELECTROCHEMICAL ENERGY SYSTEMS** **Thermodynamic functions:** Energy, free energy. Free energy and Emf. **Electrodes:** Introduction, single electrode potential, origin of single electrode potential, derivation of Nernst equation for electrode potential and applications. **Types of electrodes:** Metal-Metal ion, Metal-Metal insoluble salt, gas, Amalgam, red-ox & Ion selective. **Reference electrodes:** Introduction, Demerits of SHE, construction, working, applications of Calomel and Ag-AgCl electrodes. **Ion selective electrodes:** Construction and working of glass electrode, determination of pH using glass electrode. Electrolyte concentration cells, numerical problems on electrode potential, emf of cells and concentration cells. **Battery Technology**: Introduction, classification-primary, secondary and reserve batteries. Construction, working and applications of Ni-MH battery. **Lithium batteries:** Introduction, construction, working and applications of Li-ion battery. **Fuel Cells**: Introduction, Differences between conventional cell and fuel cell, Limitations and advantages of fuel cells, construction & working of Hydrogen-Oxygen fuel cell.	**10**	**CO1-CO6**
3	**CORROSION SCIENCE AND METAL FINISHING** **Corrosion**: Introduction, electrochemical theory of corrosion, Free energy in corrosion, galvanic series. Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of metal, nature of corrosion product, nature of medium-pH and temperature. Types of corrosion-differential metal and differential aeration corrosion (pitting and	**10**	**CO1-CO6**

	waterline). **Corrosion control**: Metal coating-Galvanization and Tinning. Cathodic protection- Sacrificial anodic and impressed current methods. **Metal Finishing:** Introduction, Technological importance. **Electroplating:** Introduction, principles governing-polarization, decomposition potential and overvoltage. Surface pre-treatment and electroplating of chromium (hard and decorative). **Electroless plating:** Introduction, distinction between electroplating and electroless plating, electroless plating of copper.		
4	**POLYMER CHEMISTRY** **Introduction to organic reactions:** Substitution, addition, elimination, oxidation, reduction, cyclisation and ring openings. **Polymers:** Introduction, types of polymerization: addition and condensation, mechanism of polymerization-free radical mechanism taking ethylene as an example. Molecular weight of polymers: Number average and weight average, numerical problems. Glass transition temperature (Tg): Significance of Tg, factors influencing Tg –flexibility, inter molecular forces, molecular mass, branching & cross linking and stereo regularity. **Biodegradable Polymers:** Introduction and their requirements. Properties and synthesis of poly lactic acid and their applications. **Elastomers:** Introduction, synthesis, properties and applications of silicone rubber. **Adhesives:** Introduction, synthesis, properties and applications of epoxy resin. **Polymer Composites:** Introduction, synthesis, properties and applications of Kevlar. **Conducting polymers:** Introduction, mention of Polyaniline, Poly pyrrole and their applications.	**10**	**CO1-CO6**
5	**WATER TREATMENT AND NANO-MATERIALS** **Water Treatment**: Introduction, boiler feed water, boiler troubles, formation of scale and sludge, disadvantages, boiler corrosion (due to dissolved O_2, CO_2 and $MgCl_2$). Determination of DO and COD. Numerical problems on COD. Sewage treatment (water recycling): Primary, secondary (activated sludge method) and tertiary methods. Softening of water by ion exchange process. Desalination of sea water by reverse osmosis. **Nano Materials**: Introduction, size dependent properties (surface area, electrical and optical), Synthesis: top-down and bottom up approaches. Methods of synthesis - solution combustion and sol-gel. Nano scale materials, properties of fullerenes and carbon nano-tubes. Nanomaterials for water purification, light emitting diodes (LED), sensors and Fluorescence in Nano medicine. **Characterization of nanomaterials (no description of instrumentation):** Diffraction and scattering: X-ray diffraction (XRD). Electron microscopy: Transmission electron microscopy (TEM) and scanning electron microscopy (SEM).	**10**	**CO1-CO6**

Self-study component:

Note: 1. Questions for CIE and SEE not to be set from self-study component.

