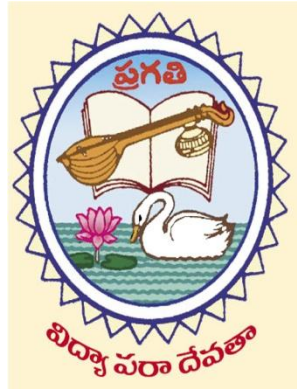# COURSE STRUCTURE AND SYLLABUS

For

B.Tech

COMPUTER SCIENCE AND ENGINEERING

(Applicable for batches admitted from 2016-17)

PRAGATI ENGINEERING COLLEGE
(AUTONOMOUS)

Permanently Affiliated to JNTUK, Kakinada, Accredited by NAAC with "A" Grade
Recognized by UGC 2(f) and 12(b) under UGC act, 1956
1-378, ADB Road, Surampalem – 533 437
Near Peddapuram, E.G.Dist, Andhra Pradesh

I Year – I Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16BH1T01	English – I	4	-	-	3
2	16BH1T03	Mathematics – I	4	-	-	3
3	16BH1T04	Mathematics – II (Mathematical Methods)	4	-	-	3
4	16BH1T10	Applied Physics	4	-	-	3
5	16CS1T01	Computer Programming using C	4	-	-	3
6	16ME1T02	Engineering Drawing	4	-	-	3
7	16BH1L01	English - Communication Skills Lab – 1	-	-	3	2
8	16BH1L03	Engineering /Applied Physics Lab	-	-	3	2
9	16BH1L04	Engineering/ Applied Physics – Virtual Labs Assignments	-	-	2	-
10	16CS1L01	C-Programming Lab	-	-	3	2
		Total Credits				**24**

I Year – II Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16BH2T02	English – II	4	-	-	3
2	16BH2T06	Mathematics – III	4	-	-	3
3	16BH2T12	Applied Chemistry	4	-	-	3
4	16IT2T01	Object Oriented Programming through C++	4	-	-	3
5	16BH2T13	Environmental Studies	4	-	-	3
6	16ME2T01	Engineering Mechanics	4	-	-	3
7	16BH2L05	Engineering Applied Chemistry Lab	-	-	3	2
8	16BH2L02	English - Communication Skills Lab – 2	-	-	3	2
9	16IT2L01	Object Oriented Programming Lab	-	-	3	2
		Total Credits				**24**

II Year – I Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16BH3T07	Statistics with R Programming	4	-	-	3
2	16CS3T02	Mathematical Foundations of Computer Science	4	-	-	3
3	16EC3T08	Digital Logic Design	4	-	-	3
4	16IT3T02	Python Programming	4	-	-	3
5	16CS3T03	Data Structures through C++	4	-	-	3
6	16BH3T14	Managerial Economics and Financial Analysis	4	-	-	3
7	16CS3L02	Data Structures through C++Lab	-	-	3	2
8	16IT3L02	Python Programming Lab	-	-	3	2
		Total Credits				**22**

II Year – II Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16CS4T04	Software Engineering	4	-	-	3
2	16IT4T06	Java Programming	4	-	-	3
3	16CS4T05	Advanced Data Structures	4	-	-	3
4	16CS4T06	Computer Organization	4	-	-	3
5	16CS4T07	Formal Languages and Automata Theory	4	-	-	3
6	16CS4T08	Computer Graphics	4	-	-	3
7	16CS4L03	Advanced Data Structures Lab	-	-	3	2
8	16IT4L04	Java Programming Lab	-	-	3	2
		Total Credits				**22**

III Year – I Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16CS5T09	Compiler Design	4	-	-	3
2	16EC5T18	Microprocessor & Interfacing	4	-	-	3
3	16CS5T10	Software Testing Methodologies	4	-	-	3
4	16CS5T11	Database Management Systems	4	-	-	3
5	16CS5T13	Operating Systems	4	-	-	3
6	16EC5L07	Microprocessor & Interfacing Lab	-	-	3	2
7	16CS5L04	Operating System & Linux Programming Lab	-	-	3	2
8	16CS5L05	Database Management System Lab	-	-	3	2
9	16BH5T17	Professional Ethics & Human Values	-	3	-	-
10	16CS5M01	MOOCs	-	-	-	-
		Total Credits				**21**

III Year – II Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16CS6T15	Computer Networks	4	-		3
2	16CS6T16	Data Warehousing and Mining	4	-		3
3	16CS6T17	Design and Analysis of Algorithms	4	-		3
4	16CS6T18	Object Oriented Analysis and Design using UML	4	-		3
5	16IT6E01 16CS6E01 16CS6E02 16EC6E01 16EC6E04 16ME6E01	**Open Elective:** i. Artificial Intelligence ii. Internet of Things iii. Cyber Security iv. Digital Signal Processing v. Embedded Systems vi. Robotics	4	-	-	3
6	16CS6L07	Network Programming & UML Lab	-	-	3	2
7	16CS6L08	Data Warehousing and Mining Lab	-	-	3	2
8	16BH6T16	IPR & Patents	-	2	-	-
9	16CS6P01	Mini Project / Term paper	-	-	3	2
		Total Credits				**21**

IV Year – I Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16CS7T19	Cryptography and Network Security	4	-	-	3
2	16CS7T20	Cloud Computing	4	-	-	3
3	16CS7T21	Web Technologies	4	-	-	3
4	16BH7T15	Management Science	4	-	-	3
5	16CS7D01 16CS7D02 16CS7D03	**Elective-I** i. Big Data Analytics ii. Artificial Neural Networks iii. Software Architecture & Design Patterns	4	-	-	3
6	16CS7D04 16CS7D05 16CS7D06	**Elective-II** i. Mobile Computing ii. Digital Forensics iii. Scripting Languages	4	-	-	3
7	16CS7L09	Cloud & Big Data Lab	-	-	3	2
8	16CS7L11	Web Technologies Lab	-	-	3	2
		Total Credits				**22**

IV Year – II Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16CS8T22	Distributed Systems	4	-	-	3
2	16CS8T23	Information Retrieval Systems	4	-	-	3
3	16CS8T24	Machine Learning	4	-	-	3
4	16IT8D18 16ME8D11 16CS8D07	**Elective-III** Concurrent and Parallel Programming Operations Research Software Project Management	4	-	-	3
5	16CS8S01	Seminar	-	3	-	2
6	16CS8P02	Project Work	-	-	-	10
		Total Credits				24

L	T	P	C
3	1	0	3

I Year I Semester

Subject Code: 16BH1T01

ENGLISH – I

Introduction:
In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students have to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering. As far as the detailed Textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing. The non-detailed Textbooks are meant for extensive reading for pleasure and profit. Thus, the stress in the syllabus is primarily on the development of communicative skills and fostering of ideas.

Objectives:
To improve the language proficiency of the students in English with emphasis on LSRW skills.
1. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
2. To develop the communication skills of the students in both formal and informal situations.

LISTENING SKILLS:
Objectives:
1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds and regions.
3. To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS:
Objectives:
1. To make the students aware of the importance of speaking for their personal and professional communication.
2. To enable the students to express themselves fluently and accurately in social and professional success.
3. To help the students describe objects, situations and people.
4. To make the students participate in group activities like role-plays, discussions and debates.
5. To make the students participate in Just a Minute talks.

READING SKILLS:
Objectives:
1. To enable the students to comprehend a text through silent reading.

2. To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
3. To enable the students to skim and scan a text.
4. To enable the students to identify the topic sentence.
5. To enable the students to identify discourse features.
6. To enable the students to make intensive and extensive reading.

WRITING SKILLS:
Objectives:
1. To make the students understand that writing is an exact formal skills.
2. To enable the students to write sentences and paragraphs.
3. To make the students identify and use appropriate vocabulary.
4. To enable the students to narrate and describe.
5. To enable the students capable of note-making.
6. To enable the students to write coherently and cohesively.
7. To make the students to write formal and informal letters.
8. To enable the students to describe graphs using expressions of comparison.
9. To enable the students to write technical reports.

