SYLLABUS

SITE21 Regulation

For

I B.Tech.

all Branches

With effective from the Academic Year

2021-2022

I B.Tech I Semester Course Structure SITE21 Regulations						
Common for CSE,ECE &IT						
S.N	Subject Code	Course	L	T	P	C
1	21CMEGT1010	Technical English	3	0	0	3
2	21CMMAT1020	Engineering Mathematics-I	3	0	0	3
3	21CMEET1030	Basic Electrical Engineering	3	0	0	3
4	21CMCST1040	Programming for Problem Solving	3	0	0	3
5	21CSMEL1050 21ECMEL1050 21ITMEL1050	Computer Aided Engineering Graphics	2	0	2	3
6	21CMEGL1060	English Communication Skills Lab	0	0	3	1.5
7	21CMEEL1070	Basic Electrical Engineering Lab	0	0	3	1.5
8	21CMCSL1080	Programming for Problem Solving Lab	0	0	3	1.5
9	21CMESN1090	Environmental Science	2	0	0	0
TOTAL			**16**	**0**	**11**	**19.5**

I B.Tech II Semester Course Structure SITE21 Regulations						
Common for CSE,ECE,IT						
S.N	Subject code	Course	L	T	P	C
1	21CMMAT2010	Engineering Mathematics - II	3	0	0	3
2	21CSPHT2020 21ECPHT2020 21ITPHT2020	Engineering Physics	3	0	0	3
3	21CMCHT2030	Engineering Chemistry	3	0	0	3
4	21CMCST2040	Python Programming	3	0	0	3
5	21ECECT2050	Network Analysis	3	0	0	3
5	21CSCST2050 21ITITT2050	Data Structures	3	0	0	3
6	21CSPHL2060 21ECPHL2060 21ITPHL2060	Engineering Physics Lab	0	0	3	1.5
7	21CMEEL2070	Engineering Chemistry Lab	0	0	3	1.5
8	21ECMEL2080	Engineering Workshop	0	0	3	1.5
8	21CSCSL2080 21ITITL2080	Data Structures Lab	0	0	3	1.5
9	21CMMSN2090	Constitution of India, Professional Ethics & Human Rights	2	0	0	0
TOTAL			**16**	**0**	**11**	**19.5**

I B.Tech I Semester Course Structure SITE21 Regulations						
Common for AI&ML,CE,CST,ECT, EEE, ME						
SN	Subject Code	Course	L	T	P	C
1	21CMMAT1010	Engineering Mathematics – I	3	0	0	3
2	21AMPHT1020 21CEPHT1020 21CTPHT1020 21ETPHT1020 21EEPHT1020 21MEPHT1020	Engineering Physics	3	0	0	3
3	21CMCHT1030	Engineering Chemistry	3	0	0	3
4	21CMCST1040	Programming for Problem Solving	3	0	0	3
5	21AMMEL1050 21CTMEL1050 21ETMEL1050	Computer Aided Engineering Graphics	2	0	2	3
5	21CEMEL1050 21EEMEL1050 21MEMEL1050	Engineering Graphics	2	0	2	3
6	21AMPHL1060 21CEPHL1060 21CTPHL1060 21ETPHL1060 21EEPHL1060 21MEPHL1060	Engineering Physics Lab	0	0	3	1.5
7	21CMCHL1070	Engineering Chemistry Lab	0	0	3	1.5
8	21CMCSL1080	Programming for Problem Solving Lab	0	0	3	1.5
9	21CMMSN1090	Constitution of India, Professional Ethics & Human Rights	2	0	0	0
TOTAL			**16**	**0**	**11**	**19.5**

I B.Tech II Semester Course Structure SITE21 Regulations						
Common for AI &ML,CE, CST,ECT,EEE &ME						
S.N	Subject Code	Course	L	T	P	C
1	21CMEGT2010	Technical English	3	0	0	3
2	21CMMAT2020	Engineering Mathematics – II	3	0	0	3
3	21CMEET2030	Basic Electrical Engineering	3	0	0	3
4	21CMCST2040	Python Programming	3	0	0	3
5	21ETETT2050	Network Analysis	3	0	0	3
5	21AMAMT2050 21CTCTT2050	Data Structures	3	0	0	3
5	21CEMET2050 21EEMET2050 21MEMET2050	Engineering Mechanics	3	0	0	3
6	21CMEGL2060	English Communication Skills Lab	0	0	3	1.5
7	21CMEEL2070	Basic Electrical Engineering Lab	0	0	3	1.5
7	21AMAML2070 21CTCTL2070	Data Structures Lab	0	0	3	1.5
8	21CEMEL2080 21EEMEL2080 21ETMEL2080 21MEMEL2080	Engineering Workshop Lab	0	0	3	1.5
9	21CMCHN2090	Environmental Science	2	0	0	0
TOTAL			**16**	**0**	**11**	**19.5**

<table>
<tr><td colspan="4">TECHNICAL ENGLISH
SEMESTER I/II</td></tr>
<tr><td>Subject Code</td><td>21CMEGT1010/2010</td><td>IA Marks</td><td>30</td></tr>
<tr><td>Number of Lecture Hours/ Week</td><td>03</td><td>Exam Marks</td><td>70</td></tr>
<tr><td>Total Number of Lecture Hours</td><td>50</td><td>Exams Hours</td><td>03</td></tr>
<tr><td colspan="4">Credits -03</td></tr>
<tr><td colspan="4">Course Objectives:
To enable the students to learn and apply fundamental principles in Technical English & Communication by focusing on:
1. Technical English Vocabulary
2. Writing Skills
3. Common Errors in Writing
4. Nature and Style of Sensible Technical Writing
5. Writing Technical Reports and Letters</td></tr>
<tr><td colspan="4">Unit I</td></tr>
<tr><td colspan="3">Principles of Scientific Vocabulary
• Principles of Scientific vocabulary: short and simple words-compact substitutes for wordy phrases- redundant words and expressions- Avoid hackneyed and stilted phrases, verbosity and incorrect use of words
• The role of roots in word building, prefixes and suffixes, confusing words and expressions.</td><td>10 hours</td></tr>
<tr><td colspan="4">Unit II</td></tr>
<tr><td colspan="3">Writing Skills
• Distinguishing between academic and personal styles of writing
• Use of clauses in technical phrases and</td><td>10 hours</td></tr>
</table>

sentences • Techniques of Sentence and paragraph writing • Measuring the clarity of a text through Fog Index or Clarity Index	
Unit III	
Common Errors in Writing • Subject-verb agreement and concord of nouns, pronouns and possessive adjectives • Common errors in the use of articles, prepositions, adjectives and adverbs • Punctuation • Technical Guidelines for Communication • Avoiding the pitfalls	10 hours
Unit IV	
Nature and Style of Sensible Technical Writing • Academic Writing Process • Describing, processes and products • Defining, Classifying • Effective use of charts, graphs, and tables	10 hours
Unit V	
Report writing and Letter writing • Writing Technical Reports, Précis writing ,Letter Writing & Essay writing	10 Hours
COURSE OUTCOMES On Completion of the course student will acquire 1. Ability to understand Scientific vocabulary and use them confidently 2. Familiarity with the basic principles of writing clear sentences and paragraphs 3. Ability to write error free simple technical passages 4. Knowledge of writing different writing styles 5. Confidence to write letters and technical reports clearly	

and coherently

Question paper pattern:

1. Question paper consists of 10 questions.
2. Each full question carrying 14 marks.
3. Each full question will have sub question covering all topics under a unit.
4. The student will have to answer 5 full questions selecting one full question from each unit.

Text Books

1. **Effective Technical Communication by Barun K Mitra**, Oxford University Publication

Non-detailed Text

1. **Karmayogi: A Biography of E Sreedharan by M S Ashokan**

Reference Books

1. *Communication Skills* by Sanjay Kumar & Pushpa Latha, OUP
2. Study Writing by Liz Hamp-Lyons and Ben Heasly, Cambridge University Press.
3. Remedial English Grammar by F T Wood, Macmillian 2007
4. *Practical English Usage* by Michael Swan Oxford University Press
5. *English Collocations in Use* by Michael McCarthy & Felicity O'Dell
6. *Effective Technical Communication* by Arsahf Rizvi,
7. *Essential English Grammar by Raymond Murphy, CUP, 2017*

Unit	Title	Text books/Reference Books
I	Principles of Scientific Vocabulary	Text Book 1/Reference Book 5
II	Writing Skills	Text Book 1Reference Book 2 Reference Book 6
III	Common Errors in Writing	Text Book 1,Reference Book 3 Reference Book 4,Reference Book 7
IV	Nature and Style of Sensible Technical Writing	Text Book 1,Reference Book 1 Reference Book 2
V	Report writing and Letter writing	Text Book 1,Reference Book 1 Reference Book 2

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
1	-	-	-	-	-	-	-	-	-	**2**	-	-
2	-	-	-	-	-	-	-	-	-	**2**	-	-
3	-	-	-	-	-	-	-	-	-	**2**	-	-
4	-	-	-	-	-	-	-	-	-	**2**	-	-
5	-	-	-	-	-	-	-	-	-	**2**	-	-
6	-	-	-	-	-	-	-	-	-	**2**	-	-

ENGINEERING MATHEMATICS-I (Calculus & Differential Equations) Common to all the branches SEMESTER I			
Subject Code	21CMMAT1010/1020	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
		Credits – 03	

Course Objectives:

1. To solve the differential equations related to various engineering fields
2. To enlighten the learners in the concept of differential equations.
3. To familiarize with functions of several variables which is useful in optimization
4. To solve the partial partial differential equations of first order
5. To apply double integration techniques in evaluating areas bounded by region.

Unit -1	**Hours**
Differential Equations of first order and first degree : Linear differential equations - Bernoulli's equations – Exact equations and Equations reducible to exact form. Applications: Newton's law of cooling - Law of natural growth and decay - Orthogonal trajectories.	**10**
Unit -2	
Linear differential equations of higher order: Homogeneous and Non-homogeneous differential equations of higher order with constant coefficients – with non-homogeneous term of the type e^{ax}, sin ax, cos ax, polynomials in x^n, e^{ax} V(x) and x^n V(x) – Method of Variation of parameters. Applications: LCR circuit.	**10**

Unit – 3	
Partial differentiation: Introduction – Homogeneous function – Euler's theorem– Total derivative– Chain rule– Jacobian – Functional dependence –Taylor's and MacLaurin's series expansion of functions of two variables. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method.	**10**
Unit – 4	
PDE of first order: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations.	**08**
Unit – 5	
Multiple integrals: Double and Triple integrals – Change of order of integration in double integrals – Change of variables to polar, cylindrical and spherical coordinates. Applications: Finding Areas and Volumes.	**12**
Course outcomes: On completion of this course, students are able to 1. Solve the differential equations related to various engineering fields (L3) 2. Solve the differential equations of higher order related to various engineering fields (L3) 3. familiarize with functions of several variables which is useful in optimization (L3) 4. Solve the partial partial differential equations of first order (L3) 5. Apply double integration techniques in evaluating areas bounded by region (L3).	
Question paper pattern: 1. Question paper consists of 10 questions. 2. Each full question carrying 14 marks. 3. Each full question will have sub question covering all	

topics under a unit.

