

**CENTRAL UNIVERSITY OF KARNATAKA  
KALABURAGI  
SCHOOL OF ENGINEERING**



CENTRAL UNIVERSITY OF KARNATAKA

**COURSE STRUCTURE AND SYLLABUS**

**B.Tech. First Year -2020 Batch**

**ELECTRONICS & COMMUNICATION ENGINEERING**

**Learning Outcomes-based Curriculum Framework**

**(Effective from the academic year 2020 –21)**

Department of Electronics & Communications Engineering  
School of Engineering  
Central University of Karnataka  
Kalaburagi-585367

**SCHOOL OF ENGINEERING**  
**COURSE STRUCTURE - FIRST YEAR B. TECH**  
**ELECTRONICS & COMMUNICATION ENGINEERING**  
(Effective from the academic year 2020-21)

<b>I SEMESTER</b>											
Course code	Course Type	Course Title	Teaching Hrs./Week				Examination				Credits
			Theory Lecture	Tutorial	Practical/ Drawing	Total	Duration in Hrs.	IA Marks	End Sem Marks	Total Marks	
			L	T	P						
UECTCC1001	CC	Engineering Physics	3	1	-	4	3	40	60	100	3
UECTCC1002	CC	Engineering Mathematics-I	3	1	-	4	3	40	60	100	3
UECTCC1003	CC	Introduction to Electrical Engineering	3	1	-	4	3	40	60	100	3
UECTCC1004	CC	Programming for Problem Solving	3	1	-	4	3	40	60	100	3
UECPCC1005	CC	Computer Aided Engineering Drawing	1	-	3	4	3	40	60	100	3
UECPCC1006	CC	Programming for Problem Solving Lab	-	-	3	3	3	40	60	100	2
UECPCC1007	CC	Basic Electrical Lab	-	-	3	3	3	40	60	100	2
UECTGE1091	GE	Environmental Science	3	-	-	3	3	40	60	100	2
<b>Total</b>			<b>16</b>	<b>4</b>	<b>9</b>	<b>29</b>	<b>24</b>	<b>320</b>	<b>480</b>	<b>800</b>	<b>21</b>
<b>Note:</b> 1. CC-Core Course, DS-Discipline specific Elective, AE-Ability Enhancement course and GE-Generic Elective courses 2. Environmental Science is a mandatory non-graded course. This course shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree.											

**SCHOOL OF ENGINEERING**  
**COURSE STRUCTURE - FIRST YEAR B. TECH**  
**ELECTRONICS & COMMUNICATION ENGINEERING**  
(Effective from the academic year 2020-21)

<b>II SEMESTER</b>											
Course code	Course Type	Course Title	Teaching Hrs./Week				Examination				Credits
			Theory Lecture	Tutorial	Practical/ Drawing	Total	Duration in Hrs.	IA Marks	End Sem Marks	Total Marks	
			L	T	P						
UECTCC2008	CC	Engineering Chemistry	3	1	-	4	3	40	60	100	3
UECTCC2009	CC	Engineering Mathematics-II	3	1	-	4	3	40	60	100	3
UECTCC2010	CC	Introduction to Electronics Engineering	3	1	-	4	3	40	60	100	3
UECTCC2011	CC	Introduction to Mechanical Engineering	3	-	-	3	3	40	60	100	3
UECTCC2012	CC	Elements of Civil Engineering	3	-	-	3	3	40	60	100	3
UECPCC2013	CC	Basic Electronics Lab	-	-	3	3	3	40	60	100	2
UECTGE2092	GE	English Enhancement Course	-	-	3	3	3	40	60	100	2
UECTGE2093	GE	Constitutions of India and Professional Ethics	3	-	-	3	3	40	60	100	2
<b>Total</b>			<b>18</b>	<b>3</b>	<b>6</b>	<b>27</b>	<b>24</b>	<b>320</b>	<b>480</b>	<b>800</b>	<b>21</b>
<b>Note:</b> 1. CC-Core Course, DS-Discipline specific Elective, AE-Ability Enhancement course and GE-Generic Elective courses 2. English Enhancement and Constitutions of India & Professional Ethics are mandatory non-credit courses. These courses shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree.											



CENTRAL UNIVERSITY OF KARNATAKA

# Central University of Karnataka

(Established by an Act of the Parliament in 2009)

## School of Engineering

Dept.: ECE & EE

First Year Course  
Structure & Syllabus

2020-21

### COURSE CONTENT/SYLLABUS

#### SEMESTER- I

ENGINEERING PHYSICS			
Semester	I	Internal Assessment	40
Course Code	UECTCC1001	End Sem. Exam	60
Teaching Hours/Week (L:T:P)	3:1:0	Exam Duration (Hours)	03
Credits: 03			

#### PREREQUISITE(S)

Basic Physics

#### COURSE OUTCOMES

After completion of this course the student will be able to

- Solve 1 D problems in quantum mechanics
- Explain the basis of energy bands and gaps in solids and semiconductors
- Analyze and solve problem involving variety of wave phenomena
- Apply principles of electromagnetism and Maxwells equation to simple systems
- Explain principles and techniques used in the field of nanoscience

#### DETAILED SYLLABUS

##### UNIT-I

**Waves and Oscillations:** Rectilinear motion, Oscillations or Vibrations, Simple Harmonic Motion, Damped Harmonic motion: Real oscillatory system, Forced or Driven oscillation, Types of Wave; Superposition of Waves, Reflection and Refraction, Standing Waves and Normal Modes, Beats, Resonance, Doppler's Effect

##### UNIT-II


**Electricity and Magnetism:** Physical concepts of gradient, divergence, and curl; Laplacian operator, Concept of electricity and magnetism, Coulomb's law, The Lorentz force, Maxwell's equations

##### UNIT-III

**Introduction to Solids and Semiconductors:** Introduction to Quantum Mechanics, Free electron theory of metals, Fermi level, density of states in 1, 2 and 3 dimensions, Kronig-Penney model and origin of energy bands, metals, semiconductors, and insulators.

##### UNIT-IV

**Introduction to nanoscience:** Origin of nanoscience, nanoscale, surface to volume ratio, quantum confinement, dominance of electromagnetic forces, random molecular motion,

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bottom-up fabrication: Sol-gel, CVD and PVD techniques, top-down fabrication: ball mill method, characterization by XRD, SEM and TEM.

### TEXT BOOKS

1. Griffiths, D.J. and Schroeter, D.F., 2018. Introduction to quantum mechanics. Cambridge University Press.
2. Griffiths DJ. Introduction to electrodynamics.
3. The Feynman Lectures on Physics, vol. 2,.
4. Fitzpatrick, R., 2018. Oscillations and waves: an introduction. CRC Press.
5. Solid State Physics, A. J. Dekkar, Macmillan publishers Ind. Ltd.,
6. Solid State Physics, Charles Kittel, Wiley student edition.
7. Fundamentals of Physics, Alan Giambattisa, BM Richardson and Robert C Richardson, Tata McGraw hill Publishers.

