DEPARTMENT OF CIVIL ENGINEERING

Scheme of Instruction
and
Syllabi of

B.E. I & II- SEMESTER

2018-2019

UNIVERSITY COLLEGE OF ENGINEERING
(AUTONOMOUS)
OSMANIA UNIVERSITY
HYDERABAD – 500 007, TELANGANA

AICTE MODEL CURRICULUM
I & II SEMSTERS SCHEME & SYLLABUS

CIVIL ENGINEERING

SCHEME OF INSTRUCTION
B.E. (CIVIL ENGINEERING) I – SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction				Contact hr/week	Scheme of Examination		Credits
			L	T	Dr	P		CIE	SEE	
1	MT 101BS	Engineering Mathematics-I	3	1	-	-	4	30	70	4
2	PH 101BS	Engineering Physics	3	1	-	-	4	30	70	4
3	CE 101ES	Engineering Mechanics	3	1	-	-	4	30	70	4
4	PH 151BS	Engineering Physics Lab	-	-	-	3	3	25	50	1.5
5	CE 151ES	Engineering Graphics	-	-	2x3	-	6	50	50	3
6	ME 151ES	Workshop Practice	-	-		6	6	25	50	3
			09	**03**	**06**	**07**	25	190	360	**19.5**

L : Lectures
T : Tutorials
P : Practical
Dr. : Drawing
CIE : Continuous Internal Evaluation
SEE : Semester End Examination

SCHEME OF INSTRUCTION FOR B.E. (CIVIL ENGG) II – SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction				Contact hr/week	Scheme of Examination		Credits
			L	T	Dr	P		CIE	SEE	
1	MT 201BS	Engineering Mathematics-II	3	1	-	-	4	30	70	4
2	CH 102BS	Engineering Chemistry	3	1		-	4	30	70	4
3	EG 101HS	English	2	-		-	2	30	70	2
4	CS 201ES	Programming & Problem Solving	3	-		-	3	30	70	3
5	CH 152BS	Engineering Chemistry Lab	-	-		3	3	25	50	1.5
6	CE 251ES	Computer Aided Civil Engg. Drawing	-	-	2x2	-	4	50	50	2
7	EG 51HS	English Lab	-	-		2	2	25	50	1
8	CS 251ES	Computer programming Laboratory	-	-		4	4	25	50	2
			11	**02**	**04**	**09**	**26**	245	480	**19.5**

L : Lectures T : Tutorials

P : Practical Dr. : Drawing

CIE : Continuous Internal Evaluation SEE : Semester End Examination

I – SEMESTER
DETAILED SYLLABUS

MT 101BS *With effect from 2018-2019*

ENGINEERING MATHEMATICS – I

(Common to all branches)

Instruction	4 periods per week (3 Theory + 1 Tutorial)
Duration of University Examination	3 hours
University Examination	70 Marks
Sessional	30 Marks

Course objectives:

1) To introduce the concepts of sequences, series and their properties
2) To Study Fourier Series and its applications.
3) To introduce the concepts of functions of several variables and multiple integrals
4) To study vector differential and integral calculus

Course Outcomes: After completing this course, the students will able to

1) Find the nature of sequences and series
2) Expand functions as a Fourier Series.
3) Use the knowledge of multiple integrals in finding the area and volume of any region bounded by given curves
4) apply this knowledge to solve the curriculum problems

UNIT – I

Sequences and Series:

Sequences, Series, General properties of series, Series of positive terms, Comparison tests, tests of Convergence D'Alembert's ratio test, Cauchy's n^{th} root test, Raabe's test, Logarithmic test, Alternating series, Series of positive and negative terms, Absolute convergence and Conditional convergence ; Fourier Series, Half range Sine and Cosine Series, Parseval's theorem.

UNIT – II

Calculus of one variable:

Rolle's theorem, Lagrange's , Cauchy's mean value theorems (without proof) Taylor's series, Curvature, Radius of curvature, Circle of curvature, Envelope of a family of curves, Evolutes and Involutes, Evaluation of definite and improper integrals, Beta, Gamma and Error functions.

UNIT – III

Multivariable Calculus (Differentiation):

Functions of two variables, Limits and continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions (Chain rule), Change of variables, Jacobian , Higher order partial derivatives, Taylor's series of functions of two variables, Maximum and minimum values of functions two variables, Lagrange's method of multipliers.

UNIT – IV

Multivariable Calculus (Integration) :

Double integrals, Change of order of integration, Triple integrals, Change of variables in integrals and applications-areas and volumes.

UNIT – V

Vector Calculus:

Scalar and vector fields, Gradient of a scalar field, Directional derivative, Divergence and Curl of a vector field, Line, Surface and Volume integrals , Green's theorem in a plane, Gauss's divergence theorem, Stoke's theorem (without proofs) and their verification.