4. The student will have to answer 5 full questions selecting one full question from each unit.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44th Edition, Khanna Publishers.
2. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2. Joel Hass, Christopher Heil and Maurice D. Weir, Thomas calculus, 14thEdition, Pearson.
3. Lawrence Turyn, Advanced Engineering Mathematics, CRC Press, 2013.
4. Srimantha Pal, S C Bhunia, Engineering Mathematics, Oxford University Press.

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

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

BASIC ELECTRICAL ENGINEERING SEMESTER I/ II **(Common to All)**			
Subject Code	21CMEET103 0/2030	IA Marks	30
Number of Lecture Hours/Week	3L + 1T	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits-03			
Course Objectives: This course will enable student to 1. Understand basic electrical circuit operation. 2. Understand the concept of Alternating Voltage and Current. 3. Understand the operation of DC machines. 4. Understand the working of measuring instruments. 5. Understand the operation of different types of ac machines. 6. Understand the concept of Electrical Safety.			
Unit -1z			**Hours**
Basic Electrical Circuits: Basic definitions(Electric Charge, Current, Electro Magnet Force, Potential Difference; Electric Power and Energy) – types of network elements – Ohm's Law – Kirchhoff's Laws –series & parallel circuits - network theorems (Super position, Thevinen's, Norton's, Maximum power transfer theorems)			**10**
Unit -2			
AC Fundamentals & Basic Electromagnetic Laws: Study of AC Voltage and Current, RMS and Average Values, Three phase Star-Delta connections, Alternating Voltage applied to Pure Resistance, Inductance, Capacitance and their combinations, Concept of Power and Power Factor in AC Circuit. Concept of Magnetic Field, Magneto Motive Force (MMF), Permeability; Self and Mutual Induction, Basic Electromagnetic laws,			**10**

Unit – 3	
DC Machines: DC Machine -Principle of operation & construction – emf equation- torque equation - speed control methods – losses and efficiency – brake test. Applications of DC motors.	**10**
Unit – 4	
AC Machines: Single Phase Transformers - Construction and Operation- Principles - Classification - Applications-OC & SC test of single phase transformer-regulation & Efficiency. Three Phase Induction Motors: working principle- construction, speed- torque characteristics- losses and efficiency.	**10**
Unit – 5	
Electrical Safety: Electrical Shock and Precautions against it, Treatment of Electric Shock; Concept of Fuses and Their Classification, Selection and Application; Concept of Earthing.	**10**
Course Outcomes: The student should be able to 1. Understand basic electrical circuit operation. 2. Understand the concept of Alternating Voltage and Current. 3. Understand the operation of DC machines. 4. Understand the working of measuring instruments. 5. Understand the operation of different types of ac machines. 6. Understand the concept of Electrical Safety.	
Question paper pattern: 1. Question paper consists of 10 questions. 2. Each full question carrying 14 marks. 3. Each full question will have sub question covering all topics under a unit. 4. The student will have to answer 5 full questions selecting one full question from each unit.	

Text Books: i. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor &Francis Group. ii. Principles of Electrical Machines by V.K. Mehta & Rohit Mehta, S.Chand and Company Limited.	
Reference Books: i. Theory and Performance of Electrical Machines by J.B. Gupta, S.K.Kataria & Sons. ii. A Textbook of Electrical Technology – Volume II: AC & DC Machines by B.L.Theraja & A.K. Theraja, S.Chand and Company Limited. iii. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition. iv. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah, TMH Publications v. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition. vi. Electrical Technology by Surinder Pal Bali, Pearson Publications.	

COURSE-OUTCOMES-TO-PROGRAM-OUTCOMES-MAPPING:

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	2	2	1									
CO2	2	2	1									
CO3	2	2	1									
CO4	2	2	1									
CO5	2	2	1									
CO6	2	2	1									
Overall Course	**2**	**2**	**1**									

PROGRAMMING FOR PROBLEM SOLVING SEMESTER I (Common to All)			
Subject Code	21CMCST1040	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 03			

COURSE OBJECTIVES:

The Objectives of Programming for problem solving are:

- To learn about C programming language syntax, semantics, and the runtime environment
- To be familiarized with general computer programming concepts like data types,conditionalstatements, loops and functions.
- To be familiarized with general coding techniques and procedure-oriented programming.

Unit -1	**Hours**
History & Hardware: (TB 1: 1-22) Computer Hardware, Components, Types of Software, Memory Units.**Introduction to Problem solving**: (TB1:33-50) Algorithm, Characteristics of Algorithms, Pseudo Code, Flowchart, Types of Languages, Relation between Data, Information, Input and Output. **Basics of C**: (TB1:58-67)History and Features of C, Importance of C, Procedural Language, Compiler versus Interpreter, Structure of C Program, Program Development Steps, Programming Errors.	**10**
Unit -2	
Overview of C: (TB:68-125) Character Set, C-Tokens, Data Types, Variables, Constants, Operators, Operator Precedence and Associativity, Evaluation of C-Expressions, Input/output Functions. **Conditional Branching: (TB1:143-152)** if statement, if...else statement, Nested if...else	**10**

statement, If…else…if ladder, switch statement. **Unconditional Branching: (TB1:174-175)** go to**. Control flow Statements:** break, continue**. Looping Constructs:** (TB1:156-170) do-while statement, while statement, for statement	
Unit -3	
Arrays: (TB1:188-222) Introduction,1-DArrays,Character arrays and string representation, 2-D Arrays(Matrix), Multi-Dimensional Arrays. **Strings**: Working with Strings, String Handling Functions (both library and user defined). **Functions:** (TB1:230-260) Basics, Necessity and Advantages, Types of Functions, Parameter Passing Mechanisms, Recursion, Storage Classes, Command Line Arguments, Conversion from Recursion toIteration and Vice-Versa.	**10**
Unit -4	
Pointers: (TB1:288-347) Understanding Pointers, Pointer Expressions, Pointer and Arrays, Pointers and Strings, Pointers to Functions. **Dynamic Memory Allocation:** Introduction to Dynamic Memory Alloca-tion- malloc(), calloc(), realloc(), free(). **Structures and Unions:** (TB1:370-394) Defining a Structure, typedef, Advantage of Structure, Nested Structures, Arrays of Structures, Structures and Arrays, Structures and Functions, Structures and Pointers, Defining Unions, Self-Referential Structures, Bitfields, Enumerations.	**10**
Unit -5	
Preprocessing Directives: (TB2:325-333) Macro Substitution, File Inclusion, Conditional Compilation and Other Directives. **File Management In C:** (TB1:408-422) Introduction to File Management, Modes and Operations on Files, Types of Files, Error Handling during I/O Operations.	**10**

COURSE OUTCOMES:

On completion of the course student will be able to

- Demonstrate computer components, algorithms, translate them into programs.
- Choose thesuitable control structures for the problem to besolved.
- Make use of arrays, pointers, structures,and unions effectively.
- Organize reusable code in a program into functions.
- Demonstration of file operations.

Question paper pattern:

1 Question paper consists of 10 questions.
2 Each full question carrying 14 marks.
3 Each full question will have sub question covering all topics under a unit.
4 The student will have to answer 5 full questions selecting one full question from each unit.

TEXT BOOKS:

1) Programming in C ,Pradip Dey , Manas Ghosh, OXFORD
2) Programming in ,C Reema Thareja,Second Edition, OXFORD
3) Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg,CENGAGE.

REFERENCE BOOKS:

1) Computer Fundamentals and Programming, Sumithabha Das, Mc Graw Hill.
2) Programming in C, Ashok N. Kamthane, Amit Kamthane, Pearson.

Course Outcomes to Program Outcomes Mapping

COs VS POs MAPPING (DETAILED; HIGH:3; MEDIUM:2; LOW:1):

POCO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2				3					2				3
2	2				3					2				3
3	2				3					2				3
4	2				3					2				3
5	2				3					2				3
Overall	2				3					2				3

COMPUTER AIDED ENGINEERING GRAPHICS (Common to AI&M, CSE, CST,ECE,ECT & IT)			
Subject Code	221AMMEL1050/1ECMEL1050/ 21ETMEL1050/21CSMEL1050/ 21CTMEL1050/21ITMEL1050	IA Marks	30
Number of Lecture Hours/Week	1(L)+0(T)+4(P)	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	3

Credits – 03

COURSE OBJECTIVES: On successful completion of this course, Students should be able to

1. draw engineering objects with appropriate lettering and dimensioning using various commands of AutoCAD
2. draw geometric constructions, polygons, various types of curves and scales
3. construct multi views of points, lines and planes
4. construct multi views of solids by orthographic projection method
5. convert the orthographic views into isometric views and vice versa by 2D- Commands in AutoCAD

Unit -1: INTRODUCTION	**Hours**

Introduction to Engineering Graphics, sheet sizes & layouts (ISO), line types with application, scales, drawing sheet sizes, title block, sheet markings, dimensioning

AutoCAD: Overview of Computer Graphics, starting with autoCAD, templates, menu- bar, drawing area, option buttons (drawing settings), command line area, draw commands (point, line, polyline, circle, circular arc, ellipse, elliptical arc, spline fit, spline CV, rectangle & polygon), modify commands (move, rotate, trim/extend, erase, copy, mirror, chamfer/ fillet, explode, stretch, scale, array & offset), layers (layering, setting up and use of layers, layers to create drawings

and create, edit and use customized layers) & annotation commands (applying dimensions/ annotations to drawings), drawing settings (grid, snap-mode, ortho, polar tracking, object snap, iso-draft), dimension settings (edit/ modify dimension style: text size & style, arrow size & style, line types & thickness and setting other parameters of dimension text, dimension lines & extension lines) Printing documents to paper and to PDF using plot command.	12
Unit -2: CONICS AND SCALES	
Geometrical constructions, polygons, conic sections – ellipse, parabola, hyperbola (Eccentricity method only); scales – plain, diagonal and vernier scales**.**	10
Unit – 3: ORTHOGRAPHIC PROJECTION OF POINTS, LINE AND PLANES	
Principles of Orthographic Projections, Projections of Points, projection of lines (inclined to HP & VP); Projections of planes (inclined to one reference plane).	10
Unit – 4: ORTHOGRAPHIC PROJECTION OF SOLIDS	
Projections of Regular Solids- Prisms, Pyramids, Cylinder & Cone (simple position and inclined to one reference plane only)	8
Unit-5: ISOMETRIC PROJECTIONS AND ORTHOGRAPHIC VIEWS	
Isometric Projections and orthographic views: Principles of isometric projection – isometric scale, isometric views, conventions; isometric views of lines, planes, simple solids, Conversion of Isometric Views to Orthographic Views and vice-versa	10

COURSE OUTCOMES: On successful completion of this course, students will be able to

1. understand the BIS conventions of engineering drawing with basic concepts & draw engineering objects with appropriate lettering and dimensioning using various commands of AutoCAD
2. construct polygons, various types of Curves and scales used engineering application like maps, buildings, bridges
3. draw multi views of points, lines and planes by orthographic projection method
4. draw multi views of solids by orthographic projection method
5. convert the orthographic views into isometric views and vice versa by 2D-Commands in AutoCAD

Text Books

1. N.D. Bhatt & V.M. Panchal, Engineering Drawing, 48th edition, 2005, Charotar Publishing House, Gujarat
2. R.B.Choudary, Engineering Drawing with AutoCAD 2008, Anuradha Publishers

Reference Books

1. S. Trymbaka Murthy, Computer Aided Engineering Drawing, I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition 2006.
2. K.R. Gopalkrishna, Engineering Graphics, 32nd edition, 2005 Subash Publishers, Bangalore

COURSE OUTCOMES TO PROGRAM UTCOMES MAPPING:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2									3				
2	2									3				
3	2									3				
4	2									3				
5	2				3					3				3
Overall	2				3					3				3

ENGINEERING GRAPHICS (Common to CE,EE &ME)			
Subject Code	21CEMET1050/21EEMET1050 21MEMET1050	IA Marks	
Number of Lecture Hours/Week	1(L)+04(P)	Exam Marks	
Total Number of Lecture Hours	50	Exam Hours	03

Credits – 03

COURSE OBJECTIVES: On successful completion of the course, **s**tudents should be able to

1. construct polygons, scales, engineering curves (parabola, ellipse, hyperbola, cycloids, involutes)
2. draw orthographic projections of points, lines and planes.
3. draw the orthographic projections of simple solids
4. draw sectional views of solids
5. convert given isometric view into orthographic view and vice versa using AutoCAD software.

