

### SEMESTER III

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

S No.	Course Title	L	T	P	M
<b>THEORY</b>					
1	Advanced Engineering Mathematics	4	0	0	100
2	Digital Electronics	4	0	0	100
3	Electronic Devices and Circuits	4	0	0	100
4	Data Structures	4	0	0	100
5	Object Oriented Programming in C++	4	0	0	100
6	Introduction to Information Technology	4	0	0	100
<b>PRACTICAL</b>					
7	Object Oriented Programming And Data Structures Lab	0	0	3	100
8	Electronic Circuits and Digital Lab	0	0	3	100

**ADVANCED ENGINEERING MATHEMATICS**  
**(Originally Mathematics III)**  
(Common to CIVIL, MECH, ECE, EEE, E&I, IT)

- 1. PARTIAL DIFFERENTIAL EQUATIONS** **9**  
Formation - Solutions of standard types 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 - Steady state solution of two-dimensional heat equation - Fourier series solutions in Cartesian coordinates.
- 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 TRANSFORMS** **9**  
Definition of Z Transforms; linearity; transforms of simple sequences; solution of difference equations. Inversion of Z transform by partial fractions and power series.

**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.

**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>

**(Approved by the Board of Studies conducted on 4<sup>th</sup> June 2007 at Chennai)**

## **SEMESTER III**

### **DIGITAL ELECTRONICS (COMMON FOR III SEM CSE AND III SEM IT)**

#### **1. BASIC CONCEPTS AND BOOLEAN ALGEBRA**

**9**

Number systems - Binary, Octal, Decimal, Hexadecimal, conversion from one to another, complement arithmetic, Boolean theorems of Boolean algebra, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map, Tabulation and computer aided minimization procedures.

#### **2. LOGIC GATES**

**9**

RTL, DTL, TTL, ECL, ICL, HTL, NMOS & CMOS logic gates, Circuit diagram and analysis characteristics and specifications, tri-state gates.

#### **3. COMBINATIONAL CIRCUITS**

**9**

Problem formulation and design of combinational circuits, Adder / Subtractor, Encoder / decoder, Mux / Demux, Code-converters, Comparators, Implementation of combinational logic using standard ICs, ROM, EPROM, EEPROM, Basics of PLD,PAL, PLA and their use in combinational circuit design.

#### **4. SEQUENTIAL CIRCUITS**

**9**

Flipflops - SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis of clocked sequential circuits - their design, State minimization, state assignment, Circuit implementation, Registers-Shift registers, Ripple counters, Synchronous counters, Timing signal, RAM, Memory decoding, Semiconductor memories.

#### **5. FUNDAMENTAL MODE SEQUENTIAL CIRCUITS**

**9**

Stable, Unstable states, Output specifications, Cycles and Races, Race free Assignments, Hazards, Essential hazards, Pulse mode sequential circuits.

**TOTAL HOURS: 45**

#### **TEXT BOOKS:**

1. Morris Mano, " Digital logic and Computer Design ", Prentice-Hall of India, 1998.
2. William I. Fletcher, " An Engineering Approach to Digital Design ", Prentice-Hall of India, 1980.
3. Floyd T.L., " Digital Fundamentals ", Charles E. Merrill publishing Company, 1982.
4. Tokheim R.L., " Digital Electronics - Principles and Applications ", Tata McGraw Hill, 1999.
5. Jain R.P., " Modern Digital Electronics ", Tata McGraw Hill, 1999.



**SEMESTER III**  
**ELECTRONIC DEVICES AND CIRCUITS**  
**(COMMON FOR III SEM CSE AND III SEM IT)**

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|---|----|
| <b>1. SEMI CONDUCTOR DEVICES</b>  | 7  |
| Semiconductor-PN Junction diode –BJT-FET-SCR-VI characteristics (qualitative Treatment only)  |    |
| <b>2. AMPLIFIERS</b>  | 12 |
| Transistor biasing – self biasing –DC and AC analysis of CE, CB and CC amplifiers. Power amplifiers-Efficiency. Tuned Amplifiers-Frequency Response.  |    |
| <b>3. FEED BACK AMPLIFIERS AND OSCILLATORS:</b>   | 10 |
| Negative feed back- Types feedback with examples for each type. Effect of feedback on ac characteristic of amplifiers. Positive Feedback – oscillators-Analysis of RC Phase shift Oscillator and LXC oscillators – Hardly and colpitt.                            |    |
| <b>4. MULTIVIBRATORS AND TIMERS</b>   | 7  |
| Bistable, Monostable and a stable multivibrators using Transistors-triggering delay and frequency Calculation.555 Timer-Internal Block-Application.   |    |
| <b>5. OPERATIONAL AMPLIFIER AND APPLICATION</b>   | 9  |
| Operational amplifier- Characteristics-Block diagram only application of op-amp-Current to voltage, Voltage to current converters, Arithmetic circuits-Adder, Subtractor, multiplier, differentiator And Integrator. Active Filters - Butter worth and Chebyshev. |    |

