NEW HORIZON COLLEGE OF ENGINEERING

Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade, Accredited by NBA

The Trust is a Recipient of Prestigious Rajyotsava State Award 2012 Conferred by the Government of Karnataka
Awarded Outstanding Technical Education Institute in Karnataka-2016
Ring Road, Bellandur Post, Bangalore -560 103, INDIA

Academic Year 2018-19
First and Second Semesters

B.E - Bachelor of Engineering

Common to all Branches
Scheme and Syllabus

NEW HORIZON COLLEGE OF ENGINEERING

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VISION

To emerge as an institute of eminence in the fields of engineering, technology and management in serving the industry and the nation by empowering students with a high degree of technical, managerial and practical competence.

MISSION

To strengthen the theoretical, practical and ethical dimensions of the learning process by fostering a culture of research and innovation among faculty members and students.

To encourage long-term interaction between the academia and industry through the involvement of the industry in the design of the curriculum and its hands-on implementation.

To strengthen and mould students in professional, ethical, social and environmental dimensions by encouraging participation in co-curricular and extracurricular activities.

QUALITY POLICY

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

CONTENTS

CREDIT SCHEME FOR FIRST SEMESTER B.E

FIRST SEMESTER- CHEMISTRY CYCLE												
Sl. No	Course Code	Course	BoS	Credit Distribution				Overall Credits	Contact Hours	Marks		
				L	T	P	S			CIE	SEE	Total
1	18MAT11	Applied Mathematics-I	BS	2	1	0	0	3	4	50	50	100
2	18CHE12	Engineering Chemistry	BS	3	0	0	0	3	3	50	50	100
3	18CSE13	Introduction to Programming with C	CSE	3	0	0	0	3	3	50	50	100
4	18MEE14	Computer Aided Engineering Drawing	ME	1	0	2	0	3	5	50	50	100
5	18ECE15	Basic Electronics	ECE	3	0	0	0	3	3	50	50	100
6	18HSS16	Professional Communication	HSS	2	0	0	0	2	2	25	25	50
7	18CHL17	Engineering Chemistry Lab	BS	0	0	2	0	2	4	25	25	50
8	18CSL18	Programming with C Lab	CSE	0	0	2	0	2	4	25	25	50
9	18HSS172	Constitution of India and Professional Ethics	HSS	Mandatory Course				0	2	25	25	50
Total								21	30	350	350	700

FIRST SEMESTER- PHYSICS CYCLE												
Sl. No	Course Code	Course	BoS	Credit Distribution				Overall Credits	Contact Hours	Marks		
				L	T	P	S			SEE	CIE	Total
1	18MAT11	Applied Mathematics -I	BS	2	1	0	0	3	4	50	50	100
2	18PHY12	Engineering Physics	BS	3	0	0	0	3	3	50	50	100
3	18MEE13	Elements of Mechanical Engineering	ME	3	0	0	0	3	3	50	50	100
4	18CIV14	Elements of Civil Engineering	CV	3	0	0	0	3	3	50	50	100
5	18EEL15	Basic Electrical Engineering	EE	3	0	0	0	3	3	50	50	100
6	18PHL16	Engineering Physics Lab	BS	0	0	2	0	2	4	25	25	50
7	18EEL17	Basic Electrical Engineering Lab	EE	0	0	2	0	2	4	25	25	50
8	18HSS171	Essential English	HSS	Mandatory Course				0	2	25	25	50
Total								19	26	325	325	650

L-Lecture (1 hour) T-Tutorial (2 hours) P-Practical (2 hours)

CREDIT SCHEME FOR SECOND SEMESTER B.E

SECOND SEMESTER- CHEMISTRY CYCLE													
Sl. No	Course Code	Course	BoS	Credit Distribution				Overall Credits	Contact Hours	Marks		
				L	T	P	S			CIE	SEE	Total
1	18MAT21	Applied Mathematics-II	BS	2	1	0	0	3	4	50	50	100
2	18CHE22	Engineering Chemistry	BS	3	0	0	0	3	3	50	50	100
3	18CSE23	Introduction to Programming with C	CSE	3	0	0	0	3	3	50	50	100
4	18MEE24	Computer Aided Engineering Drawing	ME	1	0	2	0	3	5	50	50	100
5	18ECE25	Basic Electronics	ECE	3	0	0	0	3	3	50	50	100
6	18HSS26	Professional Communication	HSS	2	0	0	0	2	2	25	25	50
7	18CHL27	Engineering Chemistry Lab	BS	0	0	2	0	2	4	25	25	50
8	18CSL28	Programming with C Lab	CSE	0	0	2	0	2	4	25	25	50
9	18HSS272	Constitution of India and Professional Ethics	HSS	Mandatory Course				0	2	25	25	50
Total								21	30	350	350	700

SECOND SEMESTER- PHYSICS CYCLE												
Sl. No	Course Code	Course	BoS	Credit Distribution				Overall Credits	Contact Hours	Marks		
				L	T	P	S			SEE	CIE	Total
1	18MAT21	Applied Mathematics -II	BS	2	1	0	0	3	4	50	50	100
2	18PHY22	Engineering Physics	BS	3	0	0	0	3	3	50	50	100
3	18MEE23	Elements of Mechanical Engineering	ME	3	0	0	0	3	3	50	50	100
4	18CIV24	Elements of Civil Engineering	CV	3	0	0	0	3	3	50	50	100
5	18EEE25	Basic Electrical Engineering	EE	3	0	0	0	3	3	50	50	100
6	18PHL26	Engineering Physics Lab	BS	0	0	2	0	2	4	25	25	50
7	18EEL27	Basic Electrical Engineering Lab	EE	0	0	2	0	2	4	25	25	50
8	18HSS271	Essential English	HSS	Mandatory Course				0	2	25	25	50
Total								19	26	325	325	650

L-Lecture (1 hour) T-Tutorial (2 hours) P-Practical (2 hours)

CHEMISTRY CYCLE

APPLIED MATHEMATICS- I

Course Code : 18MAT11 | **Credits : 03**
L:T:P:S : 2:1:0:0 | **CIE Marks : 50**
Exam Hours : 03 | **SEE Marks : 50**

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

CO1	Understand the principles of engineering mathematics through calculus
CO2	Calculate the extreme values of a function of two variables
CO3	Apply the concepts of integration of functions of two/three variables over a region
CO4	Develop the ability to construct mathematical models involving differential equations and interpret their solutions physically
CO5	Apply ideas from linear algebra in solving systems of linear equations
CO6	Understand and reduce the given quadratic forms to canonical forms

Mapping of Course Outcomes to Program Outcomes:

	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	-	-	-	-	-	-	2	-	3
CO5	3	3	3	2	2	-	-	-	-	2	-	3
CO6	3	3	3	2	-	-	-	-	-	-	-	3

Course Syllabus			
Module No.	**Contents of the Module**	**Hours**	**COs**
1	**Differential Calculus:** **Polar Curves:** Angle between the radius vector and tangent (Derivation & Problems), angle between two curves (Problems), Pedal equation for polar curves (Problems). **Curvature and radius of curvature:** Cartesian and polar forms (without proof). Centre and circle of curvature (formulae only) **Applications**: Curvature to evolutes and involutes. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO1**
2	**Partial derivatives**: Introduction to partial differentiation, Euler's theorem(Derivation & Problems), Total derivatives, Partial differentiation of composite functions and Jacobian-definition & Problems. **Applications:** Maxima and Minima of functions of two variables Problems. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO2**

3	**Integral Calculus:** Problems on Double and triple integrals, evaluation of double integrals by changing the order of integration and changing into polar coordinates. Definitions of Beta and Gamma functions, Relation between beta and gamma functions and simple problems. **Applications:** Applications of double and triple integrals to find area and volume. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO3**
4	**Ordinary Differential Equations of first order:** Solution of first order and first degree differential equations: Problems on Exact, Linear and Bernoulli's differential equations. **Applications**: Orthogonal Trajectories, Newton's law of cooling, laws of decay & growth-Problems. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO4**
5	**Linear Algebra:** Problems on rank of a matrix by elementary transformations, Solution of system of linear equations: Gauss elimination method and Gauss-Jordon method, Linear transformation, Eigen values and Eigen vectors of a square matrix, Diagonalisation of a square matrix, Quadratic forms, reduction to Canonical form-Problems. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO5 CO6**

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley-India Publishers, 10th Edition, 2014, ISBN: 978-81-265-5423-2.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014, ISBN: 978-81-7409-195-5.

Reference Books:

1. Glyn James, Modern Engineering Mathematics, Prentice Hall, 4th Edition, 2015, ISBN: 978-0-273-73409-3
2. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education (India) Private Limited, 4th Edition, 2016, ISBN: 978-0-07-063419-0.
3. H. K. Dass, Advanced Engineering Mathematics, S. Chand & Company Ltd., 28th Edition, 2012, ISBN: 81-219-0345-9.
4. N.P.Bali and Manish Goyal, A Text Book of Engineering Mathematics, Laxmi Publications (P) Ltd., 9th Edition, 2014, ISBN: 978-81-318-0832-0.