Unit -1	**Teaching Hours**
Introduction to Engineering Drawing covering Principles of Engineering Graphics and their significance, usage of drawing instruments, lettering, Conic sections – Ellipse, Parabola, Hyperbola (Eccentricity method only); plain Cycloid, and Involutes; Scales – Plain and Vernier	10

scales only.	
Unit -2	
Projections of Points, Projections of straight lines and the line inclined to bothplanes; Projections of planes (inclined to one reference plane only).	08
Unit – 3	
Projections of regular polyhedrons – tetrahedron, hexahedron, octahedron (axisinclined to one reference plane only). Projections of irregular polyhedrons – Prisms, Pyramids, Cones and Cylinders(axis inclined to one reference plane only).	08
Unit – 4	
Sectional Views of Right Angular Solids covering Prism, Cylinder, Pyramid andCone	12
Unit – 5	
Introduction to AutoCAD - The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension Tools), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and Windows. Isometric Projections, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa.	12

COURSE OUTCOMES: On the successful completion of this course, the students will be able to

1. construct polygons, scales and engineering curves
2. draw the orthographic views of points, lines and planes
3. construct the projections of regular and irregular polyhedrons
4. draw the sectional views of solids
5. draw isometric/orthographic views using AutoCAD

Text/Reference Books

1. N.D. Bhatt, Engineering Drawing, Charotar Publications
2. R.B.Choudary, Engineering Drawing, Anuradha Publishers
3. Agarwal & Agarwal, Engineering Drawing, Tata McGraw Hill Publishers
4. K.L.Narayana & P.Kannaiah, Engineering Drawing, Scitech Publishers
5. K.C. John, Engineering Graphics for Degree, PHI Publishers
6. PI Varghese, Engineering Graphics, Mc GrawHill Publishers
7. K Venugopal, V. Prabhu Raja, Engineering Drawing + AutoCAD, New Age

COs VS POs MAPPING (DETAILED; HIGH:3; MEDIUM:2; LOW:1):

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2				3					2				3
2	2				3					2				3
3	2				3					2				3
4	2				3					2				3
5	2				3					2				3
Overall	2				3					2				3

ENGINEERING PHYSICS (Semiconductor Physics & Semiconductor Optoelectronics) (Common for AI&MLCSE,CST,EEE&IT)			
Subject Code	21AMAMT1020/21CTPHT1020/21EEPHT2020/ 21CSPHT2020/ 21ITPHT2020	IA Marks	30
Number of Lecture Hours/Week	03	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 03			

COURSE OBJECTIVES:

The objectives of this course, help the students

- **To impart** the knowledge of Quantum mechanics for understanding the conducting mechanism in solids.
- **To understand** the physics of semiconductors and their working mechanism for their utility.

Unit -1	
Quantum Mechanics: Dual nature of matter, Significance and properties of wave function, Schrodinger time independent wave equations, Particle in a one dimensional infinite potential well. **Free Electron Theory and Band theory:** Classical free electron theory (Qualitative with discussion of merits and demerits), Quantum free electron theory, Equation for electrical conductivity based on quantum free electron theory, Fermi-Dirac distribution, Density of states (3D), Fermi energy; Band theory of Solids -Bloch's theorem; Kronig - Penney model (Qualitative), Effective mass of electron.	**Hours – 12**

Unit -2	
Semiconductors: Introduction; Intrinsic semiconductors- Density of charge carriers, Electrical conductivity, Fermi level; Extrinsic semiconductors- density of charge carriers, dependence of Fermi energy on carrier concentration and temperature; Drift and diffusion currents- Einstein's equation; Hall effect- Hall coefficient- Applications of Hall effect.	**Hours – 11**
Unit – 3	
Light interaction with matter: Stimulated absorption, spontaneous emission, and stimulated emission, Einstein coefficients, Population inversion, Characteristics of lasers, Pumping mechanisms- Ruby laser, He-Ne laser, Direct and indirect band gap semiconductors, Optical transitions in bulk semiconductors Construction and working of laser diode and their applications.	**Hours – 10**
Unit – 4	
Semiconductor light emitting diodes (LEDs) : Injection Electro luminescence; Construction and working of LED, characteristics of LED's -Internal efficiency, Extraction efficiency, External Efficiency, Power conversion efficiency, Responsivity & I V characteristics, Double junction Hetero structure and its importance, LED configurations-SLED's and ELED'S, applications of LEDs.	**Hours – 9**
Unit – 5	
Photo diodes: Introduction- construction and working principle of PN photodiode, P-i-N photodiode, and Avalanche photodiode (APD), and their IV characteristics, Photovoltaic effect, construction and working of Solar cell, fill factor and efficiency of solar cell.	**Hours – 8**

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING PHYSICS (Introduction to Mechanics)			
Subject Code	21CEPHT2020 21MEPHT2020	IA Marks	30
Number of Lecture Hours/Week	03	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 03			

COURSE OBJECTIVES:

The objectives of this course, help the students

- **To explore** the knowledge of fundamental vibrations.
- **To impart** the concept of Newton's law of motion in central force field.
- **To enable** the students to understand the Rigid body dynamics.
- **To study** the structure- property relationship exhibited by solid materials with in the elastic limits.

Unit -1	
One Dimensional motion: Newton's Equation of motion in one dimension-examples of particle falling under a gravity, Simple harmonic motion (Mechanical oscillator) and its characteristics, Damped harmonic motion (Mechanical oscillator) and damping conditions (over-damped, critically damped and under damped conditions), Forced oscillations (Mechanical oscillator) - un damped and damped conditions, Resonance.	**11**

Unit -2	
Two dimensional motions: Two Dimensional motion in the Cartesian coordinate system – Example of Projectile motion without air drag; Two Dimensional motion in Radial polar coordinate system- Example of planetary motion, Kepler's laws and their deduction, Newton equations for variable mass system (rocket), Calculations of Centre of mass and its characteristics .	**11**
Unit -3	
Conservative & Non Conservative motion: Invariance of Newton's equations-Under shift of coordinate system - Galileo transformation - Accelerating frames of reference, Reference frame rotating with a constant angular velocity, Centrifugal Force-Apparent gravitational acceleration, Coriolis force -Effect of Coriolis force on a freely falling body. Conservative and Non Conservative forces.	**09**
Unit – 4	
Rigid body dynamics: Angular momentum of a single particle and system of particle, conservation of angular momentum; Equation of motion of a rigid body; Kinetic energy of a rigid rotating body; Moment of Inertia, Calculations of moment of inertia-Rectangular lamina and Uniform cylinder (rod, circular disc); Parallel axis theorem and perpendicular axis theorem and their applications; Euler's equation describing rigid body motion.	**10**
Unit – 5	
Elasticity: Stress, Strain, Hook's law, stress strain curve, generalized Hook's law with and without thermal strains for isotropic materials, Factors affecting the elastic behavior, energy stored per unit volume in stretched wire, different types of moduli and their relations, bending of beams, Bending moment of a beam, Depression of	**09**

cantilever.

COURSE OUTCOMES:

On completion of the course student will able to

1. **Distinguish** the various harmonic motions and resonance.
2. **Apply** Newton's law of motion to understand the motions of mechanical systems.
3. **Verify** the invariance of Newton's equation of motion.
4. **Understand** the concept of conservative and non-conservative motions.
5. **Formulate** the rigid body dynamics.
6. **Study** the structure- elastic property correlation under load within the elastic limits.

QUESTION PAPER PATTERN:

1. It will have 5 questions with internal choice.
2. Each question carries 14 marks.
   Each full question comprises sub questions covering all topics under a unit.

TEXT BOOKS:

1. Introduction to Mechanics — MK Verma.
2. A Text Book of Engineering Physics- M.N.Avadhanulu, 11e , S.CHAND,

REFERENCE BOOKS:

1. S.L Gupta& D.L. Gupta, Unified physics
2. An Introduction to Mechanics — D Kleppner & R Kolenkow
3. Principles of Mechanics — JL Synge & BA Griffiths.
4. Engineering Physics- Ch. Srinivas, Ch. Sesubabu Cengage learning.

WEB SOURCES:

1. W1: http://www.physics.org/news.asp
2. W2: http://www.phys.lsu.edu/newwebsite/lecturedemo/
3. W3: http://www.nptl.ac.in
4. W3: American Association of Physics Teachers
   [http://www.aapt.org/]
5. W3: Society of Physics Students
   [http://www.aip.org/education/sps/sps.htm]

COURSE OUTCOMES TO PROGRAM OUTCOMES

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

MAPPING:

ENGINEERING PHYSICS (Introduction to Electromagnetic Theory)			
Subject Code	**21ETPHT1020/21ECPHT2020**	IA Marks	30
Number of Lecture HR/Week	03	Exam Marks	70
Total Number of Lecture Hr	50	Exam Hours	03
		Credits – 03	

COURSE OBJECTIVES:

The objectives of this course, help the students:

- **To impart** the knowledge of Electrostatics and Magneto statics in vacuum and in dielectric medium.
- **To impart** the knowledge of Maxwell's equations to understanding the propagation of EM waves.