2. Assignment Questions should be from self-study component only.

Unit 1: *The current ways of minimizing environmental pollution during thermal power generation. Hydrogen as fuel: production, advantages and disadvantages.*

Unit 2: *Measurement of standard electrode potential using calomel electrode. Biological applications of electrochemistry.*

Unit 3: *Green technology for environmental sustainability and corrosion control. Electroless plating of copper on Printed Circuit Board. Types of polluting effluents from plating industries and remedial measures.*

Unit 4: *Remanufacturing of Polymers. Synthesis, properties and applications of PMMA (plexi glass). Photoconducting polymers and applications.*

Unit 5: *Determination of BOD, methods of purification for potable water (bacteria removal using Silver nanoparticles). Desalination of water by electrodialysis. Medical applications of nanomaterials in medicine.*

Text books:

1. O.G.Palanna, "Engineering Chemistry", Tata McGraw-Hill Education Pvt.Ltd, 2011.
2. R.V. Gadag & A. Nityananda Shetty., "Engineering Chemistry", I K International Publishing House Private Ltd. New Delhi, Third edition, 2014.
3. P.C. Jain & Monica Jain., "Engineering Chemistry", Dhanpat Rai Publications, New Delhi. "Wiley Engineering Chemistry", Wiley India Pvt. Ltd. New Delhi. Fifteenth Edition, 2006.

Reference books:

1. D. Pletcher & Frank C Walsh, "Industrial Electrochemistry", Blackie academic and professional, 1993.
2. S. Glasstone & D. Lewis, "Elements of Physical Chemistry", The Macmillan Press Limited, Reprint: 1976.
3. R. Narayan & B. Vishwanathan, "Chemical and Electrochemical Energy Systems", University Press (India) Ltd., 1998.
4. M.G.Fontana., "Corrosion Engineering", Tata McGraw Hill publications, New York, 1987.
5. V.R. Gowariker, N.V. Viswanathan and J. Sreedhar, "Polymer Science", Wiley-Eastern Ltd.

Assessment Pattern: SEE–Semester End Examination (50 marks)	
Bloom's Category	**Marks**
Marks	**50**
Remember	15
Understand	15
Apply	10
Analyze	10

Assessment Pattern: CIE–Continuous internal evaluation (50marks)			
Bloom's Category	**Tests**	**Assignment**	**Quiz**
Marks (Out of 50)	**30**	**10**	**10**
Remember	10	--	02
Understand	10	05	05
Apply	05	05	03
Analyze	05	--	--

ENGINEERING CHEMISTRY LABORATORY

Effective from the Academic Year 2019-20

Course code: 19CH1ILCHY/19CH2ILCHY **Credit: 01**

L: P: I: S: 0: 2: 0: 0 **CIE Marks: 50**

Exam Hours: 03 **SEE Marks: 50**

Course Objectives:

To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

Course Outcomes: On completion of this course, students will be able to	
CO1	Identify and use different types of instruments for quick and accurate analysis.
CO2	Apply the various titrimetric analyses for the estimation of metal ions present in industrially important materials.
CO3	Analyze water sample for hardness, chemical oxygen demand, dissolved oxygen, sodium and potassium content.

LIST OF EXPERIMENTS		
Experiment No.	**Course Content**	**COs**
1.	Estimation of copper in industrial waste water effluent by using colorimeter	CO1
2.	Estimation of strength of an acid mixture by conductometry	CO1
3.	Determination of pKa value of a weak acid using pH meter	CO1
4.	Determination of viscosity coefficient of a given lubricant /polymer using Ostwald's viscometer	CO1
5.	Estimation of Iron in mild steel solution using standard $K_2Cr_2O_7$ solution by potentiometry	CO1
6.	Determination of percentage of copper in brass solution by Iodometric method	CO2
7.	Determination of Iron in the given sample of Iron ore by external indicator method	CO2
8.	Determination of Calcium Oxide in the given sample of cement by rapid EDTA method	CO2
9.	Assessment of total hardness in a sample of water by complexometric method	CO3
10.	Determination of Chemical Oxygen Demand of the given industrial waste Water sample	CO3
11.	Determination of Dissolved Oxygen in the given water sample by Winkler's method (Demo)	CO3
12.	Estimation of Sodium & Potassium by Flame photometric method in a water sample (Demo)	CO3