Assessment Pattern:

1. CIE- Continuous Internal Evaluation (50 Marks).

Bloom's Category	Tests (25 Marks)	Assignments (15 Marks)	Quizzes (10 Marks)
Remember	5	5	-
Understand	5	5	-
Apply	5	5	10
Analyze	5	-	-
Evaluate	5	-	-
Create	-	-	-

2. SEE- Semester End Examination (50 Marks).

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

ENGINEERING CHEMISTRY

Course Code	**: 18CHE12/22**	**Credits**	**:3**
L:T:P:S	**: 3:0:0:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

COURSE OUTCOMES: On completion of the course student will be able to

CO1	Recall and explain the principles of chemistry related to electrochemistry, metals, natural resources, polymers and engineering materials.
CO2	Apply the knowledge of chemistry in solving societal problems related to public health, safety, environmental issues and developing new materials.
CO3	Identify, analyze and interpret engineering problems in chemistry perspective to achieve solutions.
CO4	Select the solutions to engineering problems for their suitability and sustainability.
CO5	Perform the various types of titrations for quantitative estimation of industrially important materials and gain hands on experience in handling the different types of instruments for chemical analysis.

Mapping of Course Outcomes to Program Outcomes:

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

	COURSE SYLLABUS		
Module	**Contents of the Module**	**Hour**	**COs**
1	**Electrochemistry-**Introduction to galvanic cells, Derivation of Nernst equation for single electrode potential. Emf of the cell, electrochemical conventions and problems. Reference electrodes - Construction, working and applications of Calomel and Ag-AgCl electrodes. Measurement of electrode potential using calomel electrode. Electrolyte Concentration cells: Numerical problems on electrolyte concentration cells. 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 Lead acid battery. Zn-Air battery and Lithium ion battery ($LiCoO_2$). **Fuel Cells:** Introduction, Construction, working and applications of Methanol-oxygen fuel cell. Super Capacitors – Principle, explanation and construction.	**9**	**CO1,CO2,CO3 ,CO 4 & CO5**
	List of Related Experiments **1.** Estimation of iron content in the given solution by potetiometry **2.** Determination of pKa value of a weak acid using pH meter		
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 and pH. Types of corrosion – differential metal, differential aeration corrosion (pitting and waterline) and stress corrosion. Corrosion control techniques: – protective coatings – metal coatings (Anodic and Cathodic metal coatings taking Galvanization and Tinning as example). Inorganic coatings - Anodizing of aluminum. Cathodic protection by sacrificial anodic method and Impressed voltage method. **Metal Finishing**-Introduction and technological importance. Polarization, decomposition potential and over voltage with respect to metal finishing. Factors influencing the nature of electro deposit- current density, concentration of metal ions, pH, temperature, additives(organic additives and complexing agents).Throwing power of plating bath and its determination by Haring -Blum cell. Electro plating of Gold (Alkaline cyanide bath). Electroless plating – Introduction, distinction between electro plating and electroless platin. Electroless plating of copper and its applications in making PCB.	**9**	**CO1,CO2,CO3 ,CO 4 & CO5**
	List of Related Experiments 1. Determination of percentage of iron in haematite ore. 2. Estimation of copper in given solution by Iodometry. 3. Determination of % CaO in Cement solution using std EDTA solution		
3	**Chemical Energy Sources and Photovoltaic Cells** **Chemical Energy Sources:** Introduction, classification, importance of hydrocarbons. Calorific value – Gross and Net calorific value. Determination of calorific value of fuel using Bomb calorimeter- Numerical problems. Cracking – Introduction, Fluidized catalytic cracking. Reformation of petrol. Octane and Cetane numbers. Mechanism of knocking in petrol and diesel engines. Anti knocking agents, unleaded petrol, power alcohol and	**8**	**CO1,CO2,CO3 CO1, CO2, CO3 ,CO 4 & CO5**

	biodiesel. **Photovoltaic cells** Introduction, importance, conversion and utilization of solar energy. Construction and Working of photo voltaic cells. Advantages and disadvantages of PV cells. Production of solar grade silicon (union carbide process). Purification of silicon by Zone refining.		

	List of Related Experiments 1. Determination of viscocity coefficient of given organic liquid.		
4	**Water Technology: -** Introduction. Boiler feed water. boiler troubles - Scale and sludge formation, Priming and foaming, Boiler corrosion due to dissolved O_2, CO_2, $MgCl_2$ and prevention. Determination of COD-Numerical problems. Softening of water by ion exchange process. Desalination of sea water by electro dialysis. Sewage treatment: Primary and Secondary treatment (activated sludge method). **Instrumental Methods of Analysis:** Principle, theory, instrumentation and applications of conductometry, colorimetry and flame photometry.	**9**	**CO1,CO2,CO3 ,CO 4 & CO 5**
	List of Related Experiments 1. Determination of total hardness of water sample by preparing std. EDTA solution 2. Determination of chemical oxygen demand (COD) of the given industrial waste sample 3. Determination of total alkalinity of a given sample of water using standard Hydrochloric acid. 4. Estimation of HCl and CH_3COOH in a mixture using std. NaOH b conductometry. 5. Estimation of sodium in the given sample by flame photometry. 6. Estimation of copper in the given test sample by colorimetry.		
5	**Polymers-** Introduction, types of polymerization- addition and condensation. Free radical mechanism taking vinyl chloride as an example. Glass transition temperature, Factors influencing Tg-Flexibilit intermolecular forces, molecular mass, branching, cross linking, significance of Tg. Synthesis, properties and applications of Polyurethane, Teflon and Kevlar fibre. Polymer composites – Introduction, properties and applications. Biodegradable polymers – meaning, poly lactic acid – synthesis and applications. **Nanomaterials**: Introduction, Classification based on dimension (0D, 1 2D and 3D), properties (size dependent – Catalytic, Thermal and Optical). Synthesis - Bottom up approach. Precipitation technique and Chemical vapour deposition with one example. General applications of nano materials	**9**	**CO1,CO2,CO3 ,CO 4 & CO 5**

Text Books

1. Chemistry for Engineering Students, B. S. Jaiprakash, R. Venugopal, Shivakumaraiah and Pushpalyengar, 2015 Edition, Subhash Publications, Bangalore
2. Engineering Chemistry by R. V. Gadag and A. Nityananda Shetty, , 3rd Edition, 2014 I K International Publishing House Pvt. Ltd., New Delhi.
3. Engineering Chemistry by V R Kulkarni and K. Ramakrishna Reddy, 1st Edition, 2016, New Age International Publishers.
4. A Text Book of Engineering Chemistry, Jain and Jain, 3rd Edition, 2014 Dhanpatrai Publications

Reference Books

1. Engineering Chemistry by O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd.
2. Corrosion Engineering by M. G. Fontana, Tata McGraw Hill Education Pvt. Ltd. New Delhi.
3. Engineering Chemistry, Wiley India second Edition 2014.
4. Nanochemistry - A Chemical Approach to Nanomaterials by G. A. Ozin and A. C. Arsenault.

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks, Theory)

Bloom's Category	**Tests**	**Assignment**	**Quiz**	**External Co-curricular participation (10 Marks)**
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	5	2	2	
Understand	10	5	1	
Apply	5	3	1	
Analyze	5	-	1	
Evaluate	-	-	-	
Create				

SEE- Semester End Examination Theory (50 Marks)

Bloom's Category	**SEE Theory (50)**
Remember	10
Understand	20
Apply	10
Analyze	10

INTRODUCTION TO PROGRAMMING WITH 'C'

Course Code	**: 18CSE13/23**	**Credits**	**: 3**
L:T:P:S	**: 3:0:0:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

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

CO1	Have fundamental knowledge on basics of computers hardware and number systems.
CO2	Demonstrate basic programming skills in the C Programming Language.
CO3	Use different data types in C and able to design programs involving decision structures, loops,arrays, strings and functions.
CO4	Understand the dynamics of memory by the use of pointers and to use different structures and create or update basic data files.
CO5	Analysing and understanding of the basic searching and sorting algorithms.
CO6	An understanding of the linear data structures such as stack, queues.