### REFERENCES

1. G. Main, "Vibrations and waves in physics", Cambridge University Press, 1993.
2. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006.
3. D. A. Neamen, "Semiconductor Physics and Devices", Times Mirror High Education Group, Chicago, 1997.
4. E.S. Yang, "Microelectronic Devices", McGraw Hill, Singapore, 1988.
5. B.G. Streetman, "Solid State Electronic Devices", Prentice Hall of India, 1995.

### COURSE ASSESSMENT

#### A. Continuous Assessment: (40 Marks)

Internal assessment – 20-30 marks

Remaining 10-20 marks can be divided among- assignment/surprise test/seminar/Quiz/attendance/class work

(no. of assignment, surprise test, quiz and seminar can be decided by faculty)


#### B. End Semester Examination (60 marks)

One full question carries 12-15 marks- Each questions my contains sub divisions form different units.

Marks need to be properly distributed among the units.

Five full questions should be answered

**Total no. of questions -5-8**

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<b>ENGINEERING MATHEMATICS-I</b>			
<b>Semester</b>	<b>I</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECTCC1002</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>3:1:0</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 03</b>			

### Prerequisite Course / Knowledge (If any):

None

### Course Learning Outcomes (CLOs)

After completion of this course successfully, the students will be able to

CLO-1: Solve the consistent system of linear equations

CLO-2: Apply orthogonal and congruent transformations to a quadratic form

CLO-3: Determine the power series expansion of a given function

CLO-4: Find the maxima and minima of multivariable functions

CLO-5: Solve arbitrary order linear differential equations with constant coefficients

CLO-6: Apply the concepts in solving physical problems arising in engineering

## DETAILED SYLLABUS

### UNIT I


**Matrix Theory:** Linear dependence and independence of vectors; Rank of a matrix; Consistency of the system of linear equations; Eigenvalues and eigenvectors of a matrix; Cayley-Hamilton theorem and its applications; Reduction to diagonal form; Reduction of a quadratic form to canonical form - orthogonal transformation and congruent transformation; Properties of complex matrices - Hermitian, skew-Hermitian and Unitary matrices.

### UNIT II

**Differential Calculus:** Taylor's theorem with remainders; Taylor's and Maclaurin's expansions; Asymptotes; Curvature; Curve tracing; Functions of several variables - partial differentiation; total differentiation; Euler's theorem and generalization; Change of variables - Jacobians; maxima and minima of functions of several variables (2 and 3 variables) - Lagrange's method of multipliers.

### UNIT III

**Ordinary differential equations of first order:** Formation of differential equations; variable separable equations; homogeneous and non-homogeneous equations; exact and non-exact

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equations; integrating factors; linear first order equations; Bernoulli's equation; applications- Newton's law of cooling, Law of natural growth and decay, orthogonal trajectories.

### UNIT IV

**Linear Differential Equations of Higher order:** Definition, Complete solution, Operator D, Rules for finding complementary function, Inverse operator, Rules for finding particular integral, Method of variation of parameters, Cauchy's and Legendre's linear equations, Simultaneous linear equations with constant coefficients and applications of linear differential equations to oscillatory Electrical Circuits L-C, LCR – Circuits.

### Reference Books

1. R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", Fifth Edition, Narosa Publishing House, 2016
2. Erwin Kreyszig, "Advanced Engineering Mathematics", Eighth Edition, John Wiley and Sons, 2015
3. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publications, 2015


### COURSE ASSESSMENT

#### A. Continuous Assessment: (40 Marks)

- Internal assessment – 20-30 marks
- Remaining 10-20 marks can be divided among- assignment/surprise test/seminar/Quiz/attendance/class work  
(no. of assignment, surprise test, quiz and seminar can be decided by faculty)

#### B. End semester examination (60 marks)

- One full question carries 12-15 marks- Each questions my contains sub divisions form different units.
- Marks need to be properly distributed among the units.
- Five full questions should be answered
- Total no. of questions -5-8

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<b>INTRODUCTION TO ELECTRICAL ENGINEERING</b>			
<b>Semester</b>	<b>I</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECTCC1003</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>3:1:0</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 03</b>			

### PREREQUISITE(S)

Physics fundamental, Electromagnetic basics, Linear algebra, vector analysis, matrix analysis and complex numbers.

### COURSE OUTCOMES

After Completion of the course the student should able to

- CO1- Apply basic laws and analyse electrical circuits.
- CO2- Understand transformer working principle and its usage.
- CO3- Understand electrical machines working principle and their applications.
- CO4- Understand LT and domestic electrical safety, wiring and different measuring instrument and their use.

### DETAILED SYLLABUS

#### Unit I

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits. Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections.

**RBT levels: L1, L2**

#### Unit II


Magnetic materials, BH characteristics, series and parallel magnetic circuits, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

**RBT levels: L1, L2**

#### Unit-III

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic, loss components, efficiency and applications.



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Construction, working, torque-speed characteristic and applications of separately excited dc motor. Construction and working of synchronous generators.

**RBT levels: L1, L2, L3**

### Unit IV

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup. Lamps- fluorescent, CFL, LED. Electrical measuring instruments principle and applications- energy meter, megger, tong tester. Electrical Wiring

**RBT levels: L1, L2**

### Text/Reference books

1. Fitzgerald, D. E. Higginbotham, A. Grabel, Basic Electrical Engineering, 5th Edition, McGraw-Hill, 2009.
2. William H. Hayt Jr. , Jack E. Kemmerly, Steven M. Durbin, Engineering Circuit Analysis, 6th Edition, TMH, 2002
3. Olle I. Elgerd, Basic Electric Power Engineering, Addison-Wesley, 1977. Edward Hughes, Electrical Technology, 7th Edition, Longman, 1995.
4. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
5. L.S. Bobrow, Fundamentals of Electrical Engineering”, Oxford University Press, 2011
6. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010

### Course Assessment


#### A. Internal Assessment: (40 Marks)

- Internal assessment – 20-30 marks
- Remaining 10-20 marks can be divided among- assignment/surprise test/seminar/ Quiz/attendance/class work

(no. of assignment, surprise test, quiz and seminar can be decided by faculty)

#### B. End semester examination (60 marks)

- One full question carries 12 marks- Each questions my contains sub divisions form different units.
- Marks need to be properly distributed among the units.
- Five full questions should be answered
- Total no. of questions -8

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<b>PROGRAMMING FOR PROBLEM SOLVING</b>			
<b>Semester</b>	<b>I</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECTCC1004</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>3:1:0</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 03</b>			

### PREREQUISITE(S)

- Mathematics (Algebra, Geometry etc.) knowledge, Analytical and Logical skills.

### COURSE OUTCOMES

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

CO1- Understand concept of algorithms and flowcharts for solving problems.

CO2- Understand the basic principles of Programming in C language.

CO3- Develop the problem-solving skills using C language.

CO3- Decompose a problem into functions and to develop modular reusable code.

CO4- Apply the concepts of arrays, pointers, strings and structures to write C programs.

### DETAILED SYLLABUS

#### UNIT-1

**Introduction to Computer Problem Solving:** Steps in solving logical and numerical problems. Representation of Algorithm, Flowchart and Pseudo code with examples. Program design and structured programming.