Reference books:

1. J. Bassett, R.C. Denny, G.H. Jeffery, A. I. Vogel, Text book of quantitative inorganic analysis, 4th Edition, 1978.
2. O. P. Vermani & Narula, "Theory and Practice in Applied Chemistry" New Age International Publisher, second edition, 2012.
3. Gary D. Christian, "Analytical chemistry", Wiley India, 6th edition, 2007.
4. DSCE laboratory manual 2019-20.

<table>
<tr><th colspan="6">Scheme of Evaluation</th></tr>
<tr><th colspan="6">CIE in Theory (50 marks)</th></tr>
<tr><th rowspan="2"></th><th rowspan="2">Internal Assessment Test</th><th colspan="4">Marks</th></tr>
<tr><th>Marks</th><th>Average reduced to 30 Marks</th><th colspan="2">Total final CIE marks</th><th>Final CIE Marks</th></tr>
<tr><td rowspan="3">CIE</td><td>CIE -1</td><td>50</td><td rowspan="3">30</td><td colspan="2" rowspan="3">30 +10 (one Assignment) + 10 (Quiz) = 50</td><td rowspan="3">50</td></tr>
<tr><td>CIE -2</td><td>50</td></tr>
<tr><td>CIE -3</td><td>50</td></tr>
<tr><th colspan="6">CIE in Laboratory (50 marks)</th></tr>
<tr><td colspan="4">Lab Internal Test</td><td>15</td><td rowspan="6">CIE: 50 Marks

SEE: 50 Marks</td></tr>
<tr><td colspan="4">Viva</td><td>10</td></tr>
<tr><td colspan="4">Conduction of the experiment</td><td>15</td></tr>
<tr><td colspan="4">Calculation and results</td><td>05</td></tr>
<tr><td colspan="4">Record</td><td>05</td></tr>
<tr><td colspan="4">Total</td><td>50</td></tr>
</table>

C PROGRAMMING FOR PROBLEM SOLVING (Theory)

Course code:19CS1ICPIC/19CS2ICPIC **Credits: 03**
L: P: T: S: 3: 0: 0: 0 **CIE Marks: 50**
Exam Hours: 03 **SEE Marks: 50**
Total Hours: 40

Course Objectives:

1. Understand how data can be represented in C.
2. Understand to analyse and design the problem solving techniques.
3. Understand how to create modular programs.
4. Understand the various memory and data access methods.

Course Outcomes: After completion of the course, the graduates will be able to

CO1	Illustrate the problem solving techniques using algorithm and flowcharts.
CO2	Demonstrate the solving of scientific problems using operators.
CO3	Analyze and develop programs to solve problems using decision making techniques.
CO4	Implement sorting and searching of data using arrays.
CO5	Construct new derived datatypes and create modular programs to solve complex and repetitive tasks.
CO6	Implement programs for efficient data access using pointers.

Mapping of Course outcomes to Program outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	2	2	1	-	-	2	1	-	3
CO2	3	3	3	2	2	-	-	-	2	1	-	3
CO3	3	3	3	2	2	-	-	-	3	1	-	3
CO4	3	3	3	2	2	-	-	-	3	1	-	2
CO5	2	2	2	1	1	-	-	-	2	1	-	2
CO6	2	2	2	1	1	-	-	-	2	1	-	1

