

UNIVERSITY OF MADRAS
BACHELOR DEGREE COURSE UNDER THE FACULTY OF SCIENCE (B.Sc)

B.Sc. MATHEMATICS WITH COMPUTER
APPLICATIONS
CHOICE BASED CREDIT SYSTEM

REGULATIONS

(Effective from the academic year 2011 – 2012)

1. ELIGIBILITY FOR ADMISSION:

Candidates for admission to the first year of the Degree of Bachelor of Science course MATHEMATICS WITH COMPUTER APPLICATIONS shall be required to have passed the Higher Secondary Examinations (Academic or Vocational Stream) conducted by the Government of Tamil Nadu or an Examination accepted as equivalent thereof by the Syndicate of the University of Madras with the subjects MATHEMATICS /PHYSICS / CHEMISTRY /STATISTICS / COMPUTER SCIENCE as a subject of study.

2. ELIGIBILITY FOR THE AWARD OF DEGREE:

A candidate shall be eligible for the award of the Degree only if he /she has undergone the prescribed course of study in a College affiliated to the University for a period of not less than three academic years, passed the examinations all the Six-Semesters prescribed earning 140 Credits (in Parts-I, II, III, IV & V).

3. DURATION:

- a) Each academic year shall be divided into two semesters. The first academic year shall comprise the first and second semesters, the second academic year the third and fourth semesters and the third academic year the fifth and sixth semester respectively.
- b) The odd semesters shall consist of the period from June to November of each year and the even semesters from December to April of each year. There shall be not less than 90 working days for each semester.

4. COURSE OF STUDY:

The main Subject of Study for Bachelor Degree Courses shall consist of the following and shall be in accordance with APPENDIX-B

PART – I TAMIL / OTHER LANGUAGES

PART – II ENGLISH

**PART – III CORE SUBJECTS
ALLIED SUBJECTS**

PART – IV

- 1.(a) Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two course (level will be at 6th Standard).
- (b) Those who have studies Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Advanced Tamil comprising of two courses.
- (c) Others who do not come under a and b can choose non-major elective comprising of two courses.

2. SKILL BASED SUBJECTS (ELECTIVE) - (SOFT SKILLS)

3. ENVIRONMENTAL STUDIES

4 VALUE EDUCATION

PART – V EXTENSION ACTIVITIES

5. EXTENSION ACTIVITIES:

A candidate shall be awarded a maximum of 1 Credit for Compulsory Extension Service.

All the Students shall have to enroll for NSS /NCC/ NSO (Sports & Games) Rotract/ Youth Red cross or any other service organizations in the college and shall have to put in Compulsory minimum attendance of 40 hours which shall be duly certified by the Principal of the college before 31st March in a year. If a student LACKS 40 HOURS ATTENDANCE in the First year, he/she shall have to compensate the same during the subsequent years.

Students those who complete minimum attendance of 40 hours in One year will get HALF A CREDIT and those who complete the attendance of 80 or more hours in Two Years will get ONE CREDIT.

Literacy and population Education Field Work shall be compulsory components in the above extension service activities

6. SCHEME OF EXAMINATION:

FIRST SEMESTER

Subjects	Ins Hours	Credit .	Exam. Hour	Max.Marks		
				Ext. Mark	Int. Mark	Total
Part – I Language Paper – I	6 hrs	3	3 hrs	75	25	100
Part – II English Paper – I	6 hrs	3	3 hrs	75	25	100
Core 1 : Algebra and Trigonometry- I	4 hrs	4	3 hrs	75	25	100
Core 2 : Calculus and Co-ordinate Geometry of 2 Dimensions	5 hrs	4	3 hrs	75	25	100
Core 3: OBJECT ORIENTED PROGRAMMING USING C++	9 hrs	4	3 hrs	75	25	100
Core 4 : Practical – I C++ Programming		4	3 hrs	60	40	100
Part – IV 1. (a) Not studied Tamil upto xii std. – shall take Tamil Comprising of two courses (level VI std.) (b) Studied Tamil upto xii std – taken Non-Tamil under Part – I shall take advance Tamil comprising of two courses. (c) Others who do not comes under a & b can choose non-major elective comprising of two courses.		2	3hrs	75	25	100
SOFT SKILLS		3		60	40	100