**Introduction to 'C' Programming Language:** Background, Basic structure of C program, executing a C program. Constant, variables and data types, operators and expressions.


**RBT levels: L1, L2**

#### UNIT-2

**Conditional Branching and Loops:** Conditional branching Statements (if, if-else, nested if-else and switch statements) in C, Loop control statements (For, while-do, do-while) in C, break and continue, Programming examples and exercises.

**Managing Input and Output operations:** Simple input and output with scanf and printf, formatted I/O, Command line arguments.

**RBT levels: L1, L2**

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### UNIT-3

**Arrays:** Concepts, Using Arrays (1-D and 2-D) in C, Array Applications, Searching and Sorting algorithms (Linear search, Binary Search, Selection and Bubble Sort), example programs.

**Strings:** Introduction to strings in C, handling strings as array of characters, basic string functions available in C, arrays of strings.

**Functions:** Functions in C, user defined functions, Argument Passing – call by value, call by reference, Recursion, Programming examples and exercises.

**RBT levels: L1, L2, L3**

### UNIT-4

**Structures:** Basics of structures, Definition and Initialization of structures, unions, Array of structures, example programs.

**Pointers:** Idea of pointers, Defining pointers, pointers and functions (call by reference) arguments, pointers and arrays, example programs.

**Pre-processor directives:** Introduction to Preprocessors, compiler control Directives.

**RBT levels: L1, L2, L3**

### TEXT BOOKS

1. E. Balaguruswamy, Programming in ANSI C, 7<sup>th</sup> Edition, Tata McGraw-Hill
2. Brian W. Kernighan and Dennis M. Ritchie, The “C” Programming Language, Prentice Hall of India
3. V Rajaraman: Computer Programming in C, PHI, 2013.

### REFERENCE BOOKS

1. Jacqueline Jones & Keith Harrow: Problem Solving with C, 1<sup>st</sup> Edition, Pearson 2011
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
3. Vikas Gupta: Computer Concepts and C Programming, Dreamtech Press 2013.
4. R S Bichkar, Programming with C, University Press, 2012.


### COURSE ASSESSMENT

#### A. Internal Assessment (Weightage 40 Marks)


- Two continuous assessments will be conducted with **each one for 15 marks** weightage
- Remaining 10 marks will be given for Assignments/surprise test/seminar/Quiz/attendance/class work

(no. of assignment, surprise test, quiz and seminar can be decided by faculty)

#### B. End Sem Examination (Weightage 60 Marks)

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- One full question carries 15 Marks. Full question may be divided further into sub questions.
- There will be two full questions from each unit and a total of EIGHT FULL QUESTIONS.
- Student has to answer FOUR FULL QUESTIONS one from each unit i.e., Answering one full question from each unit is mandatory.

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<b>COMPUTER AIDED ENGINEERING DRAWING</b>			
<b>Semester</b>	<b>I</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECPCC1005</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>1:0:3</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 03</b>			

### PREREQUISITE(S)

None

### COURSE OUTCOMES

After completing this Course, the students should be able to:

- CO1. Understand the points and lines with all quadrant systems.
- CO2. Apply the concepts of planes to draw the projections.
- CO3. Apply the concepts of solids to draw the projections.
- CO4. Apply the knowledge of isometric concept for drawing the projections.

### DETAILED SYLLABUS

#### UNIT-I

**Introduction to Computer Aided Sketching:** Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Introduction to Solid Edge standard tool bar/menus. Co-ordinate system, points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning conventions.

**Orthographic Projections:** Projections of points, Projections of straight lines (First Angle Projection), True and apparent lengths.

**RBT Levels: L1, L2.**

#### UNIT-II

**Orthographic Projections of Plane Surfaces:** Projections of plane surfaces.

**RBT Levels: L1, L2, L3.**


#### UNIT-III

**Projections of Solids:** Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions.

**RBT Levels: L1, L2, L3.**

#### UNIT-IV

**Isometric Projection:** Isometric scale, projection of plane figures, solids: tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, truncated solids,

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combinations.

**RBT Levels: L1, L2, L3, L4.**

### TEXT BOOKS

1. Bhatt N.D., Panchal V.M. & Ingle P.R. (2014), Engineering Drawing, Charotar Publishing House.
2. A Primer on Computer Aided Engineering Drawing-2006, Published by VTU, Belgaum.
3. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer
4. Graphics for Design and Production- by Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005- Prentice Hall of India Pvt. Ltd., New Delhi.
5. Engineering Graphics by K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore.

### REFERENCE BOOKS

1. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
2. Agrawal B. & Agrawal C.M. (2012), Engineering Graphics, TMH Publication
3. Engineering Graphics & Design, A.P. Gautam & Pradeep Jain Khanna Publishing House
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers. (Corresponding set of) CAD Software Theory and User Manuals.

### ONLINE RESOURCES


1. <https://nptel.ac.in/courses/112/103/112103019/#>

### COURSE ASSESSMENT


#### A. Internal Assessment (Weightage 40 Marks)

- Two internal assessments will be conducted with each one of 10 marks weightage
- Remaining 20 marks will be given for Assignments/Quiz/Seminar etc. based on the decision of subject in charge.
- If only Quizzes (MCQ type) are preferred then minimum of five are to be conducted and necessary proof has to be maintained.
- If only assignments are considered then Eight Assignments are to be given with two each from respective units.
- In case of seminar, student must give 45 minutes presentation and ppt file has to be submitted to the subject incharge & department.

#### B. End Sem Examination (Weightage 60 Marks)

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- One full question carries 10 to 25 Marks. Full question may be divided further into sub questions. Half marks will be given to hand drafting and remaining half will be given to computer sketching.
- There will be one or two full questions from each unit and a total of FOUR to SIX FULL QUESTIONS.
- Student will be given choice among 6 questions can answer any 5.

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<b>PROGRAMMING FOR PROBLEM SOLVING LABORATORY</b>			
<b>Semester</b>	<b>I</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECPCC1006</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>0:0:3</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 02</b>			

### PREREQUISITES

- Mathematics (Algebra, Geometry etc.) knowledge, Analytical and Logical skills.
- Knowledge of Algorithms and Flowcharts

### COURSE OUTCOMES

On completion of this lab, the students should be able to:

- Develop algorithms, flowchart and programs for solving problems.
- Identify and correct the syntax and logical errors of the program.
- Design and develop modular programming skills
- Develop Iterative and Recursive programs based on the requirement
- Apply the concepts of arrays, pointers, strings and structures to write C programs.

### LABORATORY PROGRAMS


#### PART-A

1. Develop a program to compute the roots of a quadratic equation by accepting the coefficients. Print appropriate messages.
2. Develop a program to find the reverse of a positive integer and check for palindrome or not. Display appropriate messages.
3. Develop a program to find the square root of a given number N and execute for all possible inputs with appropriate messages. Note: Don't use library function sqrt(n).
4. Develop a program to implement Binary search using 1D array.
5. Develop a program to introduce 2D Array manipulation and implement Matrix multiplication and ensure the rules of multiplication are checked.
6. Develop a program to sort the given set of N numbers using Bubble sort.