Unit	Course Content	Hours	COs
1	**Introduction to Computer Hardware and Software :** Computer types, CPU, Primary and Secondary Memory, Input & Output Devices, Software types. **Introduction to C Language:** Introduction to C language, Algorithm & Flowchart, Structure of C program, C Tokens and Data types. Formatted & Unformatted Input & Output statements	**08**	**CO1** **CO2**
2	**Operators and Expression**: Types Of Operators, Type Casting, Precedence and Associativity, Evaluation of Expression. **Branching and Looping:**Two way selection: if, if-else, nested if-else, switch statement, goto statement, Loops: for, while-do, do-while, break and continue.	**08**	**CO3**
3	**Arrays :**Introduction, Declaration & Initialization of 1D array, Bubble sort, Linear & Binary search, reading and printing of 2 D array, Programs on Matrix operations: addition, subtraction, multiplication, transpose. **Strings** :Declaration & Initialization of String Handling functions:	**08**	**CO6**
4	**Functions:** Introduction to functions, function prototype, Types of Functions, Function Definition, Function Call, Function Declaration, Categories of Functions, Actual & Formal parameters, call by value & call by reference. **Recursion:** Definition, general functioning of recursive functions, programs using recursive functions: Fibonacci series, factorial of given number.	**08**	**CO4**
5	**Structures:** Introduction to Structures, declaration and Initialization of structures, accessing members of structure, Array of structure **Pointers:** Introduction to Pointers, Declaration of pointers, Initialization of pointer, pointer arithmetic, Pointer to an array.	**08**	**CO5**

Self study component:

Note:

1. **Questions for CIE and SEE not to be set from self-study component.**

UNIT 1: Study of Escape sequences and Types of Constants.
Develop a C program to demonstrate the working of Escape sequence& constants
UNIT2: Study of exit function and explore the header files: math.h, stdio.h, conio.h, stdlib.h
Develop a C program to apply various mathematical functions.
UNIT 3: Demonstration of Arrays and strings
Develop C program to search a string in an array.
UNIT4: Demonstration of local & Global scope of variables.
Develop a C program to pass array to a function.
UNIT 5: Passing structure to function
Develop a C program to demonstrate the passing of structures to a function.

TEXT BOOKS

1. Brian W. Kernighan and Dennis M. Ritchie, **"The C Programming Language"**, 2nd Edition, PHI, 2012.
2. E .Balagurusamy, "Programming in ANSI C". 7th Edition, Tata McGraw Hill

REFERENCE BOOKS

1. Vikas Gupta, "Computer Concepts and C Programming", Dreamtech Press 2013.
2. R. S.Bichkar, "**Programming with C**", University Press, 2012.
3. V. Rajaraman, **"Computer Programming in C"**, PHI, 2013.
4. Jacqueline Jones & Keith Harrow, **"Problem Solving with C"**, 1st Edition, Pearson 2011.

COMPUTER PROGRAMMING LABORATORY (Practice)

Course code: 19CS1ILPIC/19CS2ILPIC **Credits: 01**
L: P: I: S: 0: 2: 1: 0 **CIE Marks: 50**
Exam Hours: 03 **SEE Marks: 50**
Total Hours: 30

Course Objectives:

1. Analyze and design problem solving techniques using flowcharts and algorithms.
2. Develop programs using different data types in C
3. Develop programs to solve real time problems
4. Learn to test and debug a program

Course Outcomes: After completion of the course, the graduates will be able to

CO1	Design and Create programs to solve problems using decision making statements.
CO2	Design and Develop programs to solve repetitive tasks using looping statements.
CO3	Analyze and Develop programs to handle large data using arrays.
CO4	Apply library functions and build programs to solve large computing problems.
CO5	Develop programs to solve problemsinvolving multiple types of data using structures.
CO6	Develop programs to efficient data access using pointers.