Mapping of Course Outcomes to Program Outcomes :

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

	COURSE SYLLABUS		
Module	**Contents of the Module**	**Hours**	**COs**
1	**Introduction to C Language:** Hardware components, Flowchart, Pseudo-code solutionto problems, Basic concepts of a C program, Declaration, I/O statements, Types of operators and expressions, Programming examples and exercise.	**6**	**CO1, CO2**
2	**Branching and Looping:** Two way selection (if, if-else, nested if-else, cascaded if-else), switch statement, ternary operator, goto, Loops (For, while, do-while) in C, break and continue, programming examples and exercise.	**8**	
	List of Related Experiments 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. Design and develop a C program to implement simple calculator using switch-case statement. 4. Draw the flowchart and Write a C Program to compute Sin(x) using Taylor series approximation given by Sin(x) = x - (x3/3!) + (x5/5!) - (x7/7!) + …….		**CO2 CO3**
3	**Arrays and Strings:** Using an array, Using arrays with Functions, Multi- Dimensional arrays. **Strings:** Declaring, Initializing, string manipulation functions, string input and output functions, array of strings, programming examples and Exercises. **Functions**: Functions in C, Argument Passing – call by value, Call by refernce Functions and program structure, location of functions, void and parameter less Functions, Recursion, programming examples and exercises.	**12**	**CO2 CO3 CO5**
	List of Related Experiments 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*. b. Develop, implement and execute a C program to search a number in array using linear searching technique. 6 a. Develop, implement and execute a C program to find whether a given matrix is a Sparse Matrix or not. b. Write and execute a C program to display Pascal Triangle using for loop . 7. Write and execute a C program that: a. Implement the following string manipulation functions till the user wishes to continue (infinite loop) : (i)*strcpy*() (ii)srrlen() (iii) strrev() (iv) strcmp() (v) strcat(). 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 the value of the integer *x* rotated to the right by *n* positions. Assume the integers are unsigned. 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 *r nC*. Tabulate the results for different values of *n* and *r* with suitable messages.		
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.	**8**	
	List of Related Experiments 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 show below. Display the contents of output file "output.txt" on to the screen. Student Name USN Name 1 USN1 Name 2 USN2 …. …. …. ….		**CO3** **CO4**

	10. a. Write a C program to maintain a record of n student details using anarray of structures with four fields (Roll number, Name, Marks, and Grade). Assume appropriate data type for each field. Input & Print themembers of the structure . b. WAP to take 2 structures HH:MM:SS as T1 & T2 & display the Time difference as structure as T3 .		
5	**Pointers and Pre-processors:** 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 Pre-processors, 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**	**CO4, CO6**
	List of Related Experiments 11. Write a C program using pointers to swap 2 numbers using Pass-by-value & ass-by-reference.		

Text Books:

1. "The C programming Language", Brain W. Kernighan and Dennis M. Richie, 2nd Edition, PHI, 2012.
2. "Problem Solving with C ", Jacqueline Jones &Keith Harrow, 1st Edition ,Pearson2011.

Reference Books:

1. "Computer Concepts and C Programming", VikasGupta, Dreamtech Press2013.
2. " Programmingwith C ", R S Bichkar, University Press,2012.
3. " ComputerProgramming in C ", V Rajaraman, PHI, 2013.

Assessment Method:

CIE- Continuous Internal Evaluation (50 Marks, theory)

Bloom's Category	Tests	Assignments	Quizzes	External Co-Curricular Participation
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	5		1	
Understand	5		1	
Apply	4		1	
Analyze	4	2	1	
Evaluate	2	4	1	
Create	5	4		

SEE – Semester End Examination (50 Marks - Theory)

Bloom's Category	Tests(theory)
Remember	10
Understand	10
Apply	8
Analyze	8
Evaluate	4
Create	10

COMPUTER AIDED ENGINEERING DRAWING

Course Code: 18MEE14/24 **Credits: 03**
L: T: P: S: 1:0:2:0 **CIE Marks: 50**
Exam Hours: 03 **SEE Marks: 50**

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

CO1	Dimensioning, conventions and standards related to working drawings in understanding the theory of orthographic projections and demonstrating of 1D objects in different locations.
CO2	Solve problems related to projection of lines and also they are able to understand the concept of true and apparent length and inclinations.
CO3	Organizing, demonstrating and arranging of planes in different positions
CO4	Understand the concept of solids and visualize the arrangements in different positions.
CO5	Analyze the orthographic models and are able to convert it into isometric views
CO6	Create the development for the given solid by applying concepts.

Mapping of Course outcomes to Program outcomes:

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

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Course syllabus			
Module No	Contents of Module	Hrs	Cos
1	**INTRODUCTION:** 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, Projections of straight lines (located in First quadrant/first angle only)	**06**	**CO1**
2	**PROJECTION OF STRAIGHT LINES** True and apparent lengths, True and apparent inclinations to reference planes (No application problems	**06**	**CO1,** **CO2**
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)	**08**	**CO1, CO3, CO6**
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).	**14**	**CO4,** **CO6**
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). **Development of lateral surfaces** of right regular prisms, pyramids, cylinders and cones, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, sphere and transition pieces)	**10**	**CO5,** **CO6**

TEXT BOOKS:

1. Engineering Drawing - N.D. Bhatt & V.M. Panchal, 48th edition, 2005-Charotar Publishing House, Gujarat

2. Computer Aided Engineering Drawing - K. R. Gopalakrishna, Subash Publishers, Bangalore , 2015, ISBN-13: 9789383214204

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**.**

CIE- Continuous Internal Evaluation for theory (50 Marks)

Bloom's Category	Tests	Assignments	Assignments	Surprise Test
Marks (out of 50)	**25**	**10**	**10**	**5**
Remember	2	2	2	
Understand	6	2	2	1
Apply	6	2	2	1
Analyze	6	2	2	1
Evaluate	2	1	1	1
Create	3	2	2	1

SEE – Semester End Examination (50 Marks - Theory)

Bloom's Category	Tests(theory)
Remember	4
Understand	10
Apply	11
Analyze	11
Evaluate	4
Create	10

ASSESSMENT METHOD:

CIE:
1. Three internals tests (each 25 marks) are conducted, average of all the three tests marks will be considered.
2. Submission of drawing sheets/printouts as assignment will carry 20 marks.
3. One written surprise tests conducted and evaluated for 5 marks.

SEE:
1. One Question for 10 Marks from Module 1– Only Sketching
2. One Question for 10 Marks from Module 2 – Only Sketching
3. One Question for 20 Marks from Module 3 – Only Sketching
4. Two Questions for 40 Marks from Module 4 – Only software drafting (With Choice)
5. One Question for 20 Marks from Module 5 – Only software drafting (With Choice)

BASIC ELECTRONICS

Course Code	**: 18ECE15/25**	**Credits**	**: 03**
L:T:P:S	**: 3:0:0:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

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

CO1	Employ Boolean algebra to implement the combinational logic circuits.
CO2	Identify the diode's usage as a rectifier, and Zener diode's usage as an voltage regulator.
CO3	Discuss the basic characteristics of BJT and MOSFET.
CO4	Examine the BJT's voltage-divider bias circuit, and illustrate its operation as an amplifier.
CO5	Describe the characteristics of op-amp and illustrate its various applications.
CO6	Discuss about Microprocessors, Microcontrollers and recognize their needs.

Mapping of Course Outcomes to Graduate Attributes:

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

Course Syllabus			
Sl no	**Contents of Module**	**Hrs**	**COs**
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.	**9**	**CO1**
2	**Semiconductor Diodes and Applications:** P-N Junction diode – its principle, characteristics and parameters, Applications (Half-Wave Rectifier, Two-Diode Full Wave Rectifier, Bridge Rectifier), (Zener diode and its usage as voltage regulator). **Bipolar Junction Transistor:** BJT Operation, BJT Voltages and Currents, Common Emitter Characteristics, Numerical examples as applicable.	**9**	**CO2, CO3**

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, Types of MOSFET, Comparison between BJT and MOSFET.	**9**	**CO4**
4	**Operational Amplifier & its Applications:** Characteristics (Ideal Op-amp, Practical Op-amp), Inverting and 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, RC phase shift oscillator. **Communication System:** Principles of Communication System, Need for Modulation, AM and FM Modulation concept, Modulation index, Numerical examples.	**9**	**CO5**
5	**Building blocks of a Digital system:** Half Adder, Full Adder, Encoder, Decoder, Latch, Flip-Flop, Registers. Introduction to Microprocessors, General operation of Microprocessors, 8085 Microprocessor architecture and working principle. Introduction to Microcontrollers, 8051 Microcontroller architecture and operation, Comparison between Microprocessors and Microcontrollers.	**9**	**CO6**

Case study:
Mandatory case study on an Electronic system specifying its block diagram and operation to be submitted as an assignment.

Text Books:

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

Reference Books:

1. Op-amps and linear integrated circuits, Ramakant A. Gayakwad, 4th edition, 2000, Prentice Hall.
2. Electronic communication systems, Wayne Tomasi, 5th edition, 2001, Pearson education.
3. Microprocessor Architecture, Programming and Applications with 8085, Ramesh Gaonkar, 6th Edition, 2013, Prentice Hall.
4. The 8051 Microcontroller and Embedded Systems using Assembly and C, Muhammad Ali Mazidi, 2nd Edition, 2011, Pearson.

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	External Co-curricular participation (10 Marks)
Remember	5		-	-
Understand	10	5	-	-
Apply	5	5	5	10
Analyze	5	-	-	-
Evaluate		-	-	-
Create	-	-	-	-

Note: Any particular electronic system can be considered as case-study for a team of students, and the teams are required to present the system's basic working principles to the class. This work can be considered as one of the assignments, which can be evaluated for 5 marks.