Total Hours 45

**TEXT BOOKS**

1. Electronic Device – Floyd -Fifth Edition – Addison Wesley Long man Pt. Ltd Branch 2001.
2. David A. Bell Electronic Devices and Circuits –Prentice Hall of India.

**REFERENCES**

1. Milman and Halkiad, Integrated Electronic McGraw Hill publishers 1985.
2. Boyle stad Nashelsky - Electronic devices and Circuit Theory-Prentice hall of India Pvt. 6<sup>th</sup> edition.



## **TEXT BOOKS**

1. R. G. Dromey, "How to Solve it by Computer" (Chaps 1-2), Prentice-Hall of India, 2002.
2. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2<sup>nd</sup> ed, Pearson Education Asia, 2002. (chaps 3, 4.1-4.4 (except 4.3.6), 4.6, 5.1-5.4.1, 6.1-6.3.3, 7.1-7.7 (except 7.2.2, 7.4.1, 7.5.1, 7.6.1, 7.7.5, 7.7.6), 7.11, 9.1-9.3.2, 9.5-9.5.1, 9.6-9.6.2, 9.7)

## **REFERENCES**

1. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004
2. Richard F. Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudocode Approach with C", Thomson Brooks / COLE, 1998.
3. Aho, J. E. Hopcroft and J. D. Ullman, "Data Structures and Algorithms", Pearson education Asia, 1983.

**SEMESTER III**  
**OBJECT ORIENTED PROGRAMMING IN C++**  
**(Common to IT & CSE)**

**Aim:** The subject aims to introduce the salient features of Object Oriented Programming, evolution of c++ as a object oriented programming language with focus on generic programming with templates and Exception Handling.

**Objectives:** Students will be able to know the fundamentals of object oriented programming and incorporate OOPs' features such as inheritance, polymorphism, templates using c++ as language.

**UNIT – I**

**Introduction to Fundamentals concepts:** Object oriented fundamentals- Structured versus object-oriented development, elements of object oriented programming, fundamentals of OO-class, object, and abstraction and its importance, encapsulation, polymorphism, benefits of OOP, structure of C++ program.

**UNIT – II**

**Classes and Objects:** Working with classes- Classes and Objects- Class specification, class objects, accessing class members, defining member functions, inline functions, accessing member functions within class, data hiding, class member accessibility, empty classes, constructors, parameterized constructors, constructor overloading, copy constructor, new, delete operators, “this” pointer, friend classes and friend functions.

**UNIT – III**

**Overloading:** Overloading-Function overloading, operator overloading- overloadable operators, unary operator overloading, operator keyword, limitations of increment/decrement operators, binary operator overloading, arithmetic operators, concatenation of strings, comparison operators, Generic programming with templates-Function templates, class templates.

**UNIT – IV**

**Inheritance:** Inheritance- Base class and derived class relationship, derived class declaration, Forms of inheritance, inheritance and member accessibility, constructors in derived class, destructors in derived class, constructor invocation and data member initialization, data conversion, abstract classes, virtual base classes, virtual functions.

**UNIT – V**

**Exception handling and Files:** Files and Streams-Opening and Closing a file, file modes, file pointers and their manipulation, sequential access to a file, ASCII and binary files, random access to a file, error handling during file manipulations, Exception handling-exception handling model, exception handling constructs, lists of exceptions, catching exceptions, handling exceptions.

**TEXT BOOK:**

1. K.R.Venugopal, T.Ravishankar, and Rajkumar, "Mastering C++", Tata McGraw Hill, 1997

**REFERENCE BOOKS:**

1. E.Balagurusamy, “Object Oriented Programming with C++”, Tata McGraw Hill, 2<sup>nd</sup> Edition, 2004,
2. Bjarne stroustrup, “The C++ programming Language”, Addison Wesley, 3<sup>rd</sup> edition, 1988.

## **SEMESTER III**

### **INTRODUCTION TO INFORMATION TECHNOLOGY**

**Aim:** The subject aims to introduce various IT related concepts of current Interest. The subject focuses on important application areas of computing and Information Technologies.