#### PART-B

7. Develop a function isprime(num) that accepts an integer argument and returns 1 if the argument is prime, a 0 otherwise. Write a program that invokes this function to generate prime numbers between the given range.
8. Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
9. Implement Recursive function to generate Fibonacci series.
10. Implement Recursive function for Binary to Decimal conversions.



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11. Write a program to maintain a record of n student details using an array of structures with four fields (Roll number, Name, Marks, and Grade). Assume appropriate data type for each field. Print the marks of the student, given the student name as input.
12. Write a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of n real numbers.

## COURSE ASSESSMENT

### A. Internal Assessment (Weightage 40 Marks)


- Two continuous assessments (one for each part) will be conducted with each one of 15 marks weightage.
- Marks distribution for 15 marks IA in each part:  
Procedure + Execution + Viva = 2+11+2 = 15
- Remaining 10 marks will be given for writing lab manual consisting of Algorithm, Flowchart, Program and outputs for every experiment.

### B. End Sem Examination (Weightage 60 Marks)

- Students are allowed to pick one program from PART-A and one program from PART-B and are given equal opportunity. So, students have to write and execute two programs in total.
- **Marks Distribution**
  - I. PART-A Experiment – Procedure + Execution + Viva = 4 + 21 + 5 = 30 Marks
  - II. PART-B Experiment – Procedure + Execution + Viva = 4 + 21 + 5 = 30 Marks

## INSTRUCTIONS (if any):

- Every experiment should have an algorithm and flowchart be written before writing the program.
- Code should be traced using minimum two test cases which should be recorded
- Implement the programs with WINDOWS / LINUX platform using appropriate C compiler.

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<b>BASIC ELECTRICAL LABORATORY</b>			
<b>Semester</b>	<b>I</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECPCC1007</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>0:0:3</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 02</b>			

### PREREQUISITES

1. Theory of Basic Electrical Engineering
2. Engineering Mathematics

### COURSE OUTCOMES

After completing this Course, the students should be able to:


1. Identify the common electrical components and measuring instruments used for conducting
2. Calculate and Analyze power consumed and power factor of lamps.
3. Determine the impedance of an electric circuit and power consumed in a three-phase load.
4. Measure the earth resistance and understand the usage of Megger.
5. Understanding the difference between single phase and three phase systems.

### LIST OF EXPERIMENTS

Sl.No	List of Experiments
1.	Understanding basic electrical components, tools, domestic wiring and meters.
2.	Measurement of current, power, and power factor of incandescent lamp, Fluorescent lamp and LED lamp.
3.	Measurement of resistance and inductance of a choke using 3 voltmeter method.
4.	Verification of KCL and KVL for DC Circuit.
5.	Study of effect of open and short circuit in simple circuit.
6.	Two way and three-way control of lamp and formation of truth table.
7.	Measurement of earth resistance and understanding the usage of megger.
8.	Verification of Thevenin's and Norton's theorems.
9.	Measurement of three phase power using two wattmeter method
10.	Determination of phase and line quantities in three phase star and delta connected loads.
11.	Demonstration of cut-out sections of machines.
12.	Demonstration of significance of Pipe and Plate Earthing

### TEXT BOOKS

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.

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- L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.

## REFERENCE BOOKS

- E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
- Vincent Del Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.

## ONLINE RESOURCES

- <https://nptel.ac.in/courses//>


## COURSE ASSESSMENT

### A. Continuous Assessment (Weightage 40 Marks)

- One internal assessment will be conducted with each one of 30 marks weightage
- Remaining 10 marks will be given for Lab Record.
- Marks can be given for Punctuality.

### B. End Sem Examination (Weightage 60 Marks)

- The two Lab experiments will be given for independent conduction to each student for 50 marks.
- Student has to answer viva voce for 10 marks.

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<b>ENVIRONMENTAL SCIENCE</b>			
<b>Semester</b>	<b>I</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECTGE1091</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>3:0:0</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 02</b>			

### PREREQUISITIES

- Concept of environment.
- Basics of environment, ecology and technology.

### COURSE OUTCOMES

After completing this Course, the students should be able to:

- CO1. Identify the Components of Environment Ecosystem: Types & Structure, Scope and the Impacts of Agriculture & Housing, Industry, Mining & Transportation.
- CO2. Ascertain the importance of. Natural Resources and different types of Energy.
- CO3. Comprehend the Environmental Pollutions and Global Environmental Issues.
- CO4. Examine the Air Pollution & Automobile Pollution their Effects and Solid Waste Management their sources, Characteristics.

### DETAILED SYLLABUS

#### UNIT-I

**Introduction:** Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security. Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation. Environmental Impact Assessment, Sustainable Development.

**RBT Levels: L1, L2.**

#### UNIT-II

**Natural Resources, Water resources:** Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle.

**Energy:** Different types of energy, Conventional sources & Non-Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy.


**RBT Levels: L1, L2.**

#### UNIT-III

**Environmental Pollution:** Water Pollution, Noise pollution, Land Pollution, Public Health Aspects.

**Global Environmental Issues:** Population Growth, Urbanization, Land Management, Water & Waste Water Management.

**RBT Levels: L1, L2.**

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### UNIT-IV

**Air Pollution & Automobile Pollution:** Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures.

Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods.

**RBT Levels: L1, L2, L3.**

### TEXT BOOKS

1. Benny Joseph (2005), “Environmental Studies”, Tata McGraw – Hill Publishing Company Limited.
2. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), “Environmental Studies”, Wiley India Private Ltd., New Delhi.
3. R Rajagopalan, “Environmental Studies – From Crisis to Cure”, Oxford University Press, 2005,
4. Aloka Debi, “Environmental Science and Engineering”, Universities Press (India) Pvt. Ltd. 2012


### REFERENCE BOOKS

1. Raman Sivakumar, “Principals of Environmental Science and Engineering”, Second Edition, Cengage learning Singapore, 2005 63 64
2. P. Meenakshi, “Elements of Environmental Science and Engineering”, Prentice Hall of India Private Limited, New Delhi, 2006
3. S.M. Prakash, “Environmental Studies”, Elite Publishers Mangalore, 2007
4. Erach Bharucha, “Text Book of Environmental Studies”, for UGC, University press, 2005
4. Erach Bharucha, “Text Book of Environmental Studies”, for UGC, University press, 2005
5. G.Tyler Miller Jr., “Environmental Science – working with the Earth”, Tenth Edition, Thomson Brooks /Cole, 2004
6. G.Tyler Miller Jr., “Environmental Science – working with the Earth”, Eleventh Edition, Thomson Brooks /Cole, 2006
7. Dr.Pratiba Sing, Dr.Anoop Singh and Dr.Piyush Malaviya, “Text Book of Environmental and Ecology”, Acme Learning Pvt. Ltd. New Delhi

### COURSE ASSESSMENT

#### A. Continuous Assessment (Weightage 40 Marks)


- Two assessments will be conducted with each one of 15 marks weightage
- Remaining 10 marks will be given for Assignments/Quiz/Seminar etc. based on the decision of subject incharge.
- If only Quizes (MCQ type) are preferred then minimum of five are to be conducted and necessary proof has to be maintained.
- If only assignments are considered then Four Assignments are to be given with one each from respective units.