SEE- Semester End Examination (50 Marks)

Bloom's Category	Tests
Remember	20
Understand	15
Apply	10
Analyze	5
Evaluate	-
Create	-

PROFESSIONAL COMMUNICATION

Course Code	**: 18HSS16/26**	**Credits**	**: 02**
L:T:P:S	**: 2:0:0:0**	**CIE Marks**	**:25**
Exam Hours	**: 02**	**SEE Marks**	**:25**

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

CO1	Understand the concept, process and importance of communication
CO2	Gain knowledge on different aspects of communication
CO3	Develop skills of effective communication - both written and oral
CO4	Develop a holistic approach towards enhancing their professional behavior, self-confidence and proficiency.

Mapping of Course Outcomes to Program Outcomes:

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

Module	**Contents of the Module**	**Hours**	**COs**
1	Types, purpose and definition of Communication process- 7Cs of Communication, Barriers of Effective communication and overcoming the barriers.	05	**C01,C02, C03,C04**
2	Non-verbal Communication (Body Language): Kinesics, Occulesics, Paralanguage, Proxemics, Artifactics, Chronemics & Tactilics , Presentation Skills and Body Language Across Different Cultures	05	**CO1,CO2, C03,C04**
3	Importance of Listening: Listening Vs Hearing, Types of Listening, Barriers of Listening and Traits of a good listener	02	**CO1,CO2, CO3,CO4**
4	The four main types of reading techniques-Skimming, Scanning, Intensive & Extensive reading	04	**CO1,C02, C03,C04**
5	Written Communication: Business Letter Writing, Job Application Letter , Email writing, CV's and Expansion of ideas, Report writing and Review/Progress Report Writing	06	**CO1,C02, C03,C04**

Text Books:

1. Basic Business Communication: Skills For Empowering The Internet Generation-Flatley and Lesikar, Tata McGraw Hill, 10th Edition, 2005.
2. Business and Professional Communication: Keys for Workplace Excellence- Kelly M. Quintanilla.
3. Business Communication-P.D. Chaturvedi and MukeshChaturvedi, Pearson Education.

Reference Books:

1. The Skills of Communicating-Bill Scott-Jaico Books
2. Writing, Speaking, Listening-Helen Wilkie- Jaico Books
3. Technical communication- Principles and Practice –Meenakshi. R and Sangeetha Sharma, Oxford University Press-2007
4. Practical English Grammar- A.J Thomson and A.V Martivet, Oxford University Press- 1987

Assessment Pattern:

CIE- Continuous Internal Evaluation (25 Marks)

Bloom's Category	Tests	Assignments	Presentation
Marks(out of 25)	**10**	**10**	**5**
Remember	1	-	-
Understand	2	-	-
Apply	3	5	-
Analyse	2	-	-
Evaluate	-	-	-
Create	2	5	5

SEE – Semester End Examination (25 Marks)

Bloom's Category	Tests
Remember	3
Understand	5
Apply	5
Analyze	5
Evaluate	2
Create	5

ENGINEERING CHEMISTRY LAB

Course Code	**: 18CHL17/27**	**Credits**	**:2**
L:T:P:S	**: 0:0:2:0**	**CIE Marks**	**: 25**
Exam Hours	**: 03**	**SEE Marks**	**: 25**

COURSE OUTCOMES: On completion of the course student will be able to

CO1	Recall and explain the principles of chemistry related to electrochemistry, metals, natural resources, polymers and engineering materials.
CO2	Apply the knowledge of chemistry in solving societal problems related to public health, safety, environmental issues and developing new materials.
CO3	Identify, analyze and interpret engineering problems in chemistry perspective to achieve solutions.
CO4	Select the solutions to engineering problems for their suitability and sustainability.
CO5	Perform the various types of titrations for quantitative estimation of industrially important materials and gain hands on experience in handling the different types of instruments for chemical analysis.

Mapping of Course Outcomes to Program Outcomes:

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

Sl.No	List of Experiments	Cos
1.	Estimation of iron content in the given solution by potetiometry	**CO1** **CO2** **CO3** **CO4** **CO5**
2.	Determination of pKa value of a weak acid using pH meter Determination	
3.	of percentage of iron in haematite ore.	
4.	Estimation of copper in given solution by Iodometry.	
5.	Determination of % CaO in Cement solution using std EDTA solution	
6.	Determination of viscocity coefficient of given organic liquid.	
7.	Determination of total hardness of water sample by preparing std. EDTA solution	
8.	Determination of chemical oxygen demand (COD) of the given industrial waste sample	
9.	Determination of total alkalinity of a given sample of water using standard Hydrochloric acid.	
10.	Estimation of HCl and CH3COOH in a mixture using std. NaOH by conductometry.	
11.	Estimation of sodium in the given sample by flame photometry.	
12.	Estimation of copper in the given test sample by colorimetry.	

CIE- Continuous Internal Evaluation (25 Marks, lab)

Bloom's Category	Performance (day to day)	Internal test
Marks (out of 25)	**15**	**10**
Remember	03	02
Understand	03	02
Apply	06	04
Analyze	03	02
Evaluate		
Create		

SEE- Semester End Examination Lab (25 Marks)

Bloom's Category	SEE Lab (25)
Remember	5
Understand	5
Apply	10
Analyze	5

PROGRAMMING WITH 'C' LAB

Course Code : 18CSL18/28 **Credits : 2**
L:T:P:S : 0:0:2:0 **CIE Marks : 25**
Exam Hours : 03 **SEE Marks : 25**

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

CO1	Have fundamental knowledge on basics of computers hardware and number systems.
CO2	Demonstrate basic programming skills in the C Programming Language.
CO3	Use different data types in C and able to design programs involving decision structures, loops,arrays, strings and functions.
CO4	Understand the dynamics of memory by the use of pointers and to use different structures and create or update basic data files. 28
CO5	Analysing and understanding of the basic searching and sorting algorithms.
CO6	An understanding of the linear data structures such as stack, queues.

Mapping of Course Outcomes to Program Outcomes :

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

Sl.No	List of Experiments	Cos
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.	**CO2, CO3**
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	**CO2, CO3**
3.	Design and develop a c program to implement simple calculator using switch case statement.	**CO2, CO3**
4.	Draw the flowchart and Write a C Program to compute Sin(x) using Taylor series approximation given by Sin(x) = x - (x3/3!) + (x5/5!) - (x7/7!) + …….	**CO2, CO3**
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*. b. Develop, implement and execute a C program to search a number in a list using linear searching technique.	**CO2, CO3, CO5**
6.	a. Develop, implement and execute a C program to find whether *a given matrix is a sparse matrix or not.* b. write and execute a C program to display pascal triangle using for loop.	**CO2, CO3, CO5**
7.	Write and execute a C program that a. Implement the following string manipulation functions till the user wishes to continue (Infinite loop) (i) Strcpy() (ii) strlen() (iii) Strcmp() (iv) Strrev() (v) Strcat() b. Read a sentence and print frequency of vowels and total count of consonants.	**CO2, CO3, CO5**
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. 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 r nC. Tabulate the results for different values of n and r with suitable messages.	**CO2, CO3, CO5**
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	**CO3, CO4**

	"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.	a.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. Input & print the members of the structure. b. WAP to take two structures HH:MM:SS as T1&T2 and display the time difference as structure as T3.	**CO3, CO4** **CO4, CO6**
11.	Write a C program using pointers to swap two numbers using pass-by-value & pass-by-reference.	

Assessment Method:
CIE- Continuous Internal Evaluation (25 Marks, Lab)

Bloom's Category	**Tests**
Marks (out of 25)	**25**
Remember	3
Understand	3
Apply	5
Analyze	5
Evaluate	5
Create	4

SEE – Semester End Examination (25 Marks - Lab)

Bloom's Category	**Tests(theory)**
Remember	3
Understand	3
Apply	5
Analyze	5
Evaluate	5
Create	4

CONSTITUTION OF INDIA & PROFESSIONAL ETHICS

Course Code	**: 18HSS172/272**	**Credits**	**: 0**
L: T: P: 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:

CO1	Understand the Constitution of India and Engineering Ethics
CO2	Able to solve the legal problems and professional ethical front.