**Objectives:** The students will be able to understand the importance of IT in business environment and the technologies involved in knowledge engineering. The students will acquire basic knowledge about Internet, multimedia, virtual reality based concepts. The students will be exposed to the application areas of IT.

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#### **UNIT – I**

**IT in the Business Environment-** Introduction: Business and Information Technology, Information Technologies in the Modern Organization, Information Technology for Multimedia Communication, Principles of Visual Information Analysis

#### **UNIT – II**

**IT Infrastructure-** Computer Hardware, Computer Software, Managing Organizational Data and Information, Telecommunications and Networks, The Internet, Intranets, and Extranets

#### **UNIT – III**

**Applying IT for Competitive Advantage:** Functional, Enterprise, and Inter-organizational Systems, Electronic Commerce, Computer-Based Supply Chain Management and Information Systems Integration, Data, Knowledge, and Decision Support, Intelligent Systems in Business.

#### **UNIT – IV**

**Informational and Organizational Goals-** Strategic Information Systems and Reorganization, Information Systems Development, Implementing IT: Ethics, Impacts and Security.

#### **UNIT – V**

**Important Application Areas -** Issues & Challenges, IT in Healthcare & Telemedicine, Remote Sensing and GIS Techniques, Cybermediary Concepts, Principles and Applications of Soft Computing, Industrial information Technology, IT in Mining and Electrical Load Forecasting, Information Processing from Document Images, IT for Rural Development.

#### **TEXT BOOK:**

1. Efraim Turban, R. Kelly Rainer, Richard E. Potter, "Introduction to Information Technology", John Wiley & Sons, 2002.

#### **REFERENCE BOOKS:**

1. Ray Ajoy Kumar, Acharya Tinku, "Information Technology: Principles and Applications", Prentice Hall of India
2. Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, "Introduction to Information Technology – The breaking ware" – Tata McGraw Hill.

## **SEMESTER III**

### **OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES LAB**

#### **(i) OBJECT ORIENTED PROGRAMMING LAB**

##### **C++**

1. Programs Using Functions
  - Functions with default arguments
  - Implementation of Call by Value, Call by Address and Call by Reference
2. Simple Classes for understanding objects, member functions and Constructors
  - Classes with primitive data members
  - Classes with arrays as data members
  - Classes with pointers as data members – String Class
  - Classes with constant data members
  - Classes with static member functions
3. Compile time Polymorphism
  - Operator Overloading including Unary and Binary Operators.
  - Function Overloading
4. Runtime Polymorphism
  - Inheritance
  - Virtual functions
  - Virtual Base Classes
  - Templates
5. File Handling
  - Sequential access
  - Random access

#### **(ii) DATA STRUCTURES LAB**

##### **AIM**

To teach the principles of good programming practice and to give a practical training in writing efficient programs in C

##### **OBJECTIVES**

- To teach the students to write programs in C
- To implement the various data structures as Abstract Data Types
- To write programs to solve problems using the ADTs

##### **Implement the following exercises using C:**

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

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

- (a) Program for 'Balanced Paranthesis'
- (b) Array implementation of Stack ADT
- (c) Linked list implementation of Stack ADT
- (d) Program for 'Evaluating Postfix Expressions'

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

- 6. Implement the application for checking 'Balanced Paranthesis' using array implementation of Stack ADT (by implementing files (a) and (b) given above)
- 7. Implement the application for checking 'Balanced Paranthesis' using linked list implementation of Stack ADT (by using file (a) from experiment 6 and implementing file (c))
- 8. Implement the application for 'Evaluating Postfix Expressions' using array and linked list implementations of Stack ADT (by implementing file (d) and using file (b), and then by using files (d) and (c))
- 9. Queue ADT
- 10. Search Tree ADT - Binary Search Tree
- 11. Heap Sort
- 12. Quick Sort

## **SEMESTER III**

### **Electronic circuits and Digital Lab**

**(COMMON FOR III SEM CSE AND III SEM IT)**

1. PN junction diode Characteristics
2. CE Transistor Characteristics
3. FET Characteristics
4. Frequency Response of CE Amplifiers with self bias and fixed bias.
5. Differential Amplifiers, CMRR measurements
6. Astable and monostable Multivibrator
7. IC 555 Timer
8. Differentiator/Integrator
9. Study of logic gates.
10. Adder/Subtractor
11. Study of Flip – Flops – using gates – Flip – Flop ICs.
12. Multiplexer/Demultiplexer
13. Counters
14. Shift Registers