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- In case of seminar, student must give 45 minutes presentation and ppt file has to be submitted to the subject in charge & department.

**B. End Sem Examination (Weightage 60 Marks)**

- The question paper will have eight full questions carrying equal marks.
- Each full question will be for 10 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module. The students will have to answer six full questions.

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## SEMESTER- II

<b>ENGINEERING CHEMISTRY</b>			
<b>Semester</b>	<b>II</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECTCC2008</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>3:1:0</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 03</b>			

### PREREQUISITE(S)

Basic Chemistry

### COURSE LEARNING OUTCOMES

After completion of this course successfully, the students will be able to

- CLO-1: Apply the chemistry knowledge in solving engineering problems of society.
- CLO-2: Understand the fundamentals of electrochemistry, polymer chemistry and water technology
- CLO-3: Assemble the concepts of chemistry that are in immediate need for engineering disciplines.
- CLO-4: Analyze various technologies available in electrochemistry, polymer chemistry, water & fuels.
- CLO-5: Develop problem solving skills using chemistry knowledge in an integrated approach.

### DETAILED SYLLABUS

#### UNIT-I


**Electrochemistry:** Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).

**Corrosion:** Causes and effects of corrosion, Types of corrosion ,Corrosion control methods

**Battery Technology:** Classification of batteries, emf of batteries, Modern batteries. Fuel cells and their applications.

#### UNIT-II

**Polymer Chemistry:** Introduction, Classification of polymers, Use and disposal of polymers, Polymer terminologies, commercially important polymers with synthesis and applications (plastics, fibres, adhesives, elastomers, conducting polymers), properties of polymers- Solubility, Molecular Weight, Crystallinity, Glass transition temperature, Role of additives in polymers, Reinforced plastics.

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### UNIT-III

**Water Technology:** Chemical analysis of water. Hardness of water. Determination of dissolved oxygen (DO) by Winkler or Iodometric method. Reverse osmosis. Source of water pollution. Chemical oxygen demand (COD) and Biological oxygen demand (BOD). Treatment of domestic waste. Nano-technology associated with water.

### UNIT-IV

**Chemical fuels:** Introduction, classification with examples, calorific value-classification (HCV & LCV), determination of calorific value of solid and liquid fuels using Bomb calorimeter-numerical problems. Petroleum cracking -fluidized bed catalytic cracking. Reformation of petrol, Knocking in IC engine, its ill effects and prevention. Power alcohol and its advantages. Synthetic petrol – Bergius process. Renewable and non-renewable energies. Biofuel. Solar Energy. Nuclear fuel.

### TEXT BOOKS

1. Text book of Engineering Chemistry by Dr. K. Pushpalatha, published by Wiley publications 2nd edition.
2. A text book of Engineering Chemistry 15th Edition by P.C.Jain and Monica Jain, Dhanpat Rai Publishing Co (P) Ltd., New Delhi.
3. A textbook of Engineering Chemistry: Jain and Jain, Dhanpatrai Publication.
4. A textbook of Engineering Chemistry: S. S. Dara, S. Chand Publication 2010 edn.
5. A textbook of Engineering Chemistry: Shashi Chawla, Dhanpatrai Publication

### REFERENCES

1. Principles of Physical Chemistry by B.R.Puri, L.R.Sharma and M.S.Pathania, Nagin Chand and Co.
2. Text book of Physical Chemistry by Soni and Dharmatha, S.Chand & Sons.
3. Text book of Polymers science by Gowariker and Vishwanathan.
4. Corrosion Engineering by M.G.Fontana, Mc Graw Hill Publications.
5. Introduction to Nanotechnology: Charles P. Poole, Frank J. Owens.

### COURSE ASSESSMENT


#### A. Continuous Assessment: (40 Marks)

- Internal assessment – 20-30 marks
- Remaining 10-20 marks can be divided among- assignment/surprise test/seminar/Quiz/attendance/class work  
(no. of assignment, surprise test, quiz and seminar can be decided by faculty)

#### B. End semester examination (60 marks)

- One full question carries 12 marks- Each questions my contains sub divisions form different units.
- Marks need to be properly distributed among the units.



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- Five full questions should be answered
- Total no. of questions -8

<b>ENGINEERING MATHEMATICS-II</b>			
<b>Semester</b>	<b>II</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECTCC2009</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>3:1:0</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 03</b>			

### PREREQUISITES:

Mathematics-I

### COURSE OUTCOMES

After completion of this course successfully, the students will be able to

CLO-1: Analyse improper integrals

CLO-2: Evaluate multiple integrals in various coordinate systems

CLO-3: Apply the concepts of gradient, divergence and curl to formulate engineering problems

CLO-4: Convert line integrals into area integrals and surface integrals into volume integrals

CLO-5: Apply Laplace transforms to solve physical problems arising in engineering

### DETAILED SYLLABUS

#### UNIT- I


**Integral Calculus:** Convergence of improper integrals; Beta and Gamma integrals; Differentiation under integral sign; Double and Triple integrals - computation of surface areas and volumes; change of variables in double and triple integrals.

#### UNIT- II

**Vector Calculus:** Scalar and vector fields; vector differentiation; level surfaces; directional derivative; gradient of a scalar field; divergence and curl of a vector field; Laplacian; Line and Surface integrals; Green's theorem in a plane; Stoke's theorem; Gauss Divergence theorem

#### UNIT-III

**Laplace Transforms:** Laplace transforms; inverse Laplace transforms; Properties of Laplace transforms; Laplace transforms of unit step function, impulse function, periodic function; Convolution theorem; Applications of Laplace transforms - solving certain initial value problems, solving system of linear differential equations, finding responses of systems to

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various inputs viz. sinusoidal inputs acting over a time interval, rectangular waves, impulses etc.

## REFERENCE BOOKS

1. R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", Fifth Edition, Narosa Publishing House, 2016
2. Erwin Kreyszig, "Advanced Engineering Mathematics", Eighth Edition, John Wiley and Sons, 2015
3. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publications, 2015


## COURSE ASSESSMENT

### A. Internal Assessment (Weightage 40 Marks)

- Two internal assessments will be conducted with each one of 10 marks weightage
- Remaining 20 marks will be given for Assignments/Quiz/Seminar etc. based on the decision of subject in charge.
- If only Quizes (MCQ type) are preferred then minimum of five are to be conducted and necessary proof has to be maintained.
- If only assignments are considered then Eight Assignments are to be given with two each from respective units.
- In case of seminar, student must give 45 minutes presentation and ppt file has to be submitted to the subject incharge & department.

### B. End Sem Examination (Weightage 60 Marks)

- One full question carries 10 to 25 Marks. Full question may be divided further into sub questions. Half marks will be given to hand drafting and remaining half will be given to computer sketching.
- There will be one or two full questions from each unit and a total of FOUR to SIX FULL QUESTIONS.
- Student will be given choice among 6 questions can answer any 5.

