Scheme of Instruction and Syllabi
of
Model Curriculum, AICTE
for
B.Tech. I to IV Semesters
of
Four Year Degree Course
in

COMPUTER SCIENCE AND ENGINEERING

Department of Computer Science and Engineering

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

(Autonomous Institution under UGC, Affiliated to Osmania University)

Accredited by NBA and NAAC-UGC, Chaitanya Bharathi (Post),

Gandipet, Hyderabad – 500075

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

Our Motto: Swayam Tejaswin Bhava

Vision, Mission and Quality Policy of the Institute

VISION

To be a centre of excellence in technical education and research.

MISSION

To address the emerging needs through quality technical education and advanced research.

QUALITY POLICY

Chaitanya Bharathi Institute of Technology imparts value based technical education and training to meet the requirements of student, industry, trade/ profession, research and developmental organisations for self-sustained growth of society.

Vision and Mission of Dept. of

Computer Science and Engineering

VISION

To become a center of excellence in the field of Computer Science and Engineering that produces innovative, skillful and, socially responsible professionals who can contribute significantly to industry and research

MISSION

M1: Identifying emerging areas in the field of Computer Science and Engineering and incorporating in the curriculum

M2: Providing professionals to the country with innovative ideas in certain areas of advanced computing, technologies through research

M3: Participation in the design and developmental process of industries and society

DEPARTMENTOFCOMPUTER SCIENCEAND ENGINEERING

Program Educational Objectives of B.E. (CSE) Program

PEO 1: Practice their profession with confidence by applying new ideas and technologies for the sustainable economic growth of the nation

PEO 2: Pursue higher education for professional growth

PEO 3: Engage in research leading to new knowledge and products or become a successful entrepreneur

BE(CSE) Program Educational Outcomes: At the end of the program, students will be able to:

PO 1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

PO 2: Identify, formulate, review of research literature, and analyses complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

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

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

PO 5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations

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

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

PO 8: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

PO 9: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

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

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

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

Program Specific Outcomes:

PSO 1: Knowledge and skills in the areas of Computer Vision and Machine Learning

PSO 2: Create Innovative career paths through Open Source Technologies

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
(Autonomous)
SCHEME OF INSTRUCTION AND EXAMINATION
B.E (COMPUTER SCIENCE AND ENGINEERING)

SEMESTER – I

S.No	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			Credits
			Hours per week			Duration of SEE in Hours	Maximum Marks		
			L	T	P/D		CIE	SEE	
	THEORY								
1	18MT C01	Mathematics -I	3	1	-	3	30	70	4
2	18CY C01	Chemistry	3	1	-	3	30	70	4
3	18CE C01N*	Engineering Mechanics	3	1	-	3	30	70	4
4	18CS C01	Programming for Problem Solving	3	-	-	3	30	70	3
	PRACTICALS								
5	18ME C01N*	Engineering Graphics and Design	1	-	4	3	30	70	3
6	18CS C02	Programming for Problem Solving Lab	-	-	4	3	25	50	2
7	18CY CO2	Chemistry Lab	-	-	3	3	25	50	1.5
		Total	**13**	**03**	**11**	**-**	**200**	**450**	**21.5**

* With effect from the academic year from 2019-20

L: Lecture D: Drawing CIE - Continuous Internal Evaluation
T: Tutorial P: Practical SEE - Semester End Examination

18MT CO1

MATHEMATICS–I

(Common to all branches and except for Bio-Tech)

Instruction	3 L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation:	30 Marks
Credits	4

Course Objectives:

1. To solve linear system of equations using Matrix Methods.
2. To know the convergence of the Series.
3. To represent the function in series form.
4. To know the Partial Derivatives and use them to interpret the way a function of two variables behaves.
5. To learn Vector Differential Operator and its Physical interpretations on Scalars and vector functions.
6. To solve improper integrals.

Course Outcomes: On the successful completion of this course the student shall be able to

1. Solve system of linear equations and identify the Eigen values and Eigen vectors in engineering problems.
2. Check the series convergence.
3. Find the evolutes of the given curves.
4. Expand and find extreme values of functions of two variables.
5. Understanding the significance of gradient, divergence and curl.
6. An ability to solve the problems and interpret in geometrical approach.

UNIT-I

Matrices: Rank of the matrix, Echelon form, System of linear equations, Linearly dependence and independence of vectors, Eigenvalues, Eigenvectors, Properties of eigenvalues, Cayley-Hamilton theorem, Quadratic forms, Diagonalization of Matrices, Reduction of quadratic form to canonical form by linear transformation, Nature of quadratic forms.

UNIT-II

Sequences and Series: Definition of Convergence of sequence and series. Tests for convergence of series: Comparison test, limit comparison test, D'Alembert ratio test, Raabe's test, Cauchy's n^{th} root test, logarithmic test, alternative series, absolute and conditional convergence.

UNIT-III

Calculus: Rolle's Theorem, Lagranges Mean value theorem, Cauchy's mean value theorem (without proofs). Curvature, radius of curvature, Evolutes and involutes.

Fourier series, half range sine and cosine series.

UNIT-IV

Multivariable Calculus (Differentiation): Functions of two variables, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions (Chain rule), Change of variables, Jacobian, Higher order partial derivatives, Taylor's series of functions of two variables, Maximum and minimum values of functions of two variables, Lagrange's multipliers method.

UNIT-V

Vector Calculus (Differentiation): Scalar and vector fields, Gradient of a scalar field, Directional derivative, Divergence and Curl of a vector field, vector identities. Improper integrals: Beta and Gamma functions and their properties.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

Suggested Reading:

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
2. R.K. Jain, S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th edition, 2016.
3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/ Cole, 2005.

18CY C01

CHEMISTRY

(Common to all branches)

Instruction:	3L+1T Hours per Week
Duration of Semester End Examination:	3 Hours
Semester End Examination:	70 Marks
Continuous Internal Evaluation:	30 Marks
Credits:	4

Course Objectives

1. The aim of framing the syllabus is to impart intensive and extensive knowledge of the subject so that students can understand the role of chemistry in the field of engineering.
2. This syllabus helps at providing the necessary introduction of the inorganic chemistry principles and concepts of chemical bonding involved in a comprehensive manner understandable to the students aspiring to become practicing engineers.
3. Thermodynamic and Electrochemistry units give conceptual knowledge about spontaneous processes and how can they be harnessed for producing electrical energy and efficiency of systems.
4. To teach students the value of chemistry and to improve the research opportunities knowledge of stereochemistry and organic reactions is essential.
5. New materials lead to discovering of technologies in strategic areas like defense and space research for which an insight into nano and composite materials of modern chemistry is essential.

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels; one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

1. Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. Rationalize bulk properties and processes using thermodynamic considerations & Ionic Equilibria.
3. List major chemical reactions that are used in the synthesis of molecules.
4. Apply the various methods used in treatment of water for domestic and industrial use.

5. Discuss the various Engineering materials & Drug synthesis & their applications.

UNIT-I Atomic and Molecular Structure:
Molecular Orbital theory - atomic and molecular orbitals.Linear combination of atomic orbitals (LCAO) method. Molecular orbitals of diatomic molecules. Energy level diagrams of diatomics (H_2, He_2^+,N_2, O_2, O_2^-, CO, NO). Pi- molecular orbitals of butadiene, benzene and their aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties.

UNIT-II Use of Free Energy in Chemical Equilibria and Ionic Equilibria:
Use of free energy in chemical equilibria : Thermodynamic functions: Internal energy, entropy and free energy. Significance of entropy and free energy (criteria of spontaneity). Free energy and emf (Gibbs Helmholtz equations and its applications). Cell potentials –electrochemical series. Nernst equation and its applications. Potentiometric Acid base & Redox Titrations. Numericals.
Ionic Equilibria: Solubility product, Determination of solubility product, Applications of solubility product- Determination of solubilities of sparingly soluble salts; Predicting precipitation reactions; Precipitation of an insoluble salt; Precipitation of soluble salts; Inorganic analysis. Numericals.

UNIT- III Stereochemistry and Organic Reactions
Stereochemistry: Representations of 3 dimensional structures, Symmetry and chirality, Stereoisomers - Configurational isomers (Geometrical & Optical isomers), Conformational isomers - Newman and sawhorse representations of n-butane, enantiomers (lactic acid), diastereomers (Tartaric acid) , optical activity, absolute configurations , Sequence rules for R&S notation.
Organic Reactions
Types of Organic reactions:
Substitution Reactions- Electrophilic substitution (Nitration of Benzene) ; Nucleophilic Substitution (S_N1& S_N2) ; Free Radical Substitution(Halogenation of Alkanes)

Addition Reactions:
Electrophilic Addition – Markonikoff's rule
Nucleophilic Addition – (Addition of HCN to carbonyl compounds)
Free radical Addition - Anti Markonikoff's rule (Peroxide effect)
Eliminations-E_1 and E_2 (dehydrohalogenation of alkyl halides)
Oxidation with $KMno_4$, $K_2Cr_2O_7$; **Reduction** with $LiAlH_4$,$NaBH_4$
Cyclization (Diels - Alder reaction)

UNIT–IV Water Chemistry:

Hardness of water – Types, units of hardness, Disadvantages of hard water , Boiler troubles - scales & sludge formation , causes and effects , Softening of water by ion exchange method and Reverse Osmosis. Specifications of potable water & industrial water. Disinfection of water by Chlorination, Ozonisation & UV radiation.

UNIT-V Engineering Materials and Drugs:

Nano materials-Introduction to nano materials and general applications, basic chemical methods of preparation- Sol gel method. Carbon nanotubes and their applications.

Composite materials- Definition, types of composites, fibre reinforced, glass fibre reinforced and carbon fibre reinforced composites and applications.

Conducting polymers- Definition, classification and applications.

Drugs-Introduction,Synthesis and uses of Aspirin (analgesic), Paracetamol (Antipyretic), Atenolol (antihypertensive).

Text Books:

1. P.C. Jain and M. Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company Ltd., New Delhi,16th edition (2015).
2. W.U. Malik, G.D.Tuli and R.D.Madan, "Selected topics in Inorganic Chemistry", S Chand & CompanyLtd, New Delhi,reprint (2009).
3. R.T. Morrison, R.N. Boyd and S.K. Bhattacharjee, "Organic Chemistry", Pearson, Delhi, 7thedition(2011).
4. G.L. David Krupadanam, D. Vijaya Prasad, K. Varaprasad Rao, K.L.N. Reddy and C. Sudhakar, "Drugs", Universities Press (India) Limited, Hyderabad (2007).

Suggested Reading:

1. B. H. Mahan, "University Chemistry", Narosa Publishing house, New Delhi, 3rd edition (2013).
2. B.R. Puri, L.R. Sharma and M.S. Pathania, "Principles of Physical Chemistry", S. Nagin Chand & Company Ltd.,46thedition(2013).
3. T.W. Graham Solomons, C.B. Fryhle and S.A. Snyder, "Organic Chemistry", Wiley,12th edition (2017).
4. P.W.Atkins, J.D. Paula, "Physical Chemistry", Oxford, 8thedition (2006).

18CE C01N

ENGINEERING MECHANICS

(Common to all branches)

Instruction:	3L + 1T per week
Duration of Semester End Examination:	3 Hours
Semester End Examination:	70 Marks
Continuous Internal Evaluation:	30 Marks
Credits:	4

Course Objectives: The objective of this course is to understand the

1. Concept of forces, resolution, resultant, moment, couple and equilibrium of force systems.
2. Effect of frictional resistance to force systems and methods of analysing the simple trusses.
3. Centroid, centre of gravity and area moment of inertia for various regular and composite lines, areas and volumes.
4. Basic concepts of dynamics (kinematics and kinetics) and analysis of particle motion and connected bodies.
5. Work energy principle, impulse-momentum equation and their applications for translatory motion bodies.

