NEW HORIZON
COLLEGE OF ENGINEERING
Permanently affiliated to VTU, approved by AICTE & ISO 9001:2008 certified
The Trust is a Recipient of Prestigious Rajyotsava State Award 2012 Conferred by the Government of Karnataka
Awarded Outstanding Technical Education Institute in Karnataka-2014
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(An Autonomous Institution Affiliated to VTU)

Outcome Based Education

With

Choice Based Credit System

Academic Year 2015-16

First and Second Semesters

Bachelor of Engineering (B.E)

(Common to all Branches)

Scheme and Syllabus

(An Autonomous Institution Affiliated to VTU)

VISION

To achieve total quality in education and knowledge management through specific, measurable, attainable, relevant, time bound goals and continuous improvement methods.

MISSION

To mould our students into holistic personalities who are accomplished in emotional, moral, intellectual, social and mental capabilities besides inculcating a capacity for critical and lateral thinking

QUALITY POLICY

To provide education services of the highest quality both curricular and co-curricular so that our students can integrate skills and serve industry and society equally well at the Global level.

PREFACE

New Horizon College of Engineering was recently granted the autonomous status effective academic year 2015-16. The college offers B.E program in eight branches, M.B.A, M.C.A and M.Tech program in eight specializations. We look forward to implementing the prestigious autonomous status with utmost commitment and enthusiasm-true to our institution motto “In Pursuit of Excellence.”

India has recently become a Permanent Member by signing the Washington Accord. The accord was signed by the National Board of Accreditation (NBA) on behalf of India on 13th June 2014. It enables not only the mobility of our degrees globally but also establishes equivalence to our degrees with those of the member nations such as Taiwan, Hong Kong, Ireland, Korea, Malaysia, New Zealand, Russia, Singapore, South Africa, Turkey, Australia, Canada and Japan. Among other signatories to the international agreement are the US and the UK. Implementation of Outcome Based Education (OBE) has been the core issue for enabling the equivalence and of Indian degrees and their mobility across the countries.

New Horizon College of Engineering has adopted the Choice Based Credit System (CBCS) semester structure with OBE scheme and grading system. The credit based OBE semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. OBE emphasizes setting clear standards for observable, measurable outcomes of programs in stages. Outcome Based Education is a method or means which begins with the end in mind and constantly emphasizes continuous improvement. Choice Based Credit System (CBCS) provides choice for students to select from the prescribed courses (core, Foundation, Foundation Elective, elective, open elective and minor or soft skill courses). The CBCS provides a ‘cafeteria’ type approach in which the students can choose electives from a wide range of courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, adopt an interdisciplinary approach to learning which enables integration of concepts, theories, techniques, and, perspectives from two or more disciplines to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline.

Outcome Base Education and CBCS greatly enhance the overall skills and employability of students. In order to increase the Industry readiness, many Soft Skills and Personality Development modules have been added to the existing curriculum. Industry Interactions have been made compulsory to enhance the field experience. In order to enhance creativity and innovation Mini Project and Industrial visit & Interaction are included in all undergraduate programs.

Dr. Manjunatha

Principal-NHCE

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CREDIT SCHEME FOR FIRST SEMESTER B.E (Common to all Branches)

FIRST SEMESTER- CHEMISTRY CYCLE												
Sl. No	Course Code	Course	BoS	Credit Distribution				Overall Credits	Contact Hours	Marks		
				L	P	T	S			CIE	SEE	Total
1	15MA11	Engineering Mathematics-I	Sciences	4	0	1	0	5	6	50	50	100
2	15CH12	Engineering Chemistry	Sciences	3	1	0	1	5	5	75	75	150
3	15CS13	Introduction to Programming with C	CSE	3	1	0	1	5	5	75	75	150
4	15ME14	Computer Aided Engineering Drawing	ME	2	1	1	0	4	6	50	50	100
5	15EC15	Basic Electronics	ECE	3	0	1	0	4	5	50	50	100
6	15HP16	Personality Development and Soft Skills	HSS	2	0	0	0	2	2	50	50	100
7	15HE17	Essential English	HSS	Mandatory Course				0	2	25	25	50
Total								25	31	375	375	750

FIRST SEMESTER- PHYSICS CYCLE												
Sl. No	Course Code	Course	BoS	Credit Distribution				Overall Credits	Contact Hours	Marks		
				L	P	T	S			SEE	CIE	Total
1	15MA11	Engineering Mathematics -I	Sciences	4	0	1	0	5	6	50	50	100
2	15PH12	Engineering Physics	Sciences	3	1	0	1	5	5	75	75	150
3	15ME13	Elements of Mechanical Engineering	ME	3	1	0	1	5	5	75	75	150
4	15CV14	Elements of Civil Engineering	CV	3	0	1	0	4	5	50	50	100
5	15EE15	Basics of Electrical Engineering	EE	3	0	1	0	4	5	50	50	100
6	15HB16	Business Communication	HSS	2	0	0	0	2	2	50	50	100
7	15HC17	Constitution of India and Professional Ethics	HSS	Mandatory Course				0	2	25	25	50
Total								25	30	375	375	750

CREDIT SCHEME FOR SECOND SEMESTER B.E (Common to all Branches)

SECOND SEMESTER- CHEMISTRY CYCLE												
Sl. No	Course Code	Course	BoS	Credit Distribution				Overall Credits	Contact Hours	Marks		
				L	P	T	S			CIE	SEE	Total
1	15MA21	Engineering Mathematics- II	Sciences	4	0	1	0	5	6	50	50	100
2	15CH22	Engineering Chemistry	Sciences	3	1	0	1	5	5	75	75	150
3	15CS23	Introduction to Programming with C	CSE	3	1	0	1	5	5	75	75	150
4	15ME24	Computer Aided Engineering Drawing	ME	2	1	1	0	4	6	50	50	100
5	15EC25	Basic Electronics	ECE	3	0	1	0	4	5	50	50	100
6	15HP26	Personality Development and Soft Skills	HSS	2	0	0	0	2	2	50	50	100
7	15HE27	Essential English	HSS	Mandatory Course				0	2	25	25	50
Total								25	31	375	375	750

SECOND SEMESTER- PHYSICS CYCLE												
Sl. No	Course Code	Course	BoS	Credit Distribution				Overall Credits	Contact Hours	Marks		
				L	P	T	S			SEE	CIE	Total
1	15MA21	Engineering Mathematics -II	Sciences	4	0	1	0	5	6	50	50	100
2	15PH22	Engineering Physics	Sciences	3	1	0	1	5	5	75	75	150
3	15ME23	Elements of Mechanical Engineering	ME	3	1	0	1	5	5	75	75	150
4	15CV24	Elements of Civil Engineering	CV	3	0	1	0	4	5	50	50	100
5	15EE25	Basics of Electrical Engineering	EE	3	0	1	0	4	5	50	50	100
6	15HB26	Business Communication	HSS	2	0	0	0	2	2	50	50	100
7	15HC27	Constitution of India and Professional Ethics	HSS	Mandatory Course				0	2	25	25	50
Total								25	30	375	375	750

CHEMISTRY CYCLE

ENGINEERING MATHEMATICS-I

Course Code	**: 15MA11**	**Credits**	**: 05**
L:P:T:S	**: 4:0:1:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

Course Outcomes: At the end of the Course, the Student will be able to do the following:

CO1	Learn the principles of engineering mathematics through calculus
CO2	Find the extreme values of a function of two variables
CO3	Understand the concept of vectors as a tool for solving engineering problems
CO4	Understand the concept of Integration as a tool for solving engineering problems
CO5	Develop the ability to construct mathematical models involving differential equations and interpret their solutions physically
CO6	Apply ideas from linear algebra in solving systems of linear equations

COs to POs Mapping:

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

MODULE 1

Solid Geometry: Recapitulation of planes, straight lines. Right circular cone and right circular cylinder.

Polar Curves: Angle between the radius vector and tangent, angle between two curves, Pedal equation for polar curves. Taylor's and Macluren's theorems for function of one variable (statement only)- problems. **9 Hrs**

MODULE 2

Partial derivatives: Definition and simple problems, Euler's theorem for Homogeneous function (No extended theorem) – problems, total derivatives, partial differentiation of composite functions, Jacobians - definition and problems.

Applications: Extreme values of functions of two variables. **9 Hrs**

MODULE 3

Vector Calculus: Scalar and vector point functions, Gradient, Divergence, Curl, Solenoidal and irrotational vector fields and Vector identities.

