FACULTY OF ENGINEERING, TECHNOLOGY AND MANAGEMENT SCIENCES

(V.M.K.V.ENGINEERING COLLEGE, SALEM

AND

AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY, PAIYANOOR, CHENNAI)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech . – COMPUTER SCIENCE AND ENGINEERING (PART TIME)

(SYLLABUS)

2017 ONWARDS

SEMESTER I (4+1)

CODE No.	COURSE TITLE	L	P	C
THEORY				
	Engineering Mathematics	3	0	3
	Programming in C	3	0	3
	Environmental Science in Engineering	3	0	3
	Data structures	3	0	3
PRACTICAL				
	Data structures lab	0	3	2
		TOTAL:		**14**

SEMESTER II (5+1)

THEORY				
	Advanced Engineering Mathematics	3	0	3
	Database Management Systems	3	0	3
	Computer Organization	3	0	3
	Electron Devices	3	0	3
	Object Oriented Programming	3	0	3
	PRACTICAL			
	Object Oriented Programming Lab	3	0	2
		TOTAL:		**17**

SEMESTER- I

ENGINEERING MATHEMATICS

(COMMON TO THE BRANCHES MECH,ECE,CSE, CSSE,EEE,EIE,CIVIL,IT,MECHTRONICS,AERONAUCTICAL ,ETC,AUTOMOBILE)

L	P	C
3	0	3

(PART TIME)

UNIT I

MATRICES **09**

Characteristic equation – Eigen values and eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors (Without proof) – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form.

UNIT II

ORDINARY DIFFERENTIAL EQUATIONS **09**

Solutions of First and Second order linear ordinary differential equation with constant coefficients – Method of variation of parameters –Simultaneous first order linear equations with constant coefficients.

UNIT III

MULTIPLE INTEGRALS AND VECTOR CALCULUS **09**

Double integration - Cartesian and polar coordinates –Area as a double integral – Triple integration – volume as a triple integral- Directional derivatives – Gradient, Divergence and Curl – Irrotational and solenoidal- vector fields – vector integration.

UNIT IV

LAPLACE TRANSFORMS **09**

Laplace transform – transform of elementary functions – basic properties – derivatives and integrals of transforms – transforms of derivatives and integrals – initial and final value theorems – Transform of periodic functions.

UNIT V

APPLICATIONS OF LAPLACE TRANSFORMS 09

Inverse Laplace transform – Convolution theorem – Initial and Final value theorem-Solution of linear

ODE of second order with constant coefficients and first order simultaneous equation with constant coefficients using Laplace transforms.

Total hours : 60
Lecture Hours: 45
Tutorial Hours: 15

TEXT BOOKS

1**. "**Engineering Mathematics**"** by Department of Mathematics, VMU

2. Veerarajan, T., "Engineering Mathematics", Tata McGraw Hill Publishing Co., NewDelhi, 2006.

3. Prof.Dr.A .Singaravelu , Engineering Mathematics Volume I & Volume II by Meenakshi Publications.

REFERENCE BOOKS

1. Grewal, B.S., "Higher Engineering Mathematics" (36th Edition), Khanna Publishers, Delhi 2001.
2. Kreyszig, E., "Advanced Engineering Mathematics" (8th Edition), John Wiley and Sons (Asia) Pvt Ltd., Singapore, 2001.
3. Kandasamy .P., Thilagavathy. K., and Gunavathy. K., "Engineering Mathematics", Volumes I & II (4th edition), S.Chand & Co., New Delhi., 2001.

PROGRAMMING IN C

L P C
3 0 3

OBJECTIVES :
To enable the student to learn programming knowledge in C.
Outcomes: Do develop the skill of the student to develop the programming in C language.

UNIT I

Introduction: Algorithms & flowcharts-Overview of C-Features of C-IDE of C Structure of C program-Compilation & execution of C program-Identifiers, variables, expression, keywords, data types, constants, scope and life of variables, local and global variables. Operators: arithmetic, logical, relational, conditional and bitwise operators- Special operators: size of () & comma (,) operator-Precedence and associativity of operators & Type conversion in expressions.

Basic input/output and library functions: Single character input/output i.e. getch(), getchar(), getche() & putchar()-Formatted input/output: printf() and scanf()-Library Functions: concepts, mathematical and character functions.

