

ANDHRA UNIVERSITY VISAKHAPATNAM



COMMON SCHEME OF INSTRUCTION & EXAMINATION for FIRST YEAR ENGINEERING COURSE

**I/IV B.TECH (4 YEAR)
I/IV B.TECH (6 YEAR DOUBLE DEGREE)**

(With Effect From 2019-2020 Admitted Batch)

Under Choice Based Credit System

**(As per Model Curriculum for Undergraduate
Degree Courses in Engineering & Technology,
January 2018, AICTE, New Delhi)**

SEMESTER-1
GROUP – A
(For the branches of Civil Engg., Chemical Engg, Computer Science Engg and Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1101*	Mathematics-1	3	0	0	30	70	100	3 Hrs	3
ENG1102*	Mathematics -2	3	0	0	30	70	100	3 Hrs	3
ENG1103	Chemistry	3	1	0	30	70	100	3 Hrs	4
ENG1105	Computer Programming using C & Numerical Methods	3	0	0	30	70	100	3 Hrs	3
ENG1107	Essence of Indian Traditional Knowledge	2	0	0	30	70	100	3 Hrs	0
ENG1109	English	3	0	0	30	70	100	3 Hrs	3
ENG1110	Chemistry Lab	0	0	3	50	50	100	3 Hrs	1.5
ENG1112	Computer Programming using C & Numerical Methods Lab	0	0	3	50	50	100	3 Hrs	1.5
	Total	17	1	6			800		19

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

***Common to both Group-A and Group-B**

GROUP – B
(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology, Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1101*	Mathematics -1	3	0	0	30	70	100	3 Hrs	3
ENG1102*	Mathematics -2	3	0	0	30	70	100	3 Hrs	3
ENG1104	Physics	3	1	0	30	70	100	3 Hrs	4
ENG1106	Engineering Graphics	2	0	4	30	70	100	3 Hrs	4
ENG1108	Professional Ethics & Moral Values	2	0	0	30	70	100	3 Hrs	0
ENG1111	Physics Lab	0	0	3	50	50	100	3 Hrs	1.5
ENG1113	Workshop	0	0	3	50	50	100	3 Hrs	1.5
	Total	13	1	10			700		17

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

***Common to both Group-A and Group-B**

SEMESTER-2**GROUP – A**

(For the branches of Civil Engg., Chemical Engg, Computer Science Engg and Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1201*	Mathematics -3	3	1	0	30	70	100	3 Hrs	4
ENG1203	Physics	3	1	0	30	70	100	3 Hrs	4
ENG1205	Engineering Graphics	2	0	4	30	70	100	3 Hrs	4
ENG1206#	Department Subject	3	1	0	30	70	100	3 Hrs	4
ENG1208	Professional Ethics & Moral Values	2	0	0	30	70	100	3 Hrs	0
ENG1211	Physics Lab	0	0	3	50	50	100	3 Hrs	1.5
ENG1213	Workshop	0	0	3	50	50	100	3 Hrs	1.5
	Total	13	3	10			700		20

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

***Common to both Group-A and Group-B**

Department Subjects with respective codes are given separately at the end.

GROUP – B

(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology, Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1201*	Mathematics -3	3	1	0	30	70	100	3 Hrs	4
ENG1202	Chemistry	3	1	0	30	70	100	3 Hrs	4
ENG1204	Computer Programming using C & Numerical Methods	3	0	0	30	70	100	3 Hrs	3
ENG1206#	Department Subject	3	1	0	30	70	100	3 Hrs	4
ENG1207	Essence of Indian Traditional Knowledge	2	0	0	30	70	100	3 Hrs	0
ENG1209	English	3	0	0	30	70	100	3 Hrs	3
ENG1210	Chemistry Lab	0	0	3	50	50	100	3 Hrs	1.5
ENG1212	Computer Programming using C & Numerical Methods Lab	0	0	3	50	50	100	3 Hrs	1.5
	Total	17	3	6			800		21

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

***Common to both Group-A and Group-B**

Department Subjects with respective codes are given separately at the end.

	SEMESTER 1		SEMESTER 2		TOTAL CREDITS	
	Marks	Credits	Marks	Credits	Marks	Credits
GROUP A	800	19	700	19	1500	38
GROUP B	700	17	800	21	1500	38

SCHEME OF EXAMINATION
SEMESTER - 1

Code Number	GROUP-A	Code Number	GROUP-B
ENG1101*	Mathematics-1	ENG1101*	Mathematics -1
ENG1102*	Mathematics -2	ENG1102*	Mathematics -2
ENG1103	Chemistry	ENG1104	Physics
ENG1105	Computer Programming using C & Numerical Methods	ENG1106	Engineering Graphics
ENG1107	Essence of Indian Traditional Knowledge	ENG1108	Professional Ethics & Moral Values
ENG1109	English		--NO EXAM--
ENG1110	Chemistry Lab	ENG1111	Physics Lab
ENG1112	Computer Programming using C & Numerical Methods Lab	ENG1113	Workshop

SEMESTER – 2

Code Number	GROUP-A	Code Number	GROUP-B
ENG1201*	Mathematics -3	ENG1201*	Mathematics -3
ENG1203	Physics	ENG1202	Chemistry
ENG1205	Engineering Graphics	ENG1204	Computer Programming using C & Numerical Methods
ENG1206#	Department Subject	ENG1206#	Department Subject
ENG1208	Professional Ethics & Moral Values	ENG1207	Essence of Indian Traditional Knowledge
	--NO EXAM--	ENG1209	English
ENG1211	Physics Lab	ENG1210	Chemistry Lab
ENG1213	Workshop	ENG1212	Computer Programming using C & Numerical Methods Lab

Induction Programme (Mandatory) - 3 Weeks Duration

Induction program for students to be offered right at the start of the first year. It is observed that there is a necessity for a student to acclimatize to the new environment of a college and to create a bonding between the teacher and a student. Hence, an induction program in the curriculum is introduced to equip the students with communication skills, and get them acquainted with the culture of institution and human values was formalized. A student has to undergo this induction program after joining the institute and before the commencement of classes. Normal classes of the engineering program shall begin after the students have undergone a three-week induction program. The Induction program for students comprises of Physical activities; Learning an art form; Literature & Cinema; Social Awareness; Lectures & Visits; Universal Human Values; Familiarization to Department/Branch, College& Innovations.

The Induction Programme includes:

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas - Familiarization to Dept./Branch & Innovations

SEMESTER-1

ENG1101

MATHEMATICS 1

(Common For All Branches in Group A & Group B)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1101	Mathematics1	3	0	0	30	70	100	3 Hrs	3

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

OBJECTIVES:

To impart the knowledge of partial differentiation involving two or more variables, Euler's theorem, change of variables, Jacobians, Geometrical interpretation. To apply the concept of partial differentiation in finding the errors and approximations, maxima and minima of two variables, to introduce the Lagrange's method of undetermined constants and Leibnitz's rule. To solve the ordinary differential equations of first order and first degree, Bernoulli's equation, exact differential equations, and equations reducible to exact equations. To get knowledge about the applications of differential equations of first order like orthogonal trajectories, simple electric circuits, law of natural growth and decay. To solve the linear differential equations of higher order and Simultaneous Differential Equations.

Partial Differentiation, Functions of several Variables & Ordinary Differential Equations and Their Applications

Unit-I

Functions of two or more variables - Partial derivatives - Homogeneous functions – Euler's theorem - Total derivative.

Unit-II

Change of variables – Jacobians - Geometrical interpretation: Tangent plane and Normal to a surface. Taylor's theorem for functions of two variables - Errors and approximations – Total differential.

Unit-III

Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers - Differentiation under the integral Sign - Leibnitz's rule.

Unit-IV

Formation of the ordinary differential equations(ODEs) - Solution of an ordinary differential equation - Equations of the first order and first degree - Linear differential equation - Bernoulli's equation - Exact differential equations - Equations reducible to exact equations.

Unit-V

Orthogonal Trajectories - Simple Electric (LR & CR) Circuits - Newton's Law of Cooling - Law of Natural growth and decay.

Unit-VI

Solutions of Linear Ordinary Differential Equations with Constant Coefficients - Rules for finding the complimentary function - Rules for finding the particular integral - Method of variation of parameters.

Unit-VII

Cauchy's linear equation - Legendre's linear equation - Simultaneous linear differential equations.

TEXT BOOK:

Scope and Treatment as in “Higher Engineering Mathematics”, by Dr. B.S. Grewal, 43rd Edition, Khanna publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Erwin Kreyszig.
2. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal, Lakshmi Publications.
3. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
4. Graduate Engineering Mathematics by V B Kumar Vatti.
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.
6. Higher Engineering Mathematics by Dr. M.K.Venkataraman.

ENG1102
MATHEMATICS 2
(Common For All Branches in Group A & Group B)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1102	Mathematics2	3	0	0	30	70	100	3 Hrs	3

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

OBJECTIVES: The students are introduced with matrix algebra, Laplace transforms and Fourier Series to enable them to use in their further studies.

In matrix algebra, Consistency and inconsistency of system of equations by the use of rank of a matrix, Obtaining Eigen values and Eigen vectors of a square matrix and application of Cayley- Hamilton's theorem, Quadratic and canonical forms, Properties of complex matrices, Solution of system of equations by direct methods are thoroughly discussed.

In Laplace transforms, Properties of Laplace transforms, Properties of Inverse Laplace transforms, Applications of Laplace transforms are presented.

Whereas in Fourier Series, Euler's Formula, Conditions for a Fourier Expansion, Functions having points of discontinuity, Expansions of Odd or Even Functions, Half-Range Series, Parseval's Formula.

Matrix Algebra, Laplace Transforms and Fourier Series
Unit-I

Rank of a matrix- Echelon form, Normal Form - Solution of Linear System of Equations - Consistency of Linear System of Equations - Direct & Indirect Methods: Gauss elimination method, LU Factorization method, Gauss Seidal Method.

Unit-II

Eigen Values and Eigen Vectors of a Matrix - Cayley-Hamilton theorem - Inverse and Powers of a Matrix using Cayley-Hamilton's theorem and its applications.

Unit-III

Diagonalization of a Matrix - Quadratic Forms - Reduction of Quadratic Form to Canonical Form - Nature of a Quadratic Form - Complex Matrices: Hermitian, Skew-Hermitian and Unitary Matrices and their Properties, Mean Value Theorems (without proofs).

Unit-IV

Introduction - Existence Conditions - Transforms of Elementary Functions - Properties of Laplace Transforms - Transforms of Derivatives - Transforms of Integrals - Multiplication by t^n - Division by t – Evaluation of integrals by Laplace Transforms.