Methodology:
1. The classes are to be learner-centred where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

DETAILED TEXTBOOKS:
- *ENGLISH FOR ENGINEERS AND TECHNOLOGISTS, Published by Orient Blackswan Pvt Ltd*
- *THE COP AND THE ANTHEM BY O. HENRY PUBLISHED BY PERFECTION LEARNING*

NON-DETAILED TEXTBOOK:
- *-PANORAMA: A COURSE ON READING, Published by Oxford University Press India*

The course content along with the study material is divided into six units.

UNIT I:
1. 'Human Resources' from English for Engineers and Technologists.
 Objective:

To develop human resources to serve the society in different ways.

Outcome:

The lesson motivates the readers to develop their knowledge different fields and serve the society accordingly.

2. 'An Ideal Family' from Panorama: A Course on Reading

Objective:

To develop extensive reading skill and comprehension for pleasure and profit.

Outcome:

Acquisition of writing skills

UNIT 2:

1. ' Transport: Problems and Solutions' from English for Engineers and Technologists.

Objective:

To highlight road safety measures whatever be the mode of transport.

Outcome:

The lesson motivates the public to adopt road safety measures.

2. 'War' from 'Panorama : A Course on Reading'

Objective:

To develop extensive reading skill and comprehension for pleasure and profit.

Outcome:

Acquisition of writing skills

UNIT 3:

Unit 3 has two sections: Unit 3(A) and 3(B)

3(A):

1. 'Evaluating Technology' from English for Engineers and Technologists.

Objective:

To highlight the advantages and disadvantages of technology.

Outcome:

The lesson creates an awareness in the readers that mass production is ultimately survival.

2. 'The Verger' from 'Panorama : A Course on Reading'

Objective:

To develop extensive reading skill and comprehension for pleasure and profit.

Outcome:

Acquisition of writing skills

Unit 3(B)

- *1. THE COP AND THE ANTHEM   BY O.HENRY*

   Objective:

   To enable students to develop interest in reading and appreciating short stories of different genres.

   Outcome:

   This lesson motivates students to respond and express the ideas and feelings in the story through oral, written and performative means.

UNIT 4:

1. 'Alternative Sources of Energy' from English for Engineers and Technologists.

Objective:

To bring into focus different sources of energy as alternatives to the depleting sources.

Outcome:

The lesson helps to choose a source of energy suitable for rural India.

2. ' The Scarecrow' from Panorama : A Course on Reading

Objective:

To develop extensive reading skill and comprehension for pleasure and profit.

Outcome:

Acquisition of writing skills.

UNIT 5:

1. 'Our Living Environment' from English for Engineers and Technologists.

Objective:

To highlight the fact that animals must be preserved because animal life is precious.

Outcome:

The lesson creates an awareness in the reader as to the usefulness of animals for the human society.

2. 'A Village Host to Nation' from Panorama : A Course on Reading

Objective:

To develop extensive reading skill and comprehension for pleasure and profit.

Outcome:

Acquisition of writing skills

UNIT 6:

1. ' Safety and Training' from English for Engineers and Technologists.

Objective:

To highlight the possibility of accidents in laboratories, industries and other places and to follow safety measures.

Outcome:

The lesson helps in identifying safety measures against different varieties of accidents at home and in the workplace.

2. 'Martin Luther King and Africa' from Panorama : A Course on Reading

Objective:

To develop extensive reading skill and comprehension for pleasure and profit.

Outcome:

Acquisition of writing skills

NOTE:

All the exercises given in the prescribed lessons in both detailed and non-detailed textbooks relating to the theme and language skills must be covered.

OVERALL COURSE OUTCOME:
1. Using English languages, both written and spoken, competently and correctly.
2. Improving comprehension and fluency of speech.
3. Gaining confidence in using English in verbal situations.

L	T	P	C
3	1	0	3

I Year I Semester

Subject Code: 16BH1T03

MATHEMATICS – I

Course Objectives:
1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:At the end of the Course, Student will be able to:
1. Determine rank, Eigenvalues and Eigen vectors of a given matrix and solve simultaneous linear equations.
2. Solve simultaneous linear equations numerically using various matrix methods.
3. Solve linear differential equations of first, second and higher order.
4. Calculate total derivative, Jocobian and minima of functions of two variables.

UNIT I: Linear systems of equations
Rank-Echelon form-Normal form – Solution of linear systems – Gauss elimination - Gauss Jordon- Gauss Jacobi and Gauss Seidel methods.
Applications: Finding the current inelectrical circuits.

UNIT II: Eigen values - Eigen vectors
Eigen values - Eigen vectors– Properties – Cayley-Hamilton theorem - Inverse and powersof a matrix by using Cayley-Hamilton theorem- Diagonalization.
Applications: Free vibration of a two-mass system.
UNIT III–Quadratic forms
Quadratic formsReduction of quadratic form to canonical form – Rank - Positive, negative and semi definite- Index – Signature.
UNIT IV: Differential equations of first order and first degree
Linear-Bernoulli-Exact-Reducible to exact.
Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonaltrajectories-Electrical circuits- Chemical reactions.

UNIT V: Linear differential equations of higher order
Non-homogeneous equations of higher order with constant coefficients with RHS term of the typee^{ax}, $sin\, ax, cos\, ax$, polynomials in x, $e^{ax}V(x)$, $xV(x)$ − Method of Variation ofparameters.
Applications: LCR circuit, Simple Harmonic motion.

UNIT VI: Partial differentiation
Introduction- Homogeneous function-Euler's theorem-Total derivative-Chain ruleGeneralized Mean value theorem for single variable (without proof)-Taylor's and McLaurent's series expansion of functions of two variables - Jacobian– Functional dependence.
Applications: Maxima and Minima of functions of two variables without constraints and
Lagrange's method (with constraints).

Text Books:
1. **B.S.Grewal**, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **N.P.Bali,** Engineering Mathematics, Lakshmi Publications.
3. **Erwin Kreyszig**, Advanced Engineering Mathematics, 10th Edition, Wiley-India

Reference Books:
1. **Micheael Greenberg**, Advanced Engineering Mathematics, 9th edition, Pearson edn
2. **Dean G. Duffy**, Advanced engineering mathematics with MATLAB, CRC Press
3. **Peter O'neil**, Advanced Engineering Mathematics, Cengage Learning.
4. **Srimanta Pal, SubodhC.Bhunia**, Engineering Mathematics, Oxford UniversityPress.
5. **Dass H.K., RajnishVerma. Er**, Higher Engineering Mathematics, S. Chand Co.Pvt. Ltd, Delhi.

L	T	P	C
3	1	0	3

I year - I semester

Subject Code: 16BH1T04

MATHEMATICS – II
(METHAMETICAL METHODS)

Course Objectives:
1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:At the end of the Course, Student will be able to:
1. Solve the numerical problems which will be the platform for engineering problems.
2. Determine Fourier series, Fourier Transforms of the given functions.
3. Solving the higher order partial differential equations.

UNIT I: Solution of Algebraic and Transcendental Equations
Introduction- Bisection method – Method of false position – Iteration method – Newton-Raphson method (Onevariable and simultaneous Equations).

UNIT II: Interpolation
Introduction- Errors in polynomial interpolation – Finite differences- Forward differences- Backward differences –Central differences – Symbolic relations and separation of symbols - Differences of a polynomial-Newton'sformulae for interpolation – Interpolation with unequal intervals - Lagrange's interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations
Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's seriesPicard's method of successive approximations-Euler's method - Runge-Kutta method (second and fourth order).

UNIT IV: Fourier Series
Introduction- Periodic functions – Fourier series of -periodic function - Dirichlet's conditions – Even and odd functions –Change of interval– Half-range sine and cosine series.