Course Outcomes: The students will be able to

1. Solve problems dealing with forces in plane systems, draw free body diagrams and analyse problems using equilibrium equations for a smooth surface.
2. Solve problems involving force system with frictional resistance and to analyse simple trusses for forces in various members of a truss.
3. Determine centroid and area moment of inertia for elementary and composite figures.
4. Solve problems in kinematics and kinetics of a particle and connected systems.
5. Solve problems for body motion using work energy principle and impulse-momentum approach for translatory motion bodies.

UNIT–I:

Resolution, Resultant and Equilibrium of Force System: Concepts of force, system of forces, components of forces in a plane. Resultant of coplanar-concurrent force systems. Moment of a force and its applications. Couple and

its applications. Resultant of coplanar-non-concurrent force systems. Equilibrium of force systems. Free body diagram, equations of equilibrium for coplanar force system.

UNIT–II:

Friction and Analysis of Simple Trusses: Types of friction, laws of friction, application of friction to a single body and connecting systems, wedge friction. Analysis of simple trusses using method of joints and method of sections.

UNIT–III:

Centroid, Centre of Gravity and Moment of Inertia: Centroid of lines and areas from first principle, centroid of composite figures. Centre of gravity and its implications. Area moment of inertia of a plane section from first principles, theorems of moment of inertia, moment of inertia of composite sections.

UNIT–IV:

Particle Dynamics: Kinematics: Rectilinear and curvilinear translation. Rectangular, normal and tangential components of acceleration. General principles of kinetics: D' Alembert's principle and its application to particle motion and connected bodies.

UNIT–V:

Work-Energy and Impulse-Momentum: Equation of work energy for translation-applied to particle motion and connected systems. Introduction to linear impulse-momentum, principle of conservation of linear momentum and its applications.

Text Book:

1. K. Vijaya Kumar Reddy and J. Suresh Kumar, "*Singer's Engineering Mechanics: Statics and Dynamics*", B. S. Publications (SI Units), 3rd edn., Rpt.,2019.

Suggested Reading:

1. A. Nelson., "*Engineering Mechanics*", Tata Mc Graw Hill, Delhi, 2010.
2. A. K. Tayal , "*Engineering Mechanics: Statics and Dynamics*", Umesh Publications, Delhi, 14th edn., Rpt., 2015.
3. Basudeb Bhattacharyya, "*Engineering Mechanics*", Oxford University Press, 2nd edn., 2016.

18CS C01

PROGRAMMING FOR PROBLEM SOLVING
(Common to All Programs)

Instruction	3 Periods per week
Duration of Semester-End Examination	3 Hours
Semester-End Examination	70 Marks
Sessional	30 Marks
Credits	3

Course Objectives

1. Identification of computer components, Operating environments, IDEs.
2. Understanding the steps in problem solving and formulation of algorithms to problems.
3. Develop programming skills as an means of implementing an algorithmic solution with appropriate control and data structures.
4. Develop intuition to enable students to come up with creative approaches to problems.
5. Manipulation of text data using files.

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

1. Identify the computing environments.
2. Formulate solutions to problems and represent them using algorithms/ Flowcharts.
3. Choose proper control statements and data structures to implement the algorithms.
4. Decompose a problem into modules and use functions to implement the modules.
5. Develop applications using file I/O.

UNIT-I

Introduction to computers and Problem Solving: Components of a computer, Operating system, compilers, Program Development Environments, steps to solve problems, Algorithm, Flowchart / Pseudocode with examples.

Introduction to programming: Programming languages and generations, categorization of high level languages.

Introduction to C: Introduction, structure of C program, keywords, identifiers, Variables, constants, I/O statements, operators, precedence and associativity.

UNIT – II

Introduction to decision control statements: Selective, looping and nested statements.

Functions: Introduction, uses of functions, Function definition, declaration,

passing parameters to functions, recursion, scope of variables and storage classes.
Case study

UNIT – III
Arrays: Introduction, declaration of arrays, accessing and storage of array elements, 1-dimensional array, Searching (linear and binary search algorithms) and sorting(selection and bubble) algorithms, 2-D arrays, matrix operations.

Strings: Introduction, string representation, string operations with examples.
Case study

UNIT – IV
Pointers: Understanding computer's memory, introduction to pointers, declaration of pointer variables, pointer arithmetic, pointers and strings, array of pointers, function pointers, array of function pointers, dynamic memory allocation, advantages and drawbacks of pointers.
Structures: Structure definition, initialization and accessing the members of a structure, nested structures, structures and functions, self- referential structures, unions and enumerated data types.

UNIT-V
Files: Introduction to files, file operations, reading data from files, writing data to files, error handing during file operations.

Preprocessor Directives: Types of preprocessor directives, examples.

Suggested Reading:
1. A K Sharma "**Computer Fundamentals and Programming**", 2nd Edition, University Press, 2018.
2. PradeepDey and Manas Ghosh, "**Programming in C"**, Oxford Press, 2nd Edition, 2017.

References:
1. Byron Gottfried, Schaum's"**Outline of Programming with C**", McGraw-Hill.
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.
4. ReemaTharaja "**Introduction to C Programming**", Second Edition, OXFORD Press,2015.
5. https://www.tutorialspoint.com/cprogramming/index.htm.
6. https://onlinecourses.nptel.ac.in/noc18-cs10/preview.

18ME C01N

ENGINEERING GRAPHICS AND DESIGN

Instruction	1 Lecture + 4 Drawing Hours per week
Duration of Semester End Examination	3 Hours
SEE	50 Marks
CIE	50 Marks
Credits	3

Course Objectives:

1. To get exposure to a cad package and its utility.
2. Understanding orthographic projections.
3. To visualize different solids and their sections in orthographic projection
4. To prepare the student to communicate effectively by using isometric projection.
5. To prepare the student to use the techniques, skills, and modern tools necessary for practice.

Course Outcomes:

1. Exposure to graphics package.
2. Exposure to the visual aspects of engineering design.
3. To become familiar with engineering graphics standards.
4. Exposure to orthographic projections.
5. Exposure to engineering communication.

List of exercises:

1. Introduction to CAD package: Settings, draw, modify tools, dimensioning and documentation
2. Construction of Ellipse by General method, Cycloid and Involute
3. Orthographic projection: Principles, conventions, Projection of points
4. Projection of straight lines: Simple position, inclined to one plane
5. Projection of straight lines inclined to both the planes (without traces and mid-point)
6. Projection of planes: Perpendicular planes
7. Projection of planes: Oblique planes
8. Projection of solids: Simple position
9. Projection of solids: Inclined to one plane
10. Sections of solids: Prism, pyramid in simple position
11. Sections of solids: Cone and cylinder in simple position

12. Development of surfaces: Prism and Pyramid
13. Development of surfaces: Cone and Cylinder
14. Isometric projections: Simple solids (Prism, pyramid, cone and cylinder)

Text Books:

1. N.D.Bhatt, "Elementary Engineering Drawing", Charotar Publishers, 2012.
2. K.L.Narayana and P.K.Kannaiah, "Text Book of Engineering Drawing", Scitech Publications, 2011.
3. Basanth Agrawal and C M Agrawal, "Engineering Drawing", 2/e, McGraw-Hill Education (India) Pvt. Ltd.

Suggested Reading:

1. Shaw M.B and Rana B.C., "Engineering Drawing", *2/e*, Pearson, 2009.
2. K.Veenugopal, "Engineering Drawing and Graphics + AutoCAD", New Age International Pvt.Ltd, 2011.
3. Bhattacharya. B, "Engineering Graphics", I. K. International Pvt. Ltd, 2009.

18CS C02

PROGRAMMING FOR PROBLEM SOLVING LAB
(Common to All Programs)

Instruction	4 Periods per week
Duration of Semester-End Examination	3 Hours
Semester-End Examination	50 Marks
Sessional	25 Marks
Credits	2

Course Objectives

1. Setting up programming environment.
2. Develop Programming skills to solve problems.
3. Use of appropriate C programming constructs to implement algorithms.
4. Identification and rectification of coding errors in program.
4. Develop applications in a modular fashion.
5. Manage data using files.

Course Outcomes:

At the end of the course students will be able to:

1. Identify and setup program development environment.
2. Implement the algorithms using C programming language constructs.
3. Identify and rectify the syntax errors and debug program for semantic errors.
4. Solve problems in a modular approach using functions.
5. Implement file operations with simple text data.

List of Experiments:

1. Familiarization with programming environment.
2. Simple computational problems using arithmetic expressions.
3. Problems involving if-then-else structures.
4. Iterative problems e.g., sum of series.
5. Simple functions.
6. Recursive functions.
7. 1D Array manipulation.
8. 2D arrays and strings.
9. Matrix problems, String operations.
10. Pointers and structures.
11. Dynamic memory allocation and error handling.
12. File handling

Design the experiments in such a way that the students will be able to end up the solution for a real world problem that uses most of the concepts of C programming language. For example: A banking application where it uses the concepts of operators, control structures, switch case for menu, structures, functions, error handling, files etc.

Suggested Reading:

1. Pradeep Dey and Manas Ghosh, "**Programming in C"**, Oxford Press, 2nd Edition, 2017.
2. ReemaTharaja "**Introduction to C Programming**", Second Edition, OXFORD Press, 2015.

References:

1. https://www.tutorialspoint.com/cprogramming/index.htm
2. https://www.w3resource.com/c-programming/programming-in-c.php
3. https://www.w3schools.in/c-tutorial/

18CY C02

CHEMISTRY LAB

(Common to all branches)

Instruction:	3 Hours per Week
Duration of Semester End Examination:	3 Hours
Semester End Examination:	50 Marks
Continuous Internal Evaluation:	25 Marks
Credits:	1.5

Course Objectives

1. To impart fundamental knowledge in handling the equipment / glassware and chemicals in chemistry laboratory.
2. The student should be conversant with the principles of volumetric analysis and identification of organic functional groups.
3. To apply various instrumental methods to analyze the chemical compounds and to improve understanding of theoretical concepts.

Course Outcomes

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.
The students will learn to:

1. Estimate rate constants of reactions from concentration of reactants/ products as a function of time.
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
3. Synthesize a small drug molecule and Identify the organic compounds.
4. understand importance of analytical instrumentation for different chemical analysis.
5. Perform interdisciplinary research such that the findings benefit the common man.

Chemistry Lab

1. Estimation of temporary and permanent hardness of water using EDTA solution
2. Estimation of amount of chloride in water.
3. Determination of rate constant for the reaction of hydrolysis of methyl acetate.(first order)
4. Estimation of amount of HCl Conductometerically using NaOH solution.

5. Estimation of (a) amount of CH_3 COOH Conductometerically using NaOH solution. (b) amount of HCl and CH_3 COOH present in the given mixture of acids Conductometerically using NaOH solution.
6. Estimation of amount of HCl Potentiometrically using NaOH solution.
7. Estimation of amount of Fe^{+2} Potentiometrically using $KMnO_4$ solution.
8. Distribution of acetic acid between n-butanol and water.
9. Synthesis of drug - Aspirin.
10. Organic Chemistry- Identification of Functional groups - neutral group (carbonyl groups-acetaldehyde and acetone); acidic group(benzoic acid); basic group (aniline)
11. Determination of surface tension of organic solvents (ethanol, ethyl acetate)
12. Determination of Viscosity.

Text Books:

1. J. Mendham and Thomas,"Vogel' s text book of quantitative chemical analysis",Pearson education Pvt.Ltd. New Delhi ,6th ed. 2002.

Suggested Reading:

1. Dr. Subdharani , "Laboratory Manual on Engineering Chemistry", Dhanpat Rai Publishing, 2012.
2. S.S. Dara , "A Textbook on experiment and calculation in engineering chemistry", S.Chand and Company, 9th revised edition, 2015.