Suggested Reading:

1. R.K.Jain & S.R.K Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, 4th Edition 2014.
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, John Wiley, 9th Edition, 2012.
3. B.S.Grewal, *Higher Engineering Mathematics*, Khanna Publications, 43rd Edition, 2014.
4. G.B.Thomas , Maurice Weir and Joel Hass, *Thomas' Calculus*, Peterson, 12th Edition,2010.
5. B.V. Ramana, Higher Engineering Mathematics, 23rd reprint, 2015.
6. N.P.Bali and M. Goyal, A text book of Engineering Mathematics, Laxmi Publications 2010.
7. H.K. Dass, Er. Rajnish Varma, Higher Engineering Mathematics, Schand Technical Third Edition.

ENGINEERING PHYSICS
(Mech., Civil & EEE)

Instructions	(3L+1T)/week
Duration of University Examination	3 Hours
University Examination	70 Marks
Sessional	30 Marks
Credits	4

Course Objectives:

1) To make student understand the basic concepts of waves and oscillations.
2) To understand the different types of crystals and the analysis of crystal parameters to investigate crystal structures. To classify the type of the defect present in the crystal.
3) To make student understand the formation of energy bands and classification of the solids based on the band theory. To understand the concept of semiconductors, ultrasonics and its wide applications.
4) To study different types of dielectric polarizations and dielectric properties of materials. To know the significance of Maxwell's equations in engineering applications.
5) To make student understand the basic concepts of superconductivity and nanomaterials.

Course Outcomes:

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

1) Solve engineering problems using the concepts of waves and oscillations.
2) Explain the basic understandings of the matter, crystal structure and its fundamental properties including crystal systems and Miller indices.
3) Show their understanding of the conductivity nature of metals and the classification of the solids learned from the Band Theory of Solids. Apply the basic concepts of ultrasonics for various applications.
4) Demonstrate the knowledge in dielectric materials applications and its importance and explain the transportation of electromagnetic waves.
5) Apply the basic concepts of superconductivity and nano-materials in engineering applications.

UNIT – I (8 periods)

Waves and Oscillations: Simple harmonic oscillators - Complex number notation and phasor representation of simple harmonic motion, damped harmonic oscillator – Heavy, critical and light damping - Energy decay in a damped harmonic oscillator - Quality factor - Forced oscillators – Impedance - Steady state motion of forced damped harmonic oscillator - Power absorbed by oscillator

UNIT- II (8 periods)

Crystallography: Introduction – Types of crystal systems - Bravais lattices – Lattice planes and Miller Indices (Cubic system) – Inter planar spacing (Cubic system) - Bragg's law - Powder diffraction method.

Crystal defects: Classification of point defects - Concentration of Schottky defects in metals and ionic crystals - Concentration of Frankel defects – Line defects – Screw and Edge dislocations – Burger's vector.

UNIT- III (8 Periods)

Band Theory of Solids & Semiconductors: Classical free electron theory (qualitative) –Kronig-Penney model (qualitative treatment) - Energy band formation in solids - Intrinsic and Extrinsic semiconductors - Concept of a hole - Carrier concentration and conductivity in intrinsic semiconductors – Formation of P-N junction diode and its I-V characteristics – Thermistor and its characteristics - Hall effect and its applications.

***Ultrasonics*:** Introduction to Ultrasonic waves – Production of ultrasonic waves by Piezoelectric method – Detection of ultrasonic waves : Piezoelectric detector – Properties of Ultrasonic's – Wavelength of Ultrasonics by Debye-Sears method – Applications.

UNIT-IV (8 Periods)

***Dielectric Materials*:** Dielectrics - Types of polarizations – Electronic, Ionic, Orientational and Space charge polarizations – Expression for Electronic polarizability - Frequency and temperature dependence of dielectric polarizations - Determination of dielectric constant by capacitance Bridge method - Ferro electricity - Barium titanate - Applications of Ferroelectrics.

Electromagnetic theory: Basic laws of electricity and magnetism - Maxwell's equations in integral and differential forms - Conduction and displacement current – Relation between D, E and P - Electromagnetic waves: Equation of plane wave in free space – Poynting theorem.

UNIT-V (8 Periods)

Superconductivity: Introduction - General properties of super conductors - Meissner effect - Type I and Type II superconductors - BCS theory (qualitative) – Introduction to High T_c superconductors - Applications of superconductors.

Nano materials: Introduction - Properties of materials at reduced size - Surface to volume ratio at nano scale – Classification of nanomaterials - Preparation of nanomaterials: bottom–up methods (sol gel and CVD), Top-down methods (ball milling) - Basic ideas of carbon nanotubes – Applications nanomaterials and their health hazards.

Suggested Reading:

1) B.K. Pandey and S.Chaturvedi – Engineering Physics, Cengage Learning.
2) M.S. Avadhanulu and P.G. Kshirasagar - Engg. Physics, S.Chand & Co.
3) C. Kittel - Introduction to Solid State Physics, Wiley Eastern Ltd.
4) A.K Bhandhopadhya - Nano Materials, New Age International.
5) C.M. Srivastava and C. Srinivasan - Science of Engg. Materials, New Age International.