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<b>INTRODUCTION TO ELECTRONICS ENGINEERING</b>			
<b>Semester</b>	<b>II</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECTCC2010</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>3:1:0</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 03</b>			

### PREREQUISITES:

Need Experience with math courses such as Geometry, Physics and Algebra. Students able to figuring out voltage, distribution, and other circuit formulas.

### COURSE OUTCOMES

After studying this course, students will be able to:

- CO1. Describe the operation of Diodes and BJT
- CO2. Design and explain the construction of rectifiers, regulators, and amplifiers.
- CO3. Describe the general operating principles of optoelectronic devices and photodetectors.
- CO4. Explain the different number system and their conversions and construct simple combinational and sequential logic circuits using Flip-flops

### DETAILED SYLLABUS

#### UNIT- I

**Semiconductors:** Bonding forces in solids, Energy bands, Metals, Semiconductors and Insulators, Direct and Indirect semiconductors, Electrons and Holes, Intrinsic and Extrinsic materials, Conductivity and Mobility, Drift and Resistance, Effects of temperature and doping on mobility, Hall Effect.

**RBT Levels: L1, L2.**

#### UNIT-II


**Forward and Reverse biased junctions:** Qualitative description of Current flow at a junction, Reverse bias, Reverse bias breakdown- Zener breakdown, avalanche breakdown, Rectifiers. Optoelectronic Devices, Photodiodes: Current and Voltage in an Illuminated Junction, Solar Cells, Photodetectors. Light Emitting Diode.

**RBT Levels: L1, L2.**

#### UNIT- III

**Bipolar Junction Transistor:** Fundamentals of BJT operation, Amplification with BJTS, BJT Fabrication, The coupled Diode model (Ebers-Moll Model), Switching operation of a transistor, Cutoff, saturation, switching cycle, specifications, Drift in the base region, Base narrowing, Avalanche breakdown.

**RBT Levels: L1, L2.**

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## UNIT- IV

**Digital Electronics Fundamentals:** Difference between analog and digital signals, Number system – Binary, Hexadecimal, Conversion – Decimal to binary, Hexagonal to decimal and vice-versa, Boolean Algebra, Basic to Universal gates, Half and full adder, Multiplexer, Decoder, SR and JK flip-flops, Shift register, 3 bit Ripple counter.

**RBT Levels: L1, L2, L3.**

### TEXT BOOKS

1. Ben. G. Streetman, Sanjay Kumar Banerjee, “Solid State Electronic Devices”, 7<sup>th</sup> Edition, Pearson Education, 2016, ISBN 978-93-325-5508-2.
2. D.P. Kothari, I.J. Nagarath, “Basic Electronics”, 2<sup>nd</sup> Edn. Mc Graw Hill, 2018.

### REFERENCE BOOKS

1. Thomas L. Floyd, “Electronic Devices” Pearson Education, 9<sup>th</sup> Edition, 2012
2. S. M. Sze, Kwok K. Ng, “Physics of Semiconductor Devices”, 3rd Edition, Wiley, 2018.


### COURSE ASSESSMENT

#### A. Internal Assessment (40 Marks)

- Two internal assessments will be conducted with each one of 15 marks weightage
- Remaining 10 marks will be given for Assignments/Quiz/Seminar etc. based on the decision of subject incharge.
- If only Quizes (MCQ type) are preferred then minimum of five are to be conducted and necessary proof has to be maintained.
- If only assignments are considered then Four Assignments are to be given with one each from respective units.
- In case of seminar, student must give 45 minutes presentation and ppt file has to be submitted to the subject in charge & department.

#### B. End Sem Examination (60 Marks)

- One full question carries 15 Marks. Full question may be divided further into sub questions.
- There will be two full questions from each unit and a total of EIGHT FULL QUESTIONS.
- Students have to answer FOUR FULL QUESTIONS selecting at least ONE FULL QUESTION from each unit.

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INTRODUCTION TO MECHANICAL ENGINEERING			
Semester	II	Internal Assessment	40
Course Code	UCTCC2011	End Sem. Exam	60
Teaching Hours/Week (L:T:P)	3:0:0	Exam Duration (Hours)	03
Credits: 03			

### PREREQUISITES:

Basics of Algebra and Trigonometry.

### COURSE OUTCOMES

After completing this Course, the students should be able to:

- CO1. Understand different energy sources and their effective utilization.
- CO2. Distinguish different types of turbines & Boilers and their uses.
- CO3. Understand engineering materials and their uses.
- CO4. Understand the concepts of automation and robotics.

### DETAILED SYLLABUS

#### UNIT-I

**Sources of Energy:** Introduction and application of energy sources like fossil fuels, hydel, solar, wind, nuclear fuels and bio-fuels; environmental issues like global warming and ozone depletion.

Basic concepts of Thermodynamics: Introduction, states, concept of work, heat, temperature; Zeroth, 1st, 2nd and 3rd laws of thermodynamics. Concept of internal energy, enthalpy and entropy (simple numericals).

**Steam:** Formation of steam and thermodynamic properties of steam (simple numericals).

**Boilers:** Introduction to boilers, classification, Lancashire boiler, Babcock and Wilcox boiler. Introduction to boiler mountings and accessories (no sketches).


**Turbines:** Hydraulic Turbines – Classification and specification, Principles and operation of Pelton wheel turbine, Francis turbine and Kaplan turbine (elementary treatment only).  
**Hydraulic Pumps:** Introduction, classification and specification of pumps, reciprocating pump and centrifugal pump, concept of cavitation and priming.

**RBT Levels: L1, L2.**

#### UNIT-II

**Engineering Materials: Types** and applications of Ferrous & Nonferrous metals and alloys,

**Composites:** Introduction: Definition, Classification and applications (Air craft and Automobiles)

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**Soldering, Brazing and Welding:** Definitions, classification and method of soldering, Brazing and welding. Differences between soldering, Brazing and Welding. Description of Electric Arc Welding and Oxy-Acetylene Welding

**RBT Levels: L1, L2.**

### UNIT-III

**Machine Tools and Automation Machine Tools Operations:**

Turning, facing, knurling, Thread cutting, Taper Turning by swiveling the compound rest, Drilling, Boring, Reaming, Tapping, Counter Sinking, Counter Boring, -Plane milling, End milling, Slot milling.

**Introduction to Advanced Manufacturing Systems Computer Numerical Control (CNC):** Introduction, components of CNC, open loop and closed loop systems, advantages of CNC, CNC Machining centers and Turning centers.

**RBT Levels: L1, L2.**

### UNIT-IV

**Robotics: Introduction,** classification based on robots configuration; Polar, cylindrical, Cartesian Coordinate and spherical. Application, Advantages, and disadvantages

**Automation: Definition,** types –Fixed, Programmable & Flexible automation, NC/ CNC machines: Basic elements with simple block diagrams, advantages and disadvantages.