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
(Autonomous)
SCHEME OF INSTRUCTION AND EXAMINATION
B.E (COMPUTER SCIENCE AND ENGINEERING)

SEMESTER – II

S.No	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			Credits
			Hours per week			Duration of SEE in Hours	Maximum Marks		
			L	T	P/D		CIE	SEE	
	THEORY								
1	18MT C03	Mathematics -II	3	1	-	3	30	70	4
2	18PY C01	Optics and Semiconductor Physics	3	1	-	3	30	70	4
3	18CS C03	Object-Oriented Programming	3	-	-	3	30	70	3
4	18EG C01	English	2	-	-	2	20	50	2
	PRACTICALS								
5	18PY C02	Optics and Semiconductor Physics Laboratory	-	-	3	3	25	50	1.5
6	18CS C04	Object-Oriented Programming Lab	-	-	4	3	25	50	2
7	18ME C02	Workshop/ Manufacturing Practice	1	-	4	3	25	50	3
8	18EG C02	English Lab	-	-	2	2	15	35	1
		Total	**12**	**02**	**13**	-	**200**	**445**	**20.5**

L: Lecture D: Drawing CIE - Continuous Internal Evaluation
T: Tutorial P: Practical SEE - Semester End Examination

18MT CO3

MATHEMATICS– II

(Common to all branches and except for Bio-Tech)

Instruction	3 L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	4

Course Objectives:

1. To evaluate double and triple integrals of various functions and their significance.
2. To evaluate vector line, surface and volume integrals.
3. To know the relevant method to solve higher order differential equations.
4. To evaluate complex integration.
5. To evaluate real and definite integrals.
6. To know the methods to solve real life problems.

Course Outcomes: On the successful completion of this course the student shall be able to

1. Find the areas, volumes and surface of solids revolution.
2. Use Greens, Gauss and Stoke's theorems to find the surface and volume integrals.
3. Able to solve solutions of differential equations with initial and boundary value problems.
4. Solve the problems on analytic functions, Cauchy's theorem and Cauchy's integral formula.
5. Real and complex integrals by using Cauchy's theorems.
6. Solve physical and engineering problems.

UNIT-I

Multivariable Calculus (Integration): Applications of definite integrals to evaluate surface areas and volumes of revolutions. Double integrals, Change of order of integration, Triple integrals, Change of variables in integrals, Applications: areas and volumes, Centre of mass and Gravity (constant and variable densities).

UNIT-II

Vector Integral Calculus: Line, Surface and Volume integrals, Green's theorem in a plane, Gauss's divergence theorem and Stoke's theorem (without proof).
First Order Ordinary Differential Equations: Exact first order differential equations , Integrating factors, Linear first order equations , Bernoulli's, Riccati's

and Clairaut's differential equations ,Orthogonal trajectories of a given family of curves.

UNIT-III

Ordinary Differential Equations of Higher Orders: Solutions of higher order linear equations with constants coefficients, Method of variation of parameters, solution of Euler-Cauchy equation. Ordinary point, singular point and regular singular point, Power Series solution. Legendre Polynomial of first kind (without proof), Rodrigues formula, Generating function, recurrence relations, orthogonality of Legendre polynomials, Bessel's function of first kind (without proof), recurrence relations and problems.

UNIT-IV

Complex Variables – I: Differentiation, analytic functions, Cauchy-Riemann equations, harmonic functions, finding harmonic conjugate, elementary analytic functions (exponential, trigonometric, logarithm) and their properties. Conformal mappings, Mobius transformations and their properties. Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof).

UNIT-V

Complex Variables – II: Liouville's theorem and Maximum-Modulus theorem (without proof). Taylor's series, Laurent's series, zeros of analytic functions, singularities, Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine. Improper real integrals with singular points on the upper half plane.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Suggested Reading:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. R.K. Jain, S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications,5th edition,2016.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson, Reprint, 2002.

18PY C01

OPTICS AND SEMICONDUCTOR PHYSICS
(for CSE, ECE & IT)

Instruction:	3L+1T Hours per Week
Duration of Semester End Examination:	3 Hours
Semester End Examination:	70 Marks
Continuous Internal Evaluation:	30 Marks
Credits:	4

Course Objectives:

The objectives of the course is to make the student

1. Understands the fundamentals of wave nature of light.
2. Acquires knowledge of lasers.
3. Familiar with Quantum Mechanics.
4. Learns the fundamental concepts of solids.
5. Understands the basics of semiconductors.

Course Outcomes:

At the end of the course, the student will be able to

1. Demonstrate the wave nature of the light.
2. Describe the types of lasers and their applications.
3. Explain the importance of wave mechanics.
4. Demonstrate the importance of band theory of solids.
5. Identify the semiconductors for engineering applications.

UNIT-I

Wave Optics: Huygens' principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer. Farunhofer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

UNIT-II

Lasers: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO2), solid-state lasers (ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine.

UNIT-III

Wave Nature of Particles and Schrodinger Equation: Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and timeindependent

Schrodinger equation for wavefunction, Born interpretation, probability current, Expectation values, Free-particle wavefunction and wave-packets, Uncertainty principle.

UNIT – IV

Introduction to Solids: Free electron theory of metals, Fermi level, density of states, Application to white dwarfs and neutron stars, Bloch's theorem for particles in a periodic potential, Kronig-Penney model, Scattering from a potential barrier and tunneling; related examples like alpha-decay, field-ionization and scanning tunneling microscope.

UNIT-V

Semiconductors: Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Thermistor, Hall effect, LED, Solar cell.

Text Books:

1. B.K. Pandey and S. Chaturvedi, *Engineering Physics*, Cengage Publications, 2012.
2. M.N. Avadhanulu and P.G. Kshirsagar, *A Text BookEngineering Physics*, S. Chand Publications, 2014.
3. M. Arumugam, *Materials Science*, Anuradha Publications, 2015.
4. S.L. Gupta and Sanjeev Gupta, *Modern Engineering Physics*, Dhanpat Rai Publications, 2011.

Suggested Reading:

1. R. Murugeshan and Kiruthiga Sivaprasath, *Modern Physics*, S. Chand Publications S. Chand Publications, 2014.
2. V. Rajendran, *Engineering Physics*, McGahill Education Publications, 2013.
3. P.K. Palanisamy, *Engineering Physics*, Scitech Publications, 2012.
4. V. Raghavan, *Materials Science and Engineering*, Prentice Hall India Learning Private Limited; 6th Revised edition, 2015.

18CS C03

OBJECT ORIENTED P ROGRAMMING

Instruction	3 Periods per week
Duration of Semester-End Examination	3 Hours
Semester-End Examination	70 Marks
Sessional	30 Marks
Credits	3

Course Objectives: The objective of this course are

1. Describe the principles of Object-Oriented Programming.
2. Enable the students to solve problems using OOPs features.
3. Debugging in programs and files.
4. Use of library modules to develop GUI applications.

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

1. Understand the concepts Object-Oriented Programming Languages.
2. Adequately use the constructs such as selection, repetition, functions and aggregated data .
3. Develop applications in modular approach with classes/modules.
4. Develop solutions to the problems using exception handling.
5. Build packages for simple real world problems and use libraries/packages for graphics and plotting.

Unit-I

Introduction to Object Oriented Programming: Computer Programming and Programming Languages, Generations of Programming Languages, Programming Paradigms, Features of Object Oriented Programming, Merits and Demerits of OOPs

Basics of Python Programming: Features of Python, Variables, Identifiers, Datatypes, Input/ Output operations, Operators and Expressions, operations on strings, Type conversion.

Unit-II

Decision Control Statement: Selection/Conditional Branching, Loop Control Structures, Nested loops.

Functions and Modules: Uses of functions, Function definition, function call, Variable scope and Lifetime, Recursion, Lambda functions, Recursive Functions, Modules, Packages.

Unit-III

Classes and Objects: Introduction, Classes and Objects,_init method, Class variables, and Object variables, Public and Private Data members , calling methods from other methods, built-in class attributes, garbage collection, class methods, static methods.

Unit-IV

Inheritance: Introduction, Inheriting classes, Polymorphism and method overloading, Composition or Containership, Abstract classes and inheritance.
Operator Overloading: Introduction, Implementation of Operator Overloading, Overriding.
File Handling: File types, opening and closing files, reading and writing files, file positions.

Unit-V

Error and Exception Handling: Introduction, to errors and exceptions, Handling Exceptions Simple GUI Programming with *tkinter*package, Sample Graphics using *Turtle*, Plotting Graphs in Python.

Suggested Reading:

1. ReemaThareja "Python Programming", Oxford Press, 2017.
2. Mike McGrath "Python in easy steps: Makes Programming Fun", Kindle Edition, 2017.

References:

1. https://anandology.com/python-practice-book/object_oriented_programming.html
2. http://python-textbok.readthedocs.io/en/1.0/Object_Oriented_Programming.html
3. http://www.tutorialspoint.com/python/python_classes_objects.html

18EG C01

ENGLISH

(Common to all branches)

Instruction	2Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	20 Marks
Credits	2

Course Objectives:

1. To enable the students to understand the role and importance of communication and to develop their basic communication skills in English.
2. To equip the students with basics of writing correct sentences to coherent paragraphs.
3. To equip the students with techniques of writing a précis and an essay by using accurate grammar and appropriate vocabulary.
4. To train the students to describe, define and classify processes and to draft formal reports by adhering to the proper structure.
5. To develop the reading skills and reading comprehension techniques of the students.

Course Outcomes:

1. The students will understand the nature, process and types of communication and will communicate effectively without barriers.
2. The students will write correct sentences and coherent paragraphs.
3. The students will know how to condense passages by writing précis and write essays by using accurate grammar and appropriate vocabulary.
4. The students will demonstrate advanced writing skills by drafting formal reports.
5. The students will apply their reading techniques and analyze reading comprehension passages.

UNIT - I

Understanding Communication in English:

Introduction, nature and importance of communication.Process of communication.Basic types of communication - verbal and non-verbal.Barriers to communication.Intrapersonal and interpersonal communication.Johari Window

Vocabulary and Grammar: The concept of Word Formation. Importance of proper punctuation.Articles.

UNIT - II

Developing Writing Skills I:

Types of sentences.Use of phrases and clauses in sentences.Cohesion and coherence. Paragraph writing. Organizing principles of paragraphs in documents.
Vocabulary and Grammar: Cohesive devices. Root words from foreign languages and their use in English. Prepositions.

UNIT- III

Developing Writing Skills II:

Techniques for writing precisely. Précis Writing. Essay Writing.
Vocabulary and Grammar: Subject-verb agreement, Noun-pronoun agreement Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Redundancies, Clichés.

UNIT - IV

Developing Writing Skills III:

Describing, Defining, Classifying, Providing examples or evidence.Writing introduction and conclusion.
Report writing – Importance, structure and elements of style of formal reports.
Vocabulary and Grammar: Misplaced modifiers. Synonyms, antonyms.

UNIT - V

Developing Reading Skills:

The reading process, purpose, different kinds of texts.Reading comprehension. Techniques of comprehension – skimming, scanning, drawing inferences and conclusions.
Vocabulary and Grammar : Words often Confused. Standard abbreviations

Text Books:

1. Language and Life: A Skills Approach, Board of Editors, Orient Black Swan, 2017.
2. Swan Michael, Practical English Usage.OUP. 1995.

Suggested Readings:

1. Wood F.T,Remedial English Grammar, Macmillan, 2007.
2. Zinsser William,On Writing Well, Harper Resource Book, 2001.
3. Sanjay Kumar and PushpLata,Communication Skills.Oxford University Press, 2011.

18PY C02

OPTICS AND SEMICONDUCTOR PHYSICS LABORATORY
(for CSE, ECE & IT)

Instruction	3 Hours per Week
Duration of Semester End Examination	3 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	25 Marks
Credits	1.5

Course Objectives:

The objectives of the course is to make the student

1. Apply theoretical physics knowledge in doing experiments.
2. Understand the behavior of the light experimentally.
3. Analyze the behavior of semiconductor materials and optoelectronic devices.