Mapping of Course Outcomes to Program Outcomes:

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

Module No	Contents of Module	Hours	CO
1	**INTRODUCTION TO CONSTITUTION OF INDIA** Introduction to Constitution of India, The making and salient features of the Constitution, Preamble to Indian Constitution. Fundamental Right & Limitation, decided case studies Right to Information Act.	**5**	**CO1 CO2**
2	**DIRECTIVE PRINCIPLES OF STATE POLICY** Directive Principles of State Policy, Fundamental Duties, Union Executive – President, Prime Minister, Parliament and Supreme Court of India.	**4**	**CO1 CO2**
3	**STATE EXECUTIVE** State Executive- Governor, Chief Minister, State Legislature, High Court, Electoral Process in India, Amendment Procedure, 42nd44th,74th,76th,86th,91st Amendments.	**4**	**CO1 CO2**
4	**SPECIAL PROVISION** Special provision for SC & ST, special provision for women, children and backward classes, emergency provision, citizenship, National Human Right Commission**.**	**4**	**CO1 CO2**
5	**SCOPE & AIMS OF ENGINEERING ETHICS** Scope & Aims of Engineering ethics. Responsibility of Engineers, Impediments to responsibility. Risk, safety and liability of Engineers. Corporate Social responsibility.	**5**	**CO1 CO2**

Text Books:

1. Durga Das Basu: “Introduction to the Constitution of India”
2. Charles E. HRIES, Michael S Pritchard and Michael J. Robina Engineering Ethics” Thompson Asia,2003-08-05

Reference Book:

1. M.Givindarajan, S. Natarajan, V.S. Senthil Kumar, “Engineering Ethics”, Prentice-Hall of India, Pvt. Ltd. New Delhi,2004
2. Brij Kishore Sharma, “Introduction to the Constitution of India”, PHILearning Pvt. Ltd., New Delhi,2011
3. K.R. Phaneesh Constitution of India & Professional Ethics-ninth edition 2014

CIE- Continuous Internal Evaluation (25 Marks)

Bloom’s Category	**Test**	**Assignment**
Marks	**20**	**05**
Remember	10	2
Understand	05	2
Apply	05	1

SEE- Semester End Examination (25 Marks)

Bloom’s Category	**Test**
Marks	**25**
Remember	15
Understand	05
Apply	05

PHYSICS CYCLE

APPLIED MATHEMATICS–II

Course Code: 18MAT21 **Credits: 03**
L: T: P: S : 2:1:0:0 **CIE Marks : 50**
Exam Hours : 03 **SEE Marks: 50**

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

CO1	Understand linear differential equations and their applications
CO2	Formulate real world problems using partial differential equations
CO3	Understand the concept of vectors as a tool for solving engineering problems
CO4	Describe the applications of infinite series and obtain series solution of ordinary differential equations
CO5	Apply the basic concepts of Laplace transforms to electrical circuit analysis
CO6	Solve initial and boundary value problems using Laplace transform and also find the response of the system using Laplace transform method

Mapping of Course Outcomes to Program Outcomes:

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

Course Syllabus			
Module No.	**Contents of the Module**	**Hours**	**CO'S**
1	**Linear differential equations of second and higher order:** Solution of second and higher order differential equations. Solution of Cauchy's and Legendre's linear differential equations and variation of parameters method. **Applications**: Simple Harmonic Motion, Simple Pendulum and Electrical Circuits. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO1**
2	**Partial Differential equations:** Formation of partial differential equation by eliminating arbitrary constants and functions**.** Solution of non-homogeneous partial differential equation by direct integration and homogeneous partial differential equation involving derivative with respect to one independent variable. **Applications:** Derivation of one dimensional heat and wave equations and Various possible solutions of heat, Laplace and wave equations by variable separable method. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO2**

3	**Vector Calculus:** Derivative of vector valued functions, Gradient, Divergence, Curl, Solenoidal and Irrotational vector fields- Problems. Vector identities-div(ϕA), curl (ϕA) and Curl(Curl A). **Applications:** Potential functions, line integral, Problems on Gauss, Greens and Stokes (NO verification) and work done-Problems. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO3**
4	**Infinite and Power Series Solution:** Sequences, Series of positive terms, convergence and divergence, comparison tests, D'Alembert's ratio test, Cauchy's root test. Series solution of Bessel's differential equation, Legendre's differential equation, Rodrigue's formula (without proof) and Orthogonality-problems. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO4**
5	**Laplace Transform and Inverse Laplace Transforms:** Definition and Laplace transforms of standard functions. Properties of Laplace transforms: Shifting properties, $t^n f(t)$, $\frac{f(t)}{t}$ forms. Periodic functions, unit-step function and Impulse function-Problems. Inverse Laplace Transform by partial fractions, completing the square method, Problems on Convolution theorem (without proof, verification). **Applications of Laplace Transform :** Solution of linear differential equations and LCR Circuit. **RBT Levels: L1, L2, L3, L4, L5**	**9L + 2T**	**CO5CO6**

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley-India Publishers, 10th Edition,2014, ISBN: 978-81-265-5423-2.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014, ISBN: 978-81-7409-195-5.

Reference Books:

1. Glyn James, Modern Engineering Mathematics, Prentice Hall, 4th Edition, 2015, ISBN: 978-0-273-73409-3
2. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education (India) Private Limited, 4th Edition, 2016, ISBN: 978-0-07-063419-0.
3. H. K. Dass, Advanced Engineering Mathematics, S. Chand & Company Ltd., 28th Edition, 2012, ISBN: 81-219-0345-9.
4. N.P.Bali and Manish Goyal, A Text Book of Engineering Mathematics, Laxmi Publications (P) Ltd., 9th Edition, 2014, ISBN: 978-81-318-0832-0.

Assessment Pattern:

CIE- Continuous Internal Evaluation (50 Marks).

Bloom's Category	Tests (25 Marks)	Assignments (15 Marks)	Quizzes (10 Marks)
Remember	5	5	-
Understand	5	5	-
Apply	5	5	10
Analyze	5	-	-
Evaluate	5	-	-
Create	-	-	-

SEE- Semester End Examination (50 Marks).

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

ENGINEERING PHYSICS

Course Code	**: 18PHY12/22**	**Credits**	**:3**
L:T:P:S	**: 3:0:0:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

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

CO1	Understand the basic concepts of physics as applied to different branches of Engineering and Technology.
CO2	Understand the fundamental concepts of optics using Lasers, optical fibers and their Applications
CO3	Comprehend the underlying principles of dielectrics, magnetic, semiconducting and advanced engineering materials for various applications.
CO4	Apply scientific methods and make use of the experimental methods to verify theoretical concepts.
CO5	Possess the ability to analyze, formulate and solve problems

Mapping of Course Outcomes to Program Outcomes:

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

Course Syllabus			
Module No.	**Contents of the Module**	**Hours**	**Cos**
1	**Modern Physics :** Introduction, dual nature of light, dual nature of matter, de-Brogile hypothesis, matter waves and their characteristic properties , Phase velocity, Group velocity, derivation of relation between group velocity an particle velocity, derivation of de-Broglie wavelength from the concept of Group Velocity, Scanning Electron Microscope **Quantum Mechanics**: Heisenberg's uncertainty principle - statement, significance , application(broadening of spectral lines), wave function, Physical significance of wave function, setting up of Schrodinger Time Independent wave equation in 1 dimension , Eigen values and Eigen functions, Application - Particle in a box (one dimensional) and free particle.	**9**	**CO1** **CO4** **CO5**
	List of Related Experiments 1. Determination of Planck 's constant using LED 2. Stefan's Law: To verify Stefan's Law		
2	**Dielectric Properties:** Dielectric constant, polarization, types, Polarizability, Internal field (Expression for One dimensional solid), Clausius -Mossotti equation (Derivation) – Dielectric loss, Dielectric relaxation, Temperature and frequency dependence of Polarizability, ferroelctrics, application of dielectric materials. **Magnetic Properties:** Introduction, Origin of magnetic moment, Classification of Magnetic materials (dia, para, ferro), Ferromagnetic Domain theory, B-H curve, Soft and hard magnetic materials, application in magnetic storage.	**9**	**CO1** **CO3** **CO4** **CO5**
	List of Related Experiments **1.** B - H Curve: To draw the B – H curve and to determine the coercivity and retentivity of the given ferromagnetic material **2.** Dielectric constant**:** To determine the dielectric constant of given dielectric by charge and discharge method		
3	**Lasers:** Introduction, comparison of Laser and ordinary light, Interaction of radiation with matter, comparison of Spontaneous and stimulated emission, Einstein's A and B coefficients, expression for energy density at thermal equilibrium, conditions and requisites of Laser, characteristics of laser, Types - Nd:YAG laser, CO2 laser, and their applications. **Fiber Optics**: Principle and propagation of light in optical fibers, fabrication of optical fibers: double crucible method, Numerical aperture and Acceptance Angl Types of optical fibers (material, refractive index, mode), attenuation , Application of optical fibers : Fiber Optical Communication system (Block diagram) , Active fiber sensors (Temperature sensor).	**9**	**CO1** **CO2** **CO4** **CO5**

	List of Related Experiments 1. Laser Diffraction : To determine the wavelength of Laser using grating 2. Numerical Aperture: To determine the numerical aperture of Optical Fiber		
4	**Semiconductor Physics:** Introduction (basic definitions such as fermi energy, femi factor, density of states), Types (Purity, band gap), conductivity in an intrinsic semiconductor , derivation for carrier concentration in intrinsic semiconductor(N_e, N_h), expression for intrinsic carrier concentration, from Law of mass action, expression for position of Fermi level in Intrinsic semiconductors , graphical discussion of variation of fermi level with temperature and concentration in **n** and **p** type semiconductors, Hall Effect and expression for Hall coefficient in n and p type semiconductors(derivation) -applications of Hall effect	**9**	**CO1** **CO3** **CO4** **CO5**
	List of Related Experiments 1. Fermi Energy: To determine the Fermi energy of copper. 2. Photodiode Characteristics: To study the V-I characteristics of photo diode for different light intensity in reverse bias condition 3. Zener Diode Characteristics: To study the V-I characteristics of Zener diode and the reverse Zener break down voltage 4. Transistor Characteristics: To study the input and output characteristics of a Transistor in CE configuration and find the gain factor. 5. Energy Gap: To find the energy gap of a given semiconductor. 6. Hall Effect: To measure Hall Coefficient of materials.		
5	**Crystal structure:** Review, Unit cell, Bravais lattice, Seven crystal systems, Miller indices, Interplanar distance-derivation(for a cubic system), SC, BCC, FCC : n, coordination number, APF, Perovskite structure – a qualitative discussion Braggs law, Braggs X-ray diffractometer. **Modern Engineering Materials**: Introduction, Nanomaterials: properties, synthesis approach, PVD, Applications. Composites – Definition, Classification and application, Graphene: properties and application, Biomaterials: Classification of Biomaterials and its applications.	**9**	**CO1** **CO3** **CO4** **CO5**
	List of Related Experiments 1. Determination of lattice parameters using Powder Diffraction pattern.		