Unit -1	**Hours**
Electrostatics in vacuum: Coulomb's law, Electrostatic field (E) and Electrostatic potential or Scalar potential (V) due to a point charge, Equipotential surfaces, Relation between E&V, Gauss law in electrostatics, Applications of Gauss law-Calculation of Electric field strength and potential due to the uniform charge distribution over a (i) wire (ii) sheet (c) solid sphere and (e) solid cylinder, Divergence and Curl of electrostatic field, Energy of a discrete and continuous charge distribution.	**10**

Unit -2	
Electrostatics in dielectric medium: Electrostatic field and potential due to a Electric dipole, Types of dielectrics, Electric displacement (D), Dielectric polarization (P), Dielectric polarizability, Susceptibility and Dielectric constant, Relation between D, E and P, Bound charge due to electric polarization, Boundary conditions at interface of dielectric media, Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field- Clausius-Mossotti equation.	**10**
Unit – 3	
Magneto statics: Biot- Savart's law, Magnetic field due to long straight current carrying conductor, Magnetic field on the axis of a current loop, Helmholtz coils, Magnetic field induction due to a solenoid, Divergence of magnetic field (Gauss law in magneto statics), Curl of Magnetic field (Ampere's circuital law); Magnetic Scalar and Vector potential, Motion of charged particle in electrical field and in a magnetic field, Hall effect.	**11**
Unit – 4	
Electromagnetic induction: Electromotive force, Faradays laws of electromagnetic induction, Differential form of Faraday's law, motional EMF; Relation between electric potential and magnetic vector potential using faraday's law, Lenz's law, Self-inductance of Solenoid, Energy density stored in an inductor, Continuity equation for current densities; Displace current; Modified Amperes circuital law.	**10**

Unit – 5	
Maxwell's equations and EM waves: Maxwell's equation in vacuum and non-conducting medium; Wave equation of EM waves; Plane electromagnetic waves in vacuum, their transverse nature; Relation between electric and magnetic fields of an electromagnetic wave; Energy density in EM fields, Pointing Theorem, polarization of EM waves, Momentum carried by electromagnetic waves and radiation pressure.	**9**

COURSE OUTCOMES:

On completion of the course student will able to

1. **Formulate** the electric field and electric potential using fundamental laws in electrostatics.
2. **Understand** the microscopic behavior of dielectrics in electrical field**.**
3. **Calculate** the static magnetic fields due to current carrying conductors.
4. **Estimate** the physical parameters of a system using the basic laws of electricity and magnetism.
5. **Recognize** the relation between electrical fields and time varying magnetic fields.
6. **Apply** Maxwell's equations for the propagation of EM waves.

Question paper pattern:

1. Question paper consists of 10 questions.
2. Each full question carrying 14 marks.
3. Each full question will have sub question covering all topics under a unit.
4. The student will have to answer 5 full questions selecting one full question from each unit.

TEXT BOOKS:

1. Saroj K. Dash, Smaruti R. Khuntia, Fundamentals of Electromagnetic theory.

2. David Griffiths, Introduction to Electrodynamics.

REFERENCE BOOKS:

1. W. Saslow, Electricity, magnetism and light.
2. S.L Gupta& D.L. Gupta, Unified physics.
3. Ch. Srinivas, Ch. Seshubabu, Engineering Physics, Cengage learning.

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING CHEMISTRY			
Subject Code	21CMCHT1030/ 21CMCHT2030	IA Marks	30
Number of Lecture Hours/Week	3	Exam Marks	70
Total Number of Lecture Hours	48	Exam Hours	03
	Credits – 03		

COURSE OBJECTIVES:

The objectives of this course, help the students to

1. Explain the mechanism of corrosion
2. Interpret various boiler troubles and importance of water quality standards.
3. Learn preparation of semiconducting materials, nano materials and liquid crystals – their applications
4. Acquire knowledge on nonconventional energy resources and different types of batteries
5. Know various spectroscopic techniques.
6. Acquire knowledge on volumetric analysis.

Unit -1	**Hours**
Electrochemistry and Corrosion **Electro chemistry:** Introduction, electrode potential, standard electrodes – Hydrogen and Calomel electrodes, Nernst equation and applications. **Corrosion:** Introduction, Mechanism of Wet chemical corrosion, control methods – proper designing, cathodic protection- Sacrificial anodic and impressed current cathodic protection.	**9**

Unit -2	
Water Chemistry and Surface Properties **Water chemistry:** Surface and subsurface water quality parameters – turbidity, pH, total dissolved salts, chloride content, Hardness of water, Temporary and Permanent hardness, Units, determination of hardness by complexometric method. Boiler troubles, Caustic Embrittlement, Priming and foaming, Boiler corrosion. Break point chlorination. **Surface properties:** Determination of surface tension and viscosity of liquids.	**9**
Unit -3	
Material Chemistry **Non-elemental semiconducting materials:** Stoichiometric, controlled valency and chalcogen photo/semiconductors and preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling, epitaxy, diffusion and ion implantation). **Liquid crystals:** Introduction, types and applications. **Nanoparticles**: Introduction, preparation methods – Sol-gel method, Chemical reduction method – Preparation of carbon nanotubes (Arc discharge, chemical vapour deposition and laser ablation methods) properties and applications.	**10**
Unit -4	
ENERGY SOURCES: **Non-conventional energy sources,** Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower, geothermal power, tidal and wave power, ocean thermal energy conversion. **Batteries and fuel cells:** Primary and secondary batteries - Dry cell, Lead Acid Cell, Lithium ion battery and Zinc air cells and fuel cells - H_2-O_2, CH_3OH-O_2, Phosphoric acid and molten carbonate.	**10**

Unit -5	
SPECTROSCOPY AND CHROMATOGRAPHY TECHNIQUES Regions of electromagnetic spectrum - Principles of vibrational and rotational spectroscopy. Vibrational and rotational spectroscopy of diatomic molecules: Rigid diatomic molecules - selection rule - simple Harmonic Oscillator - diatomic vibrating rotator. Nuclear magnetic resonance – Principle and Instrumentation. Principles of chromatography – Thin Layer & Paper Chromatography.	**10**

COURSE OUTCOMES:

On completion of the course student will be able to

1. Interpret the mechanism of corrosion
2. Summarize the problems faced in industries due to boiler troubles.
3. Recall the properties and applications of advanced materials.
4. Summarize the advantages of non-conventional energy resources and batteries.
5. Able to gain knowledge on spectroscopic techniques and the ranges of the electromagnetic spectrum used for exciting different molecular energy levels.
6. Determine the strength of acid, base and some elements by volumetric and instrumental analysis.

Question paper pattern:

1. Question paper consists of 10 questions.
2. Each full question carrying 14 marks.
3. Each full question will have sub question covering all topics under a unit.
4. The student will have to answer 5 full questions selecting one full question from each unit.

TEXT BOOKS:

1. P.C. Jain and M. Jain "**Engineering Chemistry**", 15/e, Dhanpat Rai & Sons, Delhi, (Latest edition).
2. Shikha Agarwal, "**Engineering Chemistry**", Cambridge University Press, New Delhi, (2019).
3. S.S. Dara, "**A Textbook of Engineering Chemistry**", S.Chand & Co, (2010).
4. Shashi Chawla, "Engineering Chemistry", Dhanpat Rai Publicating Co. (Latest edition).
5. Fundamentals of Molecular Spectroscopy, by C. N. Banwell.

REFERENCE BOOKS:

1. K. Sesha Maheshwarammam and Mridula Chugh, "**Engineering Chemistry**", Pearson India Edn.
2. O.G. Palana, "**Engineering Chemistry**", Tata McGraw Hill Education Private Limited, (2009).
3. CNR Rao and JM Honig (Eds) "**Preparation and characterization of materials**" Academic press, New York (latest edition)

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

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

ENGINEERING MATHEMATICS-II (Linear algebra, Laplace transforms & Numerical Methods) Common to all the branches			
Subject Code	21CMMAT2010/2010	IA Marks	30
Number of Lecture Hours/Week	03	Exam Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Credits – 03			

Course objectives:

To enable students to apply the knowledge of Mathematics in various engineering
fields by making them to learn the following'

1. To develop the use of matrix algebra techniques that is needed by engineers for practical applications and solve system of linear equations
2. To find the inverse and power of a matrix by Cayley-Hamilton theorem and reduce the Quadratic form
3. To solve initial value problems by using Laplace transforms
4. To find the solution of algebraic/ transcendental equations and also interpolate the functions.
5. To apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations.

Unit -1	**Hr**
Solving systems of linear equations: Rank of a matrix by echelon form and normal form – Solving system of homogeneous and non homogeneous linear equations – Gauss Elimination method- Jacobi and Gauss-Seidel methods for solving system of equations numerically.	**10**

Unit -2	
Eigen values and Eigen vectors, Cayley–Hamilton theorem and Quadratic forms: Eigen values and Eigen vectors and properties- Cayley-Hamilton theorem (without proof) – Reduction to Diagonal form – Quadratic forms and nature of the quadratic forms – Reduction of quadratic form to canonical forms by orthogonal transformation, Diagonalisation and Lagrange's reduction	**10**
Unit – 3	
Laplace Transforms: Laplace transforms – Definition and Laplace transforms of some certain functions– Shifting theorems – Transforms of derivatives and integrals – Unit step function –Dirac's delta function Periodic function – Inverse Laplace transforms– Convolution theorem (without proof). Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.	**10**
Unit – 4	
Numerical Methods: Introduction - Method of false position - Newton-Raphson method (One Variable) Introduction– Errors in polynomial interpolation – Finite differences– Forward differences– Backward differences –Central differences – Relations between operators – Newton's forward and backward formulae for interpolation – Interpolation with unequal intervals – Lagrange's interpolation formula.	**10**
Unit – 5	
Numerical integration, Solution of ordinary differential equations with initial conditions: Trapezoidal rule - Simpson's 1/3rd and 3/8th rule - Solution of initial value problems by Taylor's series– Picard's method of successive approximations– Euler's method – Runge -Kutta method (second and fourth order).	**10**
Course outcomes: On completion of this course, students are able to, 1. Develop the use of matrix algebra techniques that is needed by engineers for practical applications and solve system of linear equations (L6)	

2. Find the inverse and power of a matrix by Cayley-Hamilton theorem and reduce the Quadratic form (L3)
3. Solve initial value problems by using Laplace transforms (L3)
4. Find the solution of algebraic/ transcendental equations and also interpolate the functions(L3)
5. Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3).

Question paper pattern:

5. Question paper consists of 10 questions.
6. Each full question carrying 14 marks.
7. Each full question will have sub question covering all topics under a unit.
8. The student will have to answer 5 full questions selecting one full question from each unit.

Text Books:

1. B. S. Grewal," Higher Engineering Mathematics", Khanna publishers, 44th Edition, 2016.
2. Kreyszig, "Advanced Engineering Mathematics " - Wiley, 9th Edition, 2013.
3. B.V.Ramana "Higher Engineering M athematics" Tata Mc Graw-Hill, 2006

Reference Books:

1. Dr.K.V.Nageswara Reddy and Dr.B.Rama Bhupal Reddy, “Engineering Mathematics, Volume II” Scitech Publications, 2017.
2. Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineering and Science, Tata McGraw Hill Education, 4th Edition, 2018
3. M. K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publications, 3rd Edition, 2020.
4. Lawrence Turyn, Advanced Engineering Mathematics, CRC Press, 1st Edition 2014.