Orthogonal curvilinear coordinates : Orthogonality of cylindrical and spherical coordinate systems, expressions for vectors in cylindrical and spherical coordinate systems, problems (without proof of gradient, divergence and curl).
Applications: Potential functions, line integral and work done. **9 Hrs**

MODULE 4

Integral Calculus: Reduction formulae $\int \sin^n x\,dx, \int \cos^n x\,dx$ *and* $\int \sin^m x \cos^n x\,dx$ - (m and n are positive integers), evaluation of these integrals with standard limits (0 to π/2) and problems.
Curve Tracing - tracing for Cartesian and polar curves : (i) Cissoid (ii) Strophiod (iii) Cardioid (iv) Lemniscate and (v) three and four leaved rose.
Differential Equations and its application: Review of Linear and Bernoulli's differential equations. Newton's law of cooling, flow of electricity, laws of decay, growth and mixing problem. **9 Hrs**

MODULE 5

Linear Algebra: Rank of a matrix by elementary transformations, solution of system of linear equations - Gauss-elimination method, Gauss-Jordon method and L-U decomposition method. Linear transformation, diagonalisation of a square matrix, Quadratic forms, reduction to Canonical form by orthogonal transformation. **8 Hrs**

Text Book:

1. Higher Engg. Mathematics by Dr. B S Grewal, 43rd Edition.
2. Engineering Mathematics-Kreyszig , 10th Edition.

Reference books:

1. Higher Engineering mathematics by N P Bali
2. Higher engineering mathematics by B.V.Ramana
3. Higher Engineering mathematics by H K Dass

Expected Course Outcome:

Students shall demonstrate knowledge associated with:

- Basics of differential calculus and Taylor series.
- Differentiating functions with several variables and its application.
- Application of integration and curve tracing.
- Application of vector calculus.
- Solving a system of equations by direct methods and its application in electrical circuit analysis.
- Eigen values and Eigen vectors.

Assessment Method:

CIE:

1. Three internals tests of 30 marks each will be conducted and the average of the top two test marks will be considered.
2. Assignment - 10 marks
3. Quiz test - 10 marks

SEE:

1. SEE will be conducted for 100 marks and shall be for a duration of 3 hours
2. Two Questions will be set from each module carrying 20 Marks each.
3. Students have to answer 5 questions selecting one full question from each module.

ENGINEERING CHEMISTRY

Course Code	**: 15CH12/22**	**Credits**	**: 05**
L:P:T:S	**: 3:1:0:1**	**CIE Marks**	**: 50+25**
Exam Hours	**: 03**	**SEE Marks**	**: 50+25**

Course Outcomes: On completion of the course, student will be able to

15CH12/22.1	Understand the chemistry behind engineering materials in various devices which are in the service of mankind.
15CH12/22.2	Analysis of existing problems and solutions with respect to engineering materials, energy production and other natural resources.
15CH12/22.3	Evaluate the various parameters that decide the performance and usage of materials and devices.
15CH12/22.4	Acquire technical competence in industries with respect to corrosion and metal finishing.
15CH12/22.5	Conception and implementation of alternative technologies and methods to exploit resources in an efficient way.
15CH12/22.6	Analyze chemical reactions according to stoichiometric methodology and to be able to predict the outcome of reactions and their applications.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
15CH12/22.1	3	-	-	-	-	-	-	-	-	-	-	3
15CH12/22.2	3	3	-	-	-	-		-	-	-	-	3
15CH12/22.3	3	3	-	-	-	-	3	-	-	-	-	3
15CH12/22.4	3	3	-	-	-	-		-	-	-	-	3
15CH12/22.5	3	3	-	-	-	-	3	-	-	-	-	3
15CH12/22.6	3	-	-	-	-	-	3	-	-	-	-	3

MODULE 1

Electrochemistry and Battery Technology

Electrochemistry: Introduction- Derivation of Nernst equation for single electrode potential, working and construction of calomel and silver-silver chloride electrodes, applications. Measurement of standard electrode potential using calomel electrode. Electrolyte concentration cells, numerical problems, construction and working of glass electrode, determination of pH using glass electrode.

Battery Technology: Introduction, Classification- primary, secondary and reserve batteries, construction, working and applications of Lead – acid battery, Zn-Air and Li-ion batteries. Fuel cells: Definition, construction, working and applications of hydrogen-oxygen fuel cell.

9 Hrs

MODULE 2

Corrosion and Metal Finishing

Corrosion: Introduction, electrochemical theory of corrosion, Factors affecting rate of corrosion, anodic and cathodic area, Nature of metal, Nature of corrosion product, pH. Types of corrosion –differential metal, differential aeration (water line and pitting) and stress corrosion. Corrosion control-Design and selection of materials, Protective coatings, organic coatings (brief introduction), inorganic coatings, Metal coatings-Galvanization and Tinning. Anodizing of aluminum and Phosphating,

Metal Finishing - Introduction, Technological importance. Principles governing electroplating – Polarisation, Decomposition potential and over voltage. Electro plating – Introduction, factors influencing the nature of electro deposit - current density, plating bath

(metal ion and electrolyte Concentrations), Complexing agents, pH and throwing power. Electro plating of Chromium. Electroless plating –Introduction, Distinction between Electro plating and electroless plating, electroless plating of Copper and manufacture of PCB.

9 Hrs

MODULE 3

Chemical Energy Sources and Photovoltaic Cells

Chemical Fuels: Definition, classification, importance of hydrocarbon fuels, calorific value– Gross and Net calorific value. Determination of calorific value of fuel using Bomb calorimeter-Numerical problems. Cracking – Fluidized catalytic cracking, reformation of petrol, Octane and Cetane Numbers. Gasoline knocking and mechanism, antiknocking agents, unleaded petrol, Power alcohol and Biodiesel.

Photovoltaic cells: Introduction, importance, construction and working of PV cells, advantages and disadvantages of PV cells. Production of solar grade silicon by union carbide process and purification of silicon by zone refining.

8 Hrs

MODULE 4

Phase rule and Water Technology

Phase rule: Statement of Gibb's phase rule and explanation of the terms involved, phase diagram of one component system-water system, condensed phase rule, phase diagram of two component system-eutectic Pb-Ag system, application-desilverization of lead.

Water Technology: Boiler feed water, Boiler troubles with disadvantages – Scale and sludge formation, Priming and foaming, Boiler corrosion – Dissolved oxygen, Carbon dioxide and $MgCl_2$ and prevention. Determination of COD-Numerical problems on COD. Softening of water by ion exchange process, desalination of sea water by electrodialysis. Sewage treatment: Activated sludge process.

9 Hrs

MODULE 5

Polymers and Nanoscience

Polymers- Introduction, types of polymerization- addition and condensation. Free radical mechanism taking vinyl chloride as an example- Glass transition temperature, Factors influencing Tg-Flexibility, intermolecular forces, molecular mass, branching, cross linking, significance of Tg. Synthesis, properties and applications of PMMA, Teflon, Polymer composites –Introduction, synthesis, properties and applications of Kevlar fibre.
Nanoscience: Introduction, properties at nanoscale (size dependant), synthesis-bottom up approach, precipitation technique, applications of nanomaterials - fullerenes, carbon nanotubes, nanowires, nanorods and biomedicals (nanomedicine)

9 Hrs

ENGINEERING CHEMISTRY LAB

Part A

1. Potentiometric estimation of FAS
2. Colorimetric determination of iron
3. Conductometric estimation of HCl and CH_3COOH mixture using standard NaOH
4. Determination of pKa value of a weak acid using pH meter
5. Determination of viscosity coefficient of a given liquid using Ostwald 's viscometer (Density of the liquid to be given)
6. Estimation of sodium by flame photometry.

Part B

1. Determination of total hardness of a sample of water by preparing standard EDTA solution
2. Determination of calcium oxide in given sample of cement solution by preparing standard EDTA solution (Rapid EDTA method)
3. Determination of percentage of copper in brass using standard sodium thiosulphate Solution (Brass solution to be given)
4. Determination of percentage of iron in the given sample of haematite ore solution by (External indicator method – only demo)
5. Determination of total alkalinity of a given sample of water using standard Hydrochloric acid
6. Determination of chemical oxygen demand (COD) of the given industrial waste sample

Self Study: Topics related to the latest advances in Engineering Chemistry shall be assigned.

Text Books

1. A Text Book of Engineering Chemistry by Jain and Jain, Dhanpatrai Publications, New Delhi.
2. Engineering Chemistry by R. V. Gadag and A. Nityananda Shetty, I K International Publishing House Pvt. Ltd., New Delhi.
3. Chemistry for Engineering Students, B. S. Jaiprakash, R. Venugopal, Shivakumaraiah and Pushpa Iyengar, Subhash Publications, Bangalore.

Reference Books

1. Engineering Chemistry by O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi.
2. Corrosion Engineering by M. G. Fontana, Tata McGraw Hill Education Pvt. Ltd. New Delhi.
3. Principles of Physical Chemistry by B. R. Puri, L. R. Sharma and Co., 1992.
4. Text Book of Polymer Science by F. W, Billmeyer, John Wiley & Sons, 1994.
5. Wiley Engineering Chemistry, Wiley India Pvt. Ltd., New Delhi, 2nd Edition.