UNIT II

Control structures: Conditional control-Loop control and Unconditional control structures.
Functions: The Need of a function-User defined and library function- Prototype of a function-Calling of a function-Function argument-Passing arguments to function- Return values-Nesting of function- main()-Command line arguments and recursion. Storage class specifier – auto, extern, static, & register.

UNIT III

Arrays: Single and multidimensional arrays-Array declaration and initialization of arrays-Array as function arguments.
Strings: Declaration-Initialization and string handling functions.
Structure and Union: Defining structure-Declaration of structure variable-Accessing structure members-Nested structures-Array of structures-Structure assignment-Structure as function argument-Function that returns structure- Union.

UNIT IV

Pointers: The '&' and * operators-Pointers expressions-Pointers vs arrays-Pointer to functions-Function returning pointers-Static and dynamic memory allocation in C.
DMA functions: malloc(), calloc(), sizeof(), free() and realloc()-Preprocessor directives.

UNIT V

File management: Defining, opening & closing a file, text file and binary file- Functions for file handling: fopen,fclose, gets, puts, fprintf, fscan, getw, putw, fputs, fgets, fread, fwrite-Random access to files: fseek, ftell, rewind-File name as Command Line Argument.

TEXT BOOKS:

1. Balaguruswami.E, 'Programming in C', TMH Publications,1997

REFERENCE BOOKS:

1. Behrouz A. Forouzan & Richard F. Gilberg, "Computer Science A Structured Programming
using C", Cengage Learning, 3rd Edition, 2007
2. Gottfried , 'Programming with C', schaums outline series, TMH publications,1997
3. Mahapatra , 'Thinking in C', PHI publications, 2nd Edition, 1998.
4. Stevens , 'Graphics programming in C', BPB publication, 2006
5. Subbura.R , 'Programming in C', Vikas publishing, 1st Edition, 2000

ENVIRONMENTAL SCIENCE AND ENGINEERING

L P C
3 0 3

Objectives

To Create An Awareness On The Various Environmental Pollution Aspects And Issues. To Give A Comprehensive Insight Into Natural Resources, Ecosystem And Biodiversity. To Educate The Ways And Means To Protect The Environment From Various Types Of Pollution. To Impart Some Fundamental Knowledge On Human Welfare Measures.

1. Introduction To Environmental Studies And Natural Resources 10

Definition, Scope And Importance – Need For Public Awareness – Forest Resources: Use And Over-Exploitation, Deforestation, Case Studies. Timber Extraction, Mining, Dams And Their Ground Water, Floods, Drought, Conflicts Over Water, Dams-Benefits And Problems – Mineral Resources: Use Effects On Forests And Tribal People – Water Resources: Use And Over-Utilization Of Surface And And Exploitation, Environmental Effects Of Extracting And Using Mineral Resources, Case Studies – Food Resources: World Food Problems, Changes Caused By Agriculture And Overgrazing, Effects Of Modern Agriculture, Fertilizer-Pesticide Problems, Water Logging, Salinity, Case Studies – Energy Resources: Growing Energy Needs, Renewable And Non Renewable Energy Sources, Use Of Alternate Energy Sources. Case Studies – Land Resources: Land As A Resource, Land Degradation, Man Induced Landslides, Soil Erosion And Desertification – Role Of An Individual In Conservation Of Natural Resources – Equitable Use Of Resources For Sustainable Lifestyles. Field Study Of Local Area To Document Environmental Assets – River / Forest / Grassland / Hill / Mountain.

2. Ecosystems And Biodiversity 14

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 – Introduction, Types, Characteristic Features, Structure And Function Of The (A) Forest Ecosystem (B) Grassland Ecosystem (C) Desert Ecosystem (D) Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers, Oceans, Estuaries) – Introduction To Biodiversity – Definition: Genetic, Species And Ecosystem Diversity – Biogeographical Classification Of India – Value Of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic And Option Values – Biodiversity At Global, National And Local Levels – India As A Mega-Diversity Nation – Hot-Spots Of Biodiversity – Threats To Biodiversity: Habitat Loss, Poaching Of Wildlife, Man-Wildlife Conflicts – Endangered And Endemic Species Of India – Conservation Of Biodiversity: In-Situ And Ex-Situ Conservation Of Biodiversity.