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	3	3	-	-	-	-	-	-	-	-	-	-
2	3	3	-	-	-	-	-	-	-	-	-	-
3	3	3	-	-	-	-	-	-	-	-	-	-
4	3	3	-	-	-	-	-	-	-	-	-	-
5	3	3	-	-	-	-	-	-	-	-	-	-
Course	3	3	-	-	-	-	-	-	-	-	-	-

PYTHON PROGRAMMING Common to All SEMESTER II			
Subject Code	21CMCST2040	Internal Marks	30
Number of Lecture Hours/Week	1	External Marks	70
Total Number of Lecture Hours		Exam Hours	03
Pre-requisite		Credits – 03	

The Objectives of Python Programming are:

- To learn about Python programming language syntax, semantics, and the runtime environment
- To be familiarized with general computer programming concepts like data types, conditionalstatements, loops and functions.
- To be familiarized with general coding techniques and object-oriented programming andGraphical User Interfaces.

Unit -1	**Hours**
Introduction:(TB1:22-30,TB2:1.1-1.4,TB2:1.21-1.33) Introduction Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Variables, Reading Input fromthe Keyboard, Operators. **Data Types, and Expression: (TB1:41-59)** Strings Assignment, and Comment, Numeric Data Types and Character Sets, Type conversions, Expressions, Using functions and Modules. **Decision Structures and Boolean Logic:(TB1:77-85)** if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables.	08

Unit -2	
Control Statement:(TB1:65-72, TB1:86-91) Definite iteration for Loop Formatting Text for output, Selection if and if else Statement ConditionalIteration, The While Loop, Nested Loops. **Strings and Text Files:(TB1:103-125)** Accessing Character and Substring in Strings, Data Encryption, Strings and Number Systems, String Methods, Text Files.	10
Unit -3	
List and Dictionaries:(TB1:135-145, TB1:153-158) Lists,Tuples,Sets, Dictionaries. **Design with Function:(TB1:146-149, TB1:169-190)**Functions as Abstraction Mechanisms, Problem Solving with Top Down Design, Design with Recursive Functions, Case Study Gathering Information from a File System. **Modules**: **(TB2:8.1-8.5)** Modules, Standard Modules, Packages.	12
Unit – 4	
File Operations:(TB1:122-123) Reading config files in python, Writing log files in python, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(). **Object Oriented Programming:(TB2:5.1-5.20, TB2:6.1-6.17)**Concept of class, object and instances, Constructor, class attributes and destructors, Inheritance. **Design with Classes:(TB1:294-301, TB1:309-330)** Objects and Classes, Data modeling Examples, CaseStudy an ATM.	12
Unit – 5	
Errors and Exceptions:(TB2:7.1-7.8) Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, User-defined Exceptions, Defining Clean-up Actions, Redefined Clean-up Actions**.** **Graphical User Interfaces:(TB1:245-288)** The Behavior of Terminal Based Programs and GUI -Based Programs, Coding	8

Simple GUI-Based Programs, Other Useful GUI Resources.	

Course outcomes:

On completion of the course student will be able to

- Able to learn the fundamental concepts in the Python language
- Implementation of python iterative statements and strings
- Demonstrate python lists, dictionaries and functions
- Understand the concepts of modules and packages in python
- Complete coding challenges relating to object-oriented programming's essential concepts and techniques.
- Apply variety of error handling and GUI programming techniques

Question paper pattern:

1. Question paper consists of 10 questions.
2. Each full question carrying 14 marks.
3. Each full question will have sub question covering all topics under a unit.
4. The student will have to answer 5 full questions selecting one full question from each unit.

Text Books

1. Fundamentals of Python First Programs, Kenneth. A. Lambert, Cengage.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.

Reference Books:

1) Introduction to Python Programming, Gowrishankar.S, Veena A, CRC Press.
2) Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

E-Resources:

https://www.tutorialspoint.com/python3/python_tutorial.pdf

Course Outcomes to Program Outcomes mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
3	2	2	3	-	2	-	-	-	-	-	-	-	-	-	3
4	3	2	3	-	3	-	-	-	-	-	-	-	-	-	2
5	3	3	3	-	2	-	-	-	-	-	-	-	-	-	2
6	3	2	3	-	3	-	-	-	-	-	-	-	-	-	3
Course	**3**	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

NETWORK ANALYSIS			
Subject Code	21ECECT2050/ 21ETETT2050	Internal Marks	30
Number of Lecture Hours/Week	03	External Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Pre-requisite		Credits – 03	

COURSE OBJECTIVES:

- To understand the basic concepts on RLC circuits.
- To know the behavior of the steady states and transients states in RLC circuits.
- To know the basic Laplace transforms techniques in periods' waveforms.
- To understand the two port network parameters.
- To understand the properties of LC networks and filters.

Unit -1	**Hours**
Fundamentals and Network Topology: Definitions of branch, node, tree, planar, non-planar graph, incidence matrix, basic tie set schedule, basic cut set schedule. Definitions of terms associated with periodic functions: Time period, Angular velocity and frequency, RMS value, Average value, Form factor and peak factor-problem solving, Phase angle, Phasor representation, Addition and subtraction of phasors, mathematical representation of sinusoidal quantities, explanation with relevant theory, problem solving. Principal of Duality with examples.	08
Unit -2	
Electric Circuits: Review of Kirchhoff's laws, Mesh analysis and Nodal analysis problem solving including dependent sources also. **Network Theorems:** Thevinin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens- problem solving using dependent sources also.	10

Unit -3	
Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L- C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving. **Transients:** First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, Evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots. Solutions using Laplace transform method.	12
Unit – 4	
Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti resonance, Bandwidth of parallel resonance, general case-resistance present in both branches, anti resonance at all frequencies. **Coupled Circuits:** Coupled Circuits: Self inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, Conductively coupled equivalent circuits- problem solving.	12
Unit – 5	
Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h-parameters, Inverse h-parameters, Inverse Transmission line parameters, Relationship between parameter sets, Parallel connection of two port networks, Cascading of two port networks, series connection of two port networks, problem solving including dependent sources also.	8

Course outcomes:

On completion of the course student will be able to

1. Gain the knowledge on basic network elements.
2. Will analyze the RLC circuits' behavior in detailed.
3. Analyze the performance of periodic waveforms.
4. Gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h&g).

Question paper pattern:

1. Question paper consists of 10 questions.
2. Each full question carrying 14 marks.
3. Each full question will have sub question covering all topics under a unit.
4. The student will have to answer 5 full questions selecting one full question from each unit.

Text Books:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rdEdition,2000.
2. Network Analysis by K.Satya Prasad and S Sivanagaraju,CengageLearning
3. Electric Circuit Analysis by Hayt andKimmarle,TMH

Reference Books:

1. Network lines and Fields by John. D. Ryder 2ndedition, Asiapublishinghouse.
2. Basic Circuit Analysis by DR Cunninghan, Jaico Publishers. 3.Network Analysis and Filter Design by Chadha,UmeshPublications.

Course Outcomes to Program Outcomes mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
3	2	2	3	-	2	-	-	-	-	-	-	-	-	-	3
4	3	2	3	-	3	-	-	-	-	-	-	-	-	-	2
5	3	3	3	-	2	-	-	-	-	-	-	-	-	-	2
6	3	2	3	-	3	-	-	-	-	-	-	-	-	-	3
Course	**3**	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

S.No.	Unit Name	Text Book/ Reference	Chapter No.
1.	Fundamentals and Network Topology	T2 &R1	1
2.	Electric Circuits and Network Theorems	T2&R1	2 &3
3.	Steady State Analysis of A.C Ckts &Transient	T2,T1,R2	4,5 &6
4.	Resonance and Coupled Circuits	T2,R2	6,7& 8
5.	Two-port Networks	T1	4 & 5

DATA STRUCTURES Common to AI&ML,CSE.CST&IT)			
Subject Code	21CSAMT2050/21CSCST2050 21CSCT2050/21ITITT2050	Internal Marks	30
Number of Lecture Hours/Week	03	External Marks	70
Total Number of Lecture Hours	50	Exam Hours	03
Pre-requisite		Credits – 03	

COURSE OBJECTIVES:

- Introduce the fundamental concepts of data structures and abstract data types.
- Emphasize the importance of data structures in developing and implementing efficient algorithms.
- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.

Unit -1	**Hours**
Data Structures -(RB3: 1.1-1.20) Definition, Classification of Data Structures, Operations on Data Structures, Abstract Data Type (ADT), Preliminaries of algorithms. Time and Space complexity.**Searching(TB1: 424-434)**- Linear search, Binary search, Fibonacci search.**Sorting (TB1: 434-460)**- Insertion sort, Selection sort, Exchange (Bubble sort, quick sort), distribution (radix sort), merging (Merge sort) algorithms.	08
Unit -2	
Linked List: (TB1: 162-211) Introduction, Single linked list, Representation of Linked list in memory, Operations on Single Linked list-Insertion, Deletion, Search and Traversal ,Reversing Single Linked list, Applications on Single Linked list- Polynomial Expression Representation, Addition and Multiplication, Sparse Matrix Representation using Linked List, Advantages and Disadvantages of Single Linked list, Double Linked list-Insertion, Deletion, Circular Linked list-Insertion, Deletion.	10

Unit -3	
Queues: (TB1: 253-275) Introduction to Queues, Representation of Queues-using Arrays and using Linked list, Implementation of Queues-using Arrays and using Linked list, Application of Queues, Circular Queues, Deques, Priority Queues, Multiple Queues. **Stacks:(TB1 : 219-243)**Introduction to Stacks, Array Representation of Stacks, Operations on Stacks, Linked list Representation of Stacks, Operations on Linked Stack, Applications-Reversing list, Factorial Calculation, Infix to Postfix Conversion, Evaluating Postfix Expressions.	12
Unit – 4	
Trees:(TB1: 279-306) Basic Terminology in Trees, Binary Trees-Properties, Representation of Binary Trees using Arrays and Linked lists. Binary Search Trees- Basic Concepts, BST Operations: Insertion, Deletion, Tree Traversals, Applications-Expression Trees, Heap Sort, Balanced **[Binary Trees (RB3: 7.50-7.57)-** AVL Trees, Insertion, Deletion and Rotations.]	12
Unit – 5	
Graphs: (TB1: 383-419) Basic Concepts, Representations of Graphs-Adjacency Matrix and using Linked list, Graph Traversals (BFT & DFT), Applications- Minimum Spanning Tree Using Prims &Kreskas Algorithm, Dijkstra's shortest path, Transitive closure, Wars hall's Algorithm.	8

Course outcomes:

After completing this course a student will be able to:

- Discuss the Basics of data structures and computational efficiency of algorithms for sorting & searching.
- Illustration of linked lists and its operations.
- Design programs using a variety of data structures such as stacks and queues.
- Demonstrate different tree traversing method.
- Describing the graphs concepts.

Question paper pattern:

- Question paper consists of 10 questions.
- Each full question carrying 14 marks.
- Each full question will have sub question covering all topics under a unit.
- The student will have to answer 5 full questions selecting one full question from each unit.