6. Nanochemistry A Chemical Approach to Nanomaterials by G. A. Ozin and A. C. Arsenault.

Expected Course Outcome:

Students shall demonstrate knowledge associated with:

1. The chemistry behind engineering materials in various devices which are in service of mankind.
2. Analysis of existing problems and solutions with respect to engineering materials, energy production and other natural resources.
3. Evaluation of various parameters that decide the performance and usage of materials and devices.
4. Conception and implementation of alternative technologies and methods to exploit resources in an efficient way.
5. Application of fundamental principles of Chemistry in laboratory experiments with a focus on safety

Assessment Method:

CIE (Theory):

1. Three internals tests (each 30 marks) shall be conducted and average of the top two test marks will be considered.
2. Assignment - 5 marks
3. Quiz test - 5 marks
4. Self Study- 10 Marks

SEE (Theory):

1. SEE will be conducted for 100 marks and will be for a duration of 3 hours
2. Two Questions are to be set from each module, carrying 20 Marks each
3. Students have to answer 5 questions selecting one full question from each module.

CIE (Lab):

Day-to-day completion of experiment and submission – 15 marks, Internal test - 10marks

SEE (Lab):

Two experiments to be performed (Part A and Part B) for 25 marks each.

INTRODUCTION TO PROGRAMMING WITH C

Course Code	**: 15CS13/23**	**Credits**	**: 05**
L:P:T:S	**: 3:1:0:1**	**CIE Marks**	**: 50+25**
Exam Hours	**: 03**	**SEE Marks**	**: 50+25**

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

CO #	COURSE OUTCOME
15CS13/23.1	Apply the fundamentals of problem-solving skills to solve real time problems.
15CS13/23.2	Apply the basic concepts of branching, looping statements of C Language in problem solving.
15CS13/23.3	Design and evaluate C programs based on different data types, decision structures, loops, arrays, strings and functions.
15CS13/23.4	Analyze the given application and choose appropriate structures, files, pointers and preprocessors
15CS13/23.5	Analyze the various searching and sorting algorithms.
15CS13/23.6	Categorize various data structures and their applications.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
15CS13/23.1	3	-	-	-	-	-	-	-	-	1	-	1	-	-
15CS13/23.2	3	-	-	-	3	-	-	-	3	-	-	-	3	3
15CS13/23.3	3	3	3	-	3	-	-	-	3	-	-	-	3	3
15CS13/23.4	3	3	3	-	3	-	-	-	3	-	-	-	3	3
15CS13/23.5	3	3	3	1	3	-	-	-	3	1	-	-	3	3
15CS13/23.6	3	3	-	-	-	-	-	-	-	1	-	1	3	3
AVERAGE	**3**	**3**	**3**	**1**	**3**	**-**	**-**	**-**	**3**	**1**	**-**	**1**	**3**	**3**

MODULE 1

Introduction to C Language: Introduction to Computer Hardware, Flowchart**,** Pseudo-code solution to problem, Basic concepts of a C program, Declaration, Assignment & Print statement, Types of operators and expressions, Programming examples and exercise. **8 hrs**

MODULE 2

Branching and Looping: Two way selection (if, if-else, nested if-else, cascaded if-else), switch statement, ternary operator? Go to, Loops (For, do-while, while) in C, break and continue, programming examples and exercises. **7 hrs**

MODULE 3

Arrays and Strings: Using an array, Using arrays with Functions, Multi- Dimensional arrays. String: Declaring, Initializing, Printing and reading strings, strings manipulation functions, strings input and output functions, arrays of strings, programming examples and Exercises.

Functions: Functions in C, Argument Passing – call by value, Functions and program structure, location of functions, void and parameter less Functions, Recursion, programming examples and exercises. **12 hrs**

MODULE 4

Structures and File Management: Basic of structures, structures and Functions, Arrays of structures, structure Data types, type definition, Defining, opening and closing of files, Input and output operations, programming examples and exercises. **7 hrs**

MODULE 5

Pointers and Preprocessors: Pointers and address, pointers and functions arguments, pointers and arrays, address arithmetic, character pointer and functions, pointers to pointer ,Initialization of pointers arrays, Dynamic allocations methods, Introduction to Preprocessors, Complier control Directives, programming examples and exercises.

Introduction to Data Structures: Primitive and non primitive data types, Definition and applications of Stacks, Queues, Linked Lists and Trees. **10 hrs**

PRACTICALS

Implement the following programs in Windows or Linux Platform using an appropriate C compiler.

1. Design and develop a flowchart or an algorithm that takes three coefficients (***a***, ***b***, and ***c***) of a Quadratic equation ($ax^2+bx+c=0$) as input and compute all possible roots. Implement a C program for the developed flowchart/algorithm and execute the same to output the possible roots for a given set of coefficients with appropriate messages.

2. Design and develop an algorithm to find the ***reverse*** of an integer number **NUM** and check whether it is PALINDROME or NOT. Implement a C program for the developed algorithm that takes an integer number as input and output the reverse of the same with suitable messages. Ex: Num: **2014**, Reverse: **4102**, Not a Palindrome

3.a. Design and develop a c program to implement simple calculator using switch case statement.
b. Design and develop a C program to read a ***year*** as an input and find whether it is ***leap year*** or not. Also consider end of the centuries.

4. Draw the flowchart and Write a C Program to compute **Sin(x)** using Taylor series approximation given by $\mathbf{Sin(x) = x - (x^3/3!) + (x^5/5!) - (x^7/7!) + \ldots\ldots}$

5.a. Develop an algorithm, implement and execute a C program that reads ***N*** integer numbers and arrange them in ascending order using ***Bubble Sort***.
5.b. Develop, implement and execute a C program to search an element in an array using linear search technique.
6. Develop, implement and execute a C program that reads two matrices ***A*** (**m x n**) and ***B*** (**p x q**) and Compute product of matrices ***A*** and ***B***. Print both the input matrices and resultant matrix with suitable headings and output should be in matrix format only. Program must check the compatibility of orders of the matrices for multiplication.Report appropriate message in case of incompatibility.

7. Write and execute a C program that,
a. Implements string copy operation ***STRCOPY*** (str1, str2) that copies a string *str1* to another string *str2* without using library function.
b. Read a *sentence* and print frequency of vowels and total count of consonants.

8. a. Design and develop a C function ***RightShift****(x ,n)* that takes two integers *x* and *n* as input and returns value of the integer *x* rotated to the right by *n* positions. Assume the integers are unsigned. Write a C program that invokes this function with different values for x and n and tabulate the results with suitable headings.

b. Draw the flowchart and write a ***recursive*** **C** function to find the factorial of a number, ***n*!**, defined by *fact*(*n*)=1, if *n*=0. Otherwise *fact* (*n*) =*n***fact* (*n*-1). Using this function, write a C

program to compute the binomial coefficient ${}_nC_r$. Tabulate the results for different values of ***n*** and ***r*** with suitable messages.

9. Given two university information files "**studentname.txt**" and "**usn.txt**" that contains students Name and USN respectively. Write a C program to create a new file called "**output.txt**" and copy the content of files "studentname.txt" and "usn.txt" into output file in the sequence shown below. Display the contents of output file "output.txt" on to the screen.

Student Name	USN
Name 1	USN1
Name 2	USN2
…. …	

10. Write a C program to maintain a record of **n** student details using an array of structures with four fields (Roll number, Name, Marks, and Grade). Assume appropriate data type for each field. Print the marks of the student, given the student name as input.

11. Write a C program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of **n** real numbers.

SELF STUDY: Students shall study the evolution of various programming languages from 1970s till date and thereby understand the fundamental difference in features among various programming languages.

TEXT BOOKS:

1. Brain W. Kernighan and Dennis M. Richie: The C programming Language, 2nd Edition, PHI, 2012.
2. Jacqueline Jones & Keith Harrow: Problem Solving with C, 1st Edition, Pearson 2011.

Reference Books:

1. Vikas Gupta: Computer Concepts and C Programming, Dreamtech Press 2013.
2. R S Bichkar, Programming with C, University Press, 2012.
3. V Rajaraman: Computer Programming in C, PHI, 2013

Assessment Method:

CIE (Theory):

1. Three internals tests of 30 marks each will be conducted and the average of the top two test marks will be considered.

2. Assignment – 5 marks
3. Quiz test - 5 marks
4. Self Study -10 marks

SEE (Theory):

1. SEE will be conducted for 100 marks and shall be for a duration of 3 hours
2. Two Questions will be set from each module carrying 20 Marks each.
3. Students have to answer 5 questions selecting one full question from each module.

CIE (Lab):

Day to day completion of experiment and submission – 10 marks,

Internal test - 15marks

SEE (Lab):

Two programs from the list of 11 programs to be executed for 20 marks each and 10 marks shall be allocated to viva-voce.