Unit-V

Inverse Laplace Transform - Applications of Laplace Transforms to Ordinary Differential Equations, Simultaneous Linear Differential Equations with Constant Coefficients.

Unit-VI

Second Shifting Theorem - Laplace Transforms of Unit Step Function, Unit Impulse Function and Laplace Transforms of Periodic Functions.

Unit-VII

Introduction - Euler's Formulae - Conditions for a Fourier Expansion - Functions having points of discontinuity - Change of Interval - Odd and Even Functions - Expansions of Odd or Even Periodic Functions, Half-Range Series - Parseval's Formula.

TEXT BOOK:

Scope and Treatment as in “Higher Engineering Mathematics”, by Dr. B.S. Grewal, 43^rd edition, Khanna publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Erwin Kreyszig.
2. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal. Lakshmi Publications.
3. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
4. Graduate Engineering Mathematics by V B Kumar Vatti.
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.

**ENG1103
CHEMISTRY**

(For the branches of Civil Engg., Chemical Engg, Computer Science Engg and
Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1103	Chemistry	3	1	0	30	70	100	3 Hrs	4

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Objectives of the Course:

- To apply the basic knowledge of Chemistry to the Engineering Discipline.
- To develop knowledge about water and its treatment for industrial and potable purposes.
- To develop understanding in the areas of Solid State Chemistry, Polymers, Mechanism of Corrosion of Metals and Corrosion Control Methods, Fuels, Lubricants and Nanomaterials for of conducting polymers, bio-degradable polymers and fiber reinforced plastics and apply the knowledge for solving existing challenges faced in various engineering and societal areas.

Learning outcome:

- This course applies the basic concepts and principles studied in Chemistry to Engineering.
- It provides an application of chemistry to different branches of engineering
- The students will be able acquire knowledge in the areas of Water Chemistry, Solid State Chemistry, Polymers, Corrosion, Fuels and Lubricants and nanomaterials and suggest innovative solutions for existing challenges in these areas.

Chapter – 1: Water Chemistry (8 Hrs)

Sources of Water – Impurities and their influence of living systems – WHO Limits – Hardness and its Determination – Boiler Troubles and their removal – Water Softening Methods – Lime-Soda, Zeolite and Ion Exchange - Municipal Water Treatment-Break Point Chlorination – Desalination of Sea Water – Reverse Osmosis Method, Electro-dialysis.

Chapter – 2: Solid State Chemistry (8 Hrs)

Solids - Classification of Solids – Types of Crystals – Fundamental Laws of Crystal Structure –X-Rays and Bragg's Law – Imperfections in Crystals – Band Theory of Solids – Chemistry of Semiconductors – Intrinsic, Extrinsic, Compound and Defects – Organic Semi conductors – Super Conductivity – Purification of Solids by Zone refining – Single Crystal Growth – Epitaxial Growth – Liquid Crystals.

Chapter – 3: Polymers and Plastics (8 Hrs)

Polymers: Definition – Types of Polymerization (Addition & Condensation) – Mechanisms of Addition Polymerization – Radical and Ionic – Thermodynamics of Polymerization Process. **Plastics:** Thermosetting and Thermoplastics – Effect of Polymer Structure on Properties of Cellulose Derivatives – Vinyl Resins – Nylon (6,6), Reinforced Plastics – Conducting Polymers.

Chapter – 4: Corrosion**(8 Hrs)**

Corrosion: Origin and Theory – Types of Corrosion: Chemical and Electrochemical; Pitting, Inter granular, Waterline, Stress – Galvanic Series – Factors Effecting Corrosion.

Corrosion Controlling Methods: Protective Coatings: Metallic Coatings, Electroplating and Electroless Plating – Chemical conversion Coatings – Phosphate, Chromate, Anodized, Organic Coatings – Paints and Special Paints.

Chapter – 5: Fuels and Lubricants**(8 Hrs)**

Solid Fuels: Wood and Coal, Ranking of Coal – Analysis (Proximate and Ultimate) Coke Manufacture – Otto Hoffmann’s Process – Applications; **Liquid Fuels:** Petroleum Refining – Motor Fuels – Petrol and Diesel Oil – Knocking – Octane number – Cetane Number; **Gaseous Fuels:** Biogas, LPG and CNG – Characteristics – Applications; **Rocket Fuels:** Propellants – Classification – Characteristics

Lubricants: Classification – Mechanism – Properties of Lubricating Oils – Selection of Lubricants for Engineering Applications.

Chapter – 6: Nanomaterials**(8 Hrs)**

Nanomaterials, Properties and application of fullerenes, fullerols, Carbon nanotubes and nanowires. Synthesis - Top-down and Bottom-up approaches - Nanocomposites - Nanoelectronics- Applications of nanomaterials in catalysis, telecommunication and medicine.

Reference Books:

Engineering Chemistry – PC Jain and M. Jain – Dhanpath Rai and Sons, New Delhi.

A Text book of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi.

Engineering Chemistry – B. K. Sharma – Krishna Prakashan – Meerut.

Introduction to Nanoscience - S. M. Lindsay - Oxford University Press

Engineering Chemistry - B. L. Tembe, Kamaluddin and M. S. Krishnan, (NPTEL).

ENG1104**PHYSICS**

(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology, Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1104	Physics	3	1	0	30	70	100	3 Hrs	4

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

UNIT-I**Mechanics, Waves and Oscillations**

Introduction to Mechanics, Transformation of scalars and vectors under Rotation transformation, Forces in Nature, Newton's laws and its completeness in describing particle motion, Form invariance of Newton's second law.

Mechanical and electrical 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.

UNIT - II**Electromagnetism and Magnetic Properties of Materials**

Electric Flux, Gauss's law of Electrostatics in Free Space and applications, Biot-Savart Law-applications, Ampere's Law-applications, Hall effect, Faraday's Law of Induction, Lenz's Law, Induced magnetic fields, Displacement Current, Maxwell's Equations in Integral Form (no derivation), Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Applications of magnetic materials.

UNIT - III**Wave Optics**

Interference: Principles of superposition – Young's Experiment – Coherence - Interference in thin films, Wedge shaped film, Newton's Rings, Michelson Interferometer and its applications.

Diffraction: Diffraction, differences between interference and diffraction, two classes of diffraction, Fraunhofer diffraction due to Single slit (Qualitative and quantitative treatment),

Polarisation : Polarisation by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization and detection.

UNIT-IV**Lasers and Fibre Optics**

Introduction, spontaneous and stimulated emissions, population inversions, pumping, Ruby laser, Gas laser (He-Ne Laser), Semiconductor laser, Applications of lasers.

Optical Fibre and Total Internal Reflection, Acceptance Angle and cone of a fibre, Numerical aperture, Fibre optics in communications, Optical parts in Fibre, Application of optical fibers.

Super conductivity

Super conductivity, Meisner Effect, Basics of BSC theory, Types of Superconductors and Applications of Superconductors.

UNIT-V

Quantum Mechanics

Introduction, Photoelectric effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

Semiconductor Physics

Energy bands in solids, Types of electronic materials: metals, semiconductors, and insulators. Intrinsic and Extrinsic semiconductors, Continuity equation - Drift & diffusion - p-n junction diode, LED: device structure, materials, characteristics, and figures of merit. Photo diode, Solar cell.

TEXT BOOKS:

1. Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand
3. Engineering Mechanics, 2nd ed.- M K Harbola, Cengage Learning
4. I. G. Main, "Vibrations and waves in physics", 3rd Edn, Cambridge University Press

ENG1105
COMPUTER PROGRAMMING USING C & NUMERICAL METHODS
(For the branches of Civil Engg., Chemical Engg, Computer Science Engg and
Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1105	Computer Programming using C & Numerical Methods	3	1	0	30	70	100	3 Hrs	3

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Introduction To C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations, Formatted Input, Formatted Output.

Decision Making, Branching, Looping, Arrays & Strings: Decision making with if statement, Simple if statement, The if...else statement, Nesting of if...else statement, the else..if ladder, switch statement, the (?:) operator, the GOTO statement., The while statement, The do statement, The for statement, Jumps in Loops, One, Two-dimensional Arrays, Character Arrays. Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings.

Functions: Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Values. Nesting of functions, recursion, passing arrays to functions, passing strings to functions, The scope, visibility and lifetime of variables. .

Pointers: Accessing the address of a variable, declaring pointer variables, initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointers, pointers as function arguments, functions returning pointers, pointers to functions, pointers to structures-Program Applications

Structure and Unions: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, structures and functions and unions, size of structures and bit-fields- Program applications.

File handling: Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments-Program Applications.

NumericalMethods:Solutions of Algebraic and Transcendental Equations: Bisection Method, Newton Raphson Method.**Interpolation:** Newton's forward and backward Interpolation, Lagrange's Interpolation in unequal intervals.

Numerical Integration: Trapezoidalrule, Simpson's 1/3 rule.**Solutions of Ordinary First Order Differential Equations:** Euler's Method, Modified Euler's Method and Runge-Kutta Method.

Text Books:

Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India) Private Limited.

Introduction to Numerical Methods, SS Sastry, Prentice Hall.

Reference Books:

Let Us C, Yashwant Kanetkar, BPB Publications, 5th Edition.

Computer Science, A structured programming approach using C”, B.A.Forouzan and R.F.Gilberg, 3rd Edition, Thomson, 2007.

The C –Programming Language’ B.W. Kernighan, Dennis M. Ritchie, PHI

Scientific Programming: C-Language, Algorithms and Models in Science, Luciano M. Barone (Author), Enzo Marinari (Author), Giovanni Organtini, World Scientific

ENG1106
ENGINEERING GRAPHICS
(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology,
Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1106	Engineering Graphics	2	0	4	30	70	100	3 Hrs	4

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions, and Scales.

Curves: Conic sections: General construction of ellipse, parabola and hyperbola. Construction of involutes of circle and polygons only. Normal and tangent to curves.

Projections of Points: Principal or Reference Planes, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of straight line inclined to both the reference planes:

Projections of Planes: Projection of Perpendicular planes: Perpendicular to both reference planes, perpendicular to one reference plane and parallel to other reference plane and perpendicular to one reference plane and inclined to other reference plane. Projection of Oblique planes. Introduction to Auxiliary Planes.

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to other and axes inclined to both the reference planes.

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids (Prism, Pyramid, Cylinder and Cone) in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

Isometric Views: Isometric projection, Isometric scale and Isometric view. Isometric view of Prisms, Pyramids, cylinder, cone, sphere and their combinations.

Text Book:

Elementary Engineering Drawing by N.D.Bhatt, Charotar Publishing House.

Reference:

Engineering Graphics by K.L. Narayana and P. Kanniah, Tata Mc-Graw Hill.