Course Outcomes:

At the end of the course, the student will be able to

1. Understand the concept of errors and find the ways to minimize the errors.
2. Demonstrate interference and diffraction phenomena experimentally.
3. Understand the applications of semiconductor materials.
4. Know the working of optoelectronic devices.
5. Use LCR circuits in different applications.

List of Experiments:

1. Error analysis - Estimation of errors in the determination of time period of a torsional pendulum.
2. Hall effect – Determination of Hall coefficient, carrier concentration & mobility of charge carriers of given semiconductor specimen.
3. Thermistor – Determination of temperature coefficient of resistance of given thermistor.
4. Solar cell - Study of I-V characteristics of given solar cell and calculation of fill factor, efficiency and series resistance.
5. P-N junction diode – Study of V-I characteristics and calculation of resistance of given diode in forward and reverse bias.
6. Energy gap – Determination of energy gap of given semiconductor.
7. Planck's constant – Determination of Planck's Constant using photo cell.

8. I-V characteristics of LED.
9. Photodiode.
10. Laser – Determination of wavelength of given semiconductor red laser.
11. Newton's rings - Determination of wavelength of given monochromatic source.
12. Diffraction grating – Determination of wavelengths of two yellow lines of mercury light.
13. LCR circuit (Resonance).

Suggested Readings:

1. Engineering Physics Manual by Department of Physics, CBIT, 2016.
2. S.K. Gupta, Engineering Physics Practical, Krishna's Educational Publishers, 2014.
3. O.P. Singh, V. Kumar and R.P. Singh, Engineering Physics Practical Manual, Ram Prasad & Sons Publications, 2009.
4. Indu Prakash, Ram Krishna and A.K. Jha, A Text Book of Practical Physics, Kitab Mahal Publications, 2012.

18CS C04

OBJECT ORIENTED PROGRAMMING LAB

Instruction	4 Periods per week
Duration of Semester-End Examination	3 Hours
Semester-End Examination	50 Marks
Sessional	25 Marks
Credits	2

Course Objectives: The objectives of this course are

1. Identification and installation of required software to work with Python.
2. Program development using OOPs concepts.
3. Handling of errors in program code.
4. Use of library modules to develop GUI applications.

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

1. Set up programming environment to work with Python.
2. Chose appropriate control constructs, data structures to implement the solutions. Design and develop solutions in to the modular approach using OOPs concepts.
3. Debug programs to verify and validate one code.
4. Use of STLs and modules for graphics and plotting.
5. Design and develop solutions to the problems in modular approach using OOPs concepts.

Lab experiments:

1. Installation of any Object Oriented Programming Language and IDE.
2. Simple scripts to demonstrate the use of basic data types and operators.
3. Simple scripts to demonstrate the use of control structures.
4. Functions and Lambda function and parameter passing.
5. Experimentation with Modules.
6. Implementation of classes with attributes and methods.
7. Demonstration of inheritance.
8. Experiments on Overloading.
9. Exceptions and built-in tools.
10. Experiments on System interfaces and GUIs.

Text Book:

1. ReemaThareja "Python Programming", Oxford Press, 2017.

Suggested Reading and References:

2. https://vknight.org/cfm/labsheets/04-object-oriented-programming/
3. http://learning-python.com/class/Workbook/x-exercises.htm
4. https://inst.eecs.berkeley.edu/~cs61a/fa14/lab/lab06/#inheritance
5. https://anandology.com/python-practice-book/object_oriented_programming.html
6. http://stanfordpython.com/

18ME C02

WORKSHOP/ MANUFACTURING PRACTICE

Instruction	1T+4P Hours per week
Duration of End Examination	3 Hours
Semester End Examination	50 Marks
CIE	25 Marks
Credits	3

Course Objectives:

1. Give a feel of Engineering Practices & develop holistic understanding of various Engineering materials and Manufacturing processes.
2. Develop skills of manufacturing, safety, precision, quality, intelligent effort, optimization, positive & team work attitude to get things right the first time.
3. To provide basic knowledge of Steel, Plastic, Composite and other materials for suitable applications.
4. Study of Principle and hands on practice on techniques of fabrication, welding, casting, manufacturing, metrology, and allied skills.
5. To advance important hard & pertinent soft skills, productivity, create skilled manpower which is cognizant of industrial workshop components and processes and can communicate their work in a technical, clear and effective way.

Course Outcomes – (Laboratory): Student will be able to

1. Fabricate components with their own hands.
2. Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
3. Assembling different components, student will be able to produce small mechanisms/devices of their interest.
4. Gain practical skills of carpentry, tinsmithy, fitting, house wiring.
5. Gain knowledge of different Engineering Materials and Manufacturing Methods and Understand trades and techniques used in Workshop and chooses the best material/ manufacturing process for the application.

List of Exercises

CYCLE 1

Exercises in Carpentry

1. To plane the given wooden piece to required size
2. To make a lap joint on the given wooden piece according to the given dimensions.

3. To make a dove tail-joint on the given wooden piece according to the given dimensions.

Exercises in Tin Smithy

4. To make a rectangular box from the given sheet metal with base and top open. Solder the corners.
5. To make a scoop.
6. To make a pamphlet box.

Exercises in Fitting

7. To make a perfect rectangular MS flat and to do parallel cuts using Hack saw
8. To make male and female fitting using MS flats-Assembly1
9. To make male and female fitting using MS flats-Assembly2

Exercises in House Wiring

10. Wiring of one light point controlled by one single pole switch, a three pin socket controlled by a single pole switch, and wiring of one buzzer controlled by a bell push
11. Wiring of two light points connected in series and controlled by single pole switch. Verify the above circuit with different bulbs.Wiring of two light points connected in parallel from two single pole switches and a three pin socket
12. Stair case wiring-wiring of one light point controlled from two different places independently using two 2-way switches.

CYCLE 2

Exercises in Casting

1. Green sand moulding practice for a single piece pattern
2. Green sand moulding practice for a split pattern with a horizontal core
3. Melting and Pouring of Aluminium
4. Study and Demonstration of Injection moulding

Exercises in Welding

5. Study of gas welding equipment and process. Identification of flames, making Butt joint with gas welding.
6. Study of Arc welding process, making Butt joint with DCSP, DCRP
7. Study of Arc welding process, making Lap joint with A.C
8. Study of resistance welding process and making Lap joint with spot welding

Exercises in Machine shop

9. Introduction to Machine Tools, like Lathe, Drilling, Milling and Shaper
10. Plain and step turning operations on Lathe

11. Step turning and Knurling on Lathe machine
12. Taper turning on Lathe

Text Books:

(i) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

(ii) Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology",4th edition, Pearson Education India Edition, 2002.

Suggested Reading:

(i) Gowri P. Hariharan and A. Suresh Babu,"Manufacturing Technology – I" Pearson Education, 2008.

(ii) Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.

(iii) Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House,2017.

18EG C02

ENGLISH LAB

(Common to all branches)

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	35 Marks
Continuous Internal Evaluation:	15 Marks
Credits	1

Course Objectives:

1. To introduce students to phonetics and the different sounds in English.
2. To familiarize the students with the software and give them sufficient practice in correct pronunciation.
3. To enable students to speak English correctly with focus on stress and intonation.
4. The students will enhance their listening skills by practicing IELTS and TOEFL material.
5. To help students overcome their inhibitions while speaking in English and to build their confidence. The focus shall be on fluency rather than accuracy.

Course Outcomes:

1. The students will differentiate the speech sounds in English.
2. The students will interact with the software and understand the nuances of pronunciation in English.
3. The students will speak with the proper tone, intonation and rhythm and apply stress correctly. The students will demonstrate their listening skills by analyzing the IELTS and TOEFL listening comprehension texts.
4. The students will speak with clarity and confidence.
5. The students will work in teams and discuss various topics and demonstrate their presentation skills through posters.

Exercises

1. **Introduction to English Phonetics**: Introduction to auditory, acoustic and articulatory phonetics, organs of speech: the respiratory, articulatory and phonatory systems.
2. **Sound system of English**: Phonetic sounds and phonemic sounds, introduction to international phonetic alphabet, classification and description of English phonemic sounds, minimal pairs . The syllable: types of syllables, consonant clusters.

3. **Word stress**: Primary stress, secondary stress, functional stress, rules of word stress.
4. **Rhythm &Intonation** : Introduction to Rhythm and Intonation. Major patterns, intonation of English with the semantic implications.
5. **Listening skills** – practice with IELTS and TOEFL material
6. **Situational dialogues and role play –** Dialogue writing, **–** Role behavior and role enactment.
7. **Group Discussions -** Dynamics of a group discussion, group discussion techniques, body language.
8. **Public speaking –** Speaking with confidence and clarity in different contexts on various issues.
9. **Poster presentation –** Theme, poster preparation, team work and presentation.

Suggested Reading

1. T Balasubramanian. A Textbook of English Phonetics for Indian Students, Macmillan, 2008.
2. J Sethi et al. A Practical Course in English Pronunciation (with CD), Prentice Hall India, 2005.
3. Priyadarshi Patnaik. Group Discussions and Interviews, Cambridge University Press Pvt Ltd 2011.
4. Aruna Koneru, Professional Speaking Skills, Oxford University Press, 2016.

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
(Autonomous)
SCHEME OF INSTRUCTION AND EXAMINATION
B.E (COMPUTER SCIENCE AND ENGINEERING)

SEMESTER – III

S.No	Course Code	Title of the Course	Scheme of Instruction			Duration of SEE in Hours	Scheme of Examination		
			Hours per Week				Maximum Marks		Credits
			L	T	P/D		CIE	SEE	
THEORY									
1	18EEC01	Basic Electrical Engineering	3	1	0	3	30	70	4
2	18CSC07	Data Structures	3	0	0	3	30	70	3
3	18CSC08	Discrete Mathematics	3	1	0	3	30	70	4
4	18CSC09	Digital Electronics and Logic Design	3	0	0	3	30	70	3
5	18MEC09	Principles of Management	3	0	0	3	30	70	3
6	18CEM01	Environmental Science	2	0	0	2	-	50	0
PRACTICAL									
7	18EEC02	Basic Electrical Engineering Lab	0	0	2	2	15	35	1
8	18CSC10	Data Structures Lab	0	0	2	2	15	35	1
9	18CSC11	Digital Electronics and Logic Design Lab	0	0	2	2	15	35	1
10	18EGC03	Soft Skills	0	0	2	2	15	35	1
		TOTAL	**17**	**2**	**8**		**210**	**540**	**21**

L: Lecture D: Drawing CIE - Continuous Internal Evaluation
T: Tutorial P: Practical SEE - Semester End Examination

18EE C01

BASIC ELECTRICAL ENGINEERING

Instruction:	3L+1T Hours per Week
Duration of Semester End Examination:	3 Hours
Semester End Examination:	70 Marks
Continuous Internal Evaluation:	30 Marks
Credits:	4

Course Objectives:

1. To understand the behavior of different circuit elements R,L & C, and the basic concepts of electrical circuit analysis.
2. To know the concepts of AC circuits, RMS value, Average value, Phasor analysis etc.
3. To understand the basic concepts of Transformer.
4. To understand the basic concepts of DC machines and AC machines.
5. To know about different types of electrical wires and cables and to understand safety rules and methods of earthing.

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

1. Acquire the concepts of Kirchhoff's laws and network theorems and able to get the solution of simple dc circuits.
2. Obtain the steady state response of RLC circuits and also determine the different powers in AC circuits.
3. Acquire the concepts of Transformers.
4. Acquire the concepts of DC machines and AC machines.
5. Acquire the knowledge of electrical wiring cables electrical safety precautions. and earthing methods.