Text Books:

- Data Structures Using C. 2nd Edition. Reema Thareja, Oxford.
- Data Structures and algorithm analysis in C, 2nded, Mark Allen Weiss

Reference Books:

- Fundamentals of Data Structures in C, 2nd Edition, Horowitz, Sahni, Universities Press.
- Data Structures: A PseudoCode Approach, 2/e, Richard F.Gilberg, Behrouz A.Forouzon, Cengage.
- Data Structures with C, Seymour Lipschutz TMH

e-Resources:

- http://algs4.cs.princeton.edu/home/
- https://faculty.washington.edu/jstraub/dsa/Master_2_7a.pdf

Course Outcomes to Program Outcomes mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3									2		2
2	3	3	3									2		2
3	3	3	3									2		2
4	3	3	3									2		2
5	3	3	3									2		2
Course	**3**	**3**	**3**									**2**		**2**

ENGINEERING MECHANICS			
Subject Code	21CEMET2050/21EEMET2050 21MEMETT2050	IA Marks	
Number of Lecture Hours/Week	3(L)	Exam Marks	
Total Number of Lecture Hours	50	Exam Hours	03

Credits - 03

Course objectives

On successful completion of the course, the students should be able to

1. understand the effect of forces and moments on the solid rigid bodies
2. analyze static problems using free body diagrams by considering friction.
3. locate centroid and calculate moment of inertia for different cross sections.
4. calculate velocity and acceleration of particles having rectilinear motion and rotation
5. analyze dynamic problems using work energy method and impulse-momentum method.

Unit -1	**Hours**
Introduction to engineering mechanics: Basic terminologies in mechanics, laws of mechanics, characteristics of force, system of force. **Resultant system of forces**: Resolution of forces, method of composition of forces, resultant of coplanar concurrent force system, moment of a force and couple. **Friction:** Frictional force, laws of Coulomb friction, angle of friction, limiting friction and angle of repose, problems on blocks resting on horizontal and inclined planes.	10 Hours

Unit -2	
Equilibrium of system of forces: Equilibrium of a rigid body subjected to coplanar concurrent forces and coplanar non-concurrent forces, free body diagrams, Lami's theorem, equilibrium of connected bodies.	9 Hours
Unit – 3	
Centroid and centre of gravity: Centre of gravity, centroid, use of axis symmetry determination of centroid of simple figures from first principles, centroid of composite sections. **Moment of inertia**: Moment of inertia, polar moment of inertia, theorems of moment of inertia, moment of inertia of rectangle, triangle, circle, semi circle, quarter circle from first principles, moment of inertia of L, T and I sections only. Mass moment of inertia, radius of gyration, mass moment of inertia of uniform rod, rectangular plate and circular plate only.	12 Hours
Unit-4 **Kinematics:** General principles in dynamics, types of motion, rectilinear motion, motion curves, motion with uniform velocity, motion with uniform acceleration, motion with varying acceleration, angular motion, relationship between linear and angular motions. **Kinetics:** Bodies in rectilinear translation, kinetics of bodies rotating about fixed axes, Newton's second law of motion, D-Alembert's principle.	10 Hours
Unit - 5 Work-Energy Method: Equation of Translation, work energy application to particle motion, connected system - Fixed axis rotation and plane motion, Impulse momentum method.	9 Hours

Course outcomes

On completion of this course, students will be able to

1. Determine resultant force and moment for different force systems.
2. analyse the rigid bodies associated with frictional forces using conditions of equilibrium
3. Locate the centroid / center of gravity and determine the moment of inertia of plane sections/solids.
4. Understand the behavior of moving bodies in rectilinear motion and solve kinematic equations of motion curves.
5. Solve the problem using work energy method and impulse momentum method.

Text Books

1. S.S. Bhavikatti and K.G. Rajashekarappa, Engineering Mechanics, New Age, 2012.
2. N.H. Dubey, Engineering Mechanics, Mc Graw Hill, 2012

Reference Books

1 F. L. Singer, Engineering Mechanics, Harper–Collins, 1994
2. B. Bhattacharya, Engineering Mechanics, Oxford University Press, 2008
3. A.K.Tayal, Engineering Mechanics, Umesh Publications, 2012.
4. R.K.Bansal, Engineering Mechanics, Laxmi Publications, 1996.
5. R.K.Rajput, A Text book of Applied Mechanics, Laxmi Publications, 2011.
6. S.Timoshenko and D.H.Young, Engineering Mechanics, 4th Ed. , Mc Graw Hill
7. A.Nelson, Engineering Mechanics - Statics and Dynamics, TMG, New Delhi, 2009.

WEB REFERENCES

W1. https://nptel.ac.in/courses
W2. http://learnmech.com/

COs vs. POs MAPPING (high: 3; medium: 2; low: 1)

COs / POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1	2				1							1	
CO2	1	2				1							1	
CO3	1	2				1							1	
CO4	1	3				1							1	
CO5	1	2				1							1	
Overall Level of mapping	**1**	**2**				**1**							**1**	

Practical Examination Evaluation Procedure Internal:15 Marks 1.Continuous Evaluation by submitting the Record book for every experiments:05 2. Conduct the internal examination at the end of the semester:10
Practical Examination at the time of final Examination:35
Question paper pattern: Ten questions are given, and student should choose one question (blind option), which carries 50 marks in total. 1. 10 marks are allotted for procedure. 2. 10 marks for conduction of the experiment. 3. 05 marks for results and conclusions. 10 marks for viva voce

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB		
Subject Code	18CMEGL1050/ 2050	IA Marks
Number of Practical Hr./week	02	Exam Marks
Total Number of Practical Hr	32	Exam Hours
Credits – 01		

Objectives: To enable the students to learn communication skills of Listening, Speaking, Reading and Writing by focusing on:

- Listening Comprehension
- Pronunciation
- Functional English in formal and Informal Situations
- Interpersonal Communication Skills
- Presentation Skills

List of Experiments

UNIT I: Listening Comprehension

UNIT II: Pronunciation , Stress, Intonation & Rhythm

UNIT III: Common Everyday Situations: Conversations & Dialogues, Communication at Workplace

UNIT IV: Interpersonal Communication Skills- Group discussions and debates

UNIT V: Formal Presentations

Outcomes:

By the end of the course the students will be able to acquire basic Proficiency in English by practicing the following:

- Listening Comprehension, Pronunciation, Dialogues, Interpersonal Communication Skills ,Presentation Skills &Discussions and Debate

Learning Resources:

- Interact – English Lab Manual for Undergraduate Students by Orient Black Swan
- Ted Talks, Interviews with Achievers and select movies
- Toastmaster's speeches and table topics
- Book Reviews and movie reviews
- Exercises in Spoken English Parts: I-III, CIEFL, Hyderabad.
- Oxford Guide to Effective Writing and Speaking by John Seely
- https://www.ted.com/talk

Course Outcomes Vs Program Outcomes Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	-	-	-	-	-	-	-	-	-	2	-	-
2	-	-	-	-	-	-	-	-	-	3	-	-
3	-	-	-	-	-	-	-	-	-	3	-	-
4	-	-	-	-	-	-	-	-	-	2	-	-
5	-	-	-	-	-	-	-	-	-	3	-	-
6	-	-	-	-	-	-	-	-	-	2	-	-

BASIC ELECTRICAL ENGINEERING LABORATORY (Common to All)			
Subject Code	21CMEEL1070/ 21CMEEL2070	IA Marks	15
Number of Lecture Hours/Week	3P	Exam Marks	35
Total Number of Lecture Hours	36	Exam Hours	03
Credits-1.5			

Course Objectives:

This course will enable the student to

1. Verify the Kirchhoff's laws, network theorems for a given circuit.
2. Analyze the performance of DC shunt generator.
3. Control the speed of DC motor.
4. Predetermine the efficiency DC machine.
5. Analyze performance of three phase induction motor.
6. Determine the regulation of an alternators.

List of Experiments(Any ten experiments must be conducted)

1. Verification of Kirchoff's laws.
2. Verification of Thevenin's Theorem.
3. Verification of Norton's Theorem.
4. Verification of Superposition theorem.
5. Verification of Maximum Power Transfer Theorem.
6. Speed control of D.C. shunt motor.
7. Brake test on DC shunt motor.
8. Calibration of wattmeter.
9. OC & SC tests on single-phase transformer.
10. Brake test on 1-phase Induction motor.
11. Brake test on 3-phase Induction motor.
12. Study experiment on Ear thing.

COURSE OUTCOMES:

On completion of the course student will be able to:

1. Verify the Kirchoff's laws.
2. Verify network theorems for a given circuit.
3. Control the speed of DC motor.
4. Analyze performance of single phase induction motor
5. Analyze performance of three phase induction motor.
6. Identify different types of earthling's

COURSE-OUTCOMES-TO-PROGRAM-OUTCOMES-MAPPING:

COs / POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1			2												
CO2			2												
CO3			2												
CO4			2												
CO5			2												
CO6			2												
Overall Course			**2**												

PROGRAMMING FOR PROBLEM SOLVING LAB (Common to All) SEMESTER I			
Subject Code	21CMCSL1080	Internal Marks	15
Number of Lecture Hours/ Week	3	External Marks	35
Total Number of Hours	36	Exam Hours	03
Credits – 1.5			

Course Objectives:

This course will enable students to

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs.
4. To learn to write programs (using structured programming approach) in C to solve problems.
5. To introduce basic data structures such as lists, stacks and queues.

Exercise 1 (Familiarization with programming environment)

a) Familiarization of CODE BLOCKS C++ Editor to edit, compile, Execute, Test and debugging C programs.

b) Familiarization of RAPTOR Tool to draw flow charts and understand flow of control.
Acquaintance with basic LINUX commands.

Exercise 2 (Simple computational problems using arithmetic expressions)

a) Write a C Program to display real number with 2 decimal places.

b) Write a C Program to convert Celsius to Fahrenheit and vice versa.

c) Write a C Program to calculate the area of triangle using the formula
area = $\sqrt{}$ (s−a)(s−b)(s −c) where =a+b+c/2

d) Write a C program to find the largest of three numbers using ternary operator.

e) Write a C Program to swap two numbers without using a temporary variable.