Mapping of Course outcomes to Program outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	2	2	1	-	-	2	1	-	3
CO2	3	3	3	2	2	-	-	-	2	1	-	3
CO3	3	3	3	2	2	-	-	-	3	1	-	3
CO4	3	3	3	2	2	-	-	-	3	1	-	2
CO5	2	2	2	1	1	-	-	-	2	1	-	2
CO6	2	2	2	1	1	-	-	-	2	1	-	1

LABORATORY WORK			
Program No	**Course Content**	**Hours**	**COs**
1.	Design and Develop a program to solve simple computational problems using arithmetic expressions and use of each operator leading to simulation of a commercial calculator. (No built-in math function)	**02**	**CO1**

2.	Design and develop a C program that accepts three coefficients (a, b, and c) of a Quadratic equation (ax2 +bx+c=0) as input and compute all possible roots and print the possible roots for a given set of coefficients. Also print the message in case of zero valued coefficient/s.	**02**	**CO1** **CO2**
3.	Program 3: An electricity board charges the following rates for the use of electricity: for the first 200 units 80 paise per unit: for the next 100 units 90 paise per unit: beyond 300 units Rs. 1 per unit. All users are charged a minimum of Rs. 100 as meter charge. If the total amount is more than 400, then an additional surcharge of 15% of total amount is charged. Design and Develop a program to read the name of the user, number of units consumed and print out the charges.	**02**	**CO1** **CO2**
4.	Design and develop a C program to find the reverse of an integer number NUM and check whether it is PALINDROME or NOT with suitable messages. Ex: Num: 1234, Reverse: 4321, Not a Palindrome.	**02**	**CO1** **CO2**
5.	Design and Develop a C program to compute sin(x) using Taylor series approximation and compare with built-in library function and display with appropriate messages.	**02**	**CO1** **CO2**
6.	Design and develop a C program that reads N integer numbers and arrange them in ascending order using Bubble Sort.	**02**	**CO1** **CO2** **CO3**
7.	Design and Develop a C program to input N numbers and store them in an array and perform a linear search for a given key and report success or failure.	**02**	**CO1** **CO2** **CO3**
8.	Design and develop a C program that reads N integer numbers and search a key element using Binary searching Technique.	**02**	**CO1** **CO2** **CO3**
9.	Design and develop a C program that reads two matrices A (m x n) and B (p x q) and Compute product of matrices A and B. Read matrix A and matrix B in row major order. Print both the input matrices and resultant matrix appropriately.	**02**	**CO1** **CO2** **CO3**
10.	Design and develop a C program to implement the following operations without using library functions. Display the results after every operation. a. Read STRING s1 = "Dayananda" b. Read STRING s2 = "Sagar" c. Output the concatenated string STRING s3 = "DayanandaSagar"	**02**	**CO1** **CO2** **CO3** **CO4**
11.	Design and Develop a program in C to copy its input to its output, replacing each string of one or more blanks by a single blank.	**02**	**CO1** **CO2** **CO3** **CO4**
12.	Design and Develop a C functionisprime (num) that accepts an integer argument and returns 1 if the argument is prime, 0 otherwise. Write a C program that invokes this function to generate prime numbers between the given range.	**02**	**CO1** **CO2** **CO3** **CO4**

13.	Design and Develop a C program to create a structure called Employee to maintain record of details using an array of structures with four fields (Emp_name, Emp_id, Emp_age and Emp_sal). Assume appropriate data type for each field. Print the Employee details in Tabular Format.	**02**	**CO1 CO2 CO3 CO5**
14.	Write a C program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of n real numbers.	**02**	**CO2 CO3 CO6**
15.	Implement recursive function toconvert binary to decimal.	**02**	**CO2 CO4**

REFERENCE BOOKS FOR LABORATORY

1. Computer Programming Laboratory Manual, Dept. of CSE, DSCE.
2. ReemaThareja, "**Computer Fundamentals and Programming in C**", Oxford Press, 2012.

ASSESSMENT PATTERN FOR LABORATORY:

CIE –Continuous Internal Evaluation Lab (50 Marks)

Bloom's Category	**Performance (Day To Day)**	**Internal Test**
Marks (Out of 50)	**25**	**25**
Remember	05	05
Understand	05	05
Apply	05	05
Analyze	05	05
Evaluate	--	--
Create	05	05

SEE –Semester End Examination Lab (50 Marks)

Bloom's Category	**Lab Marks(50)**
Remember	05
Understand	05
Apply	20
Analyze	10
Evaluate	--
Create	10

ASSESSMENT PATTERN SUMMARY

1. All laboratory experiments are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script for breakup of marks
4. Change of experiment is allowed only once and 10% Marks allotted to the procedure part to be made zero.