COMPUTER AIDED ENGINEERING DRAWING

Course Code	**: 15ME14/24**	**Credits**	**: 04**
L:P:T:S	**: 2:1:1:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

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

CO1	Apply the knowledge of engineering fundamentals in order to understand about Dimensioning, conventions and standards related to working drawings and understand the theory of orthographic projections in order to communicate effectively with engineering community.
CO2	Analyze the data in Organizing, demonstrating and arranging solids and planes in different positions using Modern tool usage with this contextual knowledge, complex problems can be solved.
CO3	Improved visualization skills which can lead to the development of sketch into orthographic views further helps in modelling of complex engineering problems.
CO4	By interpreting the given data, design or develop the 3D models in isometric view with the help of modern Engineering software tools.
CO5	Engage in independent study as a member of a team and make an effective oral presentation or demonstration on topics related to the practical application and complex engineering problems using advanced mechanical systems or software..
CO6	Understanding physical dimensions or specifications prior to executing complex engineering problems.

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

PART A

MODULE 1

INTRODUCTION TO COMPUTER AIDED SKETCHING: Introduction, Drawing instruments and their uses, BIS Conventions, Lettering, Dimensioning, geometrical constructions and freehand practicing.

Introduction to software, commands used for engineering drawing

PROJECTION OF POINTS: Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants. **10 Hrs**

MODULE 2

PROJECTION OF STRAIGHT LINES

Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems) **10Hrs**

PART B

MODULE 3

PROJECTION OF PLANE SURFACES

Introduction, Definitions, projections of plane surfaces–triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates) **10 Hrs**

MODULE 4

PROJECTIONS OF SOLIDS

Introduction, Definitions – Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions (No problems on octahedrons and combination solid). **20 Hrs**

MODULE 5

ISOMETRIC PROJECTIONS (USING ISOMETRIC SCALE ONLY)

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of three solids). **16 Hrs**

TEXT BOOKS:

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

REFERENCE BOOKS:

1. **A Primer on Computer aided Engineering drawing – 2006,** published by VTU, Belgaum.
2. **Fundamentals of Engineering drawing with an Introduction to Interactive Computer Graphics for Design and Production' –** Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005 – Prentice**–** Hall of India Pvt. Ltd., New Delhi**.**
3. **Computer Aided Engineering Drawing** - S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition- 2006 .

Expected Course Outcome:

Students shall demonstrate knowledge associated with:

1. Dimensioning, conventions and standards related to working drawings in understanding the theory of orthographic projections.
2. Organizing, demonstrating and arranging solids and planes in different positions.
3. Improved visualization skills which can lead to the development of sketch into orthographic views.
4. Representations of 3D models.

5. Understanding physical dimensions prior to executing problems.

Assessment Method:

CIE:

- Three internals tests (each 30 marks) are conducted, average of best two tests marks will be considered.
- Submission of drawing sheets/printouts will carry 10 marks.
- Two written surprise tests conducted and evaluated for 10 marks. Average of these two will be considered

SEE:

- TWO Questions for 20 Marks from Part A (Unit 1 & 2) – Only Sketching
- One Question for 20 Marks from Part B (Unit 3) – Only software drafting
- One Question for 40 Marks from Part B (Unit 4) – Only software drafting (With Choice)
- One Question for 20 Marks from Part B (Unit 5) – Only software drafting

BASIC ELECTRONICS

Course Code	**: 15EC15/25**	**Credits**	**: 04**
L:P:T:S	**: 3:0:1:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

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

CO1	Use Boolean algebra concepts to implement combinational and sequential circuits
CO2	Identify the diode's usage as rectifier, and Zener diode's usage as voltage regulator
CO3	Understand the basic characteristics of BJT and MOSFET
CO4	Analyze the working of BJT Amplifier circuits
CO5	Illustrate the various applications of op-amp
CO6	Describe the architecture of Microprocessors and Microcontrollers

Mapping of Course Outcomes to Graduate Attributes:

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

MODULE 1

Digital Electronics:

Switching and Logic Levels, Digital Waveforms, Number Systems: Decimal, Binary, Hexadecimal, Octal, Conversion from one number system to other, Complement of Binary Numbers, Boolean Algebra Theorems, De Morgan's theorem, Logic gates, Digital Circuits, Algebraic Simplification, NAND and NOR Implementation, Half Adder, Full Adder, Encoder, Decoder, Latch, Flip-Flop, Registers. **9 Hrs**

MODULE 2

Semiconductor Diodes and Applications:

P-N Junction diode: Principle, Characteristics and Parameters, Applications- Half Wave Rectifier, Two-Diode Full Wave Rectifier, Bridge Rectifier, LED, Photo diode, Zener diode as a voltage regulator.

Bipolar Junction Transistor:

BJT Operation, BJT Voltages and Currents, Common Emitter Characteristics, Numerical examples as applicable. **8 Hrs**

MODULE 3

BJT Biasing:

DC load line, Need for biasing , Voltage divider bias, Numerical examples as applicable.

Amplifiers:

BJT Amplification: BJT as a voltage and current amplifier, voltage gain, current gain, Single stage CE amplifier, Phase reversal, Effect of coupling and bypass capacitors.

MOSFET:

Introduction to MOSFET theory, operation and characteristics.

Filters:

Filters: Introduction, Low pass, high pass, band pass and band stop filters. **10 Hrs**

MODULE 4

Operational Amplifiers& its Applications:

Characteristics of Ideal Op-amp and Practical Op-amp, Inverting, Non-inverting Amplifier, Voltage follower, Summing Amplifier and Subtractor, Numerical examples as applicable.

Oscillators:

Basic feedback theory: Positive and Negative feedback, Concept of Stability, Introduction to Oscillators, Crystal oscillator.

Communication Systems:

Principles of Communication System: Need for Modulation, AM and FM Modulation concept. **9 Hrs**

MODULE 5

Microprocessors and Microcontrollers:

Introduction to Microprocessors, General operation of Microprocessors, 8085 Microprocessor Architecture and Working principle. Introduction to assembly language programming, Introduction to Microcontrollers, 8051 Microcontroller Architecture and operation, Comparison between Microprocessors and Microcontrollers. **8 Hrs**

Case Study

Mandatory case-study on an electronic system specifying its block diagram and operation - to be submitted as assignment.

Text Books:

1. David Bell, Electronic Devices and Circuits: Oxford University Press, 5th Edition, 2008.
2. Morris Mano, Digital Logic and Computer Design, PHI 2002.

Reference Books:

1. Ramakant A Gayakwad, “OP-AMPS and Linear Integrated Circuits,” Prentice Hall.
2. Wayne Tomasi, “Electronic Communication Systems,” Pearson Education.
3. Albert Malvino, “ Electronic Principles,” Tata McGraw Hill.
4. Boylstead and Nashelsky, “Electronic Devices and Circuits,” PHI.
5. R.S. Goankar, “Microprocessor Architecture, Programming and Applications with 8085,” 6th Edition, Prentice Hall, 2013.
6. Muhammad Ali Mazidi, “The 8051 Microcontroller and Embedded Systems using Assembly and C,” Second Edition, 2011.

Expected Course Outcome:

Assessment Method:

CIE:

1. Three internals tests of 30 marks each will be conducted and the average of the top two test marks will be considered.
2. Assignment - 10 marks
3. Quiz test - 10 marks

SEE:

1. SEE will be conducted for 100 marks and shall be for a duration of 3 hours
2. Two Questions will be set from each module carrying 20 Marks each.
3. Students have to answer 5 questions selecting one full question from each module.

PERSONALITY DEVELOPMENT AND SOFT SKILLS

Course Code	**: 15HP16/26**	**Credits**	**: 02**
L:P:T:S	**: 2:0:0:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

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

CO #	COURSE OUTCOME
15HP16.1	Understand the importance of being responsible and accountable in won's professional life.
15HP16.2	Understand the importance of grooming.
15HP16.3	Understand important" Soft Skills "reverent to today's workplace.
15HP16.4	Understand the importance of goal setting.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
15HP16.1	-	-	-	-	-	2	-	3	2	3	-	3
15HP16.2	-	-	-	-	-	2	-	3	2	3	-	3
15HP16.3	-	-	-	-	-	2	-	3	2	3	-	3
15HP16.4	-	-	-	-	-	2	-	3	2	3	-	3

MODULE 1

Taking Ownership: Being Responsible and Accountable: The meaning of ownership, responsibility and accountability, practicing these philosophies in everyday life, how do these philosophies build credibility, Developing a "credible character impression" about yourself, understanding diversities **4 Hrs**

MODULE 2

Personality Development and Grooming-1: Expectations from the industry, Building personal presence , Corporate grooming, Corporate etiquettes **5 Hrs**

MODULE 3

Personality Development and Grooming-2: Developing personal work code, Building skills for effective corporate communication **5 Hrs**

MODULE 4

Self Awareness: Knowing your own self, Knowing others, Working well with others, Knowing personal attitudes, Developing the right attitude for work,Being proactive and positive **6 Hrs**

MODULE 5

Goal Setting: Importance of Goals, Creating SMART goals , Action Planning to meet Goals, Tips for effective execution of goals **4 Hrs**

Textbooks:

Soft Skills: Know Yourself and Know the World, K. Alex, S. Chand Publishing
Personality Development and Career Management, R.M Onkar, S.Chand Publishing

Reference Books:

1. The 7 Habits of Highly Effective People - Author: Stephen R. Covey, Publisher: Neha Publishers
2. How To Win Friends and Influence People - Author: Dale Carnegie, Publisher: Ebury Publishing
3. Business Etiquette - Author: Shital Kakkar Mehra, Publisher: Collins Business

Assessment Method:

CIE: CIE shall be through combination of Individual presentations and Group discussions/activities. Two CIE tests will be conducted in a given semester each carrying max of 25 marks.