Text Book

1. Engineering Physics, S. P. Basavaraju, 2016 Edition, 2015, Subhas Stores
2. A Textbook of Engineering Physics, Gaur and Gupta, 8 th Edition, 2011, DhanpatRai Publishers
3. Engineering Physics, D K Bhattacharya, Poonam Tandon, Oxford university Press, 2015.

Reference Books

1. Engineering Physics, B. K. Pandey and S. Chaturvedi,1st edition, 2012, Cengage Publication
2. Solid State Physics, C Kittel, 8th Edition, 2012, Wiley International
3. Concepts of Modern Physics, Arthur Beiser, 6th Edition, 2009, Tata McGraw Hill,
4. A Textbook of Solid State Physics, S.O. Pillai, 6th Edition, 2010,New Age International
5. Engineering Physics, S. Mani Naidu, 2014, Pearson Publication

Assessment Pattern

CIE- Continuous Internal Evaluation Theory (50 Marks)

Bloom's Category	Tests	Assignment	Quiz	External Co-curricular participation (10 Marks)
Marks (out of 50)	25	10	5	10
Remember	5		02	
Understand	10	04	02	03
Apply	10	06	01	03
Analyze				04
Evaluate				
Create				

SEE- Semester End Examination Theory (50 Marks)

Bloom's Category	**Marks Theory(50)**
Remember	10
Understand	25
Apply	15

ELEMENTS OF MECHANICAL ENGINEERING

Course Code: 18MEE13/23
L:T:P:S -3:0:0:0
Exam Hours: 03

Credits: 03
CIE Marks : 50
SEE Marks : 50

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

CO1	Identify different sources of energy and their conversion process.
CO2	Explain the working principle of hydraulic turbines, pumps,IC engines and refrigeration.
CO3	Recognize various metal joining processes and power transmission elements.
CO4	Understand the properties of common engineering materials and their applications in engineering industry.
CO5	Discuss the working of conventional machine tools, machining processes, tools and accessories.
CO6	Describe the advanced manufacturing systems.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**POI0**	**POII**	**PO12**
CO1	3	2	3	1	2	2	1	1	2	2	2	1
CO2	2	2	3	2	1	1	2	1	2	2	2	1
CO3	2	2	3	2	1	1	2	1	2	2	2	1
CO4	3	3	1	1	1	2	1	1	3	2	2	1
CO5	3	2	3	1	2	2	1	1	2	2	2	1
CO6	2	2	3	2	1	1	2	1	2	2	2	1

MODULES	**hrs**	**COs**
MODULE-I **Sources of Energy :**Definition, classification based on long term availability, commercial applications, traditional use and Usability. Application of energy sources like fossil fuels, hydel, solar, wind, nuclear fuels and bio-fuels; environmental issues like global warming and ozone depletion. **Basic concepts of Thermodynamics:** Introduction, states, concept of work, heat, temperature; Zeroth, 1st, 2nd and 3rd laws of thermodynamics. Concept of internal energy, enthalpy and entropy **Steam:** Formation of steam and thermodynamic properties of steam (simple numericals on steam properties).	**09**	**CO1**
MODULE-II **Boilers:** Introduction to boilers, classification, Lancashire boiler, Babcock and Wilcox boiler. Introduction to boiler mountings and accessories (no sketches). **Hydraulic Pumps**: Introduction to fluid properties, Types and classification of fluids, classification and specification of pumps, reciprocating pump and centrifugal pump, concept of cavitation and priming. **Turbines:** Hydraulic Turbines – Classification and specification, Principles and operation of Pelton wheel turbine, Francis turbine and Kaplan turbine (elementary treatment only).	**09**	**CO2**

MODULE – III **Internal Combustion Engines** Classification, I.C. Engines parts, 2 and 4 stroke petrol and 4-stroke diesel engines. P-V diagrams of Otto and Diesel cycles. Concept of superchargers and turbochargers. Simple problems on indicated power, brake power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency and specific fuel consumption. **Refrigeration and Air conditioning** Refrigeration - Definitions - Refrigerating effect, Ton of Refrigeration, Ice making capacity, COP, relative COP, Unit of Refrigeration. Refrigerants, Properties of refrigerants, List of commonly used refrigerants. Principle and working of vapor compression refrigeration and vapor absorption refrigeration. Domestic refrigerator. Principles and applications of air conditioners, window and split air conditioners, centralized air conditioner.	**08**	**CO2** **CO3**
MODULE IV **Properties, Composition and Industrial Applications of engineering materials** Metals – Ferrous: cast iron, tool steels and stainless steels and nonferrous: aluminum, brass, bronze. Polymers - Thermoplastics and thermosetting polymers. Ceramics - Glass, optical fiber glass, cements. Composites - Fiber reinforced composites, Ceramic Matrix Composites, Polymer Matrix Composites, Cermets, Metal Matrix Composites Smart materials – Piezoelectric materials, shape memory alloys. **Robots:** Robot anatomy, joints and links, common robot configurations. Applications of Robots in material handling, processing and assembly and inspection **Joining Processes: Soldering, Brazing and Welding** Definitions. Classification and methods of soldering, brazing and welding. Brief description of arc welding, oxy-acetylene welding, TIG welding, and MIG welding.	**09**	**CO3** **CO4**
MODULE-V **Lathe** - Principle of working of a center lathe. Parts of a lathe. Operations on lathe - Turning, Facing, Knurling, Thread Cutting, Drilling, Taper turning by Tailstock offset method and Compound slide swiveling method, Specification of Lathe. **Computer Numerical Control (CNC):** Introduction, components of CNC, open loop and closed loop systems, advantages of CNC, CNC Machining centers and Turning centers. **Milling Machine** - Principle of milling, types of milling machines. Working of horizontal and vertical milling machines. Milling processes - plane milling, end milling, slot milling, angular milling, form milling, straddle milling, and gang milling. (Layout sketches of the above machines need not be dealt. Sketches need to be used only for explaining the operations performed on the machines)	**09**	**CO5** **CO6**

Question paper pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have **ten** full questions carrying equal marks.
- Each full question consisting of **20** marks.
- There will be **two** full questions (with a **maximum** of **three** sub questions) from each module.
- Each full question will have sub question covering all the topics under a module.
- The students will have to answer **five** full questions, selecting **one** full question from each module.

Note

- To illustrate the concepts of operations of turbines, pumps, conventional machines like lathe, drilling, milling, grinding etc., the instructions should be blended with video presentations and visit to the laboratories/ machine shop concerned.
- Demonstration of soldering, brazing and welding should be arranged in the workshop.
- To illustrate the fundamentals of CNC machining and turning centers and robots, video presentations should be adapted in addition to class room instructions.
- The boiler mountings and accessories should be shown in the engine lab.
- Assignments should be submitted by students on materials, sources of energy, global warming, welding processes, robots and their applications. These assignments should be given due credit in awarding CIE marks.