Field Study Of Common Plants, Insects, Birds. Field Study Of Simple Ecosystems – Pond, River, Hill Slopes, Etc.

3. Environmental Pollution 8

Definition – Causes, Effects And Control Measures Of: (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution (G) Nuclear Hazards – Soil Waste Management: Causes, Effects And Control Measures Of Urban And Industrial Wastes – Role Of An Individual In Prevention Of Pollution – Pollution Case Studies – Disaster Management: Floods, Earthquake, Cyclone And Landslides.
Field Study Of Local Polluted Site – Urban / Rural / Industrial / Agricultural

4. Social Issues And The Environment 7

From Unsustainable To Sustainable Development – Urban Problems Related To Energy – Water Conservation, Rain Water Harvesting, Watershed Management – Resettlement And Rehabilitation Of People; Its Problems And Concerns, Case Studies – Environmental Ethics: Issues And Possible Solutions – Climate Change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents And Holocaust, Case Studies. – Wasteland Reclamation – Consumerism And Waste Products – Environment Production 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

5. Human Population And The Environment 6

Population Growth, Variation Among Nations – Population Explosion – Family Welfare Programme – Environment And Human Health – Human Rights – Value Education – Hiv / Aids – Women And Child Welfare – Role Of Information Technology In Environment And Human Health – Case Studies.

Total=45

Text Book

1. Gilbert M.Masters, Introduction To Environmental Engineering And Science, Pearson Education Pvt., Ltd., Second Edition, Isbn 81-297-0277-0, 2004.
2. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co.
3. Townsend C., Harper J And Michael Begon, Essentials Of Ecology, Blackwell Science.
4. Trivedi R.K. And P.K. Goel, Introduction To Air Pollution, Techno-Science Publications.

Reference

1. Bharucha Erach, The Biodiversity Of India, Mapin Publishing Pvt. Ltd., Ahmedabad India,
2. Trivedi R.K., Handbook Of Environmental Laws, Rules, Guidelines, Compliances And Standards, Vol. I And Ii, Enviro Media.
3. Cunningham, W.P.Cooper, T.H.Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001.
4. Wager K.D., Environmental Management, W.B. Saunders Co., Philadelphia, Usa, 1998.

DATA STRUCTURES

L	P	C
3	0	3

1. Problem Solving – Lists, Stacks And Queues

Problem solving techniques and examples – Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT

2. Trees

Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – B-trees

3. Hashing And Priority Queues

Hashing – General Idea – Hash Function – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing – Priority Queues (Heaps) – Model – Simple implementations – Binary Heap – Application of Priority Queues

4. Sorting

Preliminaries – Insertion Sort – Shellsort – Heapsort – Mergesort – Quicksort – External Sorting

5. Graphs

Definitions – Topological Sort – Shortest-Path Algorithms – Minimum Spanning Tree – Applications of Depth – First Search

Text Books:

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", Second edition, Pearson Education Asia, 2002
2. R. G. Dromey, "How to Solve it by Computer", Prentice-Hall of India, 2002.

References:

1 Brian W. Kernighan and Rob Pike, "The Practice of Programming", Pearson Education Asia, 1999.
2. Aho, J. E. Hopcroft and J. D. Ullman, "Data Structures and Algorithms", Pearson Education Asia, 1983.
3. Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest, "Introduction to Algorithms",second edition., Prentice-Hall of India, 2002.
4. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia / Prentice-Hall of India, 2004.

DATA STRUCTURES LAB

L	P	C
0	3	2

1. Array implementation of List Abstract Data Type (ADT)
2. Linked list implementation of List ADT
3. Cursor implementation of List ADT
4. Stack ADT - Array and linked list implementations

The next two exercises are to be done by implementing the following source files

(a) Program source files for Stack Application 1
(b) Array implementation of Stack ADT
(c) Linked list implementation of Stack ADT
(d) Program source files for Stack Application 2

An appropriate header file for the Stack ADT should be #included in (a) and (d)

1. Implement any Stack Application using array implementation of Stack ADT (by implementing files (a) and (b) given above) and then using linked list implementation of Stack ADT (by using files (a) and implementing file (c))
2. Implement another Stack Application using array and linked list implementations of Stack ADT (by implementing files (d) and using file (b), and then by using files (d) and (c))