Exercise 3 (Problems involving if-then-else structures)
a) Write a C Program to check whether a given number is even or odd using bitwise operator, shiftoperator and arithmetic operator. b) Write a C program to find the roots of a quadratic equation. c) Write a C Program to display grade based on 6 subject marks using if…else…if ladder. d) Write a C program, which takes two integer operands and one operator form the user, performs the operation & then prints the result using switch control statement.(Consider the operators +, -,*,/, %)
Exercise 4 (Iterative problems)
a) Write a C Program to count number of 0's and 1's in a binary representation of a given number. b) Write a C program to generate all the prime numbers between two numbers supplied by theuser. c) Write a C Program to print the multiplication table corresponding to number supplied as input
Exercise 5 (Iterative problems)
a) Write a C Program to Find Whether the Given Number is i)Armstrong Number ii) Palindrome Number b) Write a C Program to print sum of digits of a given number
Exercise 6 (Series examples)
a) Write a C Program to calculate sum of following series **b) 1+2+3+…. n b) 1+1/2+1/3+……+1/n c)1+x+x2+x3……+xn**
Exercise 7 (1D Array manipulation)
a) Write a C program to interchange the largest and smallest numbers in the array. b) Write a C program to search an element in an array (linear search). c) Write a C Program to print the following pattern using a character array SA SASSASI

Exercise 8 (Matrix problems, String operations)
a) Write a C program to add two matrices. b) Write a C program to multiply two matrices if they are compatible or print an error message **"Incompatible matrix sizes" otherwise.** c) Write a C program to check given matrix is symmetric or not. Implement the following string operations with and without library functions. i)copy ii) concatenate iii) length iv) compare
Exercise 9 (Simple functions)
a) Write a C Program demonstrating the following function types b) With arguments and with return value. c) With arguments and without return alue d) Without arguments and without return value. e) Without arguments and with return value. f) Write a C Program illustrating call by reference
Exercise 10 (Recursive functions)
Write a C Program illustrating the following with Recursion without Recursion a)Factorial b) GCD c) Power d) Fibonacci
Exercise 11(Pointers and structures)
a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function. b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function. Note: Understand the difference between the above two programs. c) Write a C Program to read and print student details using structures.
Exercise 12 (File operations)

a) Write a C programto open a file and to print it contents on screen.
b) Write a C program to copy files
c) Write a C program merges two files onto a new file.
d) Write a C program to delete a file.

Text Books:

1. Computer Programing ANSI C, E Balagurusamy, Mc Graw Hill Education(Private), Limited (TB1)
2. Programming in C, ReemaThareja, Second Edition, Oxford Higher Education (TB2)

Reference Books:

1. Computer Basics and C Programming, V Raja Raman, Second Edition, PHI (RB1) Course Outcomes:
2. Attain knowledge on using CODE BLOCKS and RAPTOR tools in solving problems. Examine and analyze alternative solutions to a problem.
3. Design an algorithmic solution to a problem using problem decomposition and step- wise refinement.
4. Demonstrate conversion of iterative functions to recursive and vice-versa.

Course Outcomes to Program Outcomes Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
1	3	3	3										3	
2	3	3	3		2								3	
3	3	3	3		2								3	
4	3	3	3		2								3	
5	3	3	3		2								3	
Course	**3**	**3**	**3**		**2**								**3**	

ENGINEERING PHYSICS LAB (Common to AI &ML,CSE,CST,EEE & IT)			
Subject Code	21AMPHL1060/21CTPHL1060/ 21EEPHL1060 21ITPHL2060/21CSPHL2060	IA Marks	15
Number of Practice Hours/Week	03	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
		Credits – 1.5	

COURSE OBJECTIVES:

The objectives of this course, help the students

- **To apply** the theoretical knowledge of Physics through hands on the experimental instruments.
- **To improve** the experimental knowledge in the later studies.
- **To understand** the basic need of experiments.
- **To know** how to measure the different physical quantities.
- **To gain** the knowledge about different electrical components and basic electrical circuits.

List of Experiments

1. Determination of the Fermi energy of copper using meter bridge.
2. Determination of the Energy band gap of P-N junction diode.
3. Study of the spectral response of photo cell-Planck's constant.
4. Study of V-I characteristics of LED (Light Emitting Diode) and to determine knee voltage, frequency of the

light emitting diode.

5. Determination of the frequency of electrical vibrator-Melde's experiment.
6. Determination of the wavelength of Laser diode using diffraction.
7. Determination of the V-I characteristics of photo diode and to find the variation of photo current as a function of light intensity.
8. Study of the characteristics of a photo voltaic cell (Solar cell) and to find Fill factor and efficiency.
9. Study of the V-I characteristics of Semiconductor diode, and to determine barrier potential and forward resistance.
10. Study of the I/V Characteristics of Zener diode.

Demonstration experiments:

1. Determination of the resistivity of a semiconductor using four probes method.
2. Estimation of the Hall coefficient of a semiconductor-Hall effect.

COURSE OUTCOMES:

On completion of the course student will able to

1. **Compare** the theory and correlated with experiments.
2. **Design** experiments.
3. **Analyze** the experimental result.
4. **Apply** appropriate techniques to perform the experiments.
5. **Understand** the interaction of the light with semiconductor.
6. **Study** the characteristic curves of the optoelectronic semiconductor devices.

TEXT BOOKS:

1. "*Physics Laboratory Manual"* Prepared by Department of Physics, SITE.

REFERENCE BOOKS:

1. S. Balasubrahmanian, M.N. Srinivasan ''A Text book of Practical Physics''- S. Chand Publishers, 2017.
2. Advanced Practical Physics Vol 1& 2 SP Singh & M.S Chauhan Pragati Prakashan, Meerut

WEB SOURCES:http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**2**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**2**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING PHYSICS LAB (Common for ECE &ECT)			
Subject Code	21ETPHL1060/ 21ECL2060	IA Marks	15
Number of Practice Hours/Week	03	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
		Credits – 1.5	

COURSE OBJECTIVES:

The objectives of this course, help the students

- **To apply** the theoretical knowledge of Physics through hands on the experimental instruments
- **To improve** the experimental knowledge in the later studies
- **To understand** the basic need of experiment**s.**
- **To know** how to measure the different physical quantities.
- **To acquire** ability to use instrumentation techniques.
- **To train** the students to develop techniques based on the principles related to various devices or components.

List of Experiments

1. Determination of the dielectric constant of the dielectric material in the given capacitor using a RC charging and discharging circuit.
2. Measuring of the magnetic field induction of circular coil-Stewart-Gee's experiment.
3. Determination of the horizontal component of earth magnetic field using Helmholtz coil galvanometer..
4. Study of the motion of charged particle in electric and magnetic fields and determine the value of e/m by magnetic focusing.
5. Determination of the frequency of the AC Source using Sonometer.
6. Determination of the electromotive force (emf) of an unknown cell using a stretched wire potentiometer.
7. Study of the particle behavior of EM wave and estimation of Planck's constant

using photocell.
8. Determination of the frequency of electrical vibrator-Melde's experiment.
9. Determination of the wavelength and frequency of the electromagnetic wave using diffraction.
10. Verification of laws of transverse waves in a stretched string.

Demonstration experiments:

1. Estimation of Hall coefficient and estimate the concentration of charge carriers using Hall Effect.
2. Determination of the self inductance and resistance of a coil with air core.

COURSE OUTCOMES:

On completion of the course student will able to

7. **Compare** the theory and correlated with experiments
8. **Design** experiments
9. **Analyze** the experimental result
10. **Apply** appropriate techniques to perform the experiments
11. **Apply** the fundamental laws in electromagnetism to understand the behavior of electromagnetic fields.
12. **Calculate** the frequency and wavelength of EM Waves**.**

Question paper pattern:

Ten questions are given, and student should choose one question (blind option), which carries 50 marks in total.

a. 15 marks are allotted for procedure including circuit diagrams and model graphs.

b. 15 marks for conduction of the experiment.

c. 10 marks for results and conclusions.

d. 10 marks for viva voce.

TEXT BOOKS:"*Physics Laboratory Manual"* Prepared by Department of Physics, SITE.

REFERENCE BOOKS:

3. S. Balasubrahmanian, M.N. Srinivasan ''A Text book of Practical Physics''- S. Chand Publishers, 2017.
4. Advanced Practical Physics Vol 1& 2 SP Singh & M.S Chauhan Pragati Prakashan, Meerut

WEB SOURCES:http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

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

ENGINEERING PHYSICS LAB (Common CE & ME)			
Subject Code	21CEPHL1060/21MEPHL1060	IA Marks	15
Number of Practice Hr/Week	03	Exam Marks	35
Total Number of Practice Hours	36	Exam Hours	03
		Credits – 1.5	

COURSE OBJECTIVES:

The objectives of this course, help the students

- **To apply** the theoretical knowledge of Physics through hands on the experimental instruments
- **To improve** the experimental knowledge in the later studies
- **To understand** the basic need of experiments.
- **To know** how to measure the different physical quantities.
- **To acquire** ability to use instrumentation techniques.
- **To train** the students to develop techniques based on the principles related to various devices or components.

List of Experiments

1. Investigation of the Motion of Coupled Oscillators.
2. Determination of the rigidity modulus η of wire-Torsional pendulum.
3. Determination of acceleration due to gravity g and radius of gyration K - Compound pendulum.
4. Determination of the Frequency of an electrically maintained tuning fork by Melde's Experiment.
5. Determination of the velocity of sound in air-Volume resonator.
6. Verification of the laws of transverse vibrations of stretched wire.
7. Determination of the Young's modulus and draw load depression graph in uniform bending.
8. Determination of the Moment of Inertia of a Flywheel.
9. Verification of the parallel axis and perpendicular axis theorems and determine the moment of inertia of a regular rectangular body -Bifilar pendulum.
10. Determination of the frequency of the AC Source using Sonometer.

Demonstration experiments:

1. Determination of Young's Modulus, Modulus of rigidity and Poisson's ratio of the material of a given wire by Searle's dynamical method
2. Study of the variation of moment of inertia of a system with the variation in the distribution of mass and hence to verify the theorem of parallel axes (Maxwell' needle method).

COURSE OUTCOMES:

On completion of the course student will able to

13. **Compare** the theory and correlated with experiments
14. **Design** experiments
15. **Analyze** the experimental result

TEXT BOOKS:

2. "*Physics Laboratory Manual"* Prepared by Department of Physics, SITE.

REFERENCE BOOKS:

5. S. Balasubrahmanian, M.N. Srinivasan ''A Text book of Practical Physics''- S. Chand Publishers, 2017.
6. Advanced Practical Physics Vol 1& 2 SP Singh & M.S Chauhan Pragati Prakashan, Meerut.

WEB SOURCES:

6. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

16. **Apply** appropriate techniques to perform the experiments
17. **Apply** the knowledge in simple harmonic motions and resonance to understand the rigid body dynamics**.**
18. **Verify** the parallel axis and perpendicular theorems of moment of inertia**.**

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2	**2**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**2**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4	**3**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
5	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ENGINEERING CHEMISTRY LABORATORY (Common to All)			
Subject Code	21CMCHL1070/ 21CMCHL2070	IA Marks	15
Number of Practice Hr/Week	3	Exam Marks	35
Total Number of Practice Hr	36	Exam Hours	03
Credits – 1.5			

List of Experiments

(Any 10 experiments must be conducted)

Determination of HCl using standard Na2CO3 solution
Determination of alkalinity of a sample containing Na2CO3 and NaOH
Determination of surface tension
Determination of viscosity of a liquid by Ostwald viscometer
Determination of chloride content of water
Determination total hardness of water by EDTA.
Determination of Mg^{+2}using standard oxalic acid solution.
Determination of Cu^{+2}using standard hypo solution.
Determination of the rate constant of first order reaction (Ester hydrolysis)
Determination of strength of strong acid using conductometeric titration.
Determination of strength of weak acid using conductometeric titration .
Determination of Ferrous iron using potentiometer.
Chemical oscillations- Iodine clock reaction
Estimation of Vitamin C.

Demonstration Experiments

Thin Layer Chromatography
Determination of $Fe^{+3}$by a colorimetric method.