CIE in Laboratory			
Continuous evaluation		**Max Marks**	**Total Marks**
Lab conduction	10	**25**	**50**
Viva	05		
Observation and Record	10		
Final Lab CIE			
Write up	05	**25**	
Execution	15		
Viva	05		
Total CIE marks (Lab) = 50 Marks			
Total SEE marks (Lab) = 50 Marks			

BASIC ELECTRONICS

Course Code : 19EC1ICBEE / 19EC2ICBEE
L : P : T : S : 3 : 0 : 0: 0
Exam Hours : 03
Total Hours : 40

Credits : 03
CIE Marks : 50
SEE Marks : 50
Total Marks: CIE + SEE : 100

Course Objectives : To impart knowledge on

1. Digital concepts and number systems.
2. Basics of Electronic devices.
3. Principle of OP AMP.
4. Fundamentals of communication systems.
5. Applications of electronics.

Course Outcomes :

After completion of the course, the graduates will be able to

CO1	Identify the electronic devices and their significance in different applications.
CO2	Understand the fundamental concepts and the operation of transistor and op-amps.
CO3	Compile the different building blocks in digital electronics using logic gates and implement simple logic function using basic gates.
CO4	Analyze the basic principles of different types of MOSFETS.
CO5	Understand the functioning of a communication system, and different modulation techniques.
CO6	Design and develop simple electronic projects.

Mapping of Course Outcomes to Program outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	-	-	-	-	-	-	-	-	-
CO2	3	1	2	-	-	-	-	-	-	-	-	-
CO3	3	2	2	2	-	-	-	-	-	-	-	-
CO4	3	1	2	-	-	-	-	-	-	-	-	-
CO5	3	3	1	-	-	-	-	-	-	-	-	-
CO6	3	3	3	2	-	-	-	-	-	-	-	-

Module	Course Contents	Hours	COs
1	**Digital Electronics 1 :** Introduction to Number Systems, Binary Number System, Decimal Number System, Octal Number System, Hexadecimal Number System. Conversion from one number system to another number system, 1's and 2's complement method and their arithmetic. **Digital Electronics 2 :** Binary logic functions, Boolean algebra, De-Morgan's Theorem, Logic gates, Realization of Boolean functions using basic gates, Implementation of logic gates as half & full adder.	8	CO1 CO3
2	**Bipolar Junction Transistors:** Construction, working & operation principle of a BJT, Common Base, Common Emitter and Common Collector Characteristics, Numerical examples, Transistor biasing - fixed & voltage divider biasing techniques (no numericals). **Field Effect Transistor (FET) –** Construction, Operation, Transfer Characteristics, *p*-channel FET-construction, operation and drain characteristics, Depletion and Enhancement type Metal Oxide Semiconductor (MOSFET).	8	CO2 CO4
3	**Operational Amplifiers :** Introduction, Block diagram representation of OPAMP, Schematic symbol and pin configuration,, Ideal and Practical Characteristics of OPAMP, Virtual ground concepts, **OPAMP applications:** Inverting and Non-Inverting amplifiers, Voltage Follower, Summer, Differentiator, Integrator, Numericals.	8	CO2 CO6
4	**Communication Systems 1 :** Introduction, Elements of Communication Systems, Concept of modulation, methods of modulation - principles of AM, FM, pulse analog and pulse digital modulation – AM / FM transmitters & receivers (block diagram description only), AM derivation, Modulation index. **Communication Systems 2:** Block diagram and Principle of Optical Fiber Communication, Advantages and Applications of Optical Fiber communication.	8	CO5
5	**Applications of Electronics**: Principle of operation of Mobile phone, GSM architecture, Anti-Lock Braking System (ABS): Introduction and block diagram, Internet of Things (IoT): Introduction, Applications: Smart Home Automation system, 7805 IC voltage regulator, Introduction to microcontroller & microprocessors, Difference between microcontroller & microprocessor, Difference between CISC & RISC processors.	8	CO1 CO5 CO6

Note:

1. Questions for CIE and SEE not to be set from self-study component.
2. Assignment Questions should be from self-study component only.