ENG1107

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (For the branches of Civil Engg., Chemical Engg, Computer Science Engg and Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1107	Essence of Indian Traditional Knowledge	2	0	0	30	70	100	3 Hrs	0

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Objectives of the course:

- ❖ To know the contributions of scientists for the development of society over a period of time.
- ❖ To understand the Science and Technological developments that lead to human welfare.
- ❖ To appreciate the Science and Technological contributions for the development of various sectors of the economy.
- ❖ To identify the technological transfer versus economic progress of the countries.

Learning Outcome: By the end of this course the students should be able to understand the contribution of Scientific and Technological developments for the benefit of society at large.

UNIT-I

Historical Perspective of Science and Technology:

Nature and Definitions; Roots of Science – In Ancient Period and Modern Period (During the British Period); Science and Society; Role of Scientist in the Society. **(6 periods)**

UNIT-II

Policies and Plans after Independence:

Science and Technology Policy Resolutions; New Technology Fund; Technology Development (TIFAC); Programs aimed at Technological Self Reliance; Activities of Council of Scientific and Industrial Research. **(6 periods)**

UNIT-III

Science and Technological Developments in Critical Areas:

Space – The Indian Space Program: India's Geostationary Satellite Services – INSAT System And INSAT Services; **Defense Research and Technology** – Research Coordination, Research efforts and Development of technologies and Spin-off technologies for civilian use; **Nuclear Energy** – Effects of a nuclear explosion and India's safety measures. **(6 Periods)**

UNIT-IV

Impact of Science and Technology in Major Areas:

Ocean Development: Objectives of Ocean Development, Biological and Mineral resources, Marine Research and Capacity Building; **Biotechnology:** Meaning, Biotechnology techniques- Bioreactors, Cell fusion, Cell or Tissue Culture, DNA Fingerprinting, Cloning,

Artificial Insemination and Embryo Transfer Technology and Stem Cell Technology; Application of Biotechnology – Medicine, Biocatalysts, Food Biotechnology, Fuel and Fodder and Development of Biosensors. **(6 periods)**

UNIT-V

Technology Transfer and Development:

Transfer of Technology – Types, Methods, Mechanisms, Process, Channels and Techniques; **Appropriate Technology** - Criteria and Selection of an Appropriate Technology; Barriers of Technological Change. **(6 periods)**

Text Books:

1. Kalpana Rajaram, **Science and Technology in India**, Published and Distributed by Spectrum Books (P) Ltd., New Delhi-58.
2. Srinivasan, M., **Management of Science and Technology (Problems & Prospects)**, East – West Press (P) Ltd., New Delhi.

ENG1108
PROFESSIONAL ETHICS & MORAL VALUES
(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology,
Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1108	Professional Ethics & Moral Values	2	0	0	30	70	100	3 Hrs	0

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Objectives of the Course:

- To inculcate Ethics and Moral Values into the young minds.
- To develop moral responsibility and mould them as best professionals.
- To create ethical vision and achieve harmony in life.

Learning outcome: By the end of the course student should be able to understand the importance of ethics and values in life and society.

UNIT – I

Ethics and Moral Values: Ethics and Values, Ethical Vision, Ethical Decisions, **Moral Values** – Classification of Values, Universality of Values. **(6 Periods)**

UNIT – II

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, Professional Ethics, Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI. **(6 Periods)**

UNIT – III

Engineering as Social Experimentation: Engineering as social experimentation, Engineering Professionals – life skills, Engineers as Managers, Consultants and Leaders, Role of engineers in promoting ethical climate, balanced outlook on law. **(6 Periods)**

UNIT – IV

Safety Social Responsibility and Rights: Safety and Risk, moral responsibility of engineers for safety, case studies – Bhopal gas tragedy, Chernobyl disaster, Fukushima Nuclear disaster, Professional rights, Gender discrimination, Sexual harassment at work place. **(6 Periods)**

UNIT – V

Global Issues: Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical living, concept of Harmony in life. **(6 Periods)**

Text Books:

1. Govindharajan, M., Natarajan, S. and Senthil Kumar, V.S., Engineering Ethics, Prentice Hall of India, (PHI) Delhi, 2004.
2. Subramainam, R., Professional Ethics, Oxford University Press, New Delhi, 2013.

References:

1. Charles D, Fleddermann, “Engineering Ethics”, Pearson / PHI, New Jersey 2004 (Indian Reprint).

**ENG1109
ENGLISH**

(For the branches of Civil Engg., Chemical Engg, Computer Science Engg and
Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1109	English	3	0	0	30	70	100	3 Hrs	3

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

OBJECTIVES

Reading Skills

- Addressing explicit and implicit meanings of a text on current topics.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

Writing Skills

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, emails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

Interactive Skills

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

Life Skills

- Examining self-attributes and identifying areas that require improvement: self-diagnosis and self-motivation.
- Adapting to a given situation and developing a functional approach to finding solutions: adaptability and problem solving.
- Understanding the importance of helping others: community services and enthusiasm.

Course Outcome

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

DETAILED SYLLABUS

UNIT-1

- Reading:** *On the conduct of life:* William Hazlitt
Grammar: Prepositions
Vocabulary: Word Formation I: Introduction to Word Formation
Writing: Clauses and Sentences
Life skills: **Values and Ethics**
If: Rudyard Kipling

UNIT-2

Reading: *The Brook*: Alfred Tennyson
Grammar: Articles
Vocabulary: Word Formation II: Root Words from other Languages
Writing: Punctuation
Life skills: **Self-Improvement**
How I Became a Public Speaker: George Bernard Shaw

UNIT-3

Reading: *The Death Trap*: Saki
Grammar: Noun-Pronoun Agreement
Subject- Verb Agreement
Vocabulary Word Formation III: Prefixes and Suffixes
Writing Principals of Good Writing
Life skills: **Time Management**
On saving Time: Seneca

UNIT-4

Reading: *Chindu Yellama*
Grammar: Misplaced Modifiers
Vocabulary: Synonyms; Antonyms
Writing Essay Writing
Life skills **Innovation**
Muhammad Yunus

UNIT-5

Reading: *Politics and the English Language*: George Orwell
Grammar: Clichés; Redundancies
Vocabulary: Common Abbreviations
Writing: Writing a Summary
Life skills: **Motivation**
The Dancer with a White Parasol: Ranjana Dave

UNIT-6

Basics of Oral Communication: *Pronunciation, Stress, Intonation, Rhythm*
Everyday Communication I: *Introducing oneself and others, Announcements*
Everyday Communication II: *Getting someone's attention and Interrupting*
Listening Comprehension I: *Conversations*
Everyday Communication III: *Making Requests and Responding to them*
Listening Comprehension II: *Extended listening Passage*
Interview Skills
Making Presentations

Prescribed Textbook: *Language and Life: A Skills Approach* Board of Editors, Orient Black Swan Publishers, India. 2018.

Suggested Readings

- ❖ Practical English Usage. Michael Swan. OUP. 1995.
- ❖ Remedial English Grammar. F.T. Wood. Macmillan.2007
- ❖ On Writing Well. William Zinsser. Harper Resource Book. 2001
- ❖ Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
- ❖ Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- ❖ Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

ENG1110**CHEMISTRY LAB**

(For the branches of Civil Engg., Chemical Engg, Computer Science Engg and Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1110	Chemistry Lab	0	0	3	50	50	100	3 Hrs	1.5

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Course Objectives:

- 1) To develop the fine skills of quantitative determination of various chemical components through titrimetric analysis
- 2) To prepare and use ionexchange/ zeolite columns for the removal of hardness of water
- 3) To develop the skill of organic synthesis through the preparation of a polymer/ drug

Course Outcomes:

At the end of the course student will be able to

- 1) quantitatively determine the amount of various chemical species in solutions by titrations.
- 2) conduct the quantitative determinations with accuracy
- 3) develop novel materials to be used as zeolite and prepare columns for removal of hardness of water
- 4) synthesise a polymer or a drug

List of Experiments

1. Determination of Sodium Hydroxide with HCl (Na_2CO_3 Primary Standard)
2. Determination of Alkalinity (Carbonate and Hydroxide) of water sample
3. Determination of Fe(II)/Mohr's Salt by Permanganometry
4. Determination of Oxalic Acid by Permanganometry
5. Determination of Chromium (VI) by Mohr's Salt Solution
6. Determination of Zinc by EDTA method
7. Determination of Hardness of Water sample by EDTA method
8. Determination of Chlorine in water by Iodometric Titration
9. Ionexchange/ Zeolite column for removal of hardness of water
10. Synthesis of Polymer/ drug

Reference Books:

Vogel's Quantitative Chemical Analysis – V – Edition – Longman

Experiments in Applied Chemistry (For Engineering Students) – Sinita Rattan – S. K. Kataria & Sons, New Delhi.

**ENG1111
PHYSICS LAB**

**(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology,
Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)**

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1111	Physics Lab	0	0	3	50	50	100	3 Hrs	1.5

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray μ_o and Extraordinary μ_e ray.
6. Determination of Thickness Given Paper Strip By Wedge Method.
7. Calibration of Low Range Voltmeter.
8. Calibration of Low Range Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance.
12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell-Characteristics.
14. Planks Constants.
15. Laser- Diffraction.

ENG1112
COMPUTER PROGRAMMING USING C & NUMERICAL METHODS LAB
(For the branches of Civil Engg., Chemical Engg, Computer Science Engg and
Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1112	Computer Programming Using C & Numerical Methods Lab	0	0	3	50	50	100	3 Hrs	1.5

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Course Objectives:

- 1) To discuss basics of probability and related theorems , Problems. To study about conditional probability and Bayes theorem.
- 2) To study about random variables and their properties. To examine , analyze and compare Probability distributions.
- 3) To discuss regression and estimation techniques.
- 4) To discuss various types of tests such as F-test, Chi-square test. To study the various queuing models.