Question paper pattern:

Ten questions are given, and student should choose one question (blind option), which carries 50 marks in total.

a. 10 marks are allotted for procedure including circuit diagrams and model graphs.
b. 10 marks for conduction of the experiment.
c. 05 marks for results and conclusions.
10 marks for viva voce.

DATA STRUCTURES LAB (Common to AI& ML,CSE,CST&IT)			
Subject Code	**2**1AMAMPL2060/21CSCSPL 2060 21CTCTP2060/21ITITP2060	IA Marks	15
Number of Practice Hr/Week	03	Exam Marks	35
Total Number of Practice Hr	36	Exam Hours	03
Credits – 1.5			

COURSE OBJECTIVES:

The objectives of this course, help the students

- Demonstrate the different data structures implementation

List of Experiments

Exercise -1 (Arrays and Dynamic memory allocation)

- Write C program to insert and delete the elements of one dimensional array.
- Write C program to create Dynamic memory allocation using malloc (), calloc ().
- Write C program to create Dynamic memory allocation using realloc ().

Exercise -2 (Searching)

- Write C program that use both recursive and non-recursive functions to perform Linear search for a key value in a given list.
- Write C program that use both recursive and non-recursive functions to perform Binary search for a key value in a given list.

Exercise -3 (Sorting-I)

- Write C program that implement Bubble sort, to sort a given list of integers in ascending order.
- Write C program that implement Quick sort, to sort a given list of integers in ascending order.

- Write C program that implement Insertion sort, to sort a given list of integers in ascending order.
- Write C program that implement merge sort, to sort a given list of integers in ascending order.

Exercise -4(Singly Linked List)

- Write a C program that uses functions to create a singly linked list.
- Write a C program that uses functions to perform insertion operation on a singly linked list.
- Write a C program that uses functions to perform deletion operation on a singly linked list.
- Write a C program to reverse elements of a single linked list.

Exercise -5(Queue)

- Write C program that implement Queue (its operations) using arrays.
- Write C program that implement Queue (its operations) using linked lists.

Exercise -6(Stack)

- Write C program that implement stack (its operations) using arrays.
- Write C program that implement stack (its operations) using Linked list.
- Write a C program that uses Stack operations to evaluate postfix expression.

- **Exercise -7(Binary Tree)**

Write a recursive C program for traversing a binary tree in preorder, in order and post order.

Exercise -8(Binary Search Tree)

- Write a C program to Create a BST
- Write a C program to insert a node into a BST.
- Write a C program to delete a node from a BST.

COURSE OUTCOMES:

By the end of this lab the student can

- Making use of basic data structures such as arrays and linked list to solve problems.
- Demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
- Solve various searching and sorting problems.

Course Outcomes to Program Outcomes Mapping

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
1	3	3	3									2		2
2	3	3	3									2		2
3	3	3	3									2		2
4	3	3	3									2		2
5	3	3	3									2		2
Course	**3**	**3**	**3**									**2**		**2**

ENGINEERING WORKSHOP LAB			
Subject Code	21CEMEL2080/21ECMEL2080 21ETMEL2080/21EEMEL2080/ 21MEMEL2080	IA Marks	15
Number of Lecture Hours/Week	L(0)+T(0)+P(3)	Exam Marks	35
Total Number of Lecture Hours	36	Exam Hours	3
Credits – 1.5			

Course objectives: On completion of the course students should be able to

1. Learn basic use of hand tools along with the techniques and methods applicable to the carpentry trade
2. Learn basic use of hand tools along with the techniques and methods applicable to the fitting trade
3. Learn basic use of hand tools along with the techniques and methods applicable to the forging trade
4. Learn basic use of hand tools along with the techniques and methods applicable to the casting trade
5. Learn basic use of hand tools along with the techniques and methods applicable to the welding trade

EXPERIMENTS

1. Preparation of T Lap joint using carpentry.
2. Preparation of Cross Lap joint using carpentry.
3. Preparation of Square fit using mild steel specimen.
4. Preparation of V fit using mild steel specimen.
5. Conversion of round rod to square rod by forging operation.
6. Preparation of *S* hooks by forging operation.
7. Preparation of green sand mould for a single piece pattern
8. Preparation of green sand mould for a split piece pattern
9. Preparation of a Butt joint using arc welding
10. Preparation of a Lap joint using arc Welding

ADDITIONAL EXPERIMENTS

1. Preparation of electrical wiring connections using wiring (one lamp controlled by one switch)
2. Preparation of house wiring (stair case wiring)

Course outcomes: On successful completion of this course, the students will be able to

1. Perform the joinery work of wooden pieces using carpentry.
2. Perform the joinery work of metallic pieces using fitting.
3. Produce the required shaped metallic products using black smithy.
4. Make the green sand moulds using different patterns
5. Fabricate different components using welding.

Question paper pattern:

Ten questions are given, and student should choose one question (blind option), which carries 50 marks in total.

a. 15 marks are allotted for procedure including circuit diagrams and model graphs.
b. 15 marks for conduction of the experiment.
c. 10 marks for results and conclusions.
d. 10 marks for viva voce.

COs vs POs MAPPING (HIGH: 3; MEDIUM: 2; LOW: 1)

COs / POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2								2					
CO2	2								2				2	
CO3	2								2				2	
CO4	2								2				2	
CO5	2								2					
CO6	1								1				1	
Course	**2**								**2**				**2**	

CONSTITUTION OF INDIA, PROFESSIONAL ETHICS & HUMAN RIGHTS (Common to all Branches)			
Subject Code	21CMMSN1090/ 21CMMSN2090	IA Marks	30
Number of Lecture Hr/week	03	Exam Marks	70
Total Number of Lecture Hr	50	Exam Hours	03
Credits – 00			

COURSE OBJECTIVES:

The objectives of this course help the students to

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.
3. To understand human rights and its implications.

Unit - I	**Hours**
Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & its limitations.	**10**
Unit - II	
Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India.	**10**
Unit – III	
State Executives – Governor, Chief Minister, State Legislature High Court of State. Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments.	**10**

Unit –IV	
Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India Powers and functions of Municipalities, Panchyats and Co - Operative Societies.	**10**
Unit – V	
Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.	**10**

COURSE OUTCOMES:

On completion of the course student will

1. Have general knowledge and legal literacy and thereby to take up competitive examinations.
2. Understand state and central policies, fundamental duties.
3. Understand Electoral Process, special provisions.
4. Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, and
5. Understand Engineering ethics and responsibilities of Engineers
6. Understand Engineering Integrity & Reliability

Question paper pattern:

1 Question paper consists of 10 questions.
2 Each full question carrying 14 marks.
3 Each full question will have sub question covering all topics under a unit.
4 The student will have to answer 5 full questions selecting one full question from each unit.

TEXT BOOKS:

1. Durga Das Basu: **"Introduction to the Constitution on India",** (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001

2. Charles E. Haries, Michael S Pritchard and Michael J. Robins **"Engineering Ethics"** Thompson Asia, 2003-08-05.

REFERENCE BOOKS:

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.

2. M.Govindarajan, Natarajan, V.S.Senthilkumar, **"Engineering Ethics",** Prentice –Hall of India Pvt. Ltd. New Delhi, 2004

3. Brij Kishore Sharma,**" Introduction to the Constitution of India"**, PHI Learning Pvt. Ltd., New Delhi, 2011.

4. Latest Publications of Indian Institute of Human Rights, New Delhi

ENVIRONMENTAL SCIENCE			
Subject Code	21CMCHN2090	IA Marks	30
Number of Lecture Hours/Week	2	Exam Marks	70
Total Number of Lecture Hours	32	Exam Hours	03
			Credits – 00

COURSE OBJECTIVES:

The objectives of this course, help the students to

1. Acquire knowledge on global environmental challenges.
2. Learn different types of natural resources
3. Create awareness on biodiversity and ecology.
4. Gain scientific knowledge on environmental pollution
5. Acquire knowledge on water conservation methods and environmental legislation

Unit -1	**Hours**
MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES **Environment** - Definition, Introduction - Scope and Importance - Global environmental challenges, global warming & climate change - Acid rains, ozone layer depletion - Role of Information Technology in Environment and human health.	**6**
Unit -2	
NATURAL RESOURCES Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use, deforestation - Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Floods, drought, , dams – benefits and problems	**6**

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Food resources: Effects of modern agriculture - fertilizer-pesticide problems, water logging, eutrophication, biological magnification and salinity. Energy resources: Renewable and non-renewable energy resources Role of an individual in conservation of natural resources.	
Unit – 3	
ECOSYSTEM AND BIODIVERSITY **Ecosystem** - Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the Forest and grassland ecosystem. **Biodiversity** - Introduction - Definition: genetic, species and ecosystem diversity. – Value of biodiversity: consumptive use, productive use, social, ethical and optional values - Hot-spots ofbiodiversity - Threats to biodiversity: habitat loss - Endangered andendemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	**8**
Unit – 4	
ENVIRONMENTAL POLLUTION Definition, Cause, effects and control measures of : a. Air pollution b. Water pollution c. Soil pollution d. Noise pollution e. Nuclear hazards	**6**

Solid waste Management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution.	
Unit – 5	
SOCIAL ISSUES AND THE ENVIRONMENT Urban problems related to energy -Water conservation, rain water harvesting, Resettlement and rehabilitation of people its problems and concerns. Environment Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act .	**6**
COURSE OUTCOMES: On completion of the course student will be able to 1. Obtain knowledge on global warming & climate change - Acid rains, ozone layer depletion. 2. Preserve several natural resources 3. Summarize the concept of ecosystem 4. Control different types of pollution 5. Understand social issues and environmental legislation	
Question paper pattern: 1. Question paper consists of 10 questions. 2. Each full question carrying 14 marks. 3. Each full question will have sub question covering all topics under a unit. 4. The student will have to answer 5 full questions selecting one full question from each unit.	
TEXT BOOKS: 1. E. Bharucha (2003), "Environmental Studies", University Publishing Company, New Delhi. 2. J.G. Henry and G.W. Heinke (2004), "Environmental Science and Engineering", Second Edition, Prentice Hall of	

India, New Delhi.
3. G.M. Masters (2004)" Introduction to Environmental Engineering and Science", Second Edition, Prentice Hall of India, New Delhi

REFERENCE BOOKS:

1. Text Book of Environmental Studies by Deeksha Dave & P. Udaya Bhaskar, Cengage Learning.
2. Environmental Studies by K.V.S.G. Murali Krishna, VGS Publishers, Vijayawada.
3. Environmental Studies, P.N. Palaniswamy, P. Manikandan, A. Geeta and K. Manjula Rani, Pearson Education, Chennai.

COURSE OUTCOMES TO PROGRAM OUTCOMES MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	-	-	-	-	-	-	3	-	-	-	-	-
2	-	3	-	-	-	-	-	-	-	-	-	-
3	3	-	-	-	-	-	-	-	-	-	-	-
4	-	-	3	-	-	-	-	-	-	-	-	-
5	-	3	-	-	-	-	-	-	-	-	-	-
Course	2	3	2	-	-	-	2	-	-	-	-	-