Pre-requisites: Engineering Mathematics, Fundamentals of Electronics (studied @ X, XI, XII level)

Self-Study Components :

Unit-1 : Digital – 9's & 10's Compliment methods, Universal gates .
Unit-2 : CMOS Circuits, Construction & working of SCR, UJT.
Unit-3 : Applications of OPAMPs – Oscillators, Schmitt Trigger.
Unit-4 : Satellite Communication, ISDN
Unit-5 : Cloud computing, Electrical & Electronic Instruments, Multimeters.

Text Books:

1. D.P. Kothari, I. J. Nagrath, "Basic Electronics", 2nd Edn, *Mc Graw Hill*, 2018
2. V.K. Mehta, "Fundamentals of Electronic Devices & Circuits", *S. Chand & Company*, New Delhi, India.
3. David A. Bell, "Electronic Devices and Circuits", *Oxford University Press*, 5th Edition, 2008.
4. George Kennedy, Electronic Communication Systems, *TMH*, 4th Edition.

Reference Text Books:

1. Robert Boylested and Louis Nashelsky, "Electronic Devices and Circuit Theory", *Pearson Education*, 9th Edition, 2007.
2. Thomas Floyd, "Electronic Devices", *Prentice Hall of India*, New Delhi 2009.
3. Charles H. Roth, Jr; "Fundamentals of Logic Design", *Thomson Learning*, 2004.
4. U.B. Mahadeva Swamy, "A simplified approach to Basic Electronics", *Sanguine Technical Publications*, Bengaluru, 2015.

Web References:

1. https://www.rfwireless-world.com
2. https://en.wikipedia.org/wiki/Anti-lock_braking_system
3. https://en.wikipedia.org/wiki/Internet_of_things
4. https://www.synergy.ac.in

Scheme of Evaluation of the CIE & Assessment Pattern :

Assignment : Only one assignment (open book test normally) will be of 10 marks & conducted in the class during the course of the semester (normally midway thro' the semester or in between 2nd & 3rd test). Generally, 2- 4 questions can be given which has to be solved in 1 hour duration, the assignment question has to be from the self-study component.

Quiz : There will be 1 quiz of 30 questions, which will be reduced to 10 marks conducted, which may be conducted along with the 2nd CIE test or at the appropriate time during the course of the semester.

CIE : There will be 3 CIE tests in a semester conducted for 50 marks with 10 Marks MCQs, remaining 40 Marks descriptive (with theory & problems), each of 10 Marks, each CIE will be reduced to 10 Marks and totaled up for 30 Marks.

CIE – Continuous Internal Evaluation Theory (50 Marks)

Bloom's Category	Tests - 3 CIEs	Assignments-1 No.	Quiz-1 Nos.
Marks (Out of 50)	**30**	**10**	**10**
Remember	05	--	--
Understand	05	--	--
Apply	10	--	--
Analyze	05	--	--
Evaluate	05	--	--
Create	--	--	--

SEE – Semester End Examination Theory (50 Marks) :

Bloom's Category	Marks Theory (50 Marks)
Remember	10
Understand	20
Apply	10
Analyze	5
Evaluate	5
Create	-

ENGLISH LANGUAGE LABORATORY-II

Course Code: 19HS2ILEGL **Credits: 1**

L: T: P : 0:0:2 **CIE Marks: 50**

Course Objectives:

1. To assimilate and get familiarized with English vocabulary.
2. To improve both speaking and writing skills.
3. To identify the common errors in spoken and writing English.
4. To provide information on standard technical report writing..
5. To involve students in language lab for hands on experience.
6. To enhance oral communication skills through group activities.

Course Outcomes:

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

CO1	Attain better understanding of nuances of English language through audio-visual experience and group activity.
CO2	Acquire basic proficiency in English reading and listening, comprehensions, writing and speaking skills.
CO3	Write campus recruitment exams, engineering competitive exams and all other general competitive exams.
CO4	Improve business and technical communication skills and technical writing skills.