UNIT V: Fourier Transforms
Fourier integral theorem (without proof) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT VI: Partial Differential Equations
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations. Classification of second order partial differential equations.

Applications: Method of separation of Variables- Solution of One dimensional Wave, Heat and twodimensional Laplace equations.

Text Books:
1. **B.S.Grewal**, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **N.P.Bali**, Engineering Mathematics, Lakshmi Publications.
3. **Erwin Kreyszig,** Advanced Engineering Mathematics, 10th Edition, Wiley-India.

Reference Books:
1. **Dean G. Duffy**, Advanced engineering mathematics with MATLAB, CRC Press
2. **V.Ravindranath**and **P.Vijayalakshmi**, Mathematical Methods, Himalaya Publishing House.
3. **David Kincaid, Ward Cheney**, Numerical Analysis-Mathematics of Scientific Computing, 3rd Edition, Universities Press.
4. **Srimanta Pal, SubodhC.Bhunia**, Engineering Mathematics, Oxford University Press.
5. **Dass H.K., RajnishVerma. Er.**, Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

L	T	P	C
3	1	0	3

I Year - I Semester

Subject Code: 16CS1T10

APPLIED PHYSICS

COURSE OBJECTIVES: Physics curriculum which is re-oriented to the needs of Circuital branches of graduate engineering courses. That serves as a transit to understand the branch specific advanced topics. The courses are designed to:

• Impart Knowledge of Physical Optics phenomena like Interference, Diffraction and Polarization involving required to design instruments with higher resolution.
• Teach Concepts of coherent sources, its realization and utility optical instrumentation.
• Study the concepts regarding the bulk response of materials to the EM fields and their analytically study in the back-drop of basic quantum mechanics.
• Understand the physics of Semiconductors and their working mechanism for their utility in sensors.

UNIT-I
Objective: To impart knowledge on interference phenomenon and utilising it to design of instruments in Engineering applications.
Outcome: The students will learn to apply the concepts of interference undergo analysis of optical effects and contribute to engineering applications.
INTERFERENCE: Introduction-Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry)- Interference in wedge shaped films – Newton's rings –working principle of Interferometer, applications

UNIT-II
Objective: To impart knowledge on diffraction phenomenon to design optical instruments for Engineering applications.
Outcome: The students will learn to study diffraction pattern of light to utilize in the analysis of the materials and their properties.
DIFFRACTION: Introduction -Fraunhoffer diffraction at single slit - Cases of double slit, N-slits & Circular Aperture (Qualitative treatment only)-Grating equation - Resolving power of a grating, Telescope and Microscopes- applications.

UNIT-III
Objective:
- **To impart knowledge on types of polarization, types of polarizing materials and their effects to study and design of optical instruments.**
- **To impart knowledge on the lasers & their working principle**

Outcome: The students will learn polarization phenomenon, Lasers and their practical implications in engineering applications.

POLARIZATION: Introduction -Types of Polarization – Methods of production – double refraction-Nicol Prism -Quarter wave plate and Half Wave plate – Working principle of Polari meter (Sacharimeter)- applications.

LASERS: Introduction- Characteristics– Stimulated emission – Einstein's Transition Probabilities-Pumping schemes - Ruby laser – Helium Neon laser-applications of lasers

UNIT-IV
Objective:
- **An overview of the Maxwell's Electromagnetic Field Equations & study the concepts regarding the response of materials to EM fields.**
- **To impart knowledge on the Optical Fibers and transmission of signals through it.**

Outcomes:
- **The students will learn to study diffraction pattern of light to utilize in the analysis of the materials and their properties.**
- **The students will learn to analyze the applications of the Optical fibers in the field of communication.**

ELECTROMAGNETIC FIELDS: Introduction-Scalar and Vector Fields – Electric Potential- Gradient, Divergence of fields – Gauss and Stokes theorems-Propagation of EM waves through dielectric medium-Applications.

FIBER OPTICS: Introduction, Principle of Optical Fiber – Total Internal Reflection, Working principle of an Optical fiber, Numerical Aperture and Acceptance Angle-classification of Optical fibres-Applications.

UNIT-V
Objective:
- **To impart knowledge on the discrepancy of classical mechanics & role of quantum mechanics in explaining phenomenon related to sub-microscopic particles..**

Outcomes:
- **The students will learn the phenomenon of electrical & thermal conductivities related to sub-microscopic particles.**

QUANTUM MECHANICS: Introduction - Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box.

FREE ELECTRON THEORY: Introduction-Defects of Classical free electron theory –resistance of Conductor-Quantum Free electron theory - concept of Fermi Energy-Fermi Energy level of Conductors-Density of States.

UNIT-VI
Objective:
- **To impart knowledge on the physics of semiconductors and their working principle for their utility in electronics.**

Outcomes:

- **The students will be empowered to apply the basics of electronics in engineering applications.**

BAND THEORY OF SOLIDS: Introduction -Bloch's theorem (qualitative) – Kronig – Penney model – energy bands in crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole.

SEMICONDUCTOR PHYSICS: Introduction-Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors- Conductivity and Carrier concentration – Drift & Diffusion – relevance of Einstein's equation- Hall effect and its applications.

COURSE OUTCOME: Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt. Study EM-fields and semiconductors under the concepts of Quantum mechanics paves way for their optimal utility.

Text Books:

1. A Text book of Engineering Physics – by Dr. M.N.Avadhanulu and Dr.P.G.Kshira sagar, S.Chand & Company Ltd., (2014)

2. 'Solid State Physics' by A.J.Dekker, Mc Millan Publishers (2011)

Reference Books :

1.Physics by Resnick,Halliday&Krane ,Volume I&II ,John Wiley&sons(2002)

2. Engineering Physics by D.K.Bhattacharya and Poonam Tandon , Oxford press (2015)

3. Applied Physics by P.K.Palanisamy , Scitech publications (2014)

4. Lasers and Non-Linear optics by B.B.Laud , Newage international publishers (2008

L	T	P	C
3	1	0	3

I year - I semester

Subject Code: 16CS1T01

COMPUTER PROGRAMMING USING C

Learning objectives:
Formulating algorithmic solutions to problems and implementing algorithms in C.
- Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editingand executing programs in Linux.
- Understanding branching, iteration and data representation using arrays.
- Modular programming and recursive solution formulation.
- Understanding pointers and dynamic memory allocation.
- Understanding miscellaneous aspects of C.
- Comprehension of file operations.

UNIT-I:
History and Hardware - Computer Hardware, Bits and Bytes, Components, Programming Languages - Machine Language, Assembly Language, Low- and High-Level Languages, Procedural and Object-Oriented Languages, Application and System Software, The Development of C Algorithms The Software Development Process.

UNIT-II:
Introduction to C Programming- Identifiers, The main () Function, The printf () Function Programming Style - Indentation, Comments, Data Types**,** Arithmetic Operations, Expression Types, Variables and Declarations, Negation, Operator Precedence and Associativity, Declaration Statements, Initialization.
Assignment - Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers.

UNIT -III:
Control Flow-Relational Expressions - Logical Operators:
Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples.
Repetition: Basic Loop Structures, Pretest and Posttest Loops, Counter-Controlled and Condition-Controlled Loops, while Statement, for Statement, Nested Loops, do-while Statement.

UNIT-IV
Modular Programming: Function and Parameter Declarations, Returning a Value, Functions withEmpty Parameter Lists, Variable Scope, Variable Storage Class, Local Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Storing Addresses, Using Addresses, Declaring and Using Pointers, Passing Addresses to a Function.
Case Study: Swapping Values, Recursion - Mathematical Recursion, Recursion versus Iteration.

UNIT-V:
Arrays & Strings
Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Arrays asFunction Arguments, Two-Dimensional Arrays, Larger Dimensional Arrays- Matrices.
Strings: String Fundamentals, String Input and Output, String Processing, Library Functions

UNIT-VI:
Pointers, Structures, Files
Pointers: Concept of a Pointer, Initialization of pointer variables, pointers as function arguments,passing by address, Dangling memory, address arithmetic, character pointers and functions,pointers to pointers, Dynamic memory management functions, command line arguments.