Course Outcomes:

At the end of the course student will be able to

- 1) ability to solve various problems regarding probability and conditional probability.
 - 2) examine , analyze and compare probability distributions.
 - 3) prepare null and alternative hypothesis and test its validity based on random sample.
 - 4) solve various types of regression problems.
 - 5) understand various queuing models.
1. **Probability:** Definitions of Probability, Addition Theorem, Conditional Probability, Multiplication Theorem, Bayes' Theorem of Probability and Geometric Probability.
 2. **Random Variables and their Properties:** Discrete Random Variable, Continuous Random Variable, Probability Distribution, Joint Probability Distributions Their Properties, Transformation Variables, Mathematical Expectations, Probability Generating Functions.
 3. **Probability Distributions:** Discrete Distributions: Binomial, Poisson Negative Binominal Distributions and their Properties; Continuous Distributions : Uniform, Normal, Exponential Distributions and their Properties.
 4. **Multivariate Analysis and Curve Fitting:** Correlation, Correlation Coefficient, Rank Correlation, Regression Analysis, Multiple Regression, Principles of Least Squares and Curve Fitting
 5. **Estimation and testing of hypothesis:** Sample, Populations, Statistic, Parameter, Sampling Distribution, Standard Error, Un-Biasedness, Efficiency, Maximum Likelihood Estimator, Notion & Interval Estimation.
 6. **Sample Tests:** Large Sample Tests Based on Normal Distribution , Small Sample Tests : Testing Equality of Means, Testing Equality of Variances, Test of Correlation

Coefficient, Test for Regression Coefficient; Coefficient of Association, 2 – Test for Goodness of Fit, Test for Independence.

7. **Queuing Theory** : Queue Description, Characteristics of a Queuing Model, Study State Solutions of M/M/1: Model, M/M/1 ; N Model, M/M/C: Model, Case Studies

Text Books :

1. Probability & Statistics for Engineers and Scientists, Walpole, Myers,
2. Myers, Ye. Pearson Education.
3. Probability, Statistics and Random Processes T.Veerarajan Tata McGraw – Hill

Reference Books:

1. Probability & Statistics with Reliability, Queuing and Computer Applications, Kishor S. Trivedi, Prentice Hall of India ,1999

**ENG1113
WORKSHOP**

**(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology,
Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)**

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1113	Workshop	0	0	3	50	50	100	3 Hrs	1.5

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Carpentry:

Bench Work, tools used in carpentry.

Jobs for Class work – half lap joint, mortise and tenon joint, half – lap dovetail joint, corner dovetail joint, central bridle joint.

Sheet Metal:

Tools used in sheet metal work, Laying development of the sheet metal jobs, soldering.

Jobs for class works – Square tray, taper tray(sides), funnel, elbow pipe joint, 600 pipe joint.

Fitting:

Tools used in fitting work, Different files, chisels, hammers and bech vice.

Jobs for class work – Square, hexagon, rectangular fit, circular fit and triangular fit.

Reference

Elements of workshop technology, Vol.1 by S. K. and H. K. Choudary.

ENG1201
MATHEMATICS 3
(Common For All Branches of Group A & Group B)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1201	Mathematics3	3	1	0	30	70	100	3 Hrs	4

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

OBJECTIVES: The main objective of Engineering Mathematics is to make the students familiar with mathematical thinking and realization of the background of their problems. Multiple Integral is a natural extension of a definite integral to a function of more than one real variable. The students should be able to evaluate Double and Triple Integrals, volumes of solids and area of curved surfaces. They should know the concepts of analyticity, Complex integration, and complex power series classification of singularities. The student should know the applications of the calculus of residues in the evaluation of real definite integrals. The student should be able to use statistical methods to collect and analyze the data.

Multiple Integrals, Beta & Gamma Functions, Complex Differentiation and Complex Integration

Unit-I

Double Integrals - Change of Order of Integration - Double Integrals in Polar Coordinates.

Unit-II

Triple Integrals - Change of Variables - Beta Function - Gamma Function - Relation between Beta and Gamma Functions - Error Function or Probability Integral.

Unit-III

Area enclosed by plane curves - Volumes of solids - Area of a curved surface - Calculation of mass - Center of gravity - Moment of inertia - product of inertia – principal axes.

Unit-IV

Introduction-Limit and continuity of $f(z)$ - Derivative of $f(z)$, Cauchy-Reimann Equations, Analytic Functions, Harmonic functions, Orthogonal systems, Applications to flow problems, Geometrical representation of $f(z)$.

Unit-V

Integration of complex functions, Cauchy's theorem, Cauchy's integral formula and their applications.

Unit-VI

Introduction to Conformal transformation, Bilinear transformation $w = \frac{az+b}{cz+d}$, Series of complex terms -Taylor's and Laurent's series (without proofs), Zero's and Singularities of analytic functions.

Unit-VII

Residues and Calculations of residues, Cauchy's Residue Theorem, Evaluation of real definite integrals: Integration around unit circle, semi circle.

TEXT BOOK:

Scope and Treatment as in “Higher Engineering Mathematics”, by Dr. B.S. Grewal, 43rd edition, Khanna publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Erwin Kreyszig.
2. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal; Lakshmi Publications.
3. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
4. Graduate Engineering Mathematics by V B Kumar Vatti.
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.
6. Engineering Mathematics series by Chandrika Prasad.

**ENG1202
CHEMISTRY**

(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology,
Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1202	Chemistry	3	1	0	30	70	100	3 Hrs	4

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Objectives of the Course:

- To apply the basic knowledge of Chemistry to the Engineering Discipline.
- To develop knowledge about water and its treatment for industrial and potable purposes.
- To develop understanding in the areas of Solid State Chemistry, Polymers, Mechanism of Corrosion of Metals and Corrosion Control Methods, Fuels, Lubricants and Nanomaterials for of conducting polymers, bio-degradable polymers and fiber reinforced plastics and apply the knowledge for solving existing challenges faced in various engineering and societal areas.

Learning outcome:

- This course applies the basic concepts and principles studied in Chemistry to Engineering.
- It provides an application of chemistry to different branches of engineering
- The students will be able acquire knowledge in the areas of Water Chemistry, Solid State Chemistry, Polymers, Corrosion, Fuels and Lubricants and nanomaterials and suggest innovative solutions for existing challenges in these areas.

Chapter – 1: Water Chemistry (8 Hrs)

Sources of Water – Impurities and their influence of living systems – WHO Limits – Hardness and its Determination – Boiler Troubles and their removal – Water Softening Methods – Lime-Soda, Zeolite and Ion Exchange - Municipal Water Treatment-Break Point Chlorination – Desalination of Sea Water – Reverse Osmosis Method, Electro-dialysis.

Chapter – 2: Solid State Chemistry (8 Hrs)

Solids - Classification of Solids – Types of Crystals – Fundamental Laws of Crystal Structure –X-Rays and Bragg's Law – Imperfections in Crystals – Band Theory of Solids – Chemistry of Semiconductors – Intrinsic, Extrinsic, Compound and Defects – Organic Semi conductors – Super Conductivity – Purification of Solids by Zone refining – Single Crystal Growth – Epitaxial Growth – Liquid Crystals.

Chapter – 3: Polymers and Plastics (8 Hrs)

Polymers: Definition – Types of Polymerization (Addition & Condensation) – Mechanisms of Addition Polymerization – Radical and Ionic – Thermodynamics of Polymerization Process. **Plastics:** Thermosetting and Thermoplastics – Effect of Polymer Structure on Properties of Cellulose Derivatives – Vinyl Resins – Nylon (6,6), Reinforced Plastics – Conducting Polymers.

Chapter – 4: Corrosion

(8 Hrs)

Corrosion: Origin and Theory – Types of Corrosion: Chemical and Electrochemical; Pitting, Inter granular, Waterline, Stress – Galvanic Series – Factors Effecting Corrosion.

Corrosion Controlling Methods: Protective Coatings: Metallic Coatings, Electroplating and Electroless Plating – Chemical conversion Coatings – Phosphate, Chromate, Anodized, Organic Coatings – Paints and Special Paints.

Chapter – 5: Fuels and Lubricants

(8 Hrs)

Solid Fuels: Wood and Coal, Ranking of Coal – Analysis (Proximate and Ultimate) Coke Manufacture – Otto Hoffmann’s Process – Applications; **Liquid Fuels:** Petroleum Refining – Motor Fuels – Petrol and Diesel Oil – Knocking – Octane number – Cetane Number; **Gaseous Fuels:** Biogas, LPG and CNG – Characteristics – Applications; **Rocket Fuels:** Propellants – Classification – Characteristics

Lubricants: Classification – Mechanism – Properties of Lubricating Oils – Selection of Lubricants for Engineering Applications.

Chapter – 6: Nanomaterials

(8 Hrs)

Nanomaterials, Properties and application of fullerenes, fullerols, Carbon nanotubes and nanowires. Synthesis - Top-down and Bottom-up approaches - Nanocomposites - Nanoelectronics- Applications of nanomaterials in catalysis, telecommunication and medicine.

Reference Books:

Engineering Chemistry – PC Jain and M. Jain – Dhanpath Rai and Sons, New Delhi.

A Text book of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi.

Engineering Chemistry – B. K. Sharma – Krishna Prakashan – Meerut.

Introduction to Nanoscience - S. M. Lindsay - Oxford University Press

Engineering Chemistry - B. L. Tembe, Kamaluddin and M. S. Krishnan, (NPTEL).

ENG1203**PHYSICS**

(For the branches of Civil Engg., Chemical Engg, Computer Science Engg and Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1203	Physics	3	1	0	30	70	100	3 Hrs	4

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

UNIT-I**Mechanics, Waves and Oscillations**

Introduction to Mechanics, Transformation of scalars and vectors under Rotation transformation, Forces in Nature, Newton's laws and its completeness in describing particle motion, Form invariance of Newton's second law.

Mechanical and electrical 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.

UNIT - II**Electromagnetism and Magnetic Properties of Materials**

Electric Flux, Gauss's law of Electrostatics in Free Space and applications, Biot-Savart Law-applications, Ampere's Law-applications, Hall effect, Faraday's Law of Induction, Lenz's Law, Induced magnetic fields, Displacement Current, Maxwell's Equations in Integral Form (no derivation), Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Applications of magnetic materials.

UNIT - III**Wave Optics**

Interference: Principles of superposition – Young's Experiment – Coherence - Interference in thin films, Wedge shaped film, Newton's Rings, Michelson Interferometer and its applications.

Diffraction: Diffraction, differences between interference and diffraction, two classes of diffraction, Fraunhofer diffraction due to Single slit (Qualitative and quantitative treatment),

Polarisation : Polarisation by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization and detection.

UNIT-IV**Lasers and Fibre Optics**

Introduction, spontaneous and stimulated emissions, population inversions, pumping, Ruby laser, Gas laser (He-Ne Laser), Semiconductor laser, Applications of lasers.

Optical Fibre and Total Internal Reflection, Acceptance Angle and cone of a fibre, Numerical aperture, Fibre optics in communications, Optical parts in Fibre, Application of optical fibers.

Super conductivity

Super conductivity, Meisner Effect, Basics of BSC theory, Types of Superconductors and Applications of Superconductors.