3. Queue ADT – Array and linked list implementations
4. Search Tree ADT - Binary Search Tree
5. Hash Table – separate chaining
6. Implement an interesting application as separate source files and using any of the searchable ADT files developed earlier. Replace the ADT file alone with other appropriate ADT files. Compare the performance.
7. Heap Sort
8. Quick Sort

SEMESTER II

ADVAVCED ENGINEERING MATHEMATICS

(**Common to CIVIL, MECH, AUTO, AERO, MECHAT, ECE, EEE, ETC, E&I, CSE, IT, CSSE)**

L	P	C
3	0	3

APPROVED BY THE BOARD OF STUDIES CONDUCTED AT VMKVEC, SALEM
On 28th and 29th JULY 2012

1. PARTIAL DIFFERENTIAL EQUATIONS 9

Formation - Solutions of standard types f(p,q)=0,clairatus form,f(z,p,q)=0,f(p,x)=g(q,y)of first order equations - Lagrange's Linear equation - Linear partial differential equations of second and higher order with constant coefficients.

2. FOURIER SERIES 9

Dirichlet's conditions - General Fourier series - Half-range Sine and Cosine series - Parseval's identity – Harmonic Analysis.

3. BOUNDARY VALUE PROBLEMS 9

Classification of second order linear partial differential equations - Solutions of one - dimensional wave equation, one-dimensional heat equation

4. FOURIER TRANSFORMS 9

Statement of Fourier integral theorem - Fourier transform pairs - Fourier Sine and Cosine transforms – Properties - Transforms of simple functions - Convolution theorem - Parseval's identity.

5. Z - TRANSFORM 9

Z-Transform – Elementary Properties – Inverse Z-Transform – Convolution Theorem – Formation of Difference Equations – Solution of Difference Equations using Z-Transform.

Total hours: 45

TEXT BOOKS:

1. Kreyszig, E., " Advanced Engineering Mathematics " (8th Edition), John Wiley and Sons, (Asia) Pte Ltd.,Singapore, 2000.
2. Grewal, B.S., " Higher Engineering Mathematics " (35th Edition), Khanna Publishers, Delhi 2000.
3. Prof.Dr.A .Singaravelu, Transform and Partial Differential Equations by Meenakshi Publications.

REFERENCES:

1. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., " Engineering Mathematics ", Volumes II & III (4th Revised Edition), S. Chand & Co., New Delhi, 2001.
2. Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiah, G., " Advanced Mathematics for Engineering Students ", Volumes II & III (2ndEdition), S.Viswanathan (Printers & Publishers, Pvt, Ltd.) 1992.
3. Venkataraman, M.K. " Engineering Mathematics " Volumes III - A & B, 13th Edition National Publishing Company, Chennai, 1998.
4. Shanmugam, T.N. : http://www.annauniv.edu/shan/trans.htm

DATABASE MANAGEMENT SYSTEMS

L	P	C
3	0	3

1. INTRODUCTION **5**

File System vs. DBMS – Views of data – Data Models – Database Languages – Database Management System Services – Overall System Architecture – Data Dictionary – Entity – Relationship (E-R) – Enhanced Entity – Relationship Model.

2. RELATIONAL APPROACH **8**

Relational Model – Relational Data Structure – Relational Data Integrity – Domain Constraints – Entity Integrity – Referential Integrity – Operational Constraints – keys – Codd's Rules – Relational Algebra – Fundamental operations – Additional Operations – SQL – Basic Structure – Set operations – Aggregate Functions – Null values – Nested Sub queries – Derived Relations – Views – Modification of the database – Joined Relations – Data Definition Language – Embedded SQL – Dynamic SQL – Triggers.

3. DATABASE DESIGN **10**

Functional Dependencies – Pitfalls in Relational Database Design – Decomposition – Normalization using Functional Dependencies – Normalization using Multi-valued Dependencies – Normalization using Join Dependencies – Domain-Key Normal form.