**RBT Levels: L1, L2.**

### TEXT BOOKS

1. S.TrymbakaMurthy, “A Text Book of Elements of Mechanical Engineering”, 4th Edition 2006, Universities Press (India) Pvt Ltd, Hyderabad.
2. Pravin Kumar, “Basic Mechanical Engineering”, 2013 Edition, Pearson.
3. K.R.Gopalkrishna, “A text Book of Elements of Mechanical Engineering”- Subhash Publishers, Bangalore. (Module -1,2,3,4,5)
4. Elements of Mechanical Engineering by K.P. Roy, S K Hajra Choudhury, A K Hajra Choudhury, Media Promoters, 2012

### REFERENCE BOOKS

1. V.K.Manglik, “Elements of Mechanical Engineering”, PHI Publications, 2013. (Module 1,2,4,5)
2. MikellP.Groover, “Automation, Production Systems & CIM”, 3<sup>rd</sup> Edition, PHI (Module -3)
3. K.P.Roy, S.K.Hajra Choudhury, Nirjhar Roy, “Elements of Mechanical Engineering”, Media Promoters & Publishers Pvt Ltd,Mumbai,7<sup>th</sup> Edition,2012
4. Callister Jr, William D., and David G. Rethwisch. *Callister's Materials Science and Engineering*. John Wiley & Sons, 2020. (Adopted by [R. Balasubramaniam](#))
5. Kaw, Autar K. *Mechanics of composite materials*. CRC press, 2005.
6. Nag, P. K. *Engineering thermodynamics*. Tata McGraw-Hill Education, 2013.

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## COURSE ASSESSMENT

### A. Internal Assessment (Weightage 40 Marks)

- Two internal assessments will be conducted with each one of 15 marks weightage
- Remaining 10 marks will be given for Assignments/Quiz/Seminar etc. based on the decision of subject incharge.
- If only Quizes (MCQ type) are preferred then minimum of five are to be conducted and necessary proof has to be maintained.
- If only assignments are considered then Four Assignments are to be given with one each from respective units.
- In case of seminar, student must give 45 minutes presentation and ppt file has to be submitted to the subject incharge & department.

### B. End Sem Examination (Weightage 60 Marks)

- One full question carries 10 Marks. Full question may be divided further into sub questions.
- There will be one full question from each unit and a total of SEVEN FULL QUESTIONS.
- Student will be given with 7 questions can answer any 6.

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<b>ELEMENTS OF CIVIL ENGINEERING</b>			
<b>Semester</b>	<b>II</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECTCC2012</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>3:0:0</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 03</b>			

### PREREQUISITES

- Concept of civil engineering.
- Basics of buildings, infrastructure.

### COURSE OUTCOMES

After completing this Course, the students should be able to:

- CO1. Identify the scope and importance of Civil Engineering and mention the applications of various fields of Civil Engineering.
- CO2. Ascertain the importance of Roads, their Classification and explain infrastructure developments and its implications.
- CO3. Comprehend the types of bridges and dams.
- CO4. Examine the sustainability aspect in buildings and apply the concept of embodied energy.

### DETAILED SYLLABUS

#### UNIT-I

**History and Scope of different fields of Civil Engineering:** History of Civil engineering, Building Materials, Civil Engineering Profession and Careers, Branches of Civil Engineering; Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering.

**RBT Levels: L1, L2.**

#### UNIT-II

**Roads and Infrastructure:** Importance and Classification of Roads and their functions, Comparison of Flexible and Rigid Pavements (Advantages and Limitations).

Types of infrastructure, Role of Civil Engineer in the Infrastructural Development, Effect of the infrastructural facilities on socioeconomic development of a country.

**RBT Levels: L1, L2.**


#### UNIT-III

**Bridges and Dams:** Types of Bridges and Culverts, RCC, Steel and Composite Bridges.

Different types of Dams based on Material, Structural behavior and functionality with simple sketches.

**RBT Levels: L1, L2.**



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### UNIT-IV

**Sustainability in Civil Engineering:** Concept of Sustainability, Materials and Resources and Embodied Energy in Buildings, concept of Green Ratings.


**RBT Levels: L1, L2, L3.**

#### TEXT BOOKS

1. Sushil Kumar “Building Materials and construction”, 20th edition, reprint 2015, Standard Publishers.
2. Dr. B. C. Punmia, Ashok kumar Jain, Arun Kumar Jain, “Building Construction, Laxmi Publications (P) ltd., New Delhi.
3. Rangawala S. C. “Engineering Materials”, Charter Publishing House, Anand, India.
4. Howard S. Peavy, Donald R. Rowe, George T, Environmental Engineering - McGraw Hill International Edition. New York,2000
5. S. K. Garg, Environmental Engineering vol-I, Water supply Engineering – M/s Khanna Publishers, New Delhi2010.
6. R.S.Khurmi, J.K.Gupta, Civil Engineering, S Chand Pvt Ltd.
7. Gopal Ranjan and Rao A.S.R., Basic and Applied Soil Mechanics, New Age International (P) Ltd., New Delhi. 2. Punmia B C, Soil Mechanics and Foundation Engineering, Laxmi Publications co., New Delhi.
8. S K Khanna and C E G Justo, “Highway Engineering”, Nem Chand Bros, Roorkee. 2. L R Kadiyali, “Highway Engineering”, Khanna Publishers, New Delhi.
9. KS Jagadish, B V Venkatarama Reddy and K S Nanjunda Rao, “Alternative Building Materials and Technologies”, New Age International pub
10. Charles.J.Kibert, Sustainable Construction Green Building Design and Delivery, John Wiley & Sons, INC.

#### REFERENCE BOOKS

1. S. K. Duggal, “Building Materials”, (Fourth Edition)New Age International (P) Limited, 2016 National Building Code(NBC) of India
2. B.C. Punmia, “Surveying Vol.1”, Laxmi Publications pvt. Ltd., New Delhi –2009.
3. CPHEEO Manual on water supply and treatment engineering, Ministry of Urban Development, Government of India, New Delhi.
4. T.W. Lambe and R.V. Whitman, Soil Mechanics-, John Wiley & Sons. 2. Donald P Coduto, Geotechnical Engineering- Phi Learning Private Limited, New Delhi.
5. Relevant IRC Codes. 2. Specifications for Roads and Bridges-MoR T&H, IRC, New Delhi.
6. LEED India, Green Building Rating System, IGBC pub. 3. IGBC Green Homes Rating System, CII pub
7. Allen, D.T. and S honnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
8. Michael.F.Ashby, Materials and the Environment, Elsevier Butterworth-Heinemann, 2009.

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## ONLINE RESOURCES

1. <https://nptel.ac.in/courses/105/106/105106201/>


## COURSE ASSESSMENT

### A. Continuous Assessment (Weightage 40 Marks)

- Two assessments will be conducted with each one of 15 marks weightage
- Remaining 10 marks will be given for Assignments/Quiz/Seminar etc. based on the decision of subject in charge.
- If only Quizzes (MCQ type) are preferred then minimum of five are to be conducted and necessary proof has to be maintained.
- If only assignments are considered then Four Assignments are to be given with one each from respective units.
- In case of seminar, student must give 45 minutes presentation and ppt file has to be submitted to the subject in charge & department.