UNIT-I: DC Circuits

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation, Superposition, Thevenin and Norton Theorems, Time-domain analysis of firstorder RL and RC circuits.

UNIT-II: AC 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). Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III: Transformers

Construction, Working principle, EMF Equation, Ideal and Practical transformer, Equivalent circuit of Transformer, OC and SC tests on a transformer, Efficiency and Regulation, Auto transformer.

UNIT-IV: DC and AC Machines

DC Generators: Construction, Principle of operation, EMF equation, Classification, Characteristics of shunt, series and compound generators. DC Motors: Classification, Torque equation, Characteristics, Efficiency, Speed Control of Series and Shunt Motors. Three - Phase Induction Motors: Construction, Principle of operation, Torque equation, torque-slip characteristics, Power stages, speed control of induction motors.

UNIT-V: Electrical Installations and Electrical Wiring

Types of wires and cables, Electrical Safety precautions in handling electrical appliances, electric shock, first aid for electric shock, safety rules.
Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Earthing, Elementary calculations for energy consumption.

Text books:

1. L. S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press, 2011.
2. E. Hughes, Electrical and Electronics Technology, Pearson, 2010.

Suggested Reading:

1. D. P. Kothari & I. J. Nagrath, –Basic Electrical Engineering Tata McGraw Hill, 2010.
2. V. D. Toro, –Electrical Engineering Fundamentals Prentice Hall India, 1989.
3. D.C. Kulshreshtha, –Basic Electrical Engineering McGraw Hill, 2009
4. P.V.Prasad, S.sivanagaraju, R.Prasad, "Basic Electrical and Electronics Engineering" Cengage Learning, 1st Edition, 2013.

18CS C07

DATA STRUCTURES

Instruction	3 Hours per week
Duration of End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	3

Pre-requisites: Basic knowledge of programming language such as C or C++ is preferred (but not mandatory) and some mathematical maturity also will be expected.

Course Objectives: The objectives of this course are

1. Basic linear and non-linear data structures.
2. Analyzing the performance of operations on data structures.
3. Different balanced binary trees, which provides efficient implementation for data structures.

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

1. Understand the basic concepts of data structures.
2. Analyze the performance of algorithms.
3. Distinguish between linear and non-linear data structures.
4. Identify the significance of balanced search trees.
5. Establish a suitable data structure for real world applications.

UNIT - I

Introduction: Data Types, Data structures, Types of Data Structures, Operations, ADTs, Algorithms, Comparison of Algorithms, Complexity, Time- space tradeoff. **Recursion**: Introduction, format of recursive functions, recursion Vs. Iteration, examples. **Sorting:** Quick sort, Merge Sort, Selection Sort

UNIT - II

Linked Lists: Introduction, Linked lists, Representation of linked list, operations on linked list, Comparison of Linked Lists with Arrays and Dynamic Arrays, Types of Linked Lists and operations-Circular Single Linked List, Double Linked List, Circular Double Linked List

UNIT- III

Stacks and Queues: Introduction to stacks, applications of stacks, implementation and comparison of stack implementations. Introduction to queues, applications of queues and implementations, Priority Queues and applications

UNIT - IV

Trees: Definitions and Concepts, Operations on Binary Trees, Representation of binary tree, Conversion of General Trees to Binary Trees, Representations of Binary Trees, Tree Traversal. **Binary Search Trees:** Representation and operations. **Heap Tree:** definition, representation, Heap Sort. **Graphs:** Introduction, Applications of graphs, Graph representations, graph traversals, Minimal Spanning Trees.

UNIT - V

Hashing: Introduction, Hashing Functions- Modulo, Middle of Square, Folding, Collision Techniques-Linear Probing, Quadratic Probing, Double Hashing, **Balanced Search Trees:** AVL Trees, Red-Black Trees, Splay Trees, B-Trees

Text Books:

1. Narasimha karumanchi, "Data Structures and Algorithms Made Easy", Career Monk Publications, 2017
2. S. Sahni and Susan Anderson-Freed, "Fundamentals of Data structures in C", E.Horowitz, Universities Press, 2nd Edition.
3. ReemaThareja, "Data Structures using C", Oxford University Press.

Suggested Reading:

1. D.S.Kushwaha and A.K.Misra, "Data structures A Programming Approach with C", PHI.
2. Seymour Lipschutz, "Data Structures with C", Schaums Outlines, Kindle Edition

Online Resources:

1. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2. https://www.edx.org/course/foundations-of-data-structures
3. https://sites.google.com/site/merasemester/data-structures/data-structures-1#DS

18CS C08

DISCRETE MATHEMATICS

Instruction	3L+1T Hours per week
Duration of End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	4

Course Objectives: The objectives of this course are

1. To provide theoretical foundations of computer sciences.
2. To develop an understanding of logic, set theory, counting, functions, relations and proof techniques.
3. To familiarize with algebraic systems and graph theory.

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

1. Apply Propositional and Predicate logic for problem solving in various domains.
2. Understand Set Theory, Relations, Functions and Lattices as partially ordered sets.
3. Model and solve the real world problems using Generating Functions and Recurrence Relations.
4. Understand and apply the principles of graphs and trees to simple applications.
5. Study Algebraic systems and their general Properties.

UNIT - I

Fundamental Principles of counting: The Rules of Sum and Product, permutations, Combinations. **Introduction to Propositional Calculus**: Basic Connectives and Truth tables, Logical Equivalence: Laws of Logic, Logical Implication; Rules of Inference. **Predicates**: The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems.

UNIT - II

Sets: Sets and Subsets, Operations on sets and the Laws of Set Theory, Counting and Venn Diagrams. **Relations and Functions:** Cartesian Products and Relations, Functions: Composition of functions, one-one, Onto and Inverse of functions, Pigeon hole principle, partial ordering relations, POSET, Hasse diagrams, Lattices as Partially Ordered Sets, Equivalence relations.

UNIT- III

Generating Functions: Binomial Theorem, Generating Functions, Calculating Coefficient of generating functions.

Recurrence Relations: The First Order Linear Recurrence Relation, Second Order Linear. Homogeneous Recurrence relations with constant coefficients, Non Homogeneous Recurrence relations

UNIT - IV

Introduction to Graphs: Graphs and their basic properties - degree, path, cycle, Sub graphs, Complements and Graph Isomorphism, Euler trails and circuits, Hamiltonian paths and cycles, planar graphs, Euler formula, Graph Coloring and Chromatic polynomial. **Trees**: Definitions, Properties, Rooted Trees, Spanning Trees, Minimum Spanning trees: The Algorithms of Kruskal and Prims.

UNIT - V

Algebraic Structures: Algebraic Systems: Examples and General Properties, Semi groups and Monoids. **Groups:** Definitions and Examples, Subgroups, Homomorphisms and cyclic groups.

Text Books:

1. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics", An Applied Introduction, 4th edition, Pearson Education, 2003.
2. R.K.Bisht, H.S.Dhami, "Discrete Mathematics", Oxford University Press, Published in 2015.

Suggested Reading:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 7th edition, Tata McGraw-Hill, 2005
2. J.P. Tremblay, R.Manohar, "Discrete Mathematical Structures with Applications to Computer Science", TATA McGraw-Hill Edition, 1995.
3. Joe L.Mott, Abraham Kandel, Theodore P. Baker, "Discrete Mathematics for Computer Scientists & Mathematicians", 2nd Edition, PHI, 1986.
4. David D.Railey, Kenny A. Hunt, "Computational Thinking for the Modern Problem Solving", CRC Press, 2014.

Online Resources:

1. https://nptel.ac.in/courses/111107058/
2. https://nptel-discrete-mathematics-5217

18CS C09

DIGITAL ELECTRONICS AND LOGIC DESIGN

Instruction	3 Hours per week
Duration of End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course Objectives: The objectives of this course are

1. To understand the architecture of basic building blocks, logic gates and minimization techniques including Quine-Mcclusky method.
2. To analyze and design the Combinational and Sequential circuits.
3. To familiarize the notations of HDL descriptions in Verilog.

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

1. Familiarize with number systems, simplification of Boolean functions.
2. Manipulate simple Boolean expressions using maps and tabulation method.
3. Design basic digital circuits in Computer Hardware and Digital system.
4. Use high level HDLs such as Verilog for the design of Combinational and Sequential circuits.
5. Configure registers and counters for different applications.

UNIT - I

Digital Systems and Binary Numbers: Digital systems, Binary numbers, Number base conversions, Octal and Hexadecimal numbers, Complements of Numbers, Binary codes. **Boolean Algebra and logic Gates:** Binary logic, Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits.

UNIT - II

Minimization of Switching Functions: Introduction, the map method, minimal functions and their properties, the tabulation procedure, the prime implicant chart. **NAND and NOR Gates**: NAND Circuits, Two-level Implementation, Multilevel NAND Circuits, NOR Circuits. **Exclusive OR Gates**: Odd Function, Parity Generation and Checking.

UNIT- III

Combinational Logic Design: Combinational Circuits. **Analysis Procedure:** Derivation of Boolean Functions, Derivation of the Truth Table, Logic Simulation. **Design Procedure:** Decoders, Encoders, Multiplexers, Binary Adders, Adder-Subtractor, Binary Multiplier, HDL Representations – Verilog.

UNIT - IV

Sequential Circuits: Sequential circuit definitions, Latches, Flip-Flops, sequential circuit analysis, sequential circuit design, design with D Flip-Flops, designing with JK Flip-Flops, HDL representation for sequential circuits - Verilog.

UNIT - V

Registers: Registers, Shift registers. **Counters**: Ripple Counters, Synchronous Binary counters, Other Counters. **Memory and Programmable Logic**: Introduction, Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-Only Memory, Programmable Logic Array (PLA), Programmable Array Logic (PAL).

Text Books:

1. Morris Mano M. and Michael D.Ciletti, "Digital Design, With an Introduction to Verilog HDL", Pearson 5th edition, 2013.
2. ZVI Kohavi, "Switching and Finite Automata Theory", Tata McGraw Hill 2 edition, 1995.

Suggested Reading:

1. H.T. Nagle, "Introduction to Computer logic", Prentice Hall 1975.
. Stephen Brown, Zvonko Vranesic, "Fundamentals of Digital Logic with VHDL design, McGraw Hill 2nd Edition, 2009.

18ME C09

PRINCIPLES OF MANAGEMENT

Instruction	3 Hours per week
Duration of End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course Objectives: The objectives of this course are to

1. Understand basic fundamentals and insights of management
2. Understand the nature and purpose of planning
3. Gain the knowledge about the frame work of organizing
4. Understand the essence and significance of directing
5. Recognize the importance of controlling and its outcomes

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

1. Identify and evaluate the principles of management
2. Demonstrate the ability to have an effective and realistic planning
3. Identify the nature and the type of organization
4. Apply the tools and techniques of directing
5. Explain and evaluate the necessity for controlling and further refinement of an organization.

UNIT - I

Management: Definition of management**,** science or art, manager vs entrepreneur; managerial roles and skills;. Evolution of management, Basic management theories by FW Taylor, Henry Fayol, Types of Business Organizations, sole proprietorship, partnership, companies, public and private enterprises; Organization culture and environment; Current trends and issues in management

UNIT - II

Planning: Nature and purpose of Planning, types of Planning, objectives, setting objectives, policies, Strategic Management, Planning Tools and Techniques, Planning plant location and layout, Decision making steps & processes.

UNIT- III

Organizing: Nature and purpose of Organizing, formal and informal organizations, organization structure, types, line and staff authority,

departmentalization, delegation of authority, centralization and decentralization, job design, human resource management, HR planning, Recruitment selection, Training & Development, Performance Management, Career planning and Management

UNIT - IV

Directing: Individual and group behavior, motivation, theories of motivation, motivational techniques, job satisfaction, job enrichment, leadership, types & theories of leadership, effective communication.