UNIT-V

Quantum Mechanics

Introduction, Photoelectric effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

Semiconductor Physics

Energy bands in solids, Types of electronic materials: metals, semiconductors, and insulators. Intrinsic and Extrinsic semiconductors, Continuity equation - Drift & diffusion - p-n junction diode, LED: device structure, materials, characteristics, and figures of merit. Photo diode, Solar cell.

TEXT BOOKS:

1. Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand
3. Engineering Mechanics, 2nd ed.- M K Harbola, Cengage Learning
4. I. G. Main, "Vibrations and waves in physics", 3rd Edn, Cambridge University Press

ENG1204
COMPUTER PROGRAMMING USING C & NUMERICAL METHODS
(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology,
Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1204	Computer Programming using C & Numerical Methods	3	1	0	30	70	100	3 Hrs	3

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Introduction To C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations, Formatted Input, Formatted Output.

Decision Making, Branching, Looping, Arrays & Strings: Decision making with if statement, Simple if statement, The if...else statement, Nesting of if...else statement, the else..if ladder, switch statement, the (?:) operator, the GOTO statement., The while statement, The do statement, The for statement, Jumps in Loops, One, Two-dimensional Arrays, Character Arrays. Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings.

Functions: Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Values. Nesting of functions, recursion, passing arrays to functions, passing strings to functions, The scope, visibility and lifetime of variables. .

Pointers: Accessing the address of a variable, declaring pointer variables, initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointers, pointers as function arguments, functions returning pointers, pointers to functions, pointers to structures-Program Applications

Structure and Unions: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, structures and functions and unions, size of structures and bit-fields- Program applications.

File handling: Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments-Program Applications.

NumericalMethods:Solutions of Algebraic and Transcendental Equations: Bisection Method, Newton Raphson Method.**Interpolation:** Newton's forward and backward Interpolation, Lagrange's Interpolation in unequal intervals.

Numerical Integration: Trapezoidalrule, Simpson's 1/3 rule.**Solutions of Ordinary First Order Differential Equations:** Euler's Method, Modified Euler's Method and Runge-Kutta Method.

Text Books:

Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India) Private Limited.

Introduction to Numerical Methods, SS Sastry, Prentice Hall.

Reference Books:

Let Us C, Yashwant Kanetkar, BPB Publications, 5th Edition.

Computer Science, A structured programming approach using C”, B.A.Forouzan and R.F.Gilberg, 3rd Edition, Thomson, 2007.

The C –Programming Language’ B.W. Kernighan, Dennis M. Ritchie, PHI

Scientific Programming: C-Language, Algorithms and Models in Science, Luciano M. Barone (Author), Enzo Marinari (Author), Giovanni Organtini, World Scientific

ENG1205
ENGINEERING GRAPHICS
 (For the branches of Civil Engg., Chemical Engg, Computer Science Engg and
 Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1205	Engineering Graphics	2	0	4	30	70	100	3 Hrs	4

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions, and Scales.

Curves: Conic sections: General construction of ellipse, parabola and hyperbola. Construction of involutes of circle and polygons only. Normal and tangent to curves.

Projections of Points: Principal or Reference Planes, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of straight line inclined to both the reference planes:

Projections of Planes: Projection of Perpendicular planes: Perpendicular to both reference planes, perpendicular to one reference plane and parallel to other reference plane and perpendicular to one reference plane and inclined to other reference plane. Projection of Oblique planes. Introduction to Auxiliary Planes.

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to other and axes inclined to both the reference planes.

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids (Prism, Pyramid, Cylinder and Cone) in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

Isometric Views: Isometric projection, Isometric scale and Isometric view. Isometric view of Prisms, Pyramids, cylinder, cone, sphere and their combinations.

Text Book:

Elementary Engineering Drawing by N.D.Bhatt, Charotar Publishing House.

Reference:

Engineering Graphics by K.L. Narayana and P. Kannaiah, Tata Mc-Graw Hill.

ENG1206
DEPARTMENT SUBJECT

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1206	Department Subject	3	1	0	30	70	100	3 Hrs	4

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Department Subject for Each Branch of Engineering

S. No.	Branch	Code	Department Subject
1	Chemical Engineering (Common with Ceramic, Petrochemical and Biotechnology)	ENG1206-CHE	Introduction to Chemical Engineering and Biotechnology
2	Civil Engineering (Common with Civil Environmental)	ENG1206-CIV	Introduction to Civil Engineering
3	Computer Science Engineering (Common with CSSE, CSNW & Information Technology)	ENG1206-CSE	Probability Statistics and Queuing Theory
4	Electronics and Communication Engineering	ENG1206-ECE	Basic Electronics Engineering
5	Electrical and Electronics Engineering	ENG1206-EEE	Fundamentals of Electrical Engineering
6	Geo Informatics	ENG1206-GIN	Geomorphology
7	Instrument Technology	ENG1206-INS	Basic and Digital Electronics
8	Mechanical Engineering	ENG1206-MEC	Engineering Mechanics
9	Metallurgical Engineering	ENG1206-MET	Elements of Material Science
10	Naval Architecture and Marine Engineering	ENG1206-NAM	Basic Naval Architecture

DEPARTMENT SUBJECT FOR CHEMICAL ENGINEERING
(Common with Petroleum, Ceramic and Biotechnology)
ENG1206-CHE

INTRODUCTION TO CHEMICAL ENGINEERING AND BIOTECHNOLOGY*

(*This course is offered at the level of first year undergraduate degree and hence deals with fundamentals only)

Unit I (Definitions and Concepts only)

Introduction: Chemical Engineering and role of Chemical Engineer, Unit operations, Basic laws, Useful mathematical methods, Units and dimensions, Energy: Internal energy, external energy, heat and work, enthalpy, heat capacity and specific heat, Equivalent mass, solutions: concentration of a solution, solubility, vapor pressure of solutions, Hardness of water, Humidity and saturation.

Unit II (Definitions and Concepts only)

Material balance (simple problems of composition conversions, average molecular weight, Mixing, evaporation), Energy balance (basics of energy balance, simple problems of Heat of reactions), Flow of Fluids: Introduction, nature of fluid, viscosity, flow field, laminar and turbulent flow, conservation of mass, conservation of energy, Frictional losses in Laminar flow: Hagen Poiseuille equation, Frictional losses in turbulent flow: Fanning equation.

UNIT III (Definitions and Concepts only)

Mass Transfer operations: Diffusion, Binary mixtures, vapor liquid equilibrium, Distillation, absorption, adsorption, Liquid extraction, Humidification and dehumidification, Crystallization

Unit IV (Definitions and Concepts only)

Heat transfer: Conduction, Convection, Radiation; Mass transfer: Diffusion, Mass transfer operations: Absorption, Distillation, Extraction, Humidification and dehumidification, drying, crystallization, Adsorption.

Unit V (Definitions and Concepts only)

Chemical Kinetics: Determination of rate equation, effect of temperature on rate equation, Reactors: CSTR, Plug flow reactor, Batch reactor.

Unit VI

Introduction to Biotechnology (Definitions and Concepts only)

The scope of Biotechnology: Definitions and history of Biotechnology; Biotechnology –a multi disciplinary growing tree, commercialization of Biotechnology, Public perception and future of Biotechnology.

Prescribed book:

Introduction to Chemical Engineering by Salil K Ghosal, Shymal K Sanyal and Siddhartha Datta, Mc Graw Hill Education (India) Private Limited (32nd Reprint 2015)

Reference Book:

1. Elementary Chemical Engineering, Max S Peters, Mc Graw-Hill book company, INC, New York, Toronto, London.
2. Biotechnology by U. Satyanarayana, published by Books and Allied (P) Ltd. (Section I) No. 1-E/2 Shubam Plaza (First Floor, 83/1 Baliaghate Main road, Kolkata-700010.

DEPARTMENT SUBJECT FOR CIVIL ENGINEERING
(Common with Civil Environmental Engineering)
ENG1206-CIV
INTRODUCTION TO CIVIL ENGINEERING

UNIT-1:-Duties / obligations Accountability of structural engineer for the design of a structure : a)economy b)safety: (i) strength consideration (ii) stiffness consideration. Need for assessment of strength of a material – analysis for strength requirement for design purposes – Review of IS code provisions.

Bricks and Clay Products: Bricks: Sources and qualities of Brick Earth, Classification of Bricks, Manufacture of Bricks, including burning types, general qualities of Bricks as per IS code, tests for good bricks as per IS code, including field tests, special forms of Bricks and their uses. Clay Products: Various types of tile manufacturing and their uses, Earth-wares, Terra-cotta, stone ware, porcelain, glazing of tiles etc.

Wood, Wood Based Products: Wood: Classification of various trees, cross section details of trees, their general properties, various types of defects in wood and timber, Methods of seasoning and their importance, felling and conversion, various Mechanical Properties of timber, Decay of timber, preservation methods, common Indian trees and their uses. Wood based Products: Veneers, Plywood and its types, Manufacturing of Plywood, plywood grades as per IS code, Laminated wood, merits of plywood and laminated wood, Lamin Boards, Block Boards, Batten board, Hard board, Particle boards and Composite boards.

Cements, Modern Renovation Materials: Cements: Natural and artificial cements, types of various artificial cements and their uses. Wet and dry process of manufacturing ordinary Portland cement (OPC), Chemical and Physical analysis of OPC, various field and Laboratory Tests on OPC as per IS code. Storing of cement in the field and godowns

Modern renovation materials: Cement bound, polymer cement bound and pure polymer bound materials, their properties & uses.

UNIT-2:-Introduction: Definition, scope and importance. Measuring and defining environmental development; indicators.

Ecosystems : Introduction, types, characteristic features, structure and functions of ecosystems like Forest, Grass Land, Desert ,Aquatic (Lake, rivers and estuaries)

Residential Buildings : Different types of Residential Buildings Selection of Site for Residential Building. Brief Information of Housing Colonies for Different Income Groups in India-Sizes of Plots - Public Spaces, Evolutionary Housing Concept.

Introduction: Importance and Necessity of Protected Water Supply systems, Objectives of Protected water supply system, Flow chart of public water supply system, Role of Environmental Engineer, Agency activities.

UNIT-3:- Introduction and Hydrological Aspects: WaterResources in India, Hydrology in water Resources Planning – Hydrologic Planning –Water budget equation;

Climate and Weather – Importance of monsoon rains, clouds, storms and precipitation - Precipitation – Types, Measurement of rainfall; Influence and feedbacks of hydrological changes due to climate change;

Irrigation: Definition of irrigation, Types of irrigation systems – Direct and Indirect, Lift and Inundation irrigation Systems, Methods of irrigation – Surface and Sprinkler methods, Trickle or Drip Irrigation,

Introduction: Historical development, Soil Formation, Minerals in clays and sand, Soil Structure

Development of Irrigation : Water Resources of India - Importance of Irrigation in Agriculture - Historical evolution of irrigation in India – Irrigation development during pre-

colonisation – Colonisation and post-colonization - National Water Policy- Inadequacy of Irrigation Management- Criteria for good Irrigation management.