4. IMPLEMENTATION TECHNIQUES **14**

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Catalog Information for Cost Estimation – Selection Operation – Sorting – Join Operation – Other Operations – Transaction Processing – Concepts and States – Implementation of Atomicity and Durability – Concurrent Executions – Serializability – Implementation of Isolation – Testing for Serializability – Concurrency control – Lock Based Protocols – Timestamp Based Protocols – Deadlock Handling – Recovery-Failures – Storage Structures – Log based Recovery – Shadow paging – Recovery with concurrent Transactions.

5. CURRENT TRENDS **8**

Distributed Databases – Data Storage – Network Transparency – Query processing – Transaction Model – Commit Protocols – Coordinator selection – Object Oriented Databases – Object Oriented Data Model – Object Oriented Languages – Persistent Programming languages – Persistent C++ Systems – Object relational Databases – Nested Relations – Complex types and Object Orientation – Querying with complex types – Creation of complex values and objects – Introduction to Data mining and Data Warehousing.

TOTAL HOURS: 45

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fourth Edition, Tata McGraw Hill, 2002.

REFERENCES:

1. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Fourth Edition, Addision weskey, 2002.
2. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2002.
3. Peter Rob and Corlos Coronel, “Database Systems – Design, Implementation and Management, Fifth Edition, Thompson Learning, Course Technology, 2003.

COMPUTER ORGANIZATION

L	P	C
3	0	3

1. DIGITAL FUNDAMENTALS 8

Number Systems and Conversions – Boolean Algebra And Simplification – Minimization Of Boolean Functions – Karnaugh Map – Quine Mcclusky Method – Logic Gates – NAND – NOR Implementation.

2. COMBINATIONAL AND SEQUENTIAL CIRCUITS 10

Design Of Combinational Circuits – Adder / Subtracter – Encoder – Decoder – Mux / Demux – Comparators – Flip Flops – Triggering – Master – Slave Flip Flop – State Diagram and Minimization – Counters – Registers.

3. BASIC STRUCTURE OF COMPUTERS 9

Functional Units – Basic Operational Concepts – Bus Structures – Performance and Metrics – Instruction and Instruction Sequencing – Hardware – Software Interface – Addressing Modes – Instructions – Sets – RISC and CISC – ALU Design – Fixed Point and Floating Point Operation.

4. PROCESSOR DESIGN 9

Processor Basics – CPU Organization – Data Path Design – Control Design – Basic Concepts – Hard Wired Control – Micro Programmed Control – Pipeline Control – Hazards – Super Scalar Operation.

5. MEMORY AND I/O SYSTEM 9

Memory Technology – Memory Systems – Virtual Memory – Caches – Design Methods – Associative Memories – Input/Output System – Programmed I/O – DMA And Interrupts – I/O Devices And Interfaces.

TOTAL HOURS: 45

TEXT BOOKS:

1. Morris Mano, “Digital Design”, Third Edition, Pearson Education, 1997.
2. Carl Hamacher, Zvonko Vranesic And Safwat Zaky, “Computer Organization”, Fifth Edition,Tata Mcgraw Hill, 2002.

REFERENCES:

1. Charles H. Roth, Jr., “Fundamentals Of Logic Design”, Fifth Edition, Jaico Publishing House, 1992.
2. William Stallings, “Computer Organization And Architecture – Designing For Performance”, Sixth Edition, Pearson Education, 2003.
3. David A. Patterson And John L. Hennessy, “Computer Organization And Design: The Hardware/Software Interface”, Second Edition, Morgan Kaufmann, 2002.
4. John P. Hayes, “Computer Architecture And Organization”, Third Edition, Tata McGraw Hill, 1998.

ELECTRON DEVICES

L	P	C
3	0	3

1.ELECTRON BALLISTICS AND INTRINSIC SEMICONDUCTORS 9

Force on charge in electric field - Motion of Charge in uniform and time varying electric fields - Force on a moving charge in a magnetic field - calculation of cyclotron frequency - calculation of electrostatic and magnetic deflection sensitivity.

Energy band structure of conductors, semiconductors and insulators - Density distribution of available energy states in semiconductors - Fermi- Diac probability distribution function at different temperatures - Thermal generation of carriers - Calculation of electron and hole densities in intrinsic semiconductors - Intrinsic concentration - Mass Action Law.