UNIT - V

Controlling: system and process of controlling, budgetary and non-budgetary control techniques, use of computers and IT in management control, productivity problems and management, control and performance, direct and preventive control, reporting.

Text Books:

1. S.P. Robins and M. Couiter, "Management", 10/e.,Prentice Hall India, 2009.
2. JAF Stoner, RE Freeman and DR Gilbert, "Management", 6/e., Pearson Education,2004.

Suggested Reading:

1. P.C. Tripathy & P.N. Reddy, "Principles of Management", Tata McGraw Hill,1999
2. Harold Koontz and Cyril O'Donnell "Principles of Management'', Tata McGraw Hill, 2017

18CE M01

ENVIRONMENTAL SCIENCE
(MANDATORY COURSE)

Instruction	2L Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	50 Marks
CIE	0 Marks
Credits	0

Course Objectives: The objectives of this course are

1. Identify environmental problems arising due to engineering and technological activities and the science behind those problems.
2. Become aware about the importance of eco system and biodiversity for maintaining ecological balance.
3. To identify the importance of interlinking of food chain.
4. Learn about various attributes of pollution management and waste management practices.
5. To make the students contribute for capacity building of nation for arresting and/or managing environmental disasters.

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

1. Define environment, identify the natural resources and ecosystems and contribute for the conservation of bio-diversity.
2. Suggest suitable remedial measure for the problems of environmental pollution and contribute for the framing of legislation for protection of environment.
3. Relate the social issues and the environment and contribute for the sustainable development.
4. Follow the environmental ethics.
5. Contribute for the mitigation and management of environmental disasters.

UNIT - I

Environmental Studies: Definition, Scope And Importance, Need For Public Awareness. **Natural resources:** Use And Over Utilization of Natural Resources - Water Resources, Food Resources, Forest Resources, Mineral Resources, Energy Resources, Land Resources.

UNIT - II

Ecosystems: Concept of an Ecosystem, Structure And Function of an Ecosystem, Role of Producers, Consumers And Decomposers, Energy Flow in an Ecosystem, Food Chains, Food Webs, Ecological Pyramids, Nutrient Cycling, Bio-Geo Chemical Cycles, Terrestrial And Aquatic Acosystems.

UNIT- III

Biodiversity: Genetic, Species And Ecosystem Biodiversity, Bio-Geographical Classification of India, India as a Mega Diversity Nation. Values of Biodiversity, Hot-Spots of Biodiversity, Threats to Biodiversity, Endangered And Endemic Species of India, Methods of Conservation of Biodiversity

UNIT - IV

Environmental Pollution: Cause, Effects And Control Measures of Air Pollution, Water Pollution, Marine Pollution, Soil Pollution, Noise Pollution And Solid Waste Management, Nuclear Hazards. **Environmental Legislations:** Environment Protection Act, Air, Water, Forest & Wild Life Acts, Issues Involved in Enforcement of Environmental Legislation, Responsibilities of State And Central Pollution Control Boards.

UNIT - V

Social issues and the environment: Water Conservation Methods: Rain Water Harvesting And Watershed Management, Environmental Ethics, Sustainable Development and Climate Change: Global Warming, Ozone Layer Depletion, Forest Fires, And Contemporary Issues.

Text Books:

1. Y. Anjaneyulu, "Introduction to Environmental Science", B S Publications, 2004.
2. Suresh K. Dhameja, "Environmental Studies", S. K. Kataria& Sons, 2009.

Suggested Reading:

1. C. S. Rao," Environmental Pollution Control Engineering", Wiley, 1991.
2. S. S. Dara, "A Text Book of Environmental Chemistry &Pollution Control", S. Chand Limited, 2006.

18EE C02

BASIC ELECTRICAL ENGINEERING LAB

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	35 Marks
Continuous Internal Evaluation:	15 Marks
Credits	1

Course Objectives:

1. To verify the basic electrical circuit laws and theorems.
2. To determine the parameters and power factor of a coil.
3. To calculate the time and frequency responses of RLC circuits
4. To determine the characteristics of Transformers.
5. To determine the characteristics of dc and ac machines.

Course Outcomes: At the end of the course, the students are expected to

1. Make electrical connections by wires of appropriate ratings.
2 Understand the circuit analysis techniques.
3. Determine the parameters of the given coil.
4. Understand the basic characteristics of transformer.
5. Understand the basic characteristics of dc and ac machines.

List of Laboratory Experiments/Demonstrations:

1. Demonstration of Measuring Instruments and Electrical Lab components
2. Verification of KCL and KVL.
3. Time response of RL and RC circuits.
4. Calculation of parameters of a choke coil by Wattmeter Method.
5. Verification of Thevenin's and Norton's theorems.
6. Turns ratio /voltage ratio verification of 1-Ph Transformers.
7. OC and SC tests on a given 1-Ph Transformer.
8. Observation of Excitation Phenomenon in Transformer.
9. Measurement of 3-Ph power in a balanced system (By 2- Wattmeter method).
10. Measurement of 3-Ph Energy by an Energy Meter (Demonstration of Principle).
11. Load test of DC Shunt motor.
12. Speed control of DC Shunt motor.
13. Load test of 3-Ph Induction motor.
14. Demonstration of LT Switchgear Equipment/Components.
15. Demonstration of cut - out section of Machines like DC Machine, Induction Machine etc.

Note: At least **TEN** experiments should be conducted in the semester.

18CS C10

DATA STRUCTURES LAB

Instruction	2 Hours per week
Duration of End Examination	2 Hours
Semester End Examination	35 Marks
Continuous Internal Evaluation	15 Marks
Credits	1

Pre-requisites: Any Programming Language(C/Python)

Course Objectives: The objectives of this course are to:

1. Understand basic concepts data structures and abstract data types.
2. Differentiate between linear and non-linear data structures.
3. Analyze various searching, sorting and hashing techniques.

Course Outcomes:

On successful completion of this course the student will be able to

1. Implement the abstract data type.
2. Implement linear data structures such as stacks, queues using array and linked list.
3. Implement non-linear data structures such as trees, graphs.
4. Analyze various searching and sorting techniques.
5. Design and develop real world problem using suitable data structures.

List of Experiments

1. Implementation of Quick Sort, Merge Sort, Selection Sort.
2. Implementation of Insert, Delete and Search operations on Single Linked List.
3. Implementation of Insert, Delete and Search operations on doubly Linked List.
4. Implementation of Stack using array and linked list.
5. Converting of Infix Expression to Postfix.
6. Implement the algorithm for Evaluation of Postfix.
7. Implementation of Queue using array and linked list.
8. Implementation of Binary Tree Traversals.
9. Implementation of Binary Search Tree.
10. Implementation of Heap Sort.
11. Implementation of Graph Traversal Techniques.
12. Implementation of Hashing.

Text Books

1. Brian W Kernighan, Dennis Ritchie, "C Programming Language", PH PTR, 2nd Edition.
2. Richard M Reese, "Understanding and Using C Pointers", O`Reily, 2013.

Online Resources:

1. https://nptel.ac.in/courses/106102064/
2. https://www.udemy.com/algorithms-and-data-structures-in-python/

18CS C11

DIGITAL ELECTRONICS AND LOGIC DESIGN LAB

Instruction	2 Hours per week
Duration of End Examination	2 Hours
Semester End Examination	35 Marks
CIE	15 Marks
Credits	1

Course Objectives: The objectives of this course are

1. To simulate and synthesize combinational logic circuits.
2. To simulate and synthesize sequential logic circuits.
3. To write a test bench for verifying the functionality and implement procedures for any digital design.

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

1. Design a Digital circuit using Verilog HDL.
2. Understand various abstraction levels of a digital design.
3. Verify the functionality of a design using Test bench.
4. Simulate and synthesize combinational logic circuits.
5. Simulate and synthesize sequential logic circuits.

Write a Verilog HDL to Simulate and synthesize the following

1. Implement operators and operands using Verilog.
2. Logic Gates: AND, OR, BUFFER.
3. Arithmetic Units: Adders and Subtractors.
4. Magnitude Comparator, BCD to Excess 3, BCD to 7-segment display.
5. Multiplexers and De-multiplexers.
6. Encoders, Decoders, Priority Encoder.
7. Implementation of logic function using Multiplexers and Decoders.
8. Implementation of Ripple Carry Adder.
9. Flip-Flops.
10. Design of Synchronous Counters.

Text Book:

1. Samir Palnitkar, "Verilog HDL, A guide to Digital design and synthesis", 2/e, Pearson Education, 2008.

Suggested Reading:

1. Michael D. Ciletti, "Advanced Digital Design with Verilog HDL", PHI, 2005.

18EG C03

SOFT SKILLS

Instruction	2 Hours per week
Duration of End Examination	2 Hours
Semester End Examination	35 Marks
CIE	15 Marks
Credits	1

Course Objectives: The course will introduce the students to:

1. Imbibe an impressive personality, etiquette, professional ethics & values, effective time management & goal setting.
2. Understand the elements of professional update & upgrade through industry exposure in a mini-live project. Understand confidence building strategies and thereby to make effective presentations through PPTs.
3. Learn what constitutes proper grooming and etiquette in a professional environment. Acquire the necessary skills to make a smooth transition from campus to corporate.

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

1. Be assertive and set short term and long term goals. Also learn to manage time effectively and deal with stress.
2. Win in professional communication situations and participate in group discussions with confidence. Write abstracts.
3. Write effective resumes. Plan, prepare and face interviews confidently.
4. Adapt to corporate culture by being sensitive - personally and sensible - professionally. Draft an SOP.
5. Apply the soft skills learnt in the mini-live project, by collecting and analyzing data and making oral and written presentations on the same.

Exercise 1

Main Topics: Thinking Skills, Personality Development – Effective Time Management, setting realistic goals, self confidence and assertiveness, stress management, moral values.

Flipped Sessions: Personal Sensitivity & Professional Sensibility (Reading & Discussion),

Writing Input: Writing to Express - Drafting & Delivering a Speech (Free Writing Exercise).

Exercise 2

Main Topics: Advanced Group Discussion with Case studies: Dynamics of group discussion, intervention, summarizing and modulation of voice, body language,

relevance, fluency and coherence. **Flipped Sessions:** Importance of Professional Updating & Upgrading (Reading & Discussions).**Writing Input:** Writing with Precision - Writing Abstracts.

Exercise 3
Main Topics: Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews. Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skills.
Flipped Sessions: Mock Interviews (Video Sessions &Practice), **Writing Input:** Writing to Reflect - Resume Writing.

Exercise 4
Main Topic: Corporate Culture – Grooming and etiquette, communication media, academic ethics and integrity, **Flipped Sessions:** Corporate Culture, Etiquette & Grooming (Video Sessions and Practice through Role-play), **Writing Input:** Writing to Define - Writing an effective SOP.

Exercise 5
Main Topic: Mini Project – General/Technical. Research, developing a questionnaire, data collection, analysis, written report and project seminar.Elements and Structure of effective presentation. Presentation tools – Body language, Eye-contact, Props and PPT.
Flipped Sessions: Effective Presentations (Video & Writing Sessions, Practice through Emulation), **Writing Input:** Writing to Record - Writing minutes of meeting.

Suggested Reading:

1. Madhavi Apte , "A Course in English communication", Prentice-Hall of India,2007.
2. Dr. ShaliniVerma, "Body Language- Your Success Mantra", S Chand, 2006.
3. Ramesh, Gopalswamy, and Mahadevan Ramesh, "The ACE of Soft Skills", New Delhi: Pearson, 2010.
4. Van Emden, Joan, and Lucinda Becker, "Presentation Skills for Students", New York: Palgrave Macmillan, 2004.
5. Flipped Class-room: Students explore the concept first and then trainer explains it, students work on their own.