SEE: SEE will be conducted for max of 50 marks. Practical examination involving book reviews/Case studies will be conducted for max of 25 marks and written examination for max 25 marks would be conducted.

ESSENTIAL ENGLISH (Mandatory Course)

Course Code : 15HE17/27 | **Credits : 0**
L:P:T:S : 2:0:0:0 | **CIE Marks : 25**
Exam Hours : 02 | **SEE Marks : 25**

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

CO #	COURSE OUTCOME
15HE17.1	To focus on English as an effective tool of expression.
15HE17.2	To understand the importance of grammar and its role in effective communication
15HE17.3	To understand the basics of effective intrapersonal and interpersonal communication
15HE17.4	To aid students in order to communicate effectively.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
15HE17.1	-	-	-	-	-	-	-	2	-	3	-	-
15HE17.2	-	-	-	-	-	-	-	2	-	3	-	-
15HE17.3	-	-	-	-	-	-	-	2	-	3	-	-
15HE17.4	-	-	-	-	-	-	-	2	-	3	-	-

Module – 1 **5 Hrs**

Introduction to English Grammar, Importance of Grammar, Parts of Speech, Usage of prepositions, Articles, Punctuation

Module – 2 **5 Hrs**

Tenses and Degree of Comparison, Active and Passive Voice, Vocabulary Building

Module – 3 **4 Hrs**

Idioms and Phrases, Direct and Indirect Speech, Vocabulary usage- Homonyms, Homophones, spelling and one word substitutes

Module – 4 **4 Hrs**

Subject- Verb Agreement, Common errors in English, and Collocations

Module – 5 **4 Hrs**

Essay Writing, and Creative Writing

Text Book:

- Grammar Practice Activities- Penny Ur, Cambridge University Press
- Grammar Builder Level 1 to Level 5 Paperback – Import, 10 Mar 2005by Adibah Amin (Author), Rosemary Eravelly (Author), Farida J Ibrahim (Author), Cambridge University Press

Reference Books:

- Wren, P.C.; Martin, H.; Prasada Rao, N.D.V. (1973–2010). High School English Grammar & Composition. New Delhi: S. Chand. ISBN 81-219-2197-X.
- Wren, P.C.; Martin, H., A Final Course of Grammar & Composition, S Chand.

Expected Course outcome:

- Students will be better equipped in understanding English as a means of language for expressing
- Students will be able to learn English Grammar for skill development towards writing and speaking

Assessment Method:

CIE: Three internals tests (each 25 marks) shall be conducted, average of the top two marks will be considered.

SEE: Exam will be for 50 marks and for a duration of 2 hours. 50 multiple choice questions carrying 1 mark each to be set.

PHYSICS CYCLE

ENGINEERING MATHEMATICS-II

Course Code : 15MA21 | **Credits : 05**
L:P:T:S : 4:0:1:0 | **CIE Marks : 50**
Exam Hours : 03 | **SEE Marks : 50**

Course Outcomes: At the end of the Course, the Student will be able to do the following:

CO1	To obtain the solution of second and higher differential equations using analytical methods.
CO2	To understand the partial differential equations and their applications to real world problems.
CO3	Evaluation of double and triple integrals.
CO4	To apply the concept of multiple integrals in calculating area and volume.
CO5	To understand the concept of Laplace transform and inverse Laplace transform.
CO6	Solving initial and boundary value problems using Laplace transform.

COs to POs Mapping:

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

MODULE 1

Linear differential equations of second and higher order: Solutions of second and higher order differential equations, solutions of simultaneous differential equations of first order. Solution of Cauchy's and Legendre's linear differential equations and variation of parameters method. **9 Hrs**

MODULE 2

Partial Differential equations : Formation of PDE by eliminating arbitrary constants and functions , solution of non-homogeneous PDE by direct integration and homogeneous PDE involving derivative with respect to one independent variable only. Solution of homogeneous and non-homogeneous linear PDE with constant coefficients.
Applications : - Stretched string, heat flow, derivation of one dimensional heat and wave equations and solutions of heat, Laplace and wave by variable separable method. **9 Hrs**

MODULE 3

Integral Calculus and Special Functions:
Double and triple integrals, Evaluation of double integrals by changing the order of integration and changing into polar coordinates. Beta and Gamma functions, definitions, relation between beta and gamma functions and simple problems.
Application: Application of double and triple integrals to find area , volume and volume of revolution. **9 Hrs**

MODULE 4

Laplace Transform: Definition and Laplace transforms of elementary functions. Properties of Laplace transforms(without proof), periodic functions, unit-step function and Impulse function – problems. Inverse Laplace transform - problems, initial and final value theorem. **9 Hrs**

MODULE 5

Applications of Laplace Transform : Convolution theorem , solution of linear differential equations and LCR Circuit. Matrix exponential, finding matrix exponential for second order homogeneous and non homogeneous system by Laplace transform method & spectral form of second order system. **8 Hrs**

Text Book:

1. Higher Engg. Mathematics by Dr. B S Grewal, 43rd Edition.
2. Engineering Mathematics-Kreyszig , 10th Edition.

Reference books:

1. Higher Engineering mathematics by N P Bali
2. Higher engineering mathematics by B.V.Ramana
3. Higher Engineering mathematics by H K Dass

4. Engineering mathematics by Peter o Neil
5. Dennis G. Zill , Michael R. Cullen–"Advanced Engineering Mathematics", Jones and Barlett Publishers Inc. –5th edition–2012.

Expected Course Outcome:

Students shall demonstrate knowledge associated with:

- Solution of ordinary and partial differential equations using various analytical methods.
- Modeling physical situations in terms of differential equations and solving them.
- Application of multiple integrals.
- Application of Laplace transforms to electrical circuit analysis.

Assessment Method:

CIE:

1. Three internals tests of 30 marks each will be conducted and the average of the top two test marks will be considered.
2. Assignment - 10 marks
3. Quiz test - 10 marks

SEE:

1. SEE will be conducted for 100 marks and shall be for a duration of 3 hours
2. Two Questions will be set from each module carrying 20 Marks each.
3. Students have to answer 5 questions selecting one full question from each module.

ENGINEERING PHYSICS

Course Code	**: 15PH12/22**	**Credits**	**: 05**
L:P:T:S	**: 3:1:0:1**	**CIE Marks**	**: 50+25**
Exam Hours	**: 03**	**SEE Marks**	**: 50+25**

Course Outcomes: On completion of the course, student would be able to:

CO1	Gather knowledge about modern scientific phenomena
CO2	Acquire the ability to analyze the engineering concepts based on fundamental physical concepts.
CO3	Possess the ability to analyze, formulate and solve problems
CO4	Apply the laws of physics for better understanding of materials and their properties for various applications.
CO5	Understand the Structure - Property relationship in the domain of material science and underlying its importance in field of Nanotechnology
CO6	Utilize the scientific method and demonstrate competency with experimental methods to verify concepts related to content knowledge.

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO 2**	**PO 3**	**PO4**	**PO 5**	**PO6**	**PO7**	**PO 8**	**PO9**	**PO1 0**	**PO1 1**	**PO1 2**
CO1	3	2	-	-	-	-	-	-	2	-	-	1
CO2	3	2	-	-	-	-	-	-	2	-	-	1
CO3	3	2	-	-	-	-	-	-	2	-	-	1
CO4	3	2	-	-	-	-	-	-	2	-	-	1
CO5	3	2	2	-	-	-	-	-	2	-	-	1
CO6	3	2	2	-	-	-	-	-	2	-	-	1
Avg	3	2	2	-	-	-	-	-	2	-	-	1

MODULE 1

Lasers and Fiber optics

Lasers: Introduction, Basic concepts (absorption, spontaneous emission and Stimulated emission) Einstein coefficients and their relations, Population inversion, Lasing action, - Characteristics of Lasers Working principle, components, construction and working of CO_2 laser.