Structures: Derived types, Structures declaration, Initialization of structures, accessing structures,nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef, bit-fields.

Data Files: Declaring, Opening, and Closing File Streams, Reading from and Writing to Text Files, Random File Access

Outcomes:
- Understand the basic terminology used in computer programming
- Write, compile and debug programs in C language.
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers
- Use different data structures and create/update basic data files.

Text Books:
1. ANSI C Programming, Gary J. Bronson, Cengage Learning.
2. Programming in C, B. L.Juneja, Anita Seth, Cengage Delmar Learning India Pvt.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

Reference Books:
1. C Programming-A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2. Programming with C, R S Bichkar, University Press, 2012.
3. Programming in C, ReemaThareja, Oxford.
4. C by Example, Noel Kalicharan, Cambridge University Press.

URLs

1. http://nptel.ac.in/courses/106104128/
2. http://students.iitk.ac.in/programmingclub/course/#notes
3. http://c-faq.com/~scs/cclass/cclass.html
4. http://www.youtube.com/watch?v=b00HsZvg-V0&feature=relmfu
5. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010/

L	T	P	C
4	0	0	3

I year - I semester

Subject Code: 16MEIT02

ENGINEERING DRAWING

Objective: Engineering drawing being the principle method of communication for engineers, the objective to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

UNIT I
Objective: To introduce the students to use drawing instruments and to draw polygons, Engineering Curves.
Polygons, Construction of regular polygons using given length of a side; Ellipse, arcs of circles and Oblong methods; Scales – Vernier and Diagonal scales.

UNIT II
Objective: To introduce the students to use scales and orthographic projections, projections of points & simple lines.
Introduction to orthographic projections; projections of points; projections of straight lines parallel to both the planes; projections of straight lines – parallel to one plane and inclined to the other plane.

UNIT III
Objective: The objective is to make the students draw the projections of simple lines inclined to both the planes.
Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

UNIT IV
Objective: The objective is to make the students draw the projections of the plane inclined to both the planes.
Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT V
Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT VI
Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.
Conversion of isometric views to orthographic views, Conversion of orthographic views to isometric views.

TEXT BOOKS:
1. Engineering Drawing by N.D. Bhatt, Chariot Publications
2. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age International

REFERENCE BOOKS:
1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers

3. Engineering Graphics by PI Varghese, McGrawHill Publishers
4. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers
5. http://nptel.ac.in/courses/112103019/
6. http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html
7. http://www.engineeringdrawing.org

Course Outcomes:
- ➢ Provides the students with a background in descriptive geometry, orthographic & isometric projection, engineering drawing techniques. Points, lines and plane relationships in projection, multi-view engineering drawings, basic dimensioning, engineering applications.
- ➢ Student's ability to perform basic sketching techniques will improve. Students will be able to draw orthographic projections.
- ➢ Student's ability to convert sketches to engineered drawings will increase.

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I Year - I Semester

Subject Code:16BH1L01

ENGLISH - COMMUNICATION SKILLS LAB- I

PRESCRIBED LAB MANUAL FOR SEMESTER I:
'INTERACT: English Lab Manual for Undergraduate Students', Published by Orient Black swan Pvt Ltd.

Objectives:
To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.

Outcome:
A study of the communicative items in the laboratory will help the students become successful in the competitive world. The course content along with the study material is divided into six units.

UNIT 1:
1. WHY study Spoken English?
2. Making Inquiries on the phone, thanking and responding to Thanks -- Practice work.

UNIT 2:
1. Responding to Requests and asking for Directions -- Practice work.

UNIT 3:
1. Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
2. Apologising, Advising, Suggesting, Agreeing and Disagreeing -- Practice work.

UNIT 4:
1. Letters and Sounds -- Practice work.

UNIT 5:
1. The Sounds of English -- Practice work.

UNIT 6:
1. Pronunciation
2. Stress and Intonation -- Practice wor

Reference Books:

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. Unlock, Listening and speaking skills 2, Cambridge University Press
4. Spring Board to Success, Orient BlackSwan
5. A Practical Course in effective english speaking skills, PHI
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education

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I Year - I Semester

Subject Code:16BH1L03

ENGINEERING/APPLIED PHYSICS LAB
(Common to ECE,CSE& IT)

(only 10 out of 14 Experiments prescribed)

1.   To verify the Laws of Transverse vibrations of a stretched string using sonometer

2.   To determine the Rigidity Modulus of a given wire using Torsional Pendulum

3.   To determine the velocity of sound in air using Volume Resonator Method

4.   To determine the acceleration due to gravity using Compound Pendulum

5.   To determine the frequency of an electric tuning fork using Melde's Apparatus

6.   To Study the V-I Characteristics and determine the breakdown voltage of a Zener Diode

7.   To determine the wavelength of a given source using diffraction Grating in Normal Incidence Method

8.   To determine the energy Band Gap of a Semiconductor using P-N Junction diode

9.   To Study the variation of the Magnetic field along the axis of a current carrying circular coil using Stewart and Gee's Apparatus

10.   To study the R-I Characteristics of a Themistor

11.   To determine the refractive index of the medium of the film using the formation of Newton's Rings.

12.   To determine the thickness of a paper using the formation of parallel fringes

13.   To Determine Planck's constant using photoconductor

14.   To determine the refractive index of the Prism using spectrometer

Reference :

1. Engineering Physics Lab Manual by Dr.Y.Aparna & Dr.K.Venkatesswara Rao.(V.G.S. Book Links)

2. Physics Manual cum Observation book (College Designed Manual).

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I Year - I Semester

Subject Code:16BH1L04

ENGINEERING/APPLIED PHYSICS VIRTUAL LABS - ASSIGNMENTS
(Constitutes 5 marks of 40 marks of Internal-component)

List of Experiments

1. Hall Effect

2. Crystal Structure

3. Hysteresis

4. Brewster's angle

5. Numerical Aperture of Optical fiber

6. Photoelectric Effect

7. Simple Harmonic Motion

8. LASER – Beam Divergence and Spot size

9. B-H curve

10. Michelson's interferometer

URL : www.vlab.co.in

L	T	P	C
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I year - I semester

Subject Code: 16CS1L01

C PROGRAMMING LAB

OBJECTIVES:

• Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.

• Acquire knowledge about the basic concept of writing a program.

• Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.

• Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.

• Role of Functions involving the idea of modularity.

Programming

Exercise - 1
a) System Assembling, Disassembling and identification of Parts / Peripherals. b) Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device Drivers.

Exercise - 2
a) MS-Office / Open Office
    i) Word - Formatting, Page Borders, Reviewing, Equations, symbols.
    ii) Spread Sheet - organize data, usage of formula, graphs, charts.
    iii) Powerpoint - features of power point, guidelines for preparing an effective presentation.
b) Network Configuration & Software Installation-Configuring TCP/IP, Proxy, and firewallsettings. Installing application software, system software & tools.

Exercise - 3 Basics
a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

Exercise - 4 Basic Math
a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 5 Control Flow - I
a)Write a C Program to Find Whether the Given Year is a Leap Year or not.
b)Write a C Program to Add Digits & Multiplication of a number

Exercise – 6 Control Flow - II
a)Write a C Program to Find Whether the Given Number is
    i) Prime Number
    ii) Armstrong Number
b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle

Exercise – 7 Functions
a) Write a C Program demonstrating of parameter passing in Functions and returning values.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion

Exercise – 8 Control Flow - III
a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch-case
b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

Exercise – 9 Functions - Continued
Write a C Program to compute the values ofsin x and cos x and e^x values using Series expansion. (use factorial function)

Exercise – 10 Arrays
Demonstration of arrays
a) Search-Linear.
b) Sorting-Bubble, Selection.
c) Operations on Matrix.