### B. End Sem Examination (Weightage 60 Marks)

- The question paper will have eight full questions carrying equal marks.
- Each full question will be for 10 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module. The students will have to answer six full questions.

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<b>BASIC ELECTRONICS LAB</b>			
<b>Semester</b>	<b>II</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECPCC2013</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>0:0:3</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 02</b>			

### PREREQUISITE

- Understanding of semiconductors.
- Knowledge of PN junction and working.
- Understanding of BJT working and biasing.
- Understanding of FET working and biasing.

### COURSE OUTCOMES

On the completion of this laboratory course, the students will be able to:


- CO1. Examine the characteristics of basic semiconductor devices.
- CO2. Perform experiments to study the behavior of semiconductor devices for circuit design applications.
- CO3. Calculate various device parameter values from their IV characteristics.
- CO4. Interpret the experimental data for better understanding the device behavior.

### LIST OF EXPERIMENTS: (RBT Levels: L1, L2, L3, L4.)

1. Analyze the I-V Characteristics of normal PN Junction (Ordinary Diode).
2. Analyze the I-V Characteristics of Zener Diode (Special Diode).
3. Study and Analyze the I-V Characteristics of the CE Configuration of BJT.
4. Study and Analyze the I-V Characteristics of the CB Configuration of BJT.
5. Study and Analyze the I-V Characteristics of the CC Configuration of BJT.
6. Study and Analyze the I-V of JFET.
7. Design and analyze constant power supply using a Zener Diode.
8. To construct a Half-wave rectifier circuit and analyze its output.
9. To analyze the HW rectifier output using a capacitor in shunt as a filter.
10. To construct a Full-wave rectifier circuit and analyze its output.
11. To analyze the FW rectifier output using a capacitor in shunt as a filter.
12. To design and analyze regulated power supply using ICs (7805 and 7812).
13. To design and analyze regulated power supply using ICs (7905 and 7912).
14. Study the transfer function and phase shift of a low pass RC filter.
15. Study the transfer function and phase shift of a high pass RC filter.

### COURSE ASSESSMENT

#### A. Internal Assessment (Weightage 40 Marks)

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- Two internal assessments will be conducted with each one of 20 marks weightage
- Remaining 20 marks will be given for Assignments/Mini Project.

### B. End Sem Examination (Weightage 60 Marks)

- All laboratory experiments are to be included for practical examination.
- Students are allowed to pick one experiment from the lot.
- Strictly follow the instructions as printed on the cover page of answer script for breakup of marks.
- Change of experiment is allowed and 15% Marks allotted to the procedure part to be made zero.

<b>ENGLISH ENHANCEMENT COURSE</b>			
<b>Semester</b>	<b>II</b>	<b>Internal Assessment</b>	<b>40</b>
<b>Course Code</b>	<b>UECTGE2092</b>	<b>End Sem. Exam</b>	<b>60</b>
<b>Teaching Hours/Week (L:T:P)</b>	<b>0:0:3</b>	<b>Exam Duration (Hours)</b>	<b>03</b>
<b>Credits: 02</b>			

### PREREQUISITE(S)

Basic English and grammar knowledge.

### COURSE OUTCOMES

After completion of this course successfully, the students will be able to...

CO1: Understand the purpose, summarize and paraphrase the information

CO2: Identify grammatical errors and correct them

CO3: Write a formal report and referencing properly.

CO4: Develop own style of sensible writing

### DETAILED SYLLABUS

#### UNIT-I

#### 1. READING SKILLS

1.1 Types of Reading Skills

1.1.1 Skimming

1.1.2 Scanning

1.1.3 Extensive Reading

1.1.4 Intensive Reading


1.2 Reading Strategies

1.2.1 SQ3R Technique

1.2.2 Reading Efficiently by Reading Intelligently

1.3 Timed Reading Practice

1.3.1 Reading Groups of Words at Each Glance

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### 1.3.2 Reading More Selectively

## UNIT-II

### 2. WRITING AND GRAMMAR

- 2.1 Writing Letters - Part I
  - 2.1.1 Formal Letters - Part I
  - 2.1.2 Letters of Enquiry
  - 2.1.3 Letters of Complaint and Apology
  - 2.1.4 Letters of Request
  - 2.1.5 Email
- 2.2 Grammatical Elements
  - 2.2.1 Phrase
  - 2.2.2 Phrasal Verbs
  - 2.2.3 Prepositional Phrasal Verbs
  - 2.2.4 Adverbial Phrasal Verbs

## UNIT-III

### 3. TECHNICAL WRITING PART- I

- 3.1 Introduction to Technical Writing
- 3.2 Technical Writing Basics
  - 3.2.1 Structuring Your Writing
  - 3.2.2 Positioning Your Writing
  - 3.2.3 Choosing the Right Words
  - 3.2.4 Avoiding Traps
  - 3.2.5 Making Your Technical Writing More Interesting
  - 3.2.6 The 5 Cs of Technical Writing
  - 3.2.7 Referencing

## UNIT-IV


### 4. Nature and Style of Sensible Writing

- 4.1 Describing
- 4.2 Defining
- 4.3 Classifying
- 4.4 Providing examples or evidence
- 4.5 Writing introduction and conclusion

### 5. Writing Practices

- 5.1 Comprehension
- 5.2 Précis Writing
- 5.3 Essay Writing

## TEXT BOOKS/ REFERENCES

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3. Abraham, T. C. Effective Letter Writing. New Delhi: Commonwealth, 2009.
4. Terttu Nevalainen and Sanna-Kaisa Tanskanen. Letter Writing. Amsterdam/Philadelphia: John Benjamin's Publishing Company, 2007.
5. Seely John. Oxford Guide to Effective Writing and Speaking. New Delhi: OUP, 2009.
6. Inthira, S.R and V. Saraswathi (1995) Enrich your English Communication Skills Book (Book I) New Delhi: OUP & CIEFL., Hyderabad.
7. Inthira, S.R and V. Saraswathi (1995) Enrich your English: Academic Skills Book (Book II) New Delhi: OUP & CIEFL., Hyderabad.
8. Tickoo, M. L. and et al. Living English Grammar and Composition. Hyderabad: Orient Longman, 1993.
9. Crystal, David. A Little Book of Language. Hyderabad: Orient Blackswan, 2010.
10. Green, David. Contemporary English Grammar Structures and Composition. Delhi: Macmillan, 2011.
11. English Grammar by Wren and Martin
12. Practical English Usage. Michael Swan. OUP. 1995.
13. Remedial English Grammar. F.T. Wood. Macmillan.2007
14. On Writing Well. William Zinsser. Harper Resource Book. 2001
15. Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
16. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
17. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

## COURSE ASSESSMENT

### A. Continuous Assessment: (40 Marks)

Internal assessment – 20-30 marks

Remaining 10-20 marks can be divided among- assignment/surprise test/seminar/Quiz/attendance/class work

(no. of assignment, surprise test, quiz and seminar can be decided by faculty)

### B. End Semester Examination (60 marks)

One full question carries 12 marks- Each questions my contains sub divisions form different units.

Marks need to be properly distributed among the units.

Five full questions should be answered

Total no. of questions -8