UNIT-4:-Introduction to Sanitation – systems of sanitation – relative merits & demerits – collection and conveyance of waste water – sewerage – classification of sewerage systems
Introduction: Definition of solid waste, garbage, rubbish-Sources and Types of solid wastes.
Characteristics of Solid Wastes: Physical, chemical and biological characteristics- Problems due to improper disposal of solid waste.
Air Pollution and its definition – Factors influencing air pollution – Classification of pollutants particulates – Gases-Sources of pollution – Air qualities standards – effects – Location of Industries

UNIT-5:- Equipment and Construction (for different structures). Safety aspects of construction. Aesthetics and quality aspects of construction

References:

- (1) Elements of strength of materials by Timoshenko and Young.
- (2) Introduction to mechanics of solids by Popov.
- (3) “Civil Engg. Materials”, by Technical Teachers’ Training Institute, Chandigarh, Tata-Mc Graw-Hill Publishing Company Ltd., New Delhi.
- (4) “Materials of construction”, by R.C. Smith, McGraw-Hill Company, New York.
- (5) “Engineering Materials”, 5th edition, By Surindra Singh,, Konark Publishers Pvt. Ltd., New Delhi.
- (6) Introduction to Environmental Science ,Y Anjaneyulu, B S Publications
- (7) Environmental Studies , Suresh K .Dhameja ,S K Kataria & Sons Publications
- (8) Environmental Engineering – Peavy, Rowe, Tchenobolus
- (9) Elements of Environmental Engineering – K.N. Duggal
- (10) Irrigation and Water Power Engineering, Punmia, B.C. and P.B.B. Lal, Laxmi Publications Pvt. Ltd.
- (11) Soil Mechanics and Foundation Engineering by K.R. Arora.
- (12) Wastewater Engineering Treatment and Reuse by Metcalf & Eddy, Tata McGraw-Hill edition
- (13) Integrated Solid Waste Management by Tchobanogous
- (14) Air Pollution Control Technology by T. Painter.

DEPARTMENT SUBJECT FOR COMPUTER SCIENCE ENGINEERING
(Common with CSSE, CSNW and Information Technology)
ENG1206-CSE

PROBABILITY, STATISTICS AND QUEUING THEORY

Course Objectives:

- 1) To discuss basics of probability and related theorems , Problems. To study about conditional probability and Bayes theorem.
- 2) To study about random variables and their properties. To examine , analyze and compare Probability distributions.
- 3) To discuss regression and estimation techniques.
- 4) To discuss various types of tests such as F-test, Chi-square test. To study the various queuing models.

Course Outcomes:

At the end of the course student will be able to

- 1) solve various problems regarding probability and conditional probability.
 - 2) examine , analyze and compare probability distributions.
 - 3) prepare null and alternative hypothesis and test its validity based on random sample.
 - 4) solve various types of regression problems.
 - 5) understand various queuing models.
-
- 1. Probability:** Definitions of Probability, Addition Theorem, Conditional Probability, Multiplication Theorem, Bayes' Theorem of Probability and Geometric Probability.
 - 2. Random Variables and their Properties:** Discrete Random Variable, Continuous Random Variable, Probability Distribution, Joint Probability Distributions Their Properties, Transformation Variables, Mathematical Expectations, Probability Generating Functions.
 - 3. Probability Distributions:** Discrete Distributions: Binomial, Poisson Negative Binomial Distributions and their Properties; Continuous Distributions : Uniform, Normal, Exponential Distributions and their Properties.
 - 4. Multivariate Analysis and Curve Fitting:** Correlation, Correlation Coefficient, Rank Correlation, Regression Analysis, Multiple Regression, Principles of Least Squares and Curve Fitting
 - 5. Estimation and testing of hypothesis:** Sample, Populations, Statistic, Parameter, Sampling Distribution, Standard Error, Un-Biasedness, Efficiency, Maximum Likelihood Estimator, Notion & Interval Estimation.
 - 6. Sample Tests:** Large Sample Tests Based on Normal Distribution , Small Sample Tests : Testing Equality of Means, Testing Equality of Variances, Test of Correlation Coefficient, Test for Regression Coefficient; Coefficient of Association, 2 – Test for Goodness of Fit, Test for Independence.
 - 7. Queuing Theory :** Queue Description, Characteristics of a Queuing Model, Study State Solutions of M/M/1: Model, M/M/1 ; N Model, M/M/C: Model, Case Studies

Text Books :

1. Probability & Statistics for Engineers and Scientists, Walpole, Myers, Myers, Ye. Pearson Education.
2. Probability, Statistics and Random Processes T.Veerarajan Tata McGraw – Hill

Reference Books:

1. Probability & Statistics with Reliability, Queuing and Computer Applications, Kishor S. Trivedi, Prentice Hall of India ,1999

**DEPARTMENT SUBJECT FOR ELECTRONICS & COMMUNICATION
ENGINEERING
ENG1206-ECE
BASIC ELECTRONICS ENGINEERING**

1. Common Electronic materials and properties:

Conductors, Insulators, Semi Conductors, Intrinsic, Extrinsic semiconductors, conduction in semiconductors, charge mobility, Fermi Dirac function, Fermi level, charge densities, diffusion current density, drift current density, Hall effect.

2. Passive Components, Circuit Theorems and Basic meters:

Types of passive components, types of resistors, resistor color code, capacitors, concept of charging and discharging, types of capacitances, inductors, mutual inductance, inductance of two coils, KCL, KVL, common meters, CRO.

3. Fundamentals of diodes and special diodes:

Elementary concepts, V-I characteristics and applications of PN junction diode, Varactor diode, Zener diode, LED, Tunnel diode, Photo diode, Schottky diode and PIN diode.

4. Fundamentals of BJT, FET and MOSFET (Elementary concepts):

Transistor construction, Operation of the transistor, transistor configuration, input and output characteristics, applications of transistor in three configurations, comparison of BJT and JFET, JFET construction, operation of FET, JFET characteristics, JFET configurations and applications, concept of MOSFET, types of MOSFETs.

5. Basic concepts of Power devices and Integrated Circuits (ICs):

Construction, applications and features of UJT, SCR, DIAC and TRIAC, introduction to Integrated Circuits, classification of ICs, salient features of OP-AMP, characteristics of an ideal OP-AMP and applications, salient features of 555 timer and applications.

Text Books:

1. Electronic Devices and Circuits by **G.S.N.Raju**, IK International, New Delhi.

Reference Books:

1. Basic Electronics by **Bernard Grob**, 4th edition, International Student edition, McGraw Hill publishers.
2. Electronic Devices and Circuits by **Sanjeev Guptha**.
3. Electronic Devices and Circuits Theory by **Robert L. Boylestad & Louis Nashelsky**, PHI edition.

DEPARTMENT SUBJECT FOR ELECTRICAL & ELECTRONICS ENGINEERING
ENG1206-EEE
FUNDAMENTALS OF ELECTRICAL ENGINEERING

1. Electrical Engineering Fundamentals:

Electrical circuit elements and sources, Ohm's law, effect of temperature on resistance, resistance temperature coefficient, insulation resistance, Series-parallel connection of inductors, rise and decay of current in inductive circuit, Concepts of mutual inductance, Concept of Potential difference. Charging and discharging of capacitor, Concepts of induced emfs, comparison between electric and magnetic circuit, Kirchhoff's laws, star-delta conversion.

2. Fundamental Laws of Electrical Engineering:

Coulombs law of Electrostatics (1st law and 2nd), Faradays laws of Electromagnetic induction, Fleming Left hand and Right hand rules, Lenz's law, Biot-Savart's law, Ampere circuital law, Maxwell's corkscrew rule.

3. Alternating Current Fundamentals:

Sinusoidal voltage and currents, their mathematical and graphical representation, concept of cycle, period, frequency, instantaneous value, peak value, average value, RMS value, Peak factor and Form factor; Phase difference, lagging, leading and in phase quantities; and phasor representation, Rectangular and polar representation of phasors, study of A.C circuits (RL, RC and RLC series circuits), Phasor diagrams, voltage, current, powers and power factor, Introduction to poly-phase systems.

4. Fundamentals of Electrical Measurements: (no need to explain errors and compensations)

Classification of instruments, various forces in indicating instruments (deflection, control and damping), construction and operation of MI and MC type instruments for voltage and current measurement, Construction and operation of dynamometer type wattmeter, Construction and operation of single phase induction type energy meter.

5. Electrical Wiring:

Symbols for various electrical equipment, Service mains, meter board and distribution board, Types of wirings and their Installations, Various types of conductors, conductor sizes and current ratings, Examples of house wiring (one lamp-one switch, Stair case, Corridor wiring, Power wiring), Elementary discussion on Circuit protective devices: fuse and Miniature Circuit Breaker (MCB's), significance of various parameters on name plates of equipment.

Note: The syllabus is prepared to give basic concepts of Electrical Engineering to First year students. Hence, in the evaluation, problems need to be avoided.

Text Books:

1. Basic Electrical Engineering D. C. Kulshreshtha TMH 1st Edition.
2. S L Uppal and G C Garg, "Electrical Wiring, Estimating & Costing", Khanna Publishers, 2015.

Reference Books:

1. Fundamentals of Electrical Engineering Rajendra Prasad PHI Third Edition 2014.
2. V. N. Mittal and Arvind Mittal, "Basic Electrical Engineering" McGraw Hill.
3. A.K.Sawhney, A Course in Electrical and Electronics Measurements and Instruments- Dhanpat Rai and Sons, Delhi, 2005.

DEPARTMENT SUBJECT FOR GEO-INFORMATICS ENGINEERING
ENG1206-GIN
GEOMORPHOLOGY

Unit I

Definition and scope of geomorphology; Fundamental concepts in geomorphology; Endogenetic processes: volcanism and tectonism; Exogenetic processes: weathering, Mass-wasting and erosion; geomorphic agents.

Unit II

Fluvial processes and landforms: valleys and valley forming processes - associated features; Alluvium –active and relict alluvium; Floodplain morphology; Types of streams - Genetic classification of streams; Alluvial fans and deltas Shore Zone processes and landforms: shore line, shore zone and coast; Wind waves, tides, littoral currents, storm surges and tsunamis; Erosional and depositional landforms

Unit III

Glacial processes and landforms: ice and glaciers; types of glaciers; glacial motion; Regimen of glaciers – nourishment and wastage of glaciers; active, passive and dead glaciers; erosional and depositional landforms. Eolian processes and landforms; dominance of wind processes in arid and semi-arid regions; erosional and depositional landforms

Unit IV

Scope and significance of soil studies; soil and regolith; soil forming factors – geological, climatic, topographical, biological and time factors; Soil components – mineral matter, organic matter, soil-water and soil-air; Soil Properties – colour, texture, structure, acidity and alkalinity; soil profile; Pedogenic regimes – laterisation, gleisation, podzologisation, calcification and salinisation; soil classifications – zonal system, and Seventh approximation system.