TEXT BOOKS

1. **Elements of Mechanical Engineering,** K. R. Gopalakrishna, Subhas Publications, Bangalore, 2017, ISBN-13: 5551234091781
2. **Elements of Mechanical Engineering,** Vol.-1 & 2, Hajra Choudhury, Media Promoters, New Delhi, 2015, ISBN-13: 9780906216064
3. **A Text Book of Elements of Mechanical Engineering",** S. Trymbaka Murthy, 3rd revised edition, I .K. International Publishing House Pvt. Ltd., New Delhi, 2011, ISBN-13: 9789380578576

REFERENCE BOOKS

1. **Elements of Mechanical Engineering,** R.K. Rajput, Lakshmi Publications, 2014, ISBN-13: 9788170082354
2. **Elements of Mechanical Engineering,** Dr. A. S. Ravindra, Best Publications, 8th edition, 2011, ISBN-13: 9788131514399
3. **CAD/CAM/CIM,** Dr. P Radhakrishnan, 4th edition, New Age International Publishers, New Delhi, 2018, ISBN-13: 9788122439809
4. **Introduction to Robotics: Mechanics And Control,** Craig, J. J., 4th Ed., Pearson Publishing Company, 2017, ISBN-13: 9780133489798
5. **Introduction to Engineering Materials",** B.K. Agrawal ,Tata McGraHill Publication, New Delhi, 2017, ISBN-13: 9780074515051
6. **Thermal Science and Engineering",** Dr. D.S. Kumar, S.K. Kataria& sons Publication, Delhi, 2014, ISBN-13: 9789350144282

Assessment Pattern

CIE-Continuous Internal Evaluation

Bloom's Category	Tests	Assignment		Quiz	Co-curricular
		1	2		
Marks(out of50)	**25**	**5**	**5**	**5**	**10**
Remember	10		5		
Understand	10	5			
Apply	5			5	
Analyze					10
Evaluate					
Create					

SEE-Semester End Examination

Blooms' Category	MARKS
Remember	15
Understand	15
Apply	10
Analyze	10
Evaluate	
Create	

ELEMENTS OF CIVIL ENGINEERING

Course Code :	**18CIV14/24**	**Credits CIE**	**: 03**
L:T:P:S	**: 3:0:0:0**	**Marks SEE**	**: 50**
Exam Hours	**: 3 Hours**	**Marks**	**: 50**

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

CO1	Understand action of forces, moments and other loads on systems of rigid bodies
CO2	Determine the reactive forces and the effects due to external loads
CO3	Locate the centroid and compute the moment of inertia of regular cross sections
CO4	Express the relationship between the motion of bodies and analyze simple determinate trusses

Mapping of Course Outcomes to Program Outcomes:

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

Module No	Contents of Module	Hrs	Co's
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	CO1
	(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.	6	
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.	4	CO1, CO2
	(B) 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.	4	
3	(A) 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	CO2, CO3
	(B) 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	
4	(A) 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.	5	CO3, CO4
	(B) 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.	4	
5	(A) **Kinetics-** Newtons second law of motion and D'Alemberts principle for rectilinear motion of a particle, Numerical problems.	4	CO4

	(B) **Kinematics** Definitions, Displacement, average velocity Instantaneous velocity Speed– Acceleration - Average acceleration – Variable acceleration, Acceleration due to gravity – Newton's Laws of Motion.	**5**	

TEXT BOOKS

1. Elements of Civil Engineering and Engineering Mechanics by M.N. Shesha Prakash and Ganesh. B. Mogaveer, PHI Learning, 3rdRevised edition (2014)
2. Engineering Mechanics-Statics and Dynamics by A Nelson, Tata McGraw Hill Education Private Ltd, New Delhi, 2009.
3. Elements of Civil Engineering (IV Edition) by S.S. Bhavikatti, New Age International Publisher, New Delhi, 3rd edition 2009

REFERENCE BOOKS

1. Engineering Mechanics by S.Timoshenko, D.H.Young, and J.V.Rao, TATA McGraw-Hill Book Company, New Delhi.
2. Beer FP and Johnson ER, "Mechanics for Engineers- Dynamics and Statics"- 3rd SI Metric edition, Tata McGraw Hill. – 2008.
3. Shames IH, "Engineering Mechanics – Statics & Dynamics"- PHI – 2009.

CIE Continuous Internal Evaluation (Theory 50 Marks)

Blooms Category	Tests	Assignment	Quiz	External Co-curricular participation (10 Marks)
Marks out of 50	25	10	5	10
Remember	2	1	1	
Understand	7	3	2	
Apply	13	4	2	10
Analyse	3	2	-	
Evaluate	-	-	-	
Create	-	-	-	

SEE-Semester End Examinations (Theory 50 Marks)

Blooms Category	**Marks**
Remember	10
Understand	10
Apply	20
Analyze	10

Percentage Evaluation of Various Bloom's levels

Bloom's Category	**CIE**	**SEE**	**TOTAL**	**%**
Remember	4	10	14	15
Understand	12	10	22	24
Apply	29	20	49	42
Analyze	5	10	15	19
Evaluate	-	-	-	-
Create	-	-	-	-
TOTAL	**50**	**50**	**100**	**100**

BASIC ELECTRICAL ENGINEERING

Course Code	**: 18EEE15/25**	**Credits**	**: 3**
L: T: P: S	**: 3:0:0:0**	**CIE Marks**	**: 50**
Exam Hours	**: 03**	**SEE Marks**	**: 50**

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

CO1	Understand the definitions, derivations, principles involved in electric and magnetic circuits.
CO2	Apply ohm's law, KCL, KVL & laws in electromagnetism to find unknowns in electric & magnetic circuits
CO3	Evaluate problems in single and three phase star-delta connected system, 1 phase transformers, 3 phase induction motor and dc machines
CO4	Analyze construction, basic principle of operation and performance characteristics of electrical machines and measuring instruments
CO5	Analyze protective devices, precautions against shock, Earthing and wiring techniques

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
EEE25.1	3	3	-	-	-	-	-	-	-	-	-	-
EEE25.2	3	3	2	1	1	1	-	3	-	-	-	2
EEE25.3	3	3	2	1	1	-	1	3	-	-	-	2
EEE25.4	3	3	2	1	1	-	-	3	-	-	-	2
EEE25.5	3	3	2	1	1	1	1	3	-	-	-	2

SYLLABUS			
Module	**Contents of the Module**	**Hours**	**COs**
1	**Electric Elements & Circuits Laws:** Charge and electric forces, voltage, current. Ohm's law – Resistance, Specific Resistance, Conductivity, Temperature coefficient of resistance and resistor color coding, Kirchhoff's voltage law and current law. Characteristics of series and parallel circuits. Current divider and voltage divider rules. Equivalent resistance of series and parallel circuits, definitions of work, power, energy and heating effects of electrical current **Circuit Theorems:** Superposition, Thevenin's and Norton's theorems, Maximum power transfer theorem (Only Statement and Proof- Problems Excluded) **List of Related Experiments:** 1. Verification of Kirchhoff's Voltage and Current law. 2. Verification of Superposition Theorem 3. Verification of Thevenin's and Norton's Theorem 4. Verification of Maximum Power Transfer Theorem	**10**	**EEE25.1, EEE25.2**
2	**Magnetic Fields:** Faradays law, Induced EMF- 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 Inductor. **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. Applications. **List of Related Experiments:** 5. Speed Control of DC Shunt Motor 6. Load Test on DC Shunt Motor	**10**	**EEE25.1, EEE25.2, EEE25.3, EEE25.4**
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. **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. **List of Related Experiments:** 7. Measurements of Electrical Quantities- Voltage, Current, Power and Power Factor in RLC Circuit. 8. Load Test on Single Phase Transformer.	**10**	**EEE25.1, EEE25.2, EEE25.3**

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 and power factor by using Two Watt Meter method. **Domestic wiring:** Brief discussion on concealed conduit wiring. Two-way and three-way control of lamps, Electric shock: precautions against shock, Protective devices – fuses, MCB's, Earthing – importance, pipe earthing, plate earthing. **List of Related Experiments:** 9. Measurement of 3ϕ Power using two Wattmeter method. 10. Residential House Wiring using Switches, Fuse, Indicator and Lamp. 11. Types of Wiring (Staircase and Fluorescent Wiring) 12. Study of Earthing and Measurement of Earthing Resistance using Megger. 13. Study of Circuit Protective Devices (MCB, Earth Leakage Relay and Fuse)	**7**	**EEE25.1, EEE25.2, EEE25.3, EEE25.4, EEE25.5**
5	**Induction Machines:** Three- phase induction motor, production of rotating magnetic field, construction and principles of operation, types of Rotor, slip and its significance, necessity of starter, applications. **Measuring Instruments:** Construction and Principle of operation of dynamometer type wattmeter and single phase induction type energy meter. **List of Related Experiments:** 14. Study and troubleshooting of Electrical Equipment (Fan, Iron Box and Mixer) 15. Speed control of 1 ϕ Induction motor using VFD and to measure F, V & I using DSO.	**7**	**EEE25.1, EEE25.3, EEE25.4**

TEXT BOOK:

1. "Basic Electrical Engineering", DC Kulshreshtha, TMH, Revised 1st edition, 2017. ISBN-13: 978-0071328968
2. "Basic Electrical and Electronics Engineering", S.K. Bhattacharya, Pearson Publications, 2016 . ISBN-13: 978-8131505564

REFERENCE BOOKS:

1. E. Hughes, "Electrical Technology", Pearson publishers. Latest edition, 2016, ISBN-13: 978-0582226968
2. "Basic Electrical, Electronics and Computer Engineering", Muthusubramanian R, Salivahanan S and Muraleedharan K A, Tata McGraw Hill, Latest Edition, 2016. ISBN-13: 978-0074622766
3. "Basics of Electrical and Electronics Engineering", Nagsarkar T K and Sukhija M S, Oxford press University Press. 2016. ISBN-13: 978-0198081807S.Parker Smith & N N Parker Smith, "Problems in Electrical Engineering".