Exercises - 11 Structures
a)Write a C Program to Store Information of a Movie Using Structure
b)Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise – 12 Arrays and Pointers
a)Write a C Program to Access Elements of an Array Using Pointer
b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 13 Dynamic Memory Allocations
a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.
b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function. Understand the difference between the above two programs

Exercise – 14 Strings
a) Implementation of string manipulation operations **with** library function.
    i) copy
    ii) concatenate
    iii) length
    iv) compare

b) Implementation of string manipulation operations **without** library function.

    i) copy
    ii) concatenate
    iii) length
    iv) compare

Exercise -15 Files
a)Write a C programming code to open a file and to print it contents on screen.
b)Write a C program to copy files

Exercise – 16 Files Continued
a) Write a C program merges two files and stores their contents in another file.
b) Write a C program to delete a file.

OUTCOMES:

• Apply and practice logical ability to solve the problems.
• Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment
• Analyzing the complexity of problems, modularize the problems into small modules and then convert them into programs
• Understand and apply the in-built functions and customized functions for solving the problems.
• Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
• Document and present the algorithms, flowcharts and programs in form of user-manuals
•Identification of various computer components, Installation of software

Note:
a) All the Programs must be executed in the Linux Environment. (Mandatory)
b) The Lab record must be a print of the LATEX (.tex) Format.

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I year - II semester

Subject Code: 16BH2T02

ENGLISH-II

Introduction:
In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students have to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering.

As far as the detailed Textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing. The non-detailed Textbooks are meant for extensive reading for pleasure and profit. Thus the stress in the syllabus in primarily on the development of communicative skills and fostering of ideas.

Objectives:
1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
3. To develop the communication skills of the students in both formal and informal situations.

LISTENING SKILLS

Objectives:
1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds and regions.
3. To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS

Objectives:
1. To make the students aware of the importance of speaking for their personal and professional communication.
2. To enable the students to express themselves fluently and accurately in social and professional success.
3. To help the students describe objects, situations and people.
4. To make the students participate in group activities like role-plays, discussions and debates.
5. To make the students participate in Just a Minute talks.

READING SKILLS

Objectives:
1. To enable the students to comprehend a text through silent reading.
2. To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
3. To enable the students to skim and scan a text.
4. To enable the students to identify the topic sentence.
5. To enable the students to identify discourse features.
6. To enable the students to make intensive and extensive reading.

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WRITING SKILLS

Objectives:
1. To make the students understand that writing is an exact formal skills.
2. To enable the students to write sentences and paragraphs.
3. To make the students identify and use appropriate vocabulary.
4. To enable the students to narrate and describe.
5. To enable the students capable of note-making.
6. To enable the students to write coherently and cohesively.
7. To make the students to write formal and informal letters.
8. To enable the students to describe graphs using expressions of comparison.
9. To enable the students to write technical reports.

Methodology:
1. The classes are to be learner-centred where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

The following text books are recommended for study in I B.Tech II Semester (Common for all branches) of Pragati Engineering College, Surampalem from the academic year 2016-17 (R-16 Regulations)

DETAILED TEXTBOOK:
- *ENGLISH ENCOUNTERS Published by Maruthi Publishers.*

- A BETTER INDIA, A BETTER WORLD by N.R. Narayana Murthy,Published by: Penguin Books India Pvt. Ltd.

DETAILED NON-DETAIL:
- *THE GREAT INDIAN SCIENTISTS, Published by Cengage learning*

The course content along with the study material is divided into six units.

UNIT 1:
1. ' The Greatest Resource- Education' from English Encounters
Objective:
Schumacher describes the education system by saying that it was mere training, something more than mere knowledge of facts.
Outcome:

The lesson underscores that the ultimate aim of Education is to enhance wisdom.

2. ' A P J Abdul Kalam' from The Great Indian Scientists.
>   Objective:
>   The lesson highlights Abdul Kalam's contributions to Indian science and the awards he received.
>   Outcome:
>   Abdul Kalam's simple life and service to the nation inspires the readers to follow in his footsteps.

UNIT 2:
1. ' A Dilemma' from English Encounters
>   Objective:
>   The lesson centres on the pros and cons of the development of science and technology.
>   Outcome:
>   The lesson enables the students to promote peaceful co-existence and universal harmony among people and society.

2. 'C V Raman' from The Great Indian Scientists.
>   Objective:
>   The lesson highlights the dedicated research work of C V Raman and his achievements in Physics.
>
>   Outcome:
>   The Achievements of C V Raman are inspiring and exemplary to the readers and all scientists.

UNIT 3:
Unit 3 has two sections: Unit 3(A) and 3(B)
3 (A)
1. 'Cultural Shock': Adjustments to new Cultural Environments from English Encounters.
>   Objective:
>   The lesson depicts of the symptoms of Cultural Shock and the aftermath consequences
>   Outcome:
>   The lesson imparts the students to manage different cultural shocks due to globalization.

2. 'Homi Jehangir Bhabha' from The Great Indian Scientists.
>   Objective:
>   The lesson highlights Homi Jehangir Bhabha's contributions to Indian nuclear program as architect.
>   Outcome:
>   The seminal contributions of HomiJehangirBhabha to Indian nuclear program provide an aspiration to the readers to serve the nation and strengthen it.

Unit 3 (B)
1.'What can we learn from West?' from A Better India, A Better World
>   Objective:
>   To enable students to appreciate the differences in cultural perspectives.
>   Outcome:
>   This lesson motivates students to develop a multicultural outlook and appreciate the diverse cultures.

UNIT 4:
1. 'The Lottery' from English Encounters.
>   Objective:
>   The lesson highlights insightful commentary on cultural traditions.
>   Outcome:

The theme projects society's need to re examine its traditions when they are outdated.
2. 'Jagadish Chandra Bose' from The Great Indian Scientists.

Objective:

The lesson gives an account of the unique discoveries and inventions of Jagadish Chandra Bose in Science.

Outcome:

The Scientific discoveries and inventions of Jagadish Chandra Bose provide inspiration to the readers to make their own contributions to science and technology, and strengthen the nation.

UNIT 5:

1. ' The Health Threats of Climate Change' from English Encounters.

Objective:

The essay presents several health disorders that spring out due to environmental changes

Outcome:

The lesson offers several inputs to protect environment for the sustainability of the future generations.

2. ' Prafulla Chandra Ray' from The Great Indian Scientists.

Objective:

The lesson given is an account of the experiments and discoveries in Pharmaceuticals of Prafulla Chandra Ray.

Outcome:

Prafulla Chandra Ray's scientific achievements and patriotic fervour provide inspiration to the reader.

UNIT 6:

1. ' The Chief Software Architect' from English Encounters

Objective:

The lesson supports the developments of technology for the betterment of human life.

Outcome:

Pupil gets inspired by eminent personalities who toiled for the present day advancement of software development.

2. ' Srinivasa Ramanujan' from The Great Indian Scientists.

Objective:

The lesson highlights the extraordinary achievements of Srinivasa Ramanujan, a great mathematician and the most romantic figure in mathematics.

Outcome:

The lesson provides inspiration to the readers to think and tap their innate talents

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I year - II semester

Subject Code: 16BH2T06

MATHEMATICS – III

Course Objectives:

1. The course is designed to equip the students with the necessary mathematical skillsand techniques that are essential for an engineering course.
2. The skills derived from the course will help the student from a necessary base todevelop analytic and design concepts.
3. Understand the most basic numerical methods to solve simultaneous linear equations.

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

1. Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linear ODE.
2. Determine double integral over a region and triple integral over a volume.
3. Calculate gradient of a scalar function, divergence and curl of a vector function.Determine line, surface and volume integrals. Apply Green, Stokes and Gaussdivergence theorems to calculate line, surface and volume integrals.