Web Resources:

1. https://www.goskills.com/Soft-Skills
2. https://www.trainerbubble.com
3. https://www.skillsconverged.com

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
(Autonomous)
SCHEME OF INSTRUCTION AND EXAMINATION
B.E (COMPUTER SCIENCE AND ENGINEERING)

SEMESTER – IV

S.No	Course Code	Title of the Course	Scheme of Instruction			Duration of SEE in Hours	Scheme of Examination		
			Hours per Week				Maximum Marks		Credits
			L	T	P/D		CIE	SEE	
THEORY									
1	18ECC34	Basic Electronics	3	0	0	3	30	70	3
2	18MTC09	Probability and Statistics	3	1	0	3	30	70	4
3	18CSC12	Computer Architecture and Micro Processor	3	0	0	3	30	70	3
4	18CSC13	Data Base Management Systems	3	0	0	3	30	70	3
5	18EGM 01	Indian Constitution and Fundamental Principles	2	0	0	2	-	* 50	0
PRACTICAL									
6	18ECC35	Basic Electronics Lab	0	0	2	2	15	35	1
7	18CSC14	Computer Architecture and Micro Processor Lab	0	0	3	3	25	50	1.5
8	18CSC15	Data Base Management Systems Lab	0	0	3	3	25	50	1.5
9	18CSC16	IT Workshop (Latex/Scilab)	0	1	2	3	25	50	2
		TOTAL	**14**	**2**	**10**		**210**	**515**	**19**

L: Lecture D: Drawing CIE - Continuous Internal Evaluation
T: Tutorial P: Practical SEE - Semester End Examination

* Pass/Fail

18ECC34

BASIC ELECTRONICS

Instruction	3 L Hours per week
Duration of Semester End Examination	3Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Prerequisite: Knowledge about semiconductor physics and basic electrical engineering.

Course Objectives: The objectives of this course is to make students to :

1. Describe semiconductor devices principle and to understand the characteristics of junction diode and transistors.
2. Understand working principles of Oscillators and Amplifiers.
3. Understand the working principle of the regulators and transducers.

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

1. Use semiconductor devices in making circuits like rectifiers, filters, regulators etc.
2. Design amplifier and oscillators
3. Compare various types of power amplifiers.
4. Analyze the principles and practices for instrument design to development the real world Problems.
5. Apply concepts of various electronic circuits.

UNIT – I

Semiconductor Theory: Energy levels, Intrinsic and Extrinsic Semiconductor, Mobility, Diffusion and Drift current, Hall effect, Law of mass action, Characteristics of P-N Junction diode, current equation, Parameters and Applications. **Rectifiers:** Half wave and Full wave Rectifiers Bridge and center tapped with and without filters, Ripple factor, regulation and efficiency.

UNIT – II

Transistors: Bipolar and field effect transistors with their h-parameter equivalent circuits, Basic Amplifiers classification and their circuits (Qualitative treatment only). **Regulators and Inverters**: Zener Diode**,** Breakdown mechanisms, Characteristics, Effect of Temperature, Application as voltage regulator.

UNIT – III

Feedback Amplifiers: Properties of Negative Feedback Amplifier, Types of Negative Feedback, Effect of negative feedback on Input impedance and Output impedance, Applications (Qualitative treatment only).

Oscillators: principle of oscillations, LC Type-Hartley, Colpitt and RC Type-Phase shift, Wien Bridge and Crystal Oscillator (Qualitative treatment only).

UNIT – IV

Operational Amplifiers: Basic Principle, Ideal and practical Characteristics and Applications-Summer, Integrator, Differentiator, Instrumentation Amplifier. **Power Amplifiers:** Operation of Class A, Class B, Class AB and Class C power amplifiers

UNIT – V

Data Acquisition systems: Study of transducers-LVDT, Strain gauge. **Photo Electric Devices and Industrial Devices:** Photo diode, Photo Transistor, LED, LCD, SCR, UJT Construction and Characteristics and their applications only. **Display Systems:** Constructional details of C.R.O and Applications.

Text Books:

1. Robert L. Boylestad, Louis Nashelsky, "Electronic Devices and Circuits Theory", Pearson Education, 9th edition, LPE, Reprinted, 2006.
2. Morris Mano, "Digital Design", Pearson Education, Asia 2002.

Suggested Reading:

1. Jacob Millman and C., Halkias, "Electronic Devices", McGraw Hill, Eight Edition, Reprint1985.
2. Ramakanth A. Gayakwad, "Op-Amps and Linear Integrated Circuits", Prentice Hall of India, 3rd edition,1985.
3. W. D. Cooper, A. Helfric, "Electronic Instrumentation and Measurement Techniques", PHI, 4th edition,2010.

18MT C09

PROBABILITY AND STATISTICS
(For CSE and IT)

Instruction	3 L+1T Hours per week
Duration of Semester End Examination	3Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	4

Course Objectives:

1. To Able to learn and Analyzing data in Linear and Non-Linear form.
2. To Able to fit the hypothetical data using probability distribution.
3. To Understand the data using the testing of Hypothesis.
4. To Able to Analyzing time series data using trend analysis.
5. To Able to formulate and get the solution of real world problem.

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

1. Use the principle of Least Squares approximating for estimating the value.
2. Use the basic probability for fitting the Random phenomenon.
3. Analyzing data using different methods of hypothesis testing.
4. Use the Moving Averages Methods for trend analysis.
5. Analyze the random phenomena of real world data.

UNIT – I

Basic Statistics: Measures of Central Tendency, Measures of Dispersion, Skewness (SKP & SKB) For Frequency Distribution, Kurtosis, Curve Fitting by The Method of Least Squares, Fitting of Straight Lines, Second Degree Parabola And Growth Curve. ($y = ae^{bx}, y = ax^b$ & $y = ab^x$.)

UNIT – II

Discrete Probability Distributions: Basic Probability, Conditional Probability, Bayes Theorem, Random Variable, Discrete Random Variable, Continuous Random Variable, Properties of Probability Mass Function, Probability Density Function, Mathematical Expectation Variance, Co-Variance And Properties, Poisson Distribution, MGF, CGF, Fitting of Poisson Distribution.

UNIT – III

Continuous Probability Distribution And Bivariate Distribution: Continuous Probability Distribution-Normal Distribution-Standard Normal Random Variable (MGF, Expectation, Variance, Properties of Normal Curve)-Areas Under Normal Curve-Exponential Distribution (MGF, CGF, Expectation, Variance)-Uniform Distribution (MGF, Expectation, Variance)-Bivariate Data Two Dimensional Discrete Random Variable, Continuous Random Variable, Marginal Probability Function, Properties of Joint Probability Function-Sum And Differences.

UNIT – IV

Small Sample Test: Inferential Statistics-Test of Significance-Large Sample Test For Single Proportion, Difference of Proportions, Single Mean, Difference of Means And Differences of Standard Deviations. Small Sample Test-Test For Single Mean, Differences of Means, Test For Ratio of Variances, Chi-Square Test For Goodness of Fit And Independent of Attributes.

UNIT – V

Time Series Analysis and ANOVA: One Way Classification-Assumptions For ANOVA Test-ANOVA For Fixed Effect Model-Two Way Classification-ANOVA For Fixed Effect Model-Components of Time Series-Measurement of Trend - Method of Semi Averages- Moving Averages Method (3 Years And 5 Years).

Text Books:

1. S.C.Gupta, V.K.Kappoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, 2014.
2. S.C.Gupta, V.K.Kappoor, "Fundamentals of Applied Statistics", Sultan Chand and Sons, 2014.
3. Sheldon Ross, "A First Course in Probability", 9th Edition, Pearson publications, 2014.

Suggested Reading:

1. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, 3rd Ed., Wiley, 1968.

18CS C12

COMPUTER ARCHITECTURE AND MICRO PROCESSOR

Instruction	3 Hours per week
Duration of End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	3

Pre-requisites: Digital Electronics and Logic Design.

Course Objectives: The objectives of this course are

1. To understand the basic principles of Instruction Level Architecture and Instruction Execution, Memory System Design.
2. To learn various I/O devices and its operations, knowledge on Instruction Level Parallelism.
3. To impart the knowledge on Micro Programming and Pipelining techniques.

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

1. Understand the functional block diagram of single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
2. Design assembly language program for specified computing 16 bit multiplication, division and I/O device interface.
3. Derive flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
4. Design a memory module and analyze its operation by interfacing with the CPU.
5. Apply design techniques to enhance performance using pipelining, parallelism and RISC methodology.

UNIT - I

Basic Structure of Computers: Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi-computers. **Arithmetic:** Addition and Subtraction of Signed numbers, Design of fast adders, Multiplication of positive numbers, Signed-Operand Multiplication, Integer Division.

UNIT - II

Basic Processing Unit: Fundamental concepts, Execution of a complete instruction, Multiple-Bus organization, Hardwired control, Micro programmed

control. **8086 Architecture:** CPU Architecture, Internal operation, Machine language instructions Addressing modes, Instruction formats, Instruction execution timing.

UNIT- III

Assembly Language Programming: Instruction format, Data transfer instructions, Arithmetic instructions. **Assembly Language Programming:** Branch instructions, Loop instructions, NOP and HLT, Flag manipulation instructions, Logical instructions, Shift and Rotate instructions, Directives and Operators. **Modular Programming:** Linking and Relocation, Stacks, Procedures, Interrupts and Interrupt routines, Macros and String instructions, REP prefix.

UNIT - IV

Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers –Program Controlled, Interrupt Driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCSI, USB.

Pipelining: Basic concepts, Data hazards, Instruction hazards, Influence on instruction sets, Data path and control considerations, Superscalar operation, Performance considerations.

UNIT – V

The Memory System: Semiconductor RAM Memories, Cache Memories, Performance considerations, Virtual Memories, Memory Management requirements, Secondary Storage. **Large Computer Systems:** Forms of Parallel Processing, Array Processors, Structure of general purpose multiprocessors, Program parallelism and shared variables.

Text Books:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, "Computer Organization", 5th Edition, McGrawHill Education Edition 2011.
2. Yu-chengLiu, Glenn A.Gibson, "Microcomputer Systems: The 8086/ 8088 Family", 2nd Edition, PHI Learning 2011.

Suggested Reading:

1. M. M. Mano, "Computer System Architecture", 3rd edition, Prentice Hall, 1994.
2. William Stallings, "Computer Organisation and Architecture, Design for Performance", Pearson, 9th Edition, 2013.
3. Douglas Hall. "Microprocessor and Interfacing programming and Hardware", Tata McGraw Hill, Revised 2nd Edition, 2007.
4. Brey B.Brey, "The Intel Microprocessor, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro-Processors-Architecture, Programming and Interfacing", 4thEdition, Prentice Hall.

18CS C13

DATABASE MANAGEMENT SYSTEMS

Instruction	3 Hours per week
Duration of End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Pre-requisites: Discrete mathematics of computer science, Programming and data structures.

Course Objectives: The objectives of this course are

1. To become familiar with fundamental concepts of database management. These concepts include aspects of database design, database languages and database-system implementation.
2. To understand about data storage techniques and indexing.
3. To impart knowledge in transaction management, concurrency control techniques and recovery procedures.

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

1. Explain the fundamental concepts of database management system.
2. Design a database using ER modeling and develop complex queries using SQL and PL/SQL.
3. Apply normalization techniques on databases.
4. Explain the ACID Properties of transactions and apply the serializability tests.
5. Solve problems using various indexing and hashing techniques and various database recovery techniques.

UNIT - I

Introduction : Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Users and Administrators, Database System Architecture, Application Architectures.

Database Design and E-R Model: Overview of the Design Process, Data Models, The E-R Model, Constraints, E-R Diagrams, E-R Design Issues, Extended E-R Features, Reduction to Relation Schemas.

UNIT - II

Relational Model: Structure of Relational Databases, Database Schema, Keys, Relational Algebra, Fundamental Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations.