Unit V

Applied geomorphology: landform interpretation for groundwater explorations; mineral exploration – surface expressions of ore bodies; weathering residues, placer deposits; applications in engineering projects: route selection – highways, canals, transmission lines; site selections – dam sites, industries; townships

Text Books

1. Geomorphology by A.L. Bloom, Waveland Pr.Inc. 2004
2. Principles of Geomorphology by W.D. Thornbury, Wiley Eastern, 1984
3. Landscape Systems by T.L. McKnight, Prentice-Hall International, 1987
4. Fundamentals of Geomorphology by R. Huggett, Routledge, 2007

DEPARTMENT SUBJECT FOR INSTRUMENT TECHNOLOGY
ENG1206-INS
BASIC AND DIGITAL ELECTRONICS

JUNCTION DIODE: Basic structure of a diode Depletion region and barrier potential formation conduction process – Volt – ampere characteristic --- cut-in voltage – Diode resistance – Temperature dependence of VI Characteristic – Transition and diffusion capacitances – varactor diode – Volt – ampere characteristic of a Zener diode – Avalanche and Zener breakdowns.

BIPOLAR JUNCTION TRANSISTOR: Basic structure of a transistor – conduction process – Input and output characteristics of CB and CE configurations—Active, saturation and cutoff regions – current gains—outline of biasing arrangements – The operating point of transistor and its stability – Compensation techniques for operating point stability – Analysis of self-bias Circuit for stability factor ‘S’ -- Self heating and thermal runaway – Thermal resistance.

FET CIRCUITS: Basic structure of a JFET – Conduction process – CS drain and pinch-off regions – Pinch-off voltage – Drain resistance and Trans conductance parameters — On – resistance of a JFET – JFET as a voltage variable resistor -- Basic structure of a MOSFET – Drain and transfer characteristics of a DEMOSFET — The enhancement MOSFET – Typical drain and transfer curves of an EMOSFET – Handling precautions for a MOSFET – Gate protection for a MOSFET – comparison between a FET and a BJT

NUMBER SYSTEMS & CODES: Review of number systems, weighted codes, conversion from one to another, non weighted codes, error detecting codes, error correcting codes , binary arithmetic.

DIGITAL LOGIC & BOOLEAN ALGEBRA: Basic gates OR, AND, NOT, universal gates NAND, NOR, introduction to HDL. Boolean law & theorems, representation of switching functions, Karnaugh map representation, minimization using Karnaugh map, SOP and POS methods. Design of single out put and multi out put functions using conventional gates and HDL implementation models

Arithmetic circuits: Half & full adders and subtractors , 4 bit binary adder, fast adder, ALU, arithmetic circuits using HDL

Data processing circuits: Multiplexers, demultiplexure, 1 of 16 decoder, seven segment decoders, encoders, HDL implementation of data processing circuits

Synchronous sequential logic: RS flip - flops, gated flip - flops, edge triggered RS,D,JK flip - flops, master slave flip - flop, T flip- flop switch contact bounce circuits, analysis of sequential circuits, HDL implementation of Flip- Flops .

REFERENCES:

1. Electronic Devices and Circuits, by Millman and Halkias
2. Integrated Electronics : Analog and Digital circuits and systems, by Millman and Halkias
3. Electronic Fundamentals and Applications, by John D. Ryder.
4. Electric Circuits, by Joseph A. Edminister, Schaum's outline series.
5. Circuit Theory, by Umesh Sinha
6. Digital Principles and Applications. Albert Paul Malvino and Donald P. Leach, T.M.H.
7. Digital Integrated Electronics. Herbert Taub and Donald Schilling, McGraw Hill Co.
8. Digital Logic and Computer Design by M. Morris Mano, P.H.I.

DEPARTMENT SUBJECT FOR MECHANICAL ENGINEERING
ENG1206-MEC
ENGINEERING MECHANICS

Concurrent Forces in a Plane: Principles of statics- Equilibrium of concurrent forces in a plane- Method of projections- Equilibrium of three forces in a plane-Method of moments- Friction.

Parallel Forces in a Plane: Two parallel forces- General case of parallel forces in a plane- Centre of parallel forces and centre of gravity- Centroids of composite plane figures and curves- Distributed force in a plane.

General Case of Forces in a Plane: Composition of forces in a plane- Equilibrium of forces in a plane- Plane trusses, Funicular polygon, Maxwell diagrams, method of joints, method of sections- Plane frame- method of members, Distributed force in a plane- Flexible suspension cables.

Force Systems in Space: Concurrent forces in space; method of projections, method of moments; Couples in space- Parallel forces in space- Centre of parallel forces and centre of gravity- General case of forces in space

Principal of Virtual Work: Equilibrium of ideal systems – efficiency of simple machines – stable and unstable equilibrium.

Text Book:

1. **Engineering Mechanics by S.Timoshenko and D.HYoung McGraw-Hill.(4th edition)**

References:

1. Engineering Mechanics, Vol.1 & 2 by J.L. Meriems and L.G. Kraige.
2. Engineering Mechanics by Singer.
3. Engineering Mechanics by K.L. Kumar, Tata Mc-Graw Hill.
4. Engineering mechanics by Bhavikatti. New age international.

DEPARTMENT SUBJECT FOR METALLURGICAL ENGINEERING
ENG1206-MET
ELEMENTS OF MATERIAL SCIENCE

Introduction, classification of materials, Space Lattice and unit cells, crystal systems, Indices of planes and directions. Structure of common metallic materials.

Crystal Defects: Point, Line and Surface defects. Dislocations, types, Burgers' Vector, Dislocation movement by slip, climb and cross slip, Dislocation sources. Slip system for BCC, FCC and HCP metals, Critical resolved shear stress (CRSS) for slip, Twinning, Stacking, faults, Jogs, Kinks

Electrical and Electronic Properties of materials, Electronic conductivity, free electron theory and band theory of solids. Intrinsic semi-conductors. Super conductivity. Magnetic properties, Dia, para, ferro, ferri magnetism. Soft and hard magnetic materials and applications. Optical properties of materials. Refractive index, absorption emission of light, optical fibers, Opto-electronic materials.

Textbooks:

1. Material Science and Engineering by V. Raghavan.
2. Physical Metallurgy by S. H. Avner.

Reference books:

1. Material Science and Engineering by L. H. Van Vleck, 5th edition, Addison Wealey (1985).
2. Structure and properties of materials by R. M. Rose, L. A. Shepard and J. Wulff, Vol. 1,4 John Willey (1966)
3. Essentials of Material Science by A.C. Guy, McGraw Hill (1976)
4. The Science and Engineering Materials by D.R. Askeland. 2nd Edition, Chapman and Hall (1990)

**DEPARTMENT SUBJECT FOR NAVAL ARCHITECTURE & MARINE
ENGINEERING
ENG1206-NAM
BASIC NAVAL ARCHITECTURE**

1. History – Development of primitive floating vehicles / platforms. Evolution of ship types; evolution of materials used in ship construction. Contribution of the ships to civilisation, trade and discovery of the planet Earth.
2. Fundamentals of Floatation - Archimedes principle, laws of floatation and stability.
3. Classification of ships and other Marine platforms. Definition and general arrangement of typical ships and Marine platforms.
4. Ship terminology and their meaning. Ship lines and procedure to draw them.
5. Introduction to ship construction / production process. Visit to Shipyard.
6. Economics of waterway transportation.
7. Domain of Naval Architecture Studies and role of a Naval Architect.
8. Challenges and state of the art.
9. Avenues for a Naval Architect.

Textbook:

Introduction to Naval Architecture by Eric Tupper- Butterworth Heinemann Publications

ENG1207

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology, Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1207	Essence of Indian Traditional Knowledge	2	0	0	30	70	100	3 Hrs	0

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Objectives of the course:

- ❖ To know the contributions of scientists for the development of society over a period of time.
- ❖ To understand the Science and Technological developments that lead to human welfare.
- ❖ To appreciate the Science and Technological contributions for the development of various sectors of the economy.
- ❖ To identify the technological transfer versus economic progress of the countries.

Learning Outcome: By the end of this course the students should be able to understand the contribution of Scientific and Technological developments for the benefit of society at large.

UNIT-I

Historical Perspective of Science and Technology:

Nature and Definitions; Roots of Science – In Ancient Period and Modern Period (During the British Period); Science and Society; Role of Scientist in the Society. **(6 periods)**

UNIT-II

Policies and Plans after Independence:

Science and Technology Policy Resolutions; New Technology Fund; Technology Development (TIFAC); Programs aimed at Technological Self Reliance; Activities of Council of Scientific and Industrial Research. **(6 periods)**

UNIT-III

Science and Technological Developments in Critical Areas:

Space – The Indian Space Program: India's Geostationary Satellite Services – INSAT System And INSAT Services; **Defense Research and Technology** – Research Coordination, Research efforts and Development of technologies and Spin-off technologies for civilian use; **Nuclear Energy** –Effects of a nuclear explosion and India's safety measures. **(6 Periods)**

UNIT-IV

Impact of Science and Technology in Major Areas:

Ocean Development: Objectives of Ocean Development, Biological and Mineral resources, Marine Research and Capacity Building; **Biotechnology:** Meaning, Biotechnology techniques- Bioreactors, Cell fusion, Cell or Tissue Culture, DNA Fingerprinting, Cloning, Artificial Insemination and Embryo Transfer Technology and Stem Cell Technology; Application of Biotechnology – Medicine, Biocatalysts, Food Biotechnology, Fuel and Fodder and Development of Biosensors. **(6 periods)**

UNIT-V

Technology Transfer and Development:

Transfer of Technology – Types, Methods, Mechanisms, Process, Channels and Techniques; **Appropriate Technology** - Criteria and Selection of an Appropriate Technology; Barriers of Technological Change. **(6 periods)**

Text Books:

1. Kalpana Rajaram, **Science and Technology in India**, Published and Distributed by Spectrum Books (P) Ltd., New Delhi-58.
2. Srinivasan, M., **Management of Science and Technology (Problems & Prospects)**, East – West Press (P) Ltd., New Delhi.