ENGINEERING MECHANICS

Course Objectives:

1) Understand the resolution of forces, equilibrium of force systems
2) Learn the analysis of forces in the structures
3) Understand the concept of centroid, moment of inertia and dynamics

Course Outcomes:

1) Determine the resultant and moment of a force system
2) Apply the equations of equilibrium for a generalized force system
3) Analyze the forces in trusses and frames
4) Determine the centroid and moment of inertia for 1D & 2D bodies
5) Apply the concepts of dynamics in solving the engineering problems

UNIT – I

Introduction to Engineering Mechanics covering, Force Systems Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application;

Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy

UNIT – II

Basic Structural Analysis covering, Equilibrium in three dimensions; Method of Sections; Method of Joints; How to determine if a member is in tension or compression; Simple Trusses; Zero force members; Beams & types of beams; Frames & Machines.

UNIT – III

Centroid and Centre of Gravity covering, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Mass moment inertia of circular plate, Cylinder, Cone, Sphere, Hook.

UNIT – IV

Virtual Work and Energy Method- Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency. Conservative forces and potential energy (elastic and gravitational), energy equation for equilibrium. Applications of energy method for equilibrium. Stability of equilibrium.

UNIT – V

Mechanical Vibrations covering, Basic terminology, free and forced vibrations, resonance and its effects; Degree of freedom; Derivation for frequency and amplitude of free vibrations without damping and single degree of freedom system, simple problems, types of pendulum, use of simple, compound and torsion pendulums

Suggested Reading:

1. F.L. Singer, *Engineering Mechanics*, Collins, Singapore, 1975.
2. S.P. Timoshenko and D.H. Young, *Engineering Mechanics*, McGraw-Hill International Edition, 1983.
3. S. Rajeshakharam and G. Sankarasubrahmanyam, *Mechanics*, Vikas Publications, 2002.
4. S.B. Junarkar and H.J. Shah, *Applied Mechanics*, 2001.
5. J.H. Shames, *Engineering Mechanics*, Prentice Hall, 1987.
6. B. Bhattacharyya, *Engineering Mechanics*, Oxford Higher Education, 2015.

e-Resources:

1. http://nptel.ac.in/
2. http://mhrd.gov.in/e-contents
3. http://spoken-tutorial.org/

PH 151BS *With effect from 2018-2019*

ENGINEERING PHYSICS LAB
(Mech., Civil & EEE)

Instructions	3h/week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks
Credits	1.5

Course Objectives:

1) Demonstrate an ability to make physical measurements and understand the limits of precision in measurements.
2) Demonstrate the ability to use experimental statistics to determine the precision of a series of measurements.
3) Demonstrate the ability to prepare a valid laboratory notebook.
4) Demonstrate the ability to understand the construction and working of different experiments.

Course Outcomes:

1) Student recognize the correct number of significant figures in a measurement or in the results of a computation.
2) Students can use a best fit to create a graph from a series of data points. Students can extrapolate and interpolate.
3) Students will keep a lab notebook that documents their experience in each lab procedure.
4) Develop skills to impart practical knowledge in real time solution and learn to design new instruments with practical knowledge.

List of experiments:

1. To determine the Dielectric constant and Phase transition temperature of Lead Zirconium Titanate (PZT).
2. Determination of Velocity of ultrasonic waves in a liquid by Debye-Sears method.
3. To draw the I-V Characteristics of P-N Junction diode and to evaluate the value of potential barrier of the diode.
4. To find the values of Electrical conductivity and energy gap of Ge crystal by Four probe method.
5. Determination of rigidity of modulus of Torsion pendulum.
6. Determination of Logarithmic decrement of a Torsional pendulum.
7. Determination of carrier concentration, Mobility and Hall Coefficient of Ge Crystal using Hall Effect Experiment.
8. To determine the constants of A, B and α using Thermistor characteristics.

CE 151ES *With effect from 2018-2019*

ENGINEERING GRAPHICS

No. of Credits	3 Credits
Instruction	5 Periods per week
Duration of University Examination	3 Hours
Semester End Evaluation	50 Marks
Continuous Internal Evaluation	50 Marks

Course Objectives :

1) Introduction to engineering design and its place in society
2) Exposure to the visual aspects of engineering design
3) Exposure to engineering graphics standards
4) Exposure to solid modeling

Goals & Outcomes:

1. Knowledge on the fundamentals of AUTOCAD 2D commands
2. Application of basic principles of drawing and scales for representation of prototype objects
3. Relate the logic of projections to straight lines and various views of 2D and 3D objects
4. Capability to imagine and project the developed surface and truncated portion of 3D solids
5. Assimilation of visualization process to efficiently communicate ideas graphically and provide editable solutions

UNIT – I

Module 1: Overview of Computer Graphics covering, listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles.