Fiber Optics: Introduction, Basic structure of optical fiber, Principle of optical fiber - Acceptance angle, acceptance cone and Numerical aperture - Types of optical fibers (Material, Refractive index and Mode guiding) - V-number, Attenuation, Point to point communication of optical fibers. Problems. **8 Hrs**

MODULE 2

Magnetic and Dielectric Properties

Magnetic Properties: Origin of magnetic moment - Classification of Magnetic materials (dia, para, ferro) - Ferromagnetic – Domain theory - B-H curve - Soft and hard magnetic materials - applications.

Dielectric Properties: Dielectric constant - polarization –types, Polarizability - Internal field (Expression for One dimensional solid) - Clausius -Mossotti equation(Derivation) – Temperature and frequency dependence of Polarizability – Dielectric Loss, Piezoelectrics, Ferroelctrics. Problems. **8 Hrs**

MODULE 3

Basics of Modern Physics and Quantum mechanics

Modern Physics : Introduction, dual nature of light, dual nature of matter, de-Brogile hypothesis, matter waves and their characteristic properties , Phase velocity, Group velocity (concept and derivation), Qualitative discussion of interrelationship between phase velocity and group velocity, group velocity and particle velocity, de-Broglie wavelength in terms of Group Velocity (no derivation). Problems

Quantum Mechanics: Heisenberg's uncertainty principle – definition, application and significance, derivation of Schrodinger Time Independent wave equation in 1 dimension – Eigen values and Eigen functions, Physical significance of wave function - Particle in a box (one dimensional). Problems **8 Hrs**

MODULE 4

Conductors and Semiconductors

Conductors: Qualitative discussion of Classical free electron theory – drift velocity, relaxation time- (no derivation) expression for electrical conductivity – mobility- drawbacks- Quantum free electron theory – Fermi Energy, Fermi- factor and its dependence on Energy at various temperature – success of quantum free electron theory. Problems.
Semiconductor Physics: Introduction, conductivity in an intrinsic semiconductor-carrier concentration (only expression – no derivation) , Law of mass action and expression for position of Fermi level in Intrinsic semiconductors(derivation) –Hall Effect, Hall coefficient (derivation) –applications. **8 Hrs**

MODULE 5

Crystal Structure and NanoScience

Crystal structure: Review of Unit cell, Bravais lattice, Seven crystal systems, Crystal Planes, Miller indices, Interplanar distance-derivation(for a cubic system),Structure of NaCl, Braggs law, Braggs X-ray Diffractometer. Problems.
NanoScience: Introduction, Density of states in 0d, 1d,2d and 3d system ,Moore's law, synthesis: Top-down, Bottom – Up (Sol – Gel), , Carbon nano tubes- synthesis, properties and applications, SEM. **8 Hrs**

ENGINEERING PHYSICS LAB

List of Experiments (A Minimum of 10 experiments are be performed)

1. Determination of Planck 's constant using LED
2. B - H Curve: To draw the B – H curve and to determine the co-ercivity and retentively of the given ferro magnetic material
3. Laser Diffraction : To determine the wavelength of Laser using grating.
4. Fermi Energy: To determine the Fermi energy of copper.
5. Dielectric constant: To determine the dielectric constant of given dielectric by capacitor charge and discharge method
6. Photodiode Characteristics: To study the V-I characteristics of photo diode for different light intensity in reverse bias condition
7. Zener Diode Characteristics: To study the V-I characteristics of Zener diode and find the reverse Zener break down voltage

8. Transistor Characteristics: To study the input and output characteristics of a Transistor in CE configuration and find the gain factor.
9. Stefan's Law: To verify Stefan's Law
10. Energy Gap: To find the energy gap of a given thermistor.
11. Determination of lattice parameters using Powder Diffraction pattern.
12. Frequency Response of the LCR Series and Parallel circuits and calculation of f_r, Band width and Q-factor

Self Study: The assigned topics shall vary from basics to advances related to latest technologies in the field of Engineering Physics.

Text Book:

1. Engineering Physics by S.P Basavaraju – Suhas Publications
2. Engineering Physics by V Rajendran - TataMcGraw Hill
3. Engineering Physics by M.N Avadhanulu and P.G Kshirsagar – S Chand Publications

Reference Books:

1. Solid state Physics by S O Pillai -New age Publications (Unit II, III, IV and V)
2. Introduction to Nanotechnology by Charles P Poole Jr., Frank J Owens, John Wiley Publishers
3. Material Science, R S Kurmi, R S Sedha, S Chand Publications
4. Practical Physics, R K Shukla & AnchalSrivastava, New Age International

Expected Course Outcome:

Students shall demonstrate knowledge associated with:

- Designing and analyzing optical sensing and communication instruments.
- Extrapolating properties of magnetic, dielectric and semiconducting materials in designing magnetic, electrical & electronic devices.
- Examining the discrepancy between classical estimates and laboratory observations of physical properties exhibited by materials.
- Basics of materials science in terms of Crystal Structure.
- Synthesis and characterization techniques of Nano-Materials

Assessment Method:

CIE (Theory):

1. Three internals tests (each 30 marks) shall be conducted and average of the top two test marks will be considered.
2. Assignment - 5 marks
3. Quiz test - 5 marks
4. Self Study -10 marks

SEE (Theory):

4. SEE will be conducted for 100 marks and will be for a duration of 3 hours
5. Two Questions are to be set from each module, carrying 20 Marks each
6. Students have to answer 5 questions selecting one full question from each
7. module.

CIE (Lab):

Day-to-day completion of experiment and submission – 15 marks, Internal test – 10 marks

SEE (Lab):

Two Experiments to be performed, 25 marks each.

ELEMENTS OF MECHANICAL ENGINEERING

Course Code	**: 15ME13/23**	**Credits**	**: 05**
L:P:T:S	**: 3:1:0:1**	**CIE Marks**	**: 50+25**
Exam Hours	**: 03**	**SEE Marks**	**: 50+25**

CO1	Apply the concepts of conventional and non-conventional energy systems to design and develop alternate source of energy production.
CO2	Analyze the different types of IC engines and refrigeration systems and solve problems related to them.
CO3	Apply appropriate manufacturing techniques for product development in consequent to the professional Engineering practice in Mechanical Engineering.
CO4	Apply the concepts of planes and projections and visualize the various ways to create the development of solid sheet metal Models with the aid of modern tools.
CO5	Understand the impact of various systems, processes and solutions of mechanical engineering in societal and Environmental context.
CO6	Analyze the different Engineering materials for their respective application in various engineering fields and study about their Joining processes.

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

MODULE 1

Energy and its Importance: Definition, classification based on long term availability, commercial applications, traditional use and Usability.

Conventional energy sources and their conversion: formation of fossil fuels, Energy conversion from fossil fuels, Nuclear Energy: Nuclear fission, nuclear fusion and utilization of nuclear energy. Hydel energy**:** Hydro electric power generation.

Non Conventional energy sources and their conversion

Solar energy: Introduction, Heliochemical, helioelectrical and heliothermal process, Wind Energy: Schematic diagram of windmill, advantages and disadvantages of wind energy. **Geothermal Energy Conversion**: Open cycle – working principle, closed cycle – working principle, advantages and disadvantages **10 Hrs**

MODULE 2

Internal Combustion Engines: Classification, I.C. Engines parts and terminology, principle and operation of 2 Stroke and 4 stroke Petrol engines, 4 stroke diesel engines with P-V diagrams. Performance parameters: indicated power, brake power, friction power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, specific fuel consumption, simple numerical problems.

Refrigeration and Air-Conditioning: Refrigeration: Definitions- Refrigerating effect, Ton of Refrigeration, COP, Working principle of vapour compression refrigeration and vapour absorption refrigeration. Refrigerants: properties, list of commonly used refrigerants.

Air conditioning: working principle of Room (window) air conditioner and applications.

10 Hrs

MODULE 3

Lathe and Drilling Machines:

Lathe: Classification of lathe, Specification of lathe, Principle of working of a center lathe, major parts of a lathe, Lathe operations: cylindrical turning, facing, thread cutting, drilling, knurling. Taper turning: By swivelling of compound rest method and by tail stock offset method

Drilling machines: Classification of drilling machines, Specification of radial drilling machine, Twist drill and its nomenclature, Bench drilling machine and radial drilling machine, drilling machine operations: drilling, boring, reaming, tapping, counter sinking and counter boring

8 Hrs

MODULE 4

Milling machines: Classification of milling machine, principle of milling: Up milling and down milling operations, Horizontal and vertical milling machines. Milling operations: slab milling, end milling, slot milling.

Grinding machine: Classification of grinding machine and operation of grinding machine, types of grinding machines: Surface, Cylindrical and Center less grinding machine. **8 Hrs**

MODULE 5

Engineering Materials: Properties of materials, types and applications of Ferrous & Nonferrous metals and alloys. Stress-strain curve for ductile and brittle materials, Hooke's law, Simple problems on stress and strain

Composite Materials: Introduction: definition, classification, different types of fabrication and applications.