2.EXTRINSIC SEMICONDUCTOR AND PN JUNCTIONS 9

N and P type semiconductors and their energy band structures - Law of electrical neutrality - Calculation of location of Fermi level and free electron and hole densities in extrinsic semiconductors - Mobility, drift current and conductivity - Diffusion current - Continuity equation - Hall effect. Band structure of PN Junction - Current Component in a PN Junction - Derivation of diode equation - Temperature dependence of diode characteristics.

3.SWITCHING CHARACTERISTICS OF PN JUNCTION AND SPECIAL DIODES 9

Calculation of transition and diffusion capacitance - Varactor diode - charge control description of diode - switching characteristics of diode - Mechanism of avalanche and Zener breakdown - Temperature dependence of breakdown voltages - Backward diode - Tunneling effect in thin barriers Tunnel diode - Photo diode - Light emitting diodes.

4.BIPOLAR JUNCTION TRANSISTORS AND FIELD EFFECT TRANSISTORS 9

Construction of PNP and NPN transistors - BJT current components - Emitter to collector and base to collector current gains - Base width modulation CB and CE characteristics - Breakdown characteristics - Ebers - Moll model - Transistor switching times.

Construction and Characteristics of JFET - Relation between Pinch off Voltage and drain current - Derivation. MOSFETS - Enhancement and depletion types.

5.METAL SEMICONDUCTOR CONTACTS AND POWER CONTROL DEVICES 9

Metal Semiconductor Contacts - Energy band diagram of metal semiconductor junction Schottky diode and ohmic contacts.Power control devices: Characteristics and equivalent

circuit of UJT - intrinsic stand off ratio. PNPN diode - Two transistor model, SCR, Triac, Diac.

TOTAL HOURS : 45

TEXT BOOKS:

1. Jacob Millman & Christos C.Halkias, "Electronic Devices and Circuits" Tata McGraw-Hill, 1991 .

REFERENCES:

1. Nandita Das Gupta and Amitava Das Gupta, Semiconductor Devices - Modelling and Technology, Prentice Hall of India, 2004.

2.Donald A.Neaman," Semiconductor Physics and Devices" 3rd Ed., Tata McGraw-Hill 2002.

3.S.M.Sze, Semiconductor Devices - Physics and Technology, 2nd edn. John Wiley, 2002.

4.Ben G.Streetman and Sanjay Banerjee, Solid State Electronic Devices, Pearson Education 2000.

OBJECT-ORIENTED PROGRAMMING

L	P	C
3	0	3

1. FUNDAMENTALS: 9

Object-Oriented Programming concepts – Encapsulation – Constructors and Destructors -Programming Elements – Program Structure – Enumeration Types – Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call-by-Reference – Assertions – Standard template library.

2. IMPLEMENTING ADTS AND ENCAPSULATION: 9

Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

3. POLYMORPHISM: 9

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – List – List Iterators.

4. TEMPLATES: 9

Template Class – Function Templates – Class Templates – Parameterizing – STL – Algorithms – Function Adaptors.

5. INHERITANCE: 9

Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run-Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

TOTAL HOURS: 45

TEXT BOOK:

1. Ira Pohl, “Object-Oriented Programming Using C++”, Pearson Education, Second Edition, 2003.

REFERENCES:

1. Stanley B. Lippman, Josee Lajoie, “C++ Primer”, Pearson Education, Third Edition, 2004.
2. Kamthane, ”Object Oriented Programming with ANSI and Turbo C++”, Person Education, 2002.
3. Bhave, “Object Oriented Programming With C++”, Pearson Education, 2004.
4. Dietel & Dietel, “C++ How to Program”, Second Edition, Prentice Hall.

OBJECT-ORIENTED PROGRAMMING LAB

L	P	T	C
3	0	0	3

1. Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix-vector multiplication)
2. Implement complex number class with necessary operator over loadings and type conversions such as integer to complex, double to complex, complex to double etc.
3. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
4. Overload the new and delete operators to provide custom dynamic allocation of memory.
5. Develop a template of linked-list class and its methods.
6. Develop templates of standard sorting algorithms such as bubble sort, insertion sort, merge sort, and quick sort.
7. Design stack and queue classes with necessary exception handling.
8. Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point objects and Arc objects. Write a method to find a minimum cost spanning tree in a graph.
9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
10. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).