UNIT – II

Module 2: Commands: Initial settings, Drawing aids, Drawing basic entities, Modify commands, Layers, Text and Dimensioning, Blocks Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, Create, edit and use

customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command.

UNIT – III

Module 3: Introduction to Engineering Drawing covering, Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute.

UNIT – IV

Module 4: Scales – Reduced and Enlarged scales, representative fraction, Plain, Diagonal and Vernier Scales, Projections of Points – placed in different quadrants, Projection of straight lines parallel to one plane, perpendicular to one plane, inclined to one plane and lines inclined to both planes.

UNIT – V

Module 5: Projections of planes, inclined Planes - Auxiliary Planes, Projections of Regular Solids covering, those inclined to both the Planes.

Module 6: Sections and Sectional Views of Right Angular Solids covering, Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone.

Suggested Reading:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. 2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. (Corresponding set of) CAD Software Theory and User Manuals
6. S.N. Lal., Engineering Drawing (2018), M/S. Cengage Learning India Pvt. Ltd., Pratap Gunj, Delhi

ME 151ES *With effect from 2018-2019*

WORKSHOP PRACTICE

Instructions:	(6P) hrs per week
Duration of SEE:	3hours
CIE:	25 Marks
SEE:	50 Marks
Credits:	3

Course Objectives:

1) To learn about different tools used in workshop.
2) To understand the different manufacturing processes.
3) To learn about fabrication of components using different materials.

Course Outcomes:

Upon completion of this laboratory course, students will be able to

1. To study and practice on tools and their operations of different trades.
2. To practice on manufacturing of components using workshop trades including carpentry, fitting, foundry, smithy, sheet metal & welding
3. To apply suitable tools for machining process including facing, turning & thread cutting
4. To apply basic electrical knowledge for house wiring practice

1. Machine shop (10 hours)
2. Fitting shop (8 hours)
3. Carpentry (6 hours)
4. Electrical & Electronics (8 hours)
5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4 hrs))
6. Casting (8 hours)
7. Smithy (6 hours)
8. Plastic moulding & Glass Cutting (6 hours)

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Suggested Text/Reference Books:

(1) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

II – SEMESTER
DETAILED SYLLABUS

SCHEME OF INSTRUCTION FOR B.E. (CIVIL ENGG) - II SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction				Contact hr/week	Scheme of Examination		Credits
			L	T	Dr	P		CIE	SEE	
1	MT 201BS	Engineering Mathematics-II	3	1	-	-	4	30	70	4
2	CH 102BS	Engineering Chemistry	3	1		-	4	30	70	4
3	EG 101HS	English	2	-		-	2	30	70	2
4	CS 201ES	Programming & Problem Solving	3	-		-	3	30	70	3
5	CH 152BS	Engineering Chemistry Lab	-	-		3	3	25	50	1.5
6	CE 251ES	Computer Aided Civil Engg. Drawing	-	-	2x2	-	4	50	50	2
7	EG 151HS	English Lab	-	-		2	2	25	50	1
8	CS 251ES	Computer programming Laboratory	-	-		4	4	25	50	2
			11	**02**	**04**	**09**	**26**	245	480	**19.5**

BS 201MT *With effect from 2018-2019*

ENGINEERING MATHEMATICS – II

(Common to all branches)

Instruction	4 Periods per week (3 Theory + 1 Tutorial)
Duration of University Examination	3 Hours
University Examination	70 Marks
Sessional	30 Marks

Course objectives:

1) To study matrix algebra and its use in solving system of linear equations and in solving Eigen value problems
2) To provide an overview of ordinary differential equations
3) To study special functions like Legendre and Bessel functions
4) To introduce the concept of functions of complex variable and their properties

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

1) Solve system of linear equations and eigen value problems
2) Solve certain first order and higher order differential equations
3) Determine the analyticity of complex functions and expand functions as
4) Taylor and Laurent series
5) Evaluate complex and real integrals using residue theorem

UNIT – I

Matrices :

Elementary row and column operations, Rank of a matrix, Echelon form, System of linear equations, Linearly dependence and independence of vectors, Linear transformation, Orthogonal transformation, Eigenvalues, Eigenvectors, Properties of eigenvalues, Cayley-Hamilton theorem, Quadratic forms, Diagonalization of Matrices, Reduction of quadratic form to canonical form by orthogonal transformation , Nature of quadratic forms.

UNIT – II

First Order Ordinary Differential Equations:

Exact first order differential equations, Integrating factors, Linear first order equations, Bernoulli's , Riccati's and Clairaut's differential equations, Orthogonal trajectories of a given family of curves.

UNIT – III

Differential Equations of Higher Orders:
Linear independence and dependence, Solutions of second and higher order linear homogeneous equations with constants coefficients, Method of reduction of order for the linear homogeneous second order differential equations with variable coefficients , Solutions of non-homogeneous linear differential equations, Method of variation of parameters, solution of Euler-Cauchy equation, Simultaneous linear differential equations, Power Series solution, Legendre Polynomial of first kind, Bessel's function of first kind and their properties.