UNIT I: Laplace transforms
Laplace transforms of standard functions-Shifting theorems - Transforms of derivatives and integrals – Unit step function –Dirac's delta function.
UNIT II: Inverse Laplace transforms
Inverse Laplace transforms – Shifting Theorems - Transforms of derivatives and integrals - Convolution theorem (without proof).
Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.
UNIT III: Multiple integrals
Curve tracing: Cartesian, Polar and Parametric forms.
Multiple integrals: Double and triple integrals – Change of variables – Change of order ofintegration.
Applications: Finding Areas and Volumes.
UNIT IV: Special functions
Beta and Gamma functions- Properties - Relation between Beta and Gamma functions -Evaluation of improper integrals.
Applications: Evaluation of integrals.
UNIT V: Vector Differentiation
Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities.
Applications: Equation of continuity, potential surfaces
UNIT VI: Vector Integration
Line integral – Work done – Potential function – Area- Surface and volume integrals Vectorintegral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) andrelated problems.

Applications: Work done, Force.

Text Books:
1. **B.S.Grewal**, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **N.P.Bali**, Engineering Mathematics, Lakshmi Publications.
3. **Erwin Kreyszig**, Advanced Engineering Mathematics, 10th Edition, Wiley-India.

Reference Books:
1. **Greenberg**, Advanced Engineering Mathematics, 2nd edition, Pearson edn
2. **Peter O'Neil**, Advanced Engineering Mathematics,7th edition, Cengage Learning.
3. **D.W. Jordan and T.Smith**, Mathematical Techniques, Oxford University Press.
4. **Srimanta Pal, SubodhC.Bhunia**, Engineering Mathematics, Oxford University Press.
5. **Dass H.K., RajnishVerma. Er.**, Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

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I year - II semester

Subject Code: 16BH2T12

APPLIED CHEMISTRY

Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the available resources.

UNIT I: HIGH POLYMERS AND PLASTICS

Polymerisation:- Definition- Types of Polymers -   Mechanism of polymerization- Stereo regular polymers- Methods of polymerization(emulsion and suspension)-Physical and Mechanical properties. Plastics as engineering materials: advantages and limitations- Thermoplastics and Thermosetting plastics Compounding and fabrication (Compression, Injection, Extrusion and Blown Techniques)- Preparation, properties and applications of polyethene, PVC, Bakelite Teflon, Poly Methyl Methacrylate(PMMA) and polycarbonates

Elastomers :- Natural rubber- Disadvantages- Mastication - compounding and vulcanization - Synthetic rubbers : Buna S, Buna N, Thiokol and polyurethanes - Applications of elastomers.

Composite materials & Fiber reinforced plastics - Biodegradable polymers - Conducting polymers.

Learning Objectives: Plastics are nowadays used in household appliances; They are also used as composites (FRP) in aerospace and automotive industries.

Outcomes: The advantages and limitations of plastic materials and their use in design would be understood.

UNIT II: FUEL TECHNOLOGY

Fuels – Definition –Classification - Characteristics of a good fuel - Calorific value - HCV and LCV - Dulong's formula - Bomb calorimeter – Numerical problems - Coal -- Proximate and Ultimate analysis and their Significance - Liquid fuels - Petroleum- Origin and Refining - Cracking - Synthetic petrol -Petrol knocking - Diesel knocking - Octane and Cetane ratings - Anti-knock agents - Power alcohol – Bio diesel, Gaseous fuels: - Natural gas, LPG and CNG, Combustion - Calculation of air for the combustion of a fuel, Flue gas analysis – Orsat's apparatus - Numerical problems on combustion
Explosives:- Rocket fuels

Learning Objectives: Fuels as a source of energy are a basic need of any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence are introduced to create awareness on the topics.

Outcomes: Fuels which are used commonly and their economics, advantages and limitations can be understood by the students and create awareness on the topics.

UNIT III: ELECTROCHEMICAL CELLS AND CORROSION

Galvanic cells - Reversible and irreversible cells - Single electrode potential - Electro chemical series and uses of this series- Standard electrodes (Hydrogen ,Calomel and _**Glass electrode**_) - Concentration Cells - Batteries: Dry Cell - Ni-Cd cells - Ni-Metal hydride cells - Li cells - Zinc - air cells.

Fuel cells:- Introduction - cell representation, H_2-O_2 fuel cell: Design and working, advantages and limitations. Types of fuel cells: Alkaline fuel cell - methanol-oxygen - phosphoric acid fuel cells - molten carbonate fuel cells.

Corrosion :- Definition - Theories of Corrosion (chemical & electrochemical) - Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion -   Passivity of

metals -Pitting corrosion – *Corrosion under insulation* -Galvanic series - Factors which influence the rate of corrosion –Protection from corrosion -Design and material selection - Cathodic protection - Protective coatings: -   Surface preparation - Metallic (galvanizing and tinning) coatings - Methods of application on metals (Electroplating, Electroless plating).

Learning Objectives: The basics for the construction of galvanic cells are introduced to have understanding on the concepts. Understanding on the concept of Corrosion and Mechanism of Corrosion with Theories like Electrochemical theory. .

Outcomes: Corrosion – its theories and controlling methods can create Understanding and awareness on the topic.

UNIT IV: CHEMISTRY OF ADVANCED MATERIALS

Nano materials:- Introduction - Sol-gel method & chemical reduction method of preparation-Characterization by Braunear Emmett Teller (BET)method, Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM) methods - Carbon nano tubes : Types, preparation(*Laser ablation and Chemical vapour deposition method*), properties and applications, Fullerenes.

Liquid crystals:- Introduction - Types - Applications

Super conductors:-Type -I, Type II - Characteristics and applications

Green synthesis:- Principles of Green Chemistry - Methods of synthesis (Aqueous Phase Method, Super Critical Fluid Extraction and Phase Transfer Catalysis) with examples - R_4M_4 principles

Learning Objectives : With the increase in demand, a wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced in Unit – IV.

Outcomes: The students will have awareness on now aware of materials like nano materials and fullerenes and their applications. Study on   liquid crystals and superconductors can create Understanding for their applications in various fields. The importance of green synthesis create better Understanding for application and also can create better Understanding compared to conventional methods is also explained

UNIT V: SOLID STATE CHEMISTRY
Types of solids - close packing of atoms and ions - BCC , FCC, structures of rock salt cesium chloride- spinel - normal and inverse spinels,Non-elemental semiconducting Materials:- Stoichiometric, controlled valency & Chalcogen photo/semiconductors, Preparation of Semiconductors - Semiconductor Devices:- p-n junction diode as rectifier - junction transistor.Insulators (electrical and electronic applications)

Magnetic materials:- Ferro and ferri magnetism. Hall effect and its applications.

Learning Objectives: Understanding of crystal structures will help to understand the conductivity, semiconductors and superconductors. Magnetic properties are also studied to have better Understanding.

Outcomes: Conductance phenomenon can be better understood

UNIT VI: NON CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES
Solar Energy: - Introduction, application of solar energy, conversion of solar energy (Thermal conversion & photo conversion) - photovoltaic cell: design, working and its importance

Non-conventional energy sources

(i)Hydropower include setup a hydropower plant (schematic diagram)

(ii) Geothermal energy: Introduction-schematic diagram of a geothermal power plant

(iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea

level.

(iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open cycle OTEC, hybrid OTEC, schematic diagram and explanation.

(v) Biomass and biofuels

Learning Objectives: With the increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources are introduced and the study can create a better understanding on the Non –Conventional Energy Sources and Storage Devices.

Outcomes: The students are exposed to some of the alternative fuels and their advantages and imitations.

Text Books:
1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:
1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P.Shankar and others, University Press, IIM

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I year - II semester

Subject Code: 16IT2T01

OBJECT-ORIENTED PROGRAMMING THROUGH C++

OBJECTIVES:
- This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable and portable code. The nature of C language is emphasized in the wide variety of examples and applications. To learn and acquire art of computer programming. To know about some popular programming languages and how to choose
- Programming language for solving a problem.