4. S. Parker Smith & N N Parker Smith, “Problems in Electrical Engineering”. 9th edition, 2016. ISBN: 9788123908588
5. Electrical Technology B.L Theraja, S. Chand publication, Vol 1, 2015, ISBN-13: 978-8121924412

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom’s Category	Tests	Assignments	Quiz	Co-curricular Participation
Marks (out of 50)	25	10	5	10
Remember	5			
Understand	10			
Apply	5	5	5	5
Analyze	5	5		5
Evaluate				
Create				

SEE- Semester End Examination (50 Marks)

Bloom’s Category	Tests
Remember	10
Understand	10
Apply	15
Analyze	**15**
Evaluate	
Create	

ENGINEERING PHYSICS LAB

Course Code	**: 18PHL16/26**	**Credits**	**:2**
L:T:P:S	**: 0:0:2:0**	**CIE Marks**	**: 25**
Exam Hours	**: 03**	**SEE Marks**	**: 25**

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

CO1	Understand the basic concepts of physics as applied to different branches of Engineering and Technology.
CO2	Understand the fundamental concepts of optics using Lasers, optical fibers and their Applications
CO3	Comprehend the underlying principles of dielectrics, magnetic, semiconducting and advanced engineering materials for various applications.
CO4	Apply scientific methods and make use of the experimental methods to verify theoretical concepts.
CO5	Possess the ability to analyze, formulate and solve problems

Mapping of Course Outcomes to Program Outcomes:

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

Sl.No	List of Experiments	Cos
1.	Determination of Planck 's constant using LED	**CO1** **CO2** **CO3** **CO4** **CO5**
2.	Stefan's Law: To verify Stefan's Law	
3.	B - H Curve: To draw the B – H curve and to determine the coercivity and retentivity of the given ferromagnetic material	
4.	Dielectric constant**:** To determine the dielectric constant of given dielectric by charge and discharge method	
5.	Laser Diffraction : To determine the wavelength of Laser using grating	
6.	Numerical Aperture: To determine the numerical aperture of Optical Fiber	
7.	Fermi Energy: To determine the Fermi energy of copper.	
8.	Photodiode Characteristics: To study the V-I characteristics of photo diode for different light intensity in reverse bias condition	
9.	Zener Diode Characteristics: To study the V-I characteristics of Zener diode and the reverse Zener break down voltage	
10.	Transistor Characteristics: To study the input and output characteristics of a Transistor in CE configuration and find the gain factor.	
11.	Energy Gap: To find the energy gap of a given semiconductor.	
12.	Hall Effect: To measure Hall Coefficient of materials.	
13.	Determination of lattice parameters using Powder Diffraction pattern.	

CIE- Continuous Internal Evaluation Lab (25 Marks)

Bloom's Category	**Performance (day to day)**	**Internal test**
Marks (out of 25)	**10**	**15**
Remember	02	02
Understand	03	03
Apply	03	05
Analyze	02	05
Evaluate		
Create		

SEE- Semester End Examination Lab (25 Marks)

Bloom's Category	**Lab(25)**
Remember	05
Understand	10
Apply	05
Analyze	03
Evaluate	02
Create	

BASIC ELECTRICAL ENGINEERING LAB

Course Code	**: 18EEL17/27**	**Credits**	**: 2**
L: T: P: S	**: 0:0:2:0**	**CIE Marks**	**: 25**
Exam Hours	**: 03**	**SEE Marks**	**: 25**

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

CO1	Understand the definitions, derivations, principles involved in electric and magnetic circuits.
CO2	Apply ohm's law, KCL, KVL & laws in electromagnetism to find unknowns in electric & magnetic circuits
CO3	Evaluate problems in single and three phase star-delta connected system, 1 phase transformers, 3 phase induction motor and dc machines
CO4	Analyze construction, basic principle of operation and performance characteristics of electrical machines and measuring instruments
CO5	Analyze protective devices, precautions against shock, Earthing and wiring techniques

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
EEE25.1	3	3	-	-	-	-	-	-	-	-	-	-
EEE25.2	3	3	2	1	1	1	-	3	-	-	-	2
EEE25.3	3	3	2	1	1	-	1	3	-	-	-	2
EEE25.4	3	3	2	1	1	-	-	3	-	-	-	2
EEE25.5	3	3	2	1	1	1	1	3	-	-	-	2

Sl.No	List of Experiments	COs
1.	Verification of Kirchhoff's Voltage and Current law.	**CO1, CO2**
2.	Verification of Superposition Theorem	**CO1, CO2**
3.	Verification of Thevenin's and Norton's Theorem	**CO1, CO2**
4.	Verification of Maximum Power Transfer Theorem	**CO1, CO2**
5.	Speed Control of DC Shunt Motor	**CO1, CO3, CO4**
6.	Load Test on DC Shunt Motor	**CO1, CO3, CO4**
7.	Measurements of Electrical Quantities- Voltage, Current, Power and Power Factor in RLC Circuit.	**CO1, CO3**
8.	Load Test on Single Phase Transformer.	**CO1, CO2, CO3**
9.	Measurement of 3ϕ Power using two Wattmeter method.	**CO1, CO3**
10.	Residential House Wiring using Switches, Fuse, Indicator and Lamp.	**CO1, CO3, CO4, CO5**
11.	Types of Wiring (Staircase and Fluorescent Wiring)	**CO1, CO3, CO4, CO5**
12.	Study of Earthing and Measurement of Earthing Resistance using Megger.	**CO1, CO3, CO4, CO5**
13.	Study of Circuit Protective Devices (MCB, Earth Leakage Relay and Fuse)	**CO1, CO3, CO4, CO5**
14.	Study and troubleshooting of Electrical Equipment (Fan, Iron Box and Mixer)	**CO1, CO3, CO4, CO5**
15.	Speed control of 1 ϕ Induction motor using VFD and to measure F, V & I using DSO.	**CO1, CO2, CO3**

CIE- Continuous Internal Evaluation Lab (25 Marks)

Bloom's Category	**Performance (day to day)**	**Internal test**
Marks (out of 25)	**10**	**15**
Remember	02	02
Understand	03	03
Apply	03	05
Analyze	02	05
Evaluate		
Create		

SEE- Semester End Examination Lab (25 Marks)

Bloom's Category	**Lab(25)**
Remember	05
Understand	10
Apply	05
Analyze	03
Evaluate	02
Create	

ESSENTIAL ENGLISH (Mandatory Course)

Course Code	**: 18HSS171/271**	**Credits**	**: 00**
L:T:P: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:

CO1	Grasp the ability to comprehend the meaning/vocabulary and use language in the most appropriate manner
CO2	Enhance competencies in written and oral communication skills

Mapping of Course Outcomes to Program Outcomes:

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

Module	**Contents of the Module**	**Hour**	**COs**
1	Introduction to English Grammar, Importance of Grammar, Parts of Speech, Usage of Prepositions, Articles, Wh Questions, Punctuation, One Word Substitution **Practice Session:** Speaking: Speaking about one's place, important festivals etc- Introducing oneself, one's family/friend/. Reading- Skimming a passage, Scanning for specific information, Free writing on a given topic (My favourite place/hobbies/college life) Email writing.	**05**	**CO1,C02**
2	Tenses and Degrees of Comparison, Active and Passive Voice, Vocabulary Building **Practice Session**: Listening- Listening and responding to video lecture/talks. Speaking – Describing a simple process (filling up of forms) Asking and answering questions- Telephone skills-Telephone etiquette.	**05**	**C01,C02**
3	Subject Verb Agreement, Idioms and Phrases, Homonyms, Homophones, spelling- Writing- Jumbled sentences **Practice Session**: Listening – Listening to a specific task, Speaking- Role play – Simulation- Group Interaction- speaking in formal situations (teachers and officials)	**04**	**C01,C02**
4	Collocations, Common errors In English, Dialogue Writing, Direct and Indirect speech **Practice Session:** Listening – watching videos/documentaries and responding to questions based on them. Role play to improve Dialogues.	**04**	**C01,C02**
5	Essay Writing, Creative writing. **Practice Session:** Topics will be given to improve writing skills	**04**	**C01,C02**

Text Books:

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

Reference Books:

1. 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.
2. Wren, P.C.; Martin, H., A Final Course of Grammar & Composition, S Chand.

Assessment Pattern:

CIE- Continuous Internal Evaluation (25 Marks)

Bloom's Category	Tests	Assignments	Presentation
Marks(out of 25)	**10**	**10**	**5**
Remember	1	-	-
Understand	2	-	-
Apply	3	5	-
Analyse	2	-	-
evaluate	-	-	-
create	2	5	5

SEE – Semester End Examination (50 Marks)

Bloom's Category	Tests
Remember	10
Understand	15
Apply	10
Analyze	-
Evaluate	-
Create	15

Program Outcomes

B. E graduate should posses the following program outcomes.
1. Engineering knowledge : Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of The engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.