UNIT – IV

Functions of a Complex Variable:
Limits and continuity of a function, differentiability and analyticity, Elementary Analytic functions, Necessary and Sufficient conditions for a function to be analytic, Cauchy- Riemann equations in polar form, harmonic functions, complex integration, Cauchy's integral theorem, extension of Cauchy's integral theorem for multiply connected regions, Cauchy's integral formula, Cauchy's inequality, Cauchy's formula for derivatives, Liouville's theorem, Maximum Modulus principle (without proof)and its applications

UNIT – V

Residue Calculus:
Power series, Taylor's series, Laurent's series, zeros and singularities, residues, residue theorem, evaluation of real integrals using residue theorem, Argument principle, Rouche's Theorem and their applications, conformal mapping Bilinear transformations. (**All Theorems without Proof)**

Suggested Reading:

1. R.K. Jain & S.R.K. lyengar, *Advanced Engineering Mathematics*, Narosa Publications, 4th Edition,2014.
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, John Wiley, 9th Edition, , 2012.
3. Dr.B.S.Grewal, *Higher Engineering Mathematics*, Khanna Publications, 43rd Edition,2014.
4. Dr.M.D.Raisinghania, *Ordinary and Partial differential equations*, S.CHAND, 17th Edition 2014.
5. James Brown, R.V Churchill, Complex Variables and applications, Mc GrawHill 9th Edition 2013.
6. B.V. Ramana, Higher Engineering Mathematics, 23rd reprint, 2015
7. S.L Ross, Differential Equations 3rd Edition, Wiley India.
8. G.F. Simmons and S.G. Krantz, Differential Equations, Tata Mc Graw Hill, 2007.

9. N. Bali, M.Goyal, A text book of Engineering Mathematics, Laxmi publications,2010
10. H.K. Dass, Er. Rajnish Varma, Higher Engineering Mathematics, S. Chand Technical Third Edition.

CH 102BS *With effect from 2018-2019*

CHEMISTRY
(FOR CIVIL / MECHANICAL/ELECTRICAL)

Instruction	: 3L and 1T per week
Duration of University Examination	: 3 Hours
University Examination	: 70 Marks
Sessional	: 30 Marks
Credits	: 3.5

Course Outcomes:

The concepts developed in this course will help in quantification of several concepts in chemistry that have been introduced at the 10+2 level. Technology is being increasingly based on the Electronic, Atomic and Molecular level modifications. The course will enable the student to:

1. Attains knowledge about the disadvantages of hard water for domestic and industrial purposes and its softening methods
2. Analyze microscopic chemistry in terms of atomic, molecular orbital and intermolecular forces
3. Rationalize bulk properties and processes using thermodynamic considerations
4. Gain knowledge in causes of corrosion and its prevention
5. Distinguish the ranges of electromagnetic spectrum used for various spectroscopic techniques.

UNIT-I
WATER CHEMISTRY AND CORROSION (10L):

Water chemistry: Hardness of water-Types and units of hardness, estimation of temporary and permanent hardness of water by EDTA method. Alkalinity of water and its determination. Water softening by Ion exchange and Reverse Osmosis methods. Boiler troubles-scales and sludges formation-causes, effects and prevention, Numerical problems.

Specifications of potable water. Water treatment for drinking purpose-coagulation, sedimentation, filtration, sterilization by Chlorination and Ozanization.

Corrosion-causes and its effects. Types of corrosion-Dry or Chemical corrosion and Wet or Electrochemical corrosion and their mechanism. Electrochemical corrosion and its types. Factors influencing rate of corrosion.

Corrosion control methods: Cathodic protection methods- Sacrificial anodic and Impressed current cathodic protection methods. Surface coating methods: Hot dipping-Galvanizing and Tinning. Electroplating.

UNIT-II

THERMODYNAMICS AND ELECTROCHEMISTRY (10L):

Thermodynamics: Definition of thermodynamic functions- Enthalpy, Entropy, Free energy and their significance. Entropy and Free energy change for isothermal process. Variation of free energy change with temperature and pressure. Concept of spontaneity. Criteria of spontaneity in terms of entropy and free energy. Carnot cycle-efficiency of heat engine. Numerical problems.

Electrochemistry: Electrochemical cells- Electrolytic and Galvanic cells. Cell notation, cell reaction and cell potentials. Types of electrodes-Calomel, Quinhydrone and Glass electrodes. Determination of P^H of a solution by using Quinhydrone electrode. Thermodynamics of emf of cells- Nernst equation and its derivation. Application of Nernst equation to electrode potential and emf of cells. Numerical problems. Principle and applications of Conductometric and Potentiometric titrations.

UNIT-III

MOLECULAR STRUCTURE AND SPECTROSCOPY (10L):

Molecular Orbital Theory. Linear Combination of Atomic Orbitals (LCAO). Molecular Orbital energy level diagrams of diatomic molecules-O_2, N_2 and NO. Crystal field theory-salient features, Crystal Field Splitting of d-orbitals of transition metal complexes in Octahedral, Tetrahedral and Square planar geometries. Magnetic properties of complexes.