Joining Processes: Permanent Joints: Soldering, Brazing and Welding: Definitions, classification and method of soldering, Brazing and welding. Differences between soldering, brazing and Welding. **8 Hrs**

WORKSHOP PRACTICE LAB

1. **Development and sheet metal work:** Introduction, Section planes, apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. (No problems on sections of solids). Development of lateral surfaces of above solids, their frustums and truncations.

   Models: Development of Funnel, truncated and frustum of cone, truncated and frustum of pyramid, development of prisms
2. **Welding:** Butt Joint, Lap joint, T-Joint, V-Joint (with edge preparations) models have to be prepared with Calculation of electrode length required for welding. (04 models). Brazing: Joining of two dissimilar metals

SELF STUDY

Students shall be assigned topics related to the latest technological developments in the field of Mechanical Engineering.

TEXT BOOKS:

1. **A Text Book of Mechanical Engineering** , K R Gopalkrishna, 30th Edition, 2012, Subhas Publishers, Bangalore
2. **A Text Book of Elements of Mechanical Engineering** – S. Trymbaka Murthy, 3rd Revised Edition 2006, I.K. International Publishing House Pvt Ltd, New Delhi

Reference Books:

1. **Elements of Mechanical Engineering**, SKH Chowdhary, AKH Chowdhary & Nirjar Roy, Media Promotors and Publishers, Mumbai
2. **Non Conventional Energy Resources ,** B H Khan ,Tata McGraw Hill publishing company Limited,2nd Edition 2006.
3. **Computer Aided Engineering Drawing** - K. R. Gopalakrishna, Subash Publishers, Bangalore.
4. **Elements of Mechanical Engineering**, Manglik V.K, PHI Publications, 2013

5. **Basic Mechanical Engineering**-Pravin Kumar,2013 Edition,Pearson

Expected Course Outcome:

Students shall demonstrate knowledge associated with:

1. Various forms of energy and their inter conversions.
2. Different types of internal combustion engines.
3. Solution of problems related to the energy conversion and various manufacturing processes.
4. Various joining processes

Assessment Method:

CIE (Theory):
1. Three internals tests (each 30 marks) shall be conducted and average of the top two test marks will be considered.
2. Assignment - 5 marks
3. Quiz test - 5 marks
4. Self Study -10 marks

SEE (Theory)
1. Two Questions are to be set from each unit, carrying 20 Marks each.
2. Students have to answer 5 questions, selecting one full question from each unit

CIE (Lab)
Day to day work and submission - 30marks, Internal Test-15 marks,
Viva Voce/ surprise test-5 marks

SEE (Lab)
Question Paper Pattern: Welding model/Brazing model - 10 Marks, Sheet Metal Model 30 Marks, Viva Voce - 10 Marks

ELEMENTS OF CIVIL ENGINEERING

Course code	**: 15CV14/24**	**Credits**	**: 4**
L: P: T: S	**: 3:0:1:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

Course Outcomes: On completion of the course, student would be able to:

CO1	Apply the knowledge of science and engineering fundamentals to the solution of civil engineering problems and to comprehend with structures, materials and its components.
CO2	Analyze and compute the reactive forces and its effects using principles of mathematics and engineering sciences.
CO3	Formulate and apply the conditions of static equilibrium to solve the problems of civil engineering.
CO4	Apply the knowledge of science and engineering fundamentals of sliding (Dry) friction to the problems involving incipient equilibrium of a variety of connected bodies.
CO5	Apply the appropriate techniques and tools to locate the centroid and compute the second moment of area.
CO6	Analyze the motion of particles and apply D'Alemberts principle to solve the problems of kinetics and kinematics.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	3	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-	3	-
CO5	3	-	3	-	-	-	-	-	-	-	-	-	3	-
CO6	3	3	3	-	-	-	-	-	-	-	-	-	3	-
Average	**3**	**3**	**3**	-	-	-	-	-	-	-	-	-	**3**	-

MODULE 1

(A) Scope of Civil Engineering- Housing, Roads, Bridges and Dams, Basic Introduction of Building Materials – cement, bricks/blocks, aggregate(s), timber, steel, composites, Components of a structure - Substructure, Super structure and Finishes. **4 Hrs**

(B) Principle of statics, Particle, continuum, Rigid body, Force and its characteristics, Types of forces and classification of force systems, Principle of physical independence of forces, Principle of transmissibility of forces, Principle of superposition of forces, Composition of forces - Definition of Resultant; Composition of coplanar concurrent force system, Parallelogram law of forces, Resolution of forces. **5 Hrs**

MODULE 2

(A) Moment of a force, Couple, Characteristics of couples, Varignon's theorem of moments, Composition of coplanar - non-concurrent force system, Equivalent force - couple system, Numerical problems on composition of coplanar non-concurrent force systems. Equilibrium of forces – Equilibrium of concurrent, parallel and general forces in a plane, equilibrium of three forces in a plane, Definition of equilibrant, Lami's theorem; Resultant and equilibrium of concurrent and parallel forces in space, Numerical problems on equilibrium of coplanar – concurrent and non concurrent force systems. **5 Hrs**

(B) Introduction to beams, Types of loads and supports, Support reactions, statically determinate beams with point load (normal and inclined) and uniformly distributed/varying loads, Numerical problems**.** **4 Hrs**

MODULE 3

(A) Friction-static friction, Laws of friction, Limiting friction, Angle of friction, angle of repose, Impending motion on horizontal and inclined planes, Ladder and block friction, Numerical problems.

4 Hrs

(B) Centroid of line and area, Centroid of regular figures, Locating the centroid of triangle, semicircle, quadrant of a circle and sector of a circle using method of integration, Centroid of composite sections; Numerical problems.

4 Hrs

MODULE 4

(A) Second moment of area, polar moment of inertia, Radius of gyration, Perpendicular and Parallel axis theorems, Moment of Inertia of rectangular, circular and triangular areas from method of integration, composite sections, Numerical problems.

5 Hrs

(B) Analysis of simple determinate trusses by method of joints and sections **4 Hrs**

MODULE 5

Rectilinear motion of particles:

(A) Kinetics- Newtons second law of motion and D'Alemberts principle for rectilinear motion of a particle, Numerical problems.

4 Hrs

(B) Work, Power, Energy, principle for particles- Conservation of energy, Work energy

(C) Principle for rectilinear motion, Numerical problems. **5 Hrs**

Text Books:

1. Elements of Civil Engineering and Engineering Mechanics by M.N.Sheshaprakash and G.B.Mogaveer PHI publications, 3rd edition 2014.
2. Elements of Civil Engineering and Engineering Mechanics by H.J. Sawant and S.P.Nisture, Technical publications, 1st Edition 2014.
3. Engineering Mechanics by S.Timoshenko,D.H.Young, and J.V.Rao TATA McGraw-Hill Book Company, New Delhi, 5th Edition 2013.

Reference Books:

1. Elements of Civil Engineering by S.S. Bhavikatti, New Age International Publisher, New Delhi, 4th Edition, 2011.
2. Engineering Mechanics B. Bhattacharya, Oxford University Press.
3. Engineering Mechanics by K.L. Kumar, Tata McGraw-Hill Publishing Company, New Delhi, 4th Edition, 2010.
4. Engineering Mechanics by Nelson, Tata McGraw Hill Publication. India Pvt Ltd, 1st Edition 2009.
5. Vector Mechanics by Ferdinand P. Beer and E. Russell Johnston, Tata McGraw Hill publications, 9th Edition, 2013

Assessment Method:

CIE:

1. Three internal tests of 30 marks each will be conducted and the average of the top two test marks will be considered.
2. Assignment – 10 marks.
3. Quiz – 10 marks.

SEE:

1. SEE will be conducted for 100 marks and shall be for a duration of 3 hours
2. Two questions will be set from each module carrying 20 marks each.
3. Students have to answer 5 questions selecting one full question from each module.

BASICS OF ELECTRICAL ENGINEERING

Course Code : 15EE15/25 **Credits : 4**
L:P:T:S : 3:0:1:0 **CIE Marks : 50**
Exam Hours : 03 **SEE Marks : 50**

Course Outcomes: On completion of the course, student would be able to:

CO1	To analyze and solve DC and AC electric circuit problems by applying basic electric circuit laws and analysis techniques.
CO2	To perform simple energy-related calculations and to understandthe concepts in electrical and magnetic fields.
CO3	To study fundamental concepts of Transformers and Machines.
CO4	To understand the basic concepts of domestic wiring andmeasuring instruments.

Mapping of Course Outcomes to Program Outcomes:

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

MODULE 1

Electric Elements & Circuit Laws:

Charge and electric forces, voltage, current and magnetic forces. Ohm's law – Resistance, Specific Resistance, Conductivity, Temperature coefficient of resistance and resistor colour coding, Kirchhoff's voltage law and current law. Characteristics of series and parallel circuits. Current divider and voltage divider rules. Equivalent resistance of series – parallel circuits, Definition of Work, Power and Energy and heating effects of electrical current.