UNIT-I: Introduction to C++
Difference between C and C++- Evolution of C++- The Object Oriented Technology- Disadvantage of Conventional Programming- Key Concepts of Object Oriented Programming- Advantage of OOP- Object Oriented Language.

UNIT-II: Classes and Objects &Constructors and Destructor
Classes in C++-Declaring Objects- Access Specifiers and their Scope- Defining Member Function- Overloading Member Function- Nested class, Constructors and Destructors, Introduction- Constructors and Destructor- Characteristics of Constructor and Destructor-Application with Constructor- Constructor with Arguments (parameterized Constructor-Destructors- Anonymous Objects.

UNIT-III: Operator Overloading and Type Conversion & Inheritance
The Keyword Operator- Overloading Unary Operator- Operator Return Type- OverloadingAssignment Operator (=)- Rules for Overloading Operators, Inheritance, Reusability- Types of Inheritance- Virtual Base Classes- Object as a Class Member- Abstract Classes- Advantages of Inheritance-Disadvantages of Inheritance,

UNIT-IV: Pointers & Binding Polymorphisms and Virtual Functions
Pointer, Features of Pointers- Pointer Declaration- Pointer to Class- Pointer Object- The this Pointer- Pointer to Derived Classes and Base Class, Binding Polymorphisms and Virtual Functions, Introduction- Binding in C++- Virtual Functions- Rules for Virtual Function- Virtual Destructor.

UNIT-V: Generic Programming with Templates & Exception Handling
Generic Programming with Templates, Need for Templates- Definition of class Templates- Normal Function Templates- Over Loading of Template Function-Bubble Sort Using Function Templates- Difference Between Templates and Macros- Linked Lists with Templates, Exception Handling- Principles of Exception Handling- The Keywords try throw and catch- Multiple Catch Statements − Specifying Exceptions.

UNIT-VI: Overview of Standard Template Library
Overview of Standard Template Library- STL Programming Model- Containers- Sequence
Containers- Associative Containers- Algorithms- Iterators- Vectors- Lists- Maps.

OUTCOMES:

- Understand the basic terminology used in computer programming
- Write, compile and debug programs in C language. Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference

Text Books:
1. A First Book of C++, Gary Bronson, Cengage Learning.
2. The Complete Reference C++, Herbert Schildt, TMH.
3. Programming in C++, Ashok N Kamathane, Pearson 2nd Edition.

Reference Books:
1. The C++ Programming Language, Bjarne Stroustup, 4th Edition.
2. Object oriented Programming in C++, Robert Lafore,4th Edition.
3. Object Oriented Programming C++, Joyce Farrell, Cengage.
4. C++ Programming: From problem analysis to program design, DS Malik, Cengage Learning

URL:

1. http://www.doc.ic.ac.uk/~wjk/c++Intro/
2. http://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm
3. http://www.cis.upenn.edu/~cis190/fall2014/lectures.html
4. http://www.oualline.com/books.free/teach/intro.html

Reference (Advanced) Material

1. Effective C++: 55 Specific Ways to Improve Your Programs and Designs (Third Edition) by Scott Meyers, 2005
2. More Effective C++ by Scott Meyers, 2002
3. Modern C++ Design by Andrei Alexandrescu, 2004
4. Exceptional C++: 47 Engineering Puzzles, Programming Problems, and Solutions by Herb Sutter, 1999
5. C++ Templates: The Complete Guide by David Vandevoorde and Nicolai M. Josuttis, 2002
6. The C++ Standard Library: A Tutorial and Reference by Nicolai M. Josuttis, 2012
7. Effective STL: 50 Specific Ways to Improve Your Use of the Standard Template Library

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I year - II semester

Subject Code: 16BH2T13

ENVIRONMENTAL STUDIES

UNIT – I

Course Learning Objectives: Basic understanding of the environment, global problems and ecosystems.
Course Outcomes: The importance of environment and global environmental problems. The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web.

Multidisciplinary nature of Environment and Ecology: Definition, Scope and Importance, _Introduction to Brief works of noted Environmentalists & Naturalists(Wangari Mathai,Salim Ali and Sunderlal Bahuguna)_ ,Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, Carbon Credits, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information Technology in Environment and human health.
Ecosystems: Concept of an ecosystem**,** Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. Classification of ecosystems- characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems: Estuaries and Mangroves

UNIT – II

Course Learning Objectives: Overall understanding of the natural resources
Course Outcomes: The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources.
Natural Resources: Natural resources and associated problems
Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people
Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Sustainable mining of Granite, Laterite, Coal, Sea and River sands.
Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity
Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources Vs Oil and Natural Gas Extraction.
Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT – III

Course Learning Objectives**:** Basic understanding of Biodiversity.
Course Outcomes: The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity-classification -

Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity.

UNIT – IV

Course Learning Objectives: Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
Course Outcomes: Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices
Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, *Heavy Metal pollution*, Soil pollution, Noise pollution, Radioactive pollution: Sources and risks. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style, Impact of Fire Crackers on Man and his well being.
Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e - waste management.

UNIT – V

Course Learning Objectives: Awareness on the social issues, environmental legislation and global treaties
Course Outcomes: Social issues both rural and urban environment and the possible means to combat the challenges. The environmental legislations of India and the first global initiatives towards sustainable development.
Social Issues and the Environment: Urban problems related to energy -Water conservation- *Coastal Regulatory zone management,* rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air(Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act - Wildlife Protection Act -Forest Conservation Act-Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT – VI

Course Learning Objectives: An understanding of the environmental impact of developmental activities
Course Outcomes: About environmental assessment and the stages involved in EIA and the environmental audit. Self Sustaining Green Campus with Environment Friendly aspect of – Energy, Water and Wastewater reuse Plantation, Rain water Harvesting, Parking & Curriculum.
Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. *Environmental Modeling: Definition (Box Model and Gaussian Plume Modeling),* Ecotourism, Green Campus – Green business, Green politics *and Green Building.*
The student should Visit an Industry / Ecosystem and submit a report individually on any issues related to Environmental Studies course and make a power point presentation.

TEXT BOOKS:

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
3. Environmental Studies, P.N. Palanisamy, P. Manikandan, A. Geetha, and K.Manjula Rani; Pearson Education, Chennai

REFERENCE:

1. Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014
5. Environmental pollution, Monitoring and Control by Khopkar.S.M, New Age Publishers.
6. *A Text Book of Fundamentals of Ecology, E.P.Odam, Philadelphia: W.B. Saunders Company.*

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I year - II semester

Subject Code: 16ME2T01

ENGINEERING MECHANICS

Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes, resultant of force system, Forces acting on a body, their free body diagrams using graphical methods. They are required to understand the concepts of centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

UNIT – I

Objectives: The students are to be exposed to the concepts of force and friction, direction and its application.

Introduction to Engg. Mechanics – Basic Concepts.

Systems of Forces: Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

Friction: Introduction, limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction, Problems on wedges.

UNIT II

Objectives: The students are to be exposed to application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces.

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorm, Graphical method for the equilbrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium, analysis of plane trusses.

UNIT – III

Objectives : The students are to be exposed to concepts of centre of gravity.

Centroid: Centroids of simple figures (from basic principles) – Centroids of Composite Figures

Centre of Gravity: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, Pappus theorems.

UNIT IV

Objective: The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.

Area moments of Inertia: Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia:

Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT – V

Objectives: The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.

Kinematics: Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion. **Kinetics:** Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies, Principle of virtual work.

UNIT – VI
Objectives: The students are to be exposed to concepts of work, energy and particle motion
Work – Energy Method: Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method., Law of conservation of momentum

TEXT BOOKS :
1. Engg. Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hill publications.
2. Engg. Mechanics - S. S. Bhavikatti, New Age International.