ENG1208
PROFESSIONAL ETHICS & MORAL VALUES
 (For the branches of Civil Engg., Chemical Engg, Computer Science Engg and
 Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1208	Professional Ethics & Moral Values	2	0	0	30	70	100	3 Hrs	0

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Objectives of the Course:

- To inculcate Ethics and Moral Values into the young minds.
- To develop moral responsibility and mould them as best professionals.
- To create ethical vision and achieve harmony in life.

Learning outcome: By the end of the course student should be able to understand the importance of ethics and values in life and society.

UNIT – I

Ethics and Moral Values: Ethics and Values, Ethical Vision, Ethical Decisions, **Moral Values** – Classification of Values, Universality of Values. **(6 Periods)**

UNIT – II

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, Professional Ethics, Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI. **(6 Periods)**

UNIT – III

Engineering as Social Experimentation: Engineering as social experimentation, Engineering Professionals – life skills, Engineers as Managers, Consultants and Leaders, Role of engineers in promoting ethical climate, balanced outlook on law. **(6 Periods)**

UNIT – IV

Safety Social Responsibility and Rights: Safety and Risk, moral responsibility of engineers for safety, case studies – Bhopal gas tragedy, Chernobyl disaster, Fukushima Nuclear disaster, Professional rights, Gender discrimination, Sexual harassment at work place. **(6 Periods)**

UNIT – V

Global Issues: Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical living, concept of Harmony in life. **(6 Periods)**

Text Books:

1. Govindharajan, M., Natarajan, S. and Senthil Kumar, V.S., Engineering Ethics, Prentice Hall of India, (PHI) Delhi, 2004.
2. Subramainam, R., Professional Ethics, Oxford University Press, New Delhi, 2013.

References:

1. Charles D, Fleddermann, “Engineering Ethics”, Pearson / PHI, New Jersey 2004 (Indian Reprint).

**ENG1209
ENGLISH**

(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology,
Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1209	English	3	0	0	30	70	100	3 Hrs	3

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

OBJECTIVES

Reading Skills

- Addressing explicit and implicit meanings of a text on current topics.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

Writing Skills

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, emails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

Interactive Skills

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

Life Skills

- Examining self-attributes and identifying areas that require improvement: self-diagnosis and self-motivation.
- Adapting to a given situation and developing a functional approach to finding solutions: adaptability and problem solving.
- Understanding the importance of helping others: community services and enthusiasm.

Course Outcome

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

DETAILED SYLLABUS

UNIT-1

- Reading:** *On the conduct of life:* William Hazlitt
Grammar: Prepositions
Vocabulary: Word Formation I: Introduction to Word Formation
Writing: Clauses and Sentences
Life skills: **Values and Ethics**
If: Rudyard Kipling

UNIT-2

Reading: *The Brook*: Alfred Tennyson
Grammar: Articles
Vocabulary: Word Formation II: Root Words from other Languages
Writing: Punctuation
Life skills: **Self-Improvement**
How I Became a Public Speaker: George Bernard Shaw

UNIT-3

Reading: *The Death Trap*: Saki
Grammar: Noun-Pronoun Agreement
Subject- Verb Agreement
Vocabulary Word Formation III: Prefixes and Suffixes
Writing Principals of Good Writing
Life skills: **Time Management**
On saving Time: Seneca

UNIT-4

Reading: *Chindu Yellama*
Grammar: Misplaced Modifiers
Vocabulary: Synonyms; Antonyms
Writing Essay Writing
Life skills **Innovation**
Muhammad Yunus

UNIT-5

Reading: *Politics and the English Language*: George Orwell
Grammar: Clichés; Redundancies
Vocabulary: Common Abbreviations
Writing: Writing a Summary
Life skills: **Motivation**
The Dancer with a White Parasol: Ranjana Dave

UNIT-6

Basics of Oral Communication: *Pronunciation, Stress, Intonation, Rhythm*
Everyday Communication I: *Introducing oneself and others, Announcements*
Everyday Communication II: *Getting someone's attention and Interrupting*
Listening Comprehension I: *Conversations*
Everyday Communication III: *Making Requests and Responding to them*
Listening Comprehension II: *Extended listening Passage*
Interview Skills
Making Presentations

Prescribed Textbook: *Language and Life: A Skills Approach* Board of Editors, Orient Black Swan Publishers, India. 2018.

Suggested Readings

- ❖ Practical English Usage. Michael Swan. OUP. 1995.
- ❖ Remedial English Grammar. F.T. Wood. Macmillan.2007
- ❖ On Writing Well. William Zinsser. Harper Resource Book. 2001
- ❖ Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
- ❖ Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- ❖ Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

ENG1210
CHEMISTRY LAB
 (For the branches of ECE, EEE, Geo-Informatics, Instrument Technology,
 Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1210	Chemistry Lab	0	0	3	50	50	100	3 Hrs	1.5

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Course Objectives:

- 1) To develop the fine skills of quantitative determination of various chemical components through titrimetric analysis
- 2) To prepare and use ionexchange/ zeolite columns for the removal of hardness of water
- 3) To develop the skill of organic synthesis through the preparation of a polymer/ drug

Course Outcomes:

At the end of the course student will be able to

- 1) quantitatively determine the amount of various chemical species in solutions by titrations.
 - 2) conduct the quantitative determinations with accuracy
 - 3) develop novel materials to be used as zeolite and prepare columns for removal of hardness of water
 - 4) synthesise a polymer or a drug
-
1. Determination of Sodium Hydroxide with HCl (Na_2CO_3 Primary Standard)
 2. Determination of Alkalinity (Carbonate and Hydroxide) of water sample
 3. Determination of Fe(II)/Mohr's Salt by Permanganometric titration
 4. Determination of Oxalic Acid/ Hydrogen Peroxide by Permanganometric titration
 5. Determination of Chromium (VI) with Mohr's Salt Solution
 6. Determination of Zinc by EDTA method
 7. Determination of Hardness of Water sample by EDTA method
 8. Determination of Chlorine in water by Iodometric Titration
 9. Ion exchange/ Zeolite column for removal of hardness of water
 10. Synthesis of Polymer/ drug

Reference Books:

Vogel's Quantitative Chemical Analysis – V – Edition – Longman
 Experiments in Applied Chemistry (For Engineering Students) – Sinita Rattan – S. K. Kataria & Sons, New Delhi.

ENG1211
PHYSICS LAB
 (For the branches of Civil Engg., Chemical Engg, Computer Science Engg and
 Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1211	Physics Lab	0	0	3	50	50	100	3 Hrs	1.5

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray μ_o and Extraordinary μ_e ray.
6. Determination of Thickness Given Paper Strip By Wedge Method.
7. Calibration of Low Range Voltmeter.
8. Calibration of Low Range Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance.
12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell-Characteristics.
14. Planks Constants.
15. Laser- Diffraction.

ENG1212
COMPUTER PROGRAMMING USING C & NUMERICAL METHODS LAB
(For the branches of ECE, EEE, Geo-Informatics, Instrument Technology,
Mechanical Engg., Metallurgical Engg, Naval Arch. & Marine Engg)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1212	Computer Programming Using C & Numerical Methods Lab	0	0	3	50	50	100	3 Hrs	1.5

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Course Objectives:

- 4) To discuss basics of probability and related theorems , Problems. To study about conditional probability and Bayes theorem.
- 5) To study about random variables and their properties. To examine , analyze and compare Probability distributions.
- 6) To discuss regression and estimation techniques.
- 7) To discuss various types of tests such as F-test, Chi-square test. To study the various queuing models.

Course Outcomes:

At the end of the course student will be able to

- 5) ability to solve various problems regarding probability and conditional probability.
 - 6) examine , analyze and compare probability distributions.
 - 7) prepare null and alternative hypothesis and test its validity based on random sample.
 - 8) solve various types of regression problems.
 - 9) understand various queuing models.
1. **Probability:** Definitions of Probability, Addition Theorem, Conditional Probability, Multiplication Theorem, Bayes' Theorem of Probability and Geometric Probability.
 2. **Random Variables and their Properties:** Discrete Random Variable, Continuous Random Variable, Probability Distribution, Joint Probability Distributions Their Properties, Transformation Variables, Mathematical Expectations, Probability Generating Functions.
 3. **Probability Distributions:** Discrete Distributions: Binomial, Poisson Negative Binominal Distributions and their Properties; Continuous Distributions : Uniform, Normal, Exponential Distributions and their Properties.
 4. **Multivariate Analysis and Curve Fitting:** Correlation, Correlation Coefficient, Rank Correlation, Regression Analysis, Multiple Regression, Principles of Least Squares and Curve Fitting
 5. **Estimation and testing of hypothesis:** Sample, Populations, Statistic, Parameter, Sampling Distribution, Standard Error, Un-Biasedness, Efficiency, Maximum Likelihood Estimator, Notion & Interval Estimation.

6. **Sample Tests:** Large Sample Tests Based on Normal Distribution , Small Sample Tests : Testing Equality of Means, Testing Equality of Variances, Test of Correlation Coefficient, Test for Regression Coefficient; Coefficient of Association, 2 – Test for Goodness of Fit, Test for Independence.
7. **Queuing Theory :** Queue Description, Characteristics of a Queuing Model, Study State Solutions of M/M/1: Model, M/M/1 ; N Model, M/M/C: Model, Case Studies

Text Books :

1. Probability & Statistics for Engineers and Scientists, Walpole, Myers,
2. Myers, Ye. Pearson Education.
3. Probability, Statistics and Random Processes T.Veerarajan Tata McGraw – Hill

Reference Books:

1. Probability & Statistics with Reliability, Queuing and Computer Applications, Kishor S. Trivedi, Prentice Hall of India ,1999

**ENG1213
WORKSHOP**
(For the branches of Civil Engg., Chemical Engg, Computer Science Engg and
Information Technology)

Code Number	Course	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
		Hours per week			Ses.	Ext.			
ENG1213	Workshop	0	0	3	50	50	100	3 Hrs	1.5

L: Lectures; T: Tutorial; P: Practical; Ses: Sessionals; Ext: External; C: Credits

Carpentry:

Bench Work, tools used in carpentry.

Jobs for Class work – half lap joint, mortise and tenon joint, half – lap dovetail joint, corner dovetail joint, central bridle joint.

Sheet Metal:

Tools used in sheet metal work, Laying development of the sheet metal jobs, soldering.

Jobs for class works – Square tray, taper tray(sides), funnel, elbow pipe joint, 600 pipe joint.

Fitting:

Tools used in fitting work, Different files, chisels, hammers and bech vice.

Jobs for class work – Square, hexagon, rectangular fit, circular fit and triangular fit.

Reference

Elements of workshop technology, Vol.1 by S. K. and H. K. Choudary.