Structured Query Language: Overviews, SQL Data Types, Basic Structure of SQL Queries, Modification of the Database, Set Operations, Aggregate Functions, Data-Definition Language, Integrity Constraints, Null Values, Views, Join Expression. Index Definition in SQL.

UNIT- III

Relational Database Design: Undesirable Properties in Relational Database Design, Functional Dependencies, Trivial and Nontrivial Dependencies, Closure of Set of Functional Dependencies, Closure of Set of Attributes, Irreducible Set of Functional Dependencies, Normalization–1NF,2NF and 3 NF, Dependency Preservation, BCNF, Comparison of BCNF and 3NF.

Indexing: Basic Concepts, Primary Index, Dense and Sparse Indices, Secondary Indices, Tree-Structured Indexing, Indexed Sequential Access Method (ISAM), B+ Tree Index Files.

UNIT - IV

Hash based Indexing: Static Hashing, Extendible Hashing. **Transaction Management and Concurrency Control:** Transaction Concept – ACID Properties, States of Transaction, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity.

UNIT - V

Deadlocks: Deadlock Prevention, Deadlock Detection and Recovery.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with Loss of Nonvolatile Storage, ARIES Recovery Method, Remote Backup Systems.

Text Books:

1. Abraham Silberschatz, Henry F Korth, S Sudarshan, "Database System Concepts", Sixth Edition, McGraw-Hill International Edition, 2011.
2. Date CJ, Kannan A, Swamynathan S, "An Introduction to Database Systems", Eight Editions, Pearson Education, 2006.
3. Raghu Ramakrishnan, Johnnes Gehrke, "Database Management Systems", Third Edition, McGraw Hill, 2003.
4. Ramez Elmasri, Durvasul VLN Somayazulu, Shamkant B Navathe, Shyam K Gupta, "Fundamentals of Database Systems", Fourth Edition, Pearson Education, 2006.

Suggested Reading:

1. J.D.Ullman, "Principles of Database Systems", Galgotia.

Online Resources:

1. http://www.nptelvideos.in/2012/11/database-management-system.html

18EG M01

INDIAN CONSTITUTION AND FUNDAMENTAL PRINCIPLES

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
SEE	50 Marks
CIE	-
Credits	-

Course Objectives:

The course will introduce the students to

1. The history of Indian Constitution and how it reflects the social, political and economic perspectives of the Indian society.
2. Address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
3. Have knowledge of the various Organs of Governance and Local Administration.

Course Outcomes:

After successful completion of the course the students will be able to

1. Understand the making of the Indian Constitution and its features.
2. Have an insight into various Organs of Governance - composition and functions.
3. Understand powers and functions of Municipalities, Panchayats and Co-operative Societies.
4. Be aware of the Emergency Provisions in India.
5. Understand the Right To equality, the Right To freedom and the Right To Liberty.

UNIT - I

Constitution of India: Introduction and salient features, Constitutional history, Directive principles of state policy - Its importance and implementation.

UNIT - II

Union Government and its Administration: Structure of the Indian Union: Federalism, distribution of legislative and financial powers between the Union and the States, Parliamentary form of government in India. **President**: role, power and position.

UNIT- III

Emergency Provisions in India: National emergency, President rule, Financial emergency

UNIT – IV

Local Self Government: District's Administration Head: Role and Importance. Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation.

Panchayati Raj: Introduction, Zilla Panchayat, Elected officials and their roles, CEO Zilla Panchayat: Position and role. Block level: Organizational Hierarchy (Different departments). Village level: Role of Elected and officials.

UNIT – V

Scheme of the Fundamental Rights & Duties: Fundamental Duties - the legal status.

Scheme of the Fundamental Rights: To Equality, to certain Freedom under Article 19, to Life and Personal Liberty under Article 21.

Text Books:

1. Indian Government & Politics, Ed Prof V Ravindra Sastry, Telugu Akademy, 2nd edition, 2018.
2. Indian Constitution at Work, NCERT, 10th edition, 2018.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar, Framing of Indian Constitution, 1st Edition,2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

Online Resources:

1. http://www.nptel.ac.in/courses/103107084/Script.pdf

18EC C35

BASIC ELECTRONICS LAB

Instruction	2 Hours per week
Duration of End Examination	2 Hours
Semester End Examination	35 Marks
Continuous Internal Evaluation	15 Marks
Credits	1

Prerequisite: Knowledge about semiconductor physics and basic electrical engineering.

Course Objectives: The objectives of this course are

1. Learn about various electronic components and devices.
2. Study the transistor characteristics in different modes.
3. Learn about oscillators and amplifiers.

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

1. Familiarize on basic electronic components, devices and system.
2. Analyze the measurements of time period, amplitude and phase of different waveforms.
3. Design and analyze the behavior of the regulator and rectifier.
4. Develop various types of oscillators and power amplifiers
5. Design the various circuits using operational amplifiers.

LIST OF EXPERIMENTS:

1. Study of Electronic components.
2. Characteristics of Semiconductor diodes (Ge, Si and Zener).
3. CRO and its Applications.
4. Half, Full wave rectifiers with and without filters.
5. Voltage Regulator using zener diode.
6. Characteristics of BJT in CE Configuration.
7. Characteristics of FET in CS Configuration.
8. Amplifier with and without feedback.
9. RC Phase shift oscillator
10. Operational Amplifier and its applications.
11. Power Amplifiers Characteristics
12. Realization of Half and Full adder

Text Books:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, "Basic Electronics, a Text - Lab Manual", 7th Edition, TMH, 1994.
2. Paul B. Zbar, "Industrial Electronics, a Text - Lab Manual", 4th Edition, 2008.

18CS C14

COMPUTER ARCHITECTURE AND MICRO PROCESSOR LAB

Instruction	3 Hours per week
Duration of End Examination	3 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	25 Marks
Credits	1

Pre-requisites: Digital Electronics and Logic Design, Computer Architecture.

Course Objectives: The objectives of this course are

1. To become familiar with the architecture and Instruction set of 8086 microprocessor.
2. To provide practical hands on experience with Assembly Language Programming.
3. To provide solid foundation on interfacing the external devices to the processor according to the user requirements to create novel products and solutions for the real time problems.

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

1. Describe the architecture and comprehend the instruction set of 8086.
2. Understand and apply the principles of Assembly Language Programming in developing microprocessor based applications.
3. Get familiarized with different assembly language software tools.
4. Work with standard microprocessor interfaces to know how a processor will communicate with the External world.
5. Design and develop of various Embedded Applications.

LIST OF EXPERIMENTS:

1. Examining and understanding the working nature of internal components of computer like North bridge and South bridge of mother board, Memories like cache, ROM, RAM, Secondary storage devices, understanding CMOS and analyzing configuration using inbuilt or external tools.
2. Implementation of 2's complement to represent signed numbers in C/ Java/Python for a user specified bit length like 8/16 bit.
3. Implementation of Booth's Binary Multiplication algorithm in C/Java/ Python.

4. Implementation of Non restoring Division algorithm in C/Java/Python.
5. Tutorials with 8086 kit / MASM / NASM software tool.
6. Addition of 32-bit numbers using 16-bit registers.
7. Fixed-point multiplication and division.
8. Sorting hexadecimal array.
9. Code conversion from hexadecimal to decimal.
10. Packed and Unpacked BCD numbers.
11. Sum of set of BCD numbers.
12. Searching.
13. Display a string of characters using 8279.

Suggested Reading:

1. Yu-cheng Liu, Glenn A.Gibson, "Microcomputer Systems: The 8086/8088 Family", 2nd Edition, PHI Learning 2011.
2. Douglas Hall. "Microprocessor and Interfacing programming and Hardware", Tata McGraw Hill, Revised 2nd Edition, 2007.
3. Brey B. Brey, "The Intel Microprocessor, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro-Processors-Architecture, Programming and Interfacing", 4th Edition, Prentice Hall, 1993.

18CS C15

DATABASE MANAGEMENT SYSTEMS LAB

Instruction	3 Hours per week
Duration of End Examination	3 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	25 Marks
Credits	1.5

Course Objectives: The objectives of this course are

1. To become familiar with the concepts of structured query language.
2. To understand about programming language / structured query language (PL/SQL).
3. To become familiar with generation of form and open database connectivity.

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

1. Apply the built-in functions and write simple queries on various databases.
2. Perform definition and manipulation of data using SQL commands.
3. Develop complex queries using joins and nested queries.
4. Add constraints on Databases implement DCL, TCL and advanced SQL commands.
5. Develop programs using cursors, triggers, exceptions, procedures and functions in PL/SQL.

LIST OF EXPERIMENTS:

SQL:

1. Queries using Built-In functions, like aggregate functions, String Functions, Numeric Functions, Data Functions, Conversion Functions and other miscellaneous.
2. Queries using operators in SQL.
3. Queries to Retrieve and Change Data: Select, Insert, Delete and Update.
4. Queries using Group By, Order By and Having Clauses.
5. Queries on Controlling Data: Commit, Rollback and Save point.
6. Queries to Build Report in SQL *PLUS.
7. Queries for Creating, Dropping and Altering Tables, Views and Constraints.
8. Queries on Joins and Correlated Sub-Queries.

9. Queries on Working with Index, Sequence, Synonym, Controlling Access and Locking Rows for Update, Creating Password and Security features.

PL/SQL:

10. Write a PL/SQL code using Basic Variable, Anchored Declarations and Usage of Assignment Operation.
11. Write a PL/SQL code Bind and Substitution Variables, Printing in PL/SQL.
12. Write a PL/SQL block using SQL and Control Structures in PL/SQL.
13. Write a PL/SQL code using Cursors, Exception and Composite Data Types.
14. Write a PL/SQL code using Procedures, Functions and Packages.

Note: The creation of sample database for the purpose of the experiments is expected to be pre-decided by the instructor.

Text Books / Suggested Reading:

1. "Oracle: The complete Reference", by Oracle Press.
2. Nilesh Shah, "Databse Systems Using Oracle", PHI, 2007.
3. Rick F Van der Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 2007.

18CSC16

IT WORKSHOP (Latex / Scilab)

Instruction	1T + 2P Hours per week
Duration of End Examination	3 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	25 Marks
Credits	2

Course Objectives: The objectives of this course are:

1. Familiarize the students with documentation and visualization tools like Latex and Scilab.
2. Development of proficiency in documentation for presentation and report writing.
3. Explore the utilities in Latex and Scilab.

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

1. Understand the need of documentation tools.
2. Install the documentation tools.
3. Generate templates for generation report using Latex.
4. Generate templates for presentation using Beamer.
5. Explore the utilities of Scilab

LIST OF EXPERIMENTS:

1. Installation of Latex and Scilab.
2. Understanding Latex compilation, basic syntax, writing of equations, matrices, tables.
3. Page Layout – Titles, abstract, chapters, sections, references, equation, references, citation, table of contents, generating new commands, figure handling, numbering, list of figures, list of tables, generating index.
4. Packages: Geometry, hyperref, amsmath, amssymb, algorithms, algorithmic graphic, color, tiles listing.
5. Understanding of Classes: article, book, reports,
6. Beamer, slides preparation.
7. Writing Resume, question paper, articles, research papers, Presentation using beamer.
8. Basic syntax, Mathematical Operators, Predefined constants, Built in functions.

9. Scilab Programming: Functions, loops, conditional statements, handling .sci files.
10. Graphics handling: 2D, 3D, Generating .jpg files, function plotting, data plotting.
11. Solving linear equations, Eigen values and numerical analysis, iterative methods, ordinary differential equation, plotting solution curves,
12. Comparison OS Scilab with C / C++/ Matlab.

Text Books / Suggested Reading / Online Resources:

1. https://www.latex-project.org/help/documentation/
2. https://spoken-tutorial.org/tutorial ef,search?search_foss=LaTeX&search_language=English
3. https://www.scilab.org/sites/default/files/Scilab_beginners_0.pdf
4. https://www.scilab.org/tutorials\