REFERENCES :
1. Engineering Mechanics statics and dynamics – R.C.Hibbeler, 11th Edn – Pearson Publ.
2. Engineering Mechanics, statics – J.L.Meriam, 6th Edn – Wiley India Pvt Ltd.
3. Engineering Mechanics, statics and dynamics – I.H.Shames, – Pearson Publ.
4. Mechanics For Engineers, statics - F.P.Beer & E.R.Johnston – 5th Edn Mc Graw Hill Publ.
5. Mechanics For Engineers, dynamics - F.P.Beer & E.R.Johnston –5th Edn Mc Graw Hill Publ.
6. Theory & Problems of engineering mechanics, statics & dynamics – E.W.Nelson, C.L.Best & W.G. McLean, 5th Edn – Schaum's outline series - Mc Graw Hill Publ.
7. Singer's Engineering Mechanics: Statics And Dynamics, K. Vijay Kumar Reddy, J. Suresh Kumar, Bs Publications
8. Engineering Mechanics, Fedinand . L. Singer, Harper – Collins.
9. Engineering Mechanics statics and dynamics , A Nelson , Mc Graw Hill publications
10. http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/engg_mechanics/ui/Course_home_3.htm
11. http://nptel.ac.in/courses/122104015/
12. https://www.youtube.com/watch?v=LG0YzGeAFxk

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I year - II semester

Subject Code: 16BH2L05

ENGINEERING/APPLIED CHEMISTRY LAB

1. Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Quantitative analysis etc.,

2. Trial experiment – Estimation of HCI using standard Na_2co_2 solutions

3. Estimation of $KMnO_4$ using standard Oxalic acid solution.

4. Estimation of Ferric iron using standard $K_2Cr_2O_7$ solution

5. Estimation of Copper using standard $K_2Cr_2O_7$ solution.

6. Estimation of Total Hardness water using standard EDTA solution.

7. Estimation of Copper using standard EDTA solution.

8. Estimation of Copper using Colorimeter

9. Estimation of pH of the given sample solution using pH meter.

10. Conductometric Titrations between strong acid and strong base

11. Conductometric Titrations between strong acid and Weak base

12. Potentiometric Titrations between strong acid and strong base

13. Potentiometric Titrations between strong acid and Weak base

14. Estimatinog of Zinc using standard potassium ferrocyanide solution

15. Estimation of Vitamin – C

STANDARD BOOKS :

1. Dr.Jyotsna Cherukuis(2012)Laboratory Manual of Engineering Chemistry-II, VGS Techno Series

2. Chemistry Practical Manual, Lorven Publications

3. K. Mukkanti (2009) Practical Engineering Chemistry, B.S.Publication

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I year - II semester

Subject Code: 16BH2L02

ENGLISH - COMMUNICATION SKILLS LAB- II

PRESCRIBED LAB MANUAL FOR SEMESTER II:
'INTERACT: English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd.
OBJECTIVES: To enable the students to learn demonstratively the communication skills of listening, speaking, reading and writing.
OUTCOME: A study of the communicative items in the laboratory will help the students become successful in the competitive world.
 The course content along with the study material is divided into six units.

UNIT-1:

1.Debating- Practice work

UNIT-2:

1.Group Discussion- Practice work

UNIT-3:

1.Presentation Skills- Practice work

UNIT-4:

1.Interview Skills- Practice work

UNIT-5:

1.Email
2.Curriculum Vitae- Practice work

UNIT-6:

1.Idiomatic Expressions
2.Common Errors in English- Practice work

Reference Books:

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and
   Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. Unlock, Listening and speaking skills 2, Cambridge University Press
4. Spring Board to Success, Orient BlackSwan
5. A Practical Course in effective english speaking skills, PHI
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education

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I year - II semester

Subject Code: 16IT2L01

OBJECT-ORIENTED PROGRAMMING LAB

OBJECTIVE:
• To strengthen their problem solving ability by applying the characteristics of an Object oriented approach.
• To introduce object oriented concepts in C++ and Java.

Programming:
Exercise – 1 (Basics)
Write a Simple Program on printing "Hello World" and "Hello Name" where name is the input from the user
a) Convert any two programs that are written in C into C++
b) Write a description of using g++ (150 Words)

Exercise – 2 (Expressions Control Flow)
a) Write a Program that computes the simple interest and compound interest payable onPrinciple amount(in Rs.) of loan borrowed by the customer from a bank for a given period of time (in years) at specific rate of interest. Further determine whether the bank will benefit by charging simple interest or compound interest.
b) Write a Program to calculate the fare for the passengers traveling in a bus. When a Passenger enters the bus, the conductor asks "What distance will you travel?" On knowing distance from passenger(as an approximate integer), the conductor mentions the fare to the passenger accordingto following criteria.

Exercise – 3 (Variables, Scope, Allocation)
a) Write a program to implement call by value and call by reference using reference variable.
b) Write a program to illustrate scope resolution, new and delete Operators. (Dynamic Memory Allocation)
c) Write a program to illustrate Storage classes
d) Write a program to illustrate Enumerations

Exercises –4 (Functions)
Write a program illustrating Inline Functions
a) Write a program illustrate function overloading. Write 2 overloading functions for power.
b) Write a program illustrate the use of default arguments for simple interest function.

Exercise -5 (Functions –Exercise Continued)
a) Write a program to illustrate function overloading. Write 2 overloading functions for adding two numbers
b) Write a program illustrate function template for power of a number.
c) Write a program to illustrate function template for swapping of two numbers.

Exercise -6 (Classes Objects)
Create a Distance class with:

• feet and inches as data members
• member function to input distance
• member function to output distance
• member function to add two distance objects
a). Write a main function to create objects of DISTANCE class. Input two distances and output the sum.
b). Write a C++ Program to illustrate the use of Constructors and Destructors (use theabove program.)
c) Write a program for illustrating function overloading in adding the distance between objects (use the above problem)
d). Write a C++ program demonstrating a Bank Account with necessary methods and variables

Exercise – 7 (Access)
Write a program for illustrating Access Specifiers public, private, protected
a) Write a program implementing Friend Function
b) Write a program to illustrate this pointer
c) Write a Program to illustrate pointer to a class

Exercise -8 (Operator Overloading)
a). Write a program to Overload Unary, and Binary Operators as Member Function, and Non Member Function.
   i.   Unary operator as member function
   ii. Binary operator as nonmember function
b). Write a c ++ program to implement the overloading assignment = operator
c).Write a case study on Overloading Operators and Overloading Functions (150 Words)

Exercise -9 (Inheritance)
a) Write C++ Programs and incorporating various forms of Inheritance
   i.   Single Inheritance
   ii.   Hierarchical Inheritance
   iii. Multiple Inheritances
   iv.   Multi-level inheritance
   v.   Hybrid inheritance
b) Write a program to show Virtual Base Class
c) Write a case study on using virtual classes (150 Words)

Exercise-10 (Inheritance –Continued)
a) Write a Program in C++ to illustrate the order of execution of constructors and destructors in inheritance
b) Write a Program to *show* how *constructors* are invoked in *derived class*

Exercise -11 (Polymorphism)
a) Write a program to illustrate runtime polymorphism
b) Write a program to illustrate this pointer
c) Write a program illustrates pure virtual function and calculate the area of different shapes by using abstract class.
d) Write a case study on virtual functions (150 Words)

Exercise -12(Templates)
a) Write a C++ Program to illustrate template class

b) Write a Program to illustrate class templates with multiple parameters
c) Write a Program to illustrate member function templates

Exercise -13 (Exception Handling)
a).Write a Program for Exception Handling Divide by zero
b). Write a Program to re-throw an Exception

Exercise -14 (STL)
a) Write a Program to implement List and List Operations
b) Write a Program to implementVector andVector Operations

Exercise -15 (STLContinued)
a) Write a Program to implement Dequeue and Dequeue Operations
b) Write a Program to implement Map and Map Operations

OUTCOMES:
•Explain what constitutes an object-oriented approach to programming and identifypotential benefits of object-oriented programming over other approaches.
• Apply an object-oriented approach to developing applications of varying complexities