6 Hrs

Circuit Analysis & Techniques:

Introduction to Superposition, Thevenin's and Norton's theorems and Maximum power transfer theorem (Only with independent sources and Resistive elements)

4 Hrs

MODULE 2

Magnetic Fields:

Faradays law, Induced voltage. Dynamically Induced EMF and Statically Induced EMF, Self-induced EMF and Mutually Induced EMF, Self-inductance of a Coil, Mutual Inductance (all the laws associated), Energy Stored in a Magnetic Field, Energy Stored in a Capacitor.

5 Hrs

Introduction to D.C Machines:

Principle and construction of D.C machines, EMF equation, classification of D.C. machines based on method of excitation, load characteristics of D.C generators, critical resistance, voltage regulations, speed and torque characteristics of D.C motors. Testing and efficiency of D.C machine, applications. **5 Hrs**

MODULE 3

AC Circuits:

Sinusoidal source, Maximum, Average and RMS values, Form factor, analysis of R, L & C circuits. Complex algebra and phasor diagrams. Reactance, susceptance, impedance and admittance. Problems involving series, parallel and series – parallel circuits, Power triangle - Real power, Reactive power, Apparent power and Power factor.

6 Hrs

Transformers: Single-phase transformers, construction and principle of operation, classification of transformers, E.M.F equation, turns ratio, ideal - equivalent circuit, phasor diagram, losses, efficiency, regulation and applications. **4 Hrs**

MODULE 4

Three-Phase Circuits:

Introduction to single phase and poly phase, Advantages of poly-phase systems over single-phase systems. Generation of various phase voltages (2 and 3). Relationship between line

and phase quantities in Star and Delta for balanced systems, measurement of power using various methods and determining power factor using two Watt Meter reading**.** **5 Hrs**

Domestic wiring:

Brief discussion on concealed conduit wiring. Two-way and Three-way control of lamps, Electric shock: precautions against shock, various circuit protective devices – fuses, MCB's , Earthing – importance, Pipe earthing, plate earthing. **2 Hrs**

MODULE 5

Induction Machines:

Three- Phase Induction motor, production of rotating magnetic field, construction and principle of operation, Types of Rotor, Slip and its significance, necessity of starter, applications . **5 Hrs**

Measuring Instruments:

Construction and Principle of operation of Dynamometer type wattmeter and single phase Induction type energy meter. **2 Hrs**

TEXT BOOKS:

1. "Basic Electrical Engineering", DC Kulshreshtha, TMH, 2009 edition
2. "Basic Electrical and Electronics Engineering", S.K. Bhattacharya, Pearson Publications

REFERENCE BOOKS:

1. "Electrical Technology", E.Hughes, Pearson publishers.
2. "Basic Electrical, Electronics and Computer Engineering", Muthusubramanian R, Salivahanan S and Muraleedharan K A, Tata McGraw Hill, Second Edition.
3. "Basics of Electrical and Electronics Engineering", Nagsarkar T K and Sukhija M S, Oxford press University Press.
4. "Problems in Electrical Engineering", S.Parker Smith & N N Parker Smith,"
5. "Electrical Technology", B.L Teraja, Latest edition.
6. "Basic Electrical Engineering", 3rd edition, TMH, D.P.Kothari.

Expected Course Outcome:

Students shall demonstrate knowledge associated with:

- Fundamentals of various electrical circuits.
- Construction, basic principles of operation and determination of performance characteristics of electrical equipment.
- Solving complex Electrical Engineering problems.
- Designing of domestic wiring, understanding the precautionary measures against electric shock and the need for earthing.

Assessment Method:

CIE:

1. Three internals tests of 30 marks each will be conducted and the average of the top two test marks will be considered.
2. Assignment - 10 marks.
3. Quiz test - 10 marks.

SEE:

4. SEE will be conducted for 100 marks and shall be for a duration of 3 hours
5. Two Questions will be set from each module carrying 20 Marks each.
6. Students have to answer 5 questions selecting one full question from each module.

BUSINESS COMMUNICATION

Course Code	**: 15HB16/26**	**Credits**	**: 02**
L:P:T:S	**: 2:0:0:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

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

CO #	COURSE OUTCOME
15HB16/26.1	To introduce students to Professional or Business English practices.
15HB16/26.2	To improve the four basic communication skills – Listening, Speaking, Reading and Writing.
15HB16/26.3	To transform students into proactive communicators.
15HB16/26.4	To make students "industry ready".

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
15HB16/26.1	-	-	-	-	-	-	-	3	2	3	-	3
15HB16/26.2	-	-	-	-	-	-	-	3	2	3	-	3
15HB16/26.3	-	-	-	-	-	-	-	3	2	3	-	3
15HB16/26.4	-	-	-	-	-	-	-	3	2	3	-	3

MODULE 1

Communication: Introduction and Meaning

1. Types, purpose and definition of communication process – 7 Cs of communication
2. Barriers of Effective communication and overcoming the barriers
   Activities : Case studies

5 Hrs

MODULE 2

Non –Verbal Communication (Body Language):

- Kinesics, Occulesics, Paralanguage, Proxemics, Artifactics, Chronemics&Tactilics
- Presentation Skills

Activities: Documentary

4 Hrs

MODULE 3

Importance of Listening:

- Listening Vs.Hearing
- Types of Listening
- Barriers of Listening
- Traits of a good listener

Activities: Chinese Whisper **3 Hrs**

MODULE 4

Reading

- The four main types of reading techniques – Skimming, Scanning, Intensive & Extensive

Activities: Articles, Reading News **4 Hrs**

MODULE 5

Written Communication

- Business Letter Writing: Placing Orders & Letters of Complaint
- Job Application Letter Writing
- Email Writing
- Resumes & CVs
- Expansion of Ideas

Activities: Job Application Letter, Mock Resumes **6 Hrs**

Reference Books:

- Basic Business Communication: Skills For Empowering The Internet Generation- Flatley and Lesikar, Tata McGraw Hill, 10th Edition, 2005
- Business and Professional Communication: Keys for Workplace Excellence-Kelly M. Quintanilla
- Business Communication-P.D. Chaturvedi and Mukesh Chaturvedi, Pearson Education
- The Skills of Communicating-Bill Scott-Jaico Books
- Writing, Speaking, Listening-Helen Wilkie- Jaico Books

Assessment Method:

CIE:

1. Three internals tests of 30 marks each will be conducted and the average of the top two test marks will be considered.
2. Two assignments of 10 Marks each.

SEE:

- SEE will be conducted for 100 marks and shall be for a duration of 3 hours
- Two Questions will be set from each module carrying 20 Marks each.

Students have to answer 5 questions selecting one full question from each module.

CONSTITUTION OF INDIA & PROFESSIONAL ETHICS

Course Code : 15HC17/27 | **Credits : 0**
L:P:T:S : 0:0:0:0 | **CIE Marks : 25**
Exam Hours : 02 | **SEE Marks : 25**

CO1	To enable the learner with Constitutional and engineering ethics knowledge.
CO2	To prepare learner for problem solving in legal and professional ethics front
CO3	To inculcate in learner the sense of legal awareness and social & ethical responsibility

Mapping of CO v/s PO:

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

MODULE 1

Introduction to Constitution of India, Salient features of the Constitution, Preamble to Indian constitution. Fundamental Rights & its limitations, decided case studies. Right to information Act. 5 **Hrs**

MODULE 2

Directive Principles of State Policy, Fundamental duties.

Union Executives – President, Prime Minister Parliament Supreme Court of India. 4 **hrs**

MODULE 3

State Executives, Governor Chief Minister, State Legislature High Court of State, Electoral Process in India. **4 hrs**

MODULE 4

Special Provision for SC & ST. Special Provision for Women, Children & Backward Classes. Emergency Provisions. National Human Rights Comission.

4 hrs

MODULE 5

Scope & Aims of Engineering Ethics, Responsibility of Engineers, Impediments to Responsibility, Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering. Corporate Social Responsibility. **5 Hrs**

Text Books:

1. Durga Das Basu: **"Introduction to the Constitution on India",** (Students Edn.) Prentice – Hall EEE, 19th / 20th Edn., 2001
2. J. N. Pandey: **"Constitutional law of India",** latest edition.
3. Charles E. Haries, Michael S Pritchard and Michael J. Robins **"Engineering Ethics"** Thompson Asia, 2003-08-05.

Reference Books:

1. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, **"Engineering Ethics",** Prentice –Hall of India Pvt. Ltd. New Delhi, 2004
2. Brij Kishore Sharma,**"Introduction to the Constitution of India"**, PHI Learning Pvt. Ltd., New Delhi, 2011.

Assessment Method:

CIE:

Three internals tests of 25 marks each shall be conducted and the average of top two test marks will be considered.

SEE:

SEE will be conducted for 50 marks and shall be for a duration of 2 hours.
50 multiple choice questions carrying 1 mark each to be set.