Spetroscopy:

Principles and selection rules of Vibrational , Rotational and Electronic Spectroscopy and their applications. Atomic Absorption Spectroscopy and its applications.

UNIT-IV

Engineering materials: (6L)

Lubricants: Introduction, functions and mechanism of lubrication. Hydrodynamic, Boundary and Extreme pressure lubrication. Classification of lubricants-solid, semi-solid and liquid lubricants. Properties of lubricants: viscosity, viscosity index, saponification number and acid value.

Composites: Introduction, constituents and characteristics of composites. Types of composites-reinforced, Particulate and Layered composites. Advantages and applications of Composites.

UNIT-V

Energy Sources (10L)

Fuels: Introduction. Classification and advantages, disadvantages of solid, liquid and gaseous fuels. Requirements of a good fuel. Biofuels - Biodiesel.

Combustion: Calorific value of the fuel-Lower calorific value (LCV), Higher calorific value (HCV).Theoretical calculations of calorific value by Dulongs formula-Numerical problems.

Solid Fuels: Coal-Proximate and Ultimate analysis and its significance.

Liquid Fuels: Source-Fractional distillation of petroleum, important fractions and their uses. Knocking, uel rating-Octane and Cetane numbers.

Gaseous Fuels: LPG, CNG composition and uses.

Batteries: Primary batteries-Zn carbon battery. Secondary batteries-Pb- Acid battery and Ni-Cd battery. Lithium-ion batteries- advantages and applications.

Fuel cells: Concept of fuel cells and their advantages. Construction and working of H_2-O_2 fuel cells.

Suggested Readings:

1. Jain & Jain, *Engineering chemistry*, Dhanpat Rai publishing Co.,16th Edition.
2. B.L.Tembe,Kamaluddin and M.S.Krishnan, Engineering Chemistry(NPTELWeb-book)
3. Prashanth Rath, Engineering Chemistry, Cengage Learning.
4. M.J.Sienko and R.A.Plane, Chemistry: Principles and Applications, MGH Publishers.
5. B.H.Mahan, University Chemistry, Pearson Publishing Co., 4th Edition.
6. C.N. Banwell, *Fundamentals of Molecular Spectroscopy*, TMH

CS 201ES *With effect from 2018 – 2019*

PROGRAMMING AND PROBLEM SOLVING

(Common to all Branches)

Instruction	: 3 Hours/Week
Duration of SEE	: 3 Hours
SEE	: 70 Marks
CIE	: 30 Marks
Credits	: 3

Course Objectives:

1) To introduce the basic concepts of Computing environment, number systems and flowcharts
2) To familiarize the basic constructs of C language – data types, operators and expressions
3) To understand modular and structured programming constructs in C
4) To learn the usage of structured data types and memory management using pointers
5) To learn the concepts of data handling using files

Course outcomes:

Student will be able to:

1. Explain various functional components in computing environment
2. Develop algorithmic solutions to problems and draw the flow charts
3. Explain and use basic constructs of C in writing simple programs
4. Use standard library functions in C and develop modular programs using user defined functions
5. Develop programs using user defined structured data types and Files

UNIT – I

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Software Development, Flow charts. **Number Systems**: Binary, Octal, Decimal, Hexadecimal

Introduction to C Language - Background, C Programs, Identifiers, Data Types, Variables, Constants, Input / Output Statements

Arithmetic Operators and Expressions: Evaluating Expressions, Precedence and Associativity of Operators, Type Conversions.

UNIT-II

Conditional Control Statements: Bitwise Operators, Relational and Logical Operators, If, If-Else, Switch-Statement and Examples. Loop Control Statements: For, While, Do-While and Examples. Continue, Break and Goto statements

Functions: Function Basics, User-defined Functions, Inter Function Communication, Standard Functions, Methods of Parameter Passing. **Recursion-** Recursive Functions.. **Storage Classes:** Auto, Register, Static, Extern, Scope Rules, and Type Qualifiers.

UNIT – III

Preprocessors: Preprocessor Commands

Arrays - Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two- Dimensional Arrays, Multidimensional Arrays, Linear and Binary Search, Selection and Bubble Sort.

UNIT - IV

Pointers - Introduction, Pointers for Inter-Function Communication, Pointers to Pointers, Compatibility, Lvalue and Rvalue, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications, Pointers to void, Pointers to Functions, Command-line Arguments.

Strings - Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions.

UNIT - V

Structures: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures, Unions, Type Definition (typedef), Enumerated Types.

Input and Output: Introduction to Files, Modes of Files, Streams, Standard Library Input/Output Functions, Character Input/Output Functions.