Mapping of Course outcomes to Program outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO2	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO3	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO4	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**

Spoken/Oral English Communication Skills:
GRE, IELTS, TOFEL, CIEFL-Hyderabad, Web links Videos and other exam activities with audio and videos may be used for the following topics.

Unit	Course content	Hours	COs
1	Communication Skills: Formal & Informal.	**4**	**CO1 CO2 CO4**
2	Listening skills & Comprehensions.	**4**	**CO1 CO2 CO3 CO4**
3	Pronunciation, Intonation, Stress & Rhythm.	**4**	**CO2 CO3 CO4**
4	Speaking: Self-introduction, introducing oneself, one's family, one's friends and relatives, one's country etc. Welcome Address, Vote of Thanks, Extempore Speeches, Short Speech on simple topics on simpler themes for about one minute.	**6**	**CO2 CO3 CO4**
5	Reading: Reading aloud- by students individually, reading rhymes, proverbs, passages on various topics of interest, Newspaper reading, Reading humorous passages, Anecdotes, Stories, Tricky sounds (conditioners), Reading Manuals, Reading individual sentences with Articulation, Pronunciation and Tones.	**4**	**CO2 CO4**
6	Common Everyday Situations: Conversations and Dialogues, Presentation Skills and Formal Presentations by students. Inter-personal communication skills and Group discussion, Employment Interviews	**4**	**CO2 CO3 CO4**

Note:

Each student admitted to the B.E program needs to register for these mandatory courses. There is no Semester End Examination (SEE) for the mandatory courses. The Pass Grade / Not Passed will be awarded to the student based on the performance in the Continuous Internal Evaluation (CIE). Students who do not secure the Pass Grade for the mandatory courses are not eligible for the award of the degree.

Text books:

1. Technical Communication- Principles and Practice, Third Edition, Meenakshi Raman and Sangeetha Sharma, Oxford University Press, 2015.
2. High School English Grammar & Composition, Wren & Martin (Upgraded Format), Revised by N D V Prasad, S Chand & Company Ltd, 2015.
3. English for Technical Communication, N.P. Sudharshana and C. Savitha, Cambridge University Press, India Pvt Ltd, 2017.
4. Communication Skills, Sanjay Kumar and Pushpa Lata, Oxford University Press, 2011.
5. Exercises in Spoken English, Parts I-III, CIEFL, Hyderabad, Oxford University Press, 2015

Reference books:

1. Soft Skills and Employability Skills, Sabina Pillai and Agna Fernandez, Cambridge University Press, India Pvt Ltd, 2017.
2. Soft skills for everyone, Jeff Butterfield, Cengage learning India Pvt Ltd, 2017.
3. Business Communication (Connecting at Work), Hory Sankar Mukerjee, Oxford University Press, 2017.
4. Remedial English Grammar, F.T.Wood, Macmillan, 2007.
5. Books relating to GRE, TOFEL, GATE, SSC/CDS/SSB, IBPS<IES and other state and National level Exams (UPSC & KPSC).

Web Links and Video Lectures

www.unacademy.com/lesson/future-perfect-tense/YQ9NSNQZ
https://goo.gl/mne8
Banking adda English – https://t.me/adda247youtube For All the
www.india.oup.com/orcs/9780199457496
https:goo.gl/LLAkQE
www.india.oup.com/orcs/9780199457069
https://www.youtube.com/channel/UCzGB...
https://www.youtube.com/watch?v=dSeLyms1YVM
https://www.ets.org/toe
Videos &lectures relating to IELTS, GRE, TOFEL and others exams

Assessment Pattern:

CIE –Continuous Internal Evaluation

Bloom's Category	**Tests**	**Assignments**	**AAT1**	**AAT2**
Marks	**50**	-	-	-
Remember	10			
Understand	20			
Apply	10			
Analyze	05			
Evaluate	-			
Create	05			