Suggested Reading:

1. B.A. Forouzan and R.F. Gilberg, "*A Structured Programming Approach in C"*, Cengage Learning, 2007
2. Kernighan BW and Ritchie DM, "*The C Programming Language"*, 2nd Edition, Prentice Hall of India, 2006.
3. Rajaraman V, "*The Fundamentals of Computer"*, 4th Edition, Prentice-Hall of India, 2006.
4 Dromey, How to solve it by Computer, Pearson Education, 2006

EG 101HS *With effect from 2018 – 2019*

ENGLISH

(Group I – CE, EEE, ME**)**
(Group II – CSE, ECE, BME**)**

Instruction	2 periods per week
Duration of University Examination	3 Hours
University Examination	70 Marks
Sessional	30 Marks

The following are the objectives of the course:

To enable the students to

1) communicate clearly, accurately and appropriately
2) learn different models of interpersonal communication
3) learn to communicate grammatically
4) learn to write essays, formal letters and technical reports
5) comprehend the different types of texts

UNIT – I

Effective Communication: Role and importance of communication; Features of human communication; Process of communication; Barriers to communication; Oral and Written Communication; Importance of listening, speaking, reading, and writing; Types of communication: Verbal – formal versus informal communication, one-way versus two-way communication, Non-verbal communication.

UNIT – II

Personality Development and Interpersonal Communication: Time management; Emotional Quotient; Teamwork; Persuasion techniques. Models of interpersonal development: Johari window, Knapp's model; Styles of communication;

UNIT – III

Remedial English: Tenses, Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés. (**Note**: *The focus is on appropriate usage*)

Unit - IV

Vocabulary Building and Written Communication: Roots and affixes; Words often confused: Homonyms, Homophones, Homographs; One-word substitutes; Idiomatic usage: Idioms, Phrases, Phrasal Verbs; Synonyms; Antonyms; Paragraph writing; Précis writing; Essay writing; Official letters; E-mail etiquette; Technical report writing: Feasibility, Progress and Evaluation reports.

Unit – V

Reading Comprehension: Unseen Passages, A.P.J. Abdul Kalam, Azim Premji, Sachin Tendulkar, Sathya Nadella, Sam Pitroda (**Note**: No descriptive questions to be set from this unit and only Reading Comprehension/s from unseen passages should be set in the Examination Question Papers)

Suggested Reading:

1. E. Suresh Kumar, *Engineering English,* Orient BlackSwan, 2014.
2. Language and Life A Skills Approach, Orient Black Swan, 2018
3. Michael Swan, *Practical English Usage.* OUP, 1995.
4. Ashraf Rizvi, M, *Effective Technical Communication,* Tata McGraw Hill, 2009.
5. Meenakshi Raman and Sangeeta Sharma. *Technical Communication: Principles and Practice. OUP, 2011*.

CH 152BS *With effect from 2018-2019*

ENGINEERING CHEMISTRY LABORATORY
BE-I year II semester (CIVIL/MECH/EEE)

Instruction	3 periods per week
Duration of University Examination	3 Hours
University Examination	25 Marks
Sessional	50 Marks

1. **Water analysis:**
   - **i)** Determination of total hardness of water by EDTA method
   - **ii)** Determination of Chloride content of water
2. **Conductance measurements:**
   - **i)** Determination of cell constant.
   - **ii)** Estimation of HCl and CH_3COOH by conductometric titration.
3. **Potentiometric measurements:**
   - i). Estimation of HCl by potentiometric titration.
   - ii).Estimation of ferrous iron by potentiometric.
4. **Kinetic Studies:**
   - **i)** Determination of rate constant of acid catalyzed hydrolysis of methyl acetate.
   - **ii)** Study of kinetics of Iodine-Clock reaction.
5. **Synthesis of a drug molecule:**
   - **i)** Synthesis of Aspirin.
6. **Distribution Studies:**
   - **i)** Determination of partition coefficient of acetic acid between Butanol and Water.
7. **Physical constants:**
   - **i)** Determination of a viscosity of a given liquid.
   - **ii)** Determination of surface tension of a given liquid.

Suggested Reading:

1. Senior Practical Physical Chemistry ,B.D.Khosla, A.Gulati and V.Garg (R.Chand &Co., Delhi)
2. An Introduction to Practical Chemistry, K. K. Sharma and D.S.Sharma (Vikas publishing, N. Delhi)

EG 151HS *With effect from 2018-2019*

ENGLISH LABORATORY

(Group I – CE, EEE, ME**)**

Instruction	2 periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

The following are the **objectives** of the course:

To enable the students to

1) learn IPA
2) learn minimal pairs and types of syllables
3) overcome the difficulties with sounds of English
4) learn to participate well in GDs, Debates and Presentations
5) communicate with appropriate body language and expressions

1. Introduction to English Phonetics: Organs of Speech: respiratory, articulatory and phonatory systems; Sounds of English: Introduction to International Phonetic Alphabet; Minimal pairs; Syllable; Word Stress; Introduction of rhythm and intonation; Difficulties of Indians speakers with stress and intonation.
2. Speaking Activities: Self Introduction, Picture perception, JAM.
3. Group discussion, Debate, Presentation skills
4. Listening Activities: Listening to different types of materials for effective comprehension
5. Role play: Use of dialogues in a variety of situations and settings.

Suggested Reading:

1. E. Suresh Kumar. *A Handbook for English Language Laboratories (with CD).* Revised edition, Cambridge University Press India Pvt. Ltd. 2014
2. T. Balasubramanian. *A Textbook of English Phonetics for Indian Students.* Macmillan, 2008.
3. J. Sethi et al., *A Practical Course in English Pronunciation (with CD).* Prentice Hall of India, 2005.
4. Hari Mohan Prasad. *How to Prepare for Group Discussions and Interviews*. Tata McGraw Hill, 2006.
5. (Note: *A book exclusively on presentation skills will be suggested soon*)

CE 251ES *With effect from 2018-2019*

COMPUTER-AIDED CIVIL ENGINEERING DRAWING

No. of Credits	2 Credits
Instruction	4 Periods per week
Duration of University Examination	3 Hours
Semester End Evaluation	50 Marks
Continuous Internal Evaluation	50 Marks

Course Objectives

1) To prepare you to design a system, component, or process
2) To meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health, safety,
3) To prepare you to design a system for its manufacturability and sustainability

Course Outcomes

1. Understand isometric basics and principles, create drawings of AUTOCAD
2. Able to understand symbols and sign conventions
3. Detailing of Masonry bonds
4. Understand terms, elements, methods of building drawing.
5. Establish fundamentals of Isometrics, building Information Modelling (BIM)

UNIT – I

Isometric Projections covering, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids, Draw the sectional orthographic views of geometrical solids. AutoCAD: Setting up and use of
Layers, layers to create drawings

UNIT – II

SYMBOLS AND SIGN CONVENTIONS: Materials, Architectural, Structural, Electrical and Plumbing symbols. Rebar drawings and structural steel fabrication and connections drawing symbols, welding symbols; dimensioning standards.

UNIT – III

MASONRY BONDS: English Bond and Flemish Bond – Corner wall and Cross walls - One brick wall and one and half brick wall.

UNIT – IV

BUILDING DRAWING: Terms, Elements of planning building drawing, Methods of making line drawing and detailed drawing, Site plan, floor plans, elevation and section drawing of small residential buildings, Foundation plan, Roof drainage plans. Depicting joinery, standard fittings & fixtures, finishes. Use of Notes to improve clarity

UNIT – V

PICTORIAL VIEW: Principles of isometrics and perspective drawing, Perspective view of building, Fundamentals of Building Information Modelling (BIM)

Suggested Reading:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. 2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. (Corresponding set of) CAD Software Theory and User Manuals
6. S.N. Lal., Engineering Drawing (2018), M/S. Cengage Learning India Pvt. Ltd., Pratap Gunj, Delhi

CS 251ES *With effect from 2018-2019*

PROGRAMMING AND PROBLEM SOLVING LABORATORY

(Common to all Branches)

Instruction	: 2 Hours/Week
Duration of SEE	: 4 Hours
SEE	: 50 Marks
CIE	: 25 Marks
Credits	: 2

Course Objectives:

1) To use tools available under LINUX for C programming
2) To gain hands-on experience on basic constructs of C programming
3) To formulate problems and implement algorithmic solutions in C
4) To write modular programs in C using structure programming techniques and data files.

Course Outcomes: Student will be able to:

1. Write, compile and debug C programs in Linux environment
2. Write simple programs using control structures.
3. Write simple programs using user defined functions.
4. Write simple programs using data manipulation using arrays
5. Use standard C library functions to develop modular programs in C.

1. Introducing to programming Environment (Linux commands, editing tools such as vi editor, sample program entry, compilation and execution)
2. Write programs using arithmetic, logical, bitwise and ternary operators.
3. Write programs simple control statements : Roots of a Quadratic Equation, extracting digits of integers, reversing digits ,finding sum of digit ,printing multiplication tables, Armstrong numbers, checking for prime, magic number,
4. Sin x and Cos x values using series expansion
5. Conversion of Binary to Decimal, Octal, Hexa and Vice versa
6. Generating a Pascal triangle and Pyramid of numbers
7. Recursion: Factorial, Fibonacci, GCD
8. Finding the maximum, minimum, average and standard deviation of given set of numbers using arrays
9. Reversing an array, removal of duplicates from array

10. Matrix addition, multiplication and transpose of a square matrix .using functions
11. Bubble Sort, Selection Sort ,
12. Programs on Linear Search and Binary Search using recursion and iteration
13. Functions of string manipulation**:** inputting and outputting string, using string functions such as strlen( ), strcat( ), strcpy( )……etc
14. Writing simple programs for strings without using string functions.
15. Finding the No. of characters, words and lines of given text file
16. File handling programs: student memo printing
17. Create linked list, traverse a linked list, insert a node, delete a node, reversing list.

For online practice problems: https://projecteuler.net