SECOND SEMESTER

Subjects	Ins. Hours	Credit	Exam. Hour	Max.Marks		
				Ext. Mark	Int. Mark	Total
Part – I Language Paper – II	6 hrs	3	3 hrs	75	25	100
Part – II English Paper – II	6 hrs	3	3 hrs	75	25	100
Core 5: Algebra and Trigonometry II	4 hrs	4	3 hrs	75	25	100
Core 6: Calculus and Differential Geometry	5 hrs	4	3 hrs	75	25	100
Core 7: DATA STRUCTURES	9 hrs	4	3 hrs	75	25	100
Core 8: practical- II DATA STRUCTURES USING C++		4	3 hrs	60	40	100
Part – IV 1. (a) **Not studied Tamil upto xii std. – shall take Tamil Comprising of two courses (level VI std.) (b) **Studied Tamil upto xii std – taken Non-Tamil under Part – I shall take advance Tamil comprising of two courses. (c) **Others who do not comes under a & b can choose non-major elective comprising of two courses.		2	3 hrs	75	25	100
2. SOFT SKILLS		3		60	40	100

**** The Syllabus for the (i) Non-major (ii) Softskill and (iii) Environmental Studies to be followed as prescribed for other B.Sc., degrees.**

THIRD SEMESTER

Course Components	Subjects	Inst. Hrs.	Credits	Exam Hrs.	Max. marks		
					Ext. Marks	Int. Marks	Total
Part – I	Language paper – III	6	3	3	75	25	100
Part – II	English paper – III	6	3	3	75	25	100
Part – III Core Courses	Core 9 : Differential equations and Laplace transforms	4	4	3	75	25	100
	Core 10: Coordinate geometry of 3 dimensions and probability	5	4	3	75	25	100
Allied subject	Paper I	9	5	3	75	25	100
Part IV 2. Soft skill -III			3	3	60	40	100
3.Environmental Studies		-	-	Examination will be held in IV semester			

FOURTH SEMESTER

Course Components	Subjects	Inst. Hrs.	Credits	Exam Hrs.	Max. marks		
					Ext. Marks	Int. Marks	Total
Part – I	Language Paper – IV	6	3	3	75	25	100
Part – II	English Paper – IV	6	3	3	75	25	100
Part – III Core Courses	Core 11: Vector Calculus, Fourier series and Fourier Transforms	5	4	3	75	25	100
	Core 12: STATICS	4	4	3	75	25	100
Allied subject	Paper II	9	5	3	75	25	100
Part - IV 2. Soft skill -IV			3	3	60	40	100
3. Environmental Studies		-	2	3	75	25	100

FIFTH SEMESTER

Course Components	Subjects	Inst. Hrs.	Credits	Exam Hrs.	Max. marks		
					Ext. Marks	Int. Marks	Total
Part – III Core Courses	Core 13: Algebraic Structures –I	6	4	3	75	25	100
	Core 14: Real Analysis –I	6	4	3	75	25	100
	Core 15: Dynamics	6	4	3	75	25	100
	Core 16: Discrete mathematics	5	4	3	75	25	100
	Core 17: Database Management Systems using Visual Basic	7	4	3	75	25	100
	Core 18: practical- III : RDBMS LAB		4	3	60	40	100
Part – IV 4. Value Education		-	2				100

SIXTH SEMESTER

Course Components	Subjects	Inst. Hrs.	Credits	Exam Hours	Max. marks		
					Ext. Marks	Int. Marks	Total
Part – III Core Courses	Core 19: Algebraic Structures –II	6	4	3	75	25	100
	Core 20: Real Analysis –II	6	4	3	75	25	100
	Core 21: Complex Analysis	6	4	3	75	25	100
	Core 22: OPERATING SYSTEMS	5	5	3	75	25	100
	Core 23: PROGRAMMING IN JAVA	7	5	3	75	25	100
	Core 24: PRACTICAL IV : JAVA PROGRAMMING LAB		5	3	60	40	100
Part – V Extension Activities			1				

The following procedure to be followed for Internal Marks:

Theory Papers: Internal Marks 25

Tests (2 out of 3)	= 10
Attendance	= 5
Seminars	= 5
Assignments	= 5

	25 marks

Break-up Details for Attendance	
Below 60%	- No marks
60% to 75%	- 3 marks
76% to 90 %	- 4 marks
91% to 100%	- 5 marks

Practical: Internal Marks 40

Attendance	5 marks
Practical Test best 2 out of 3	30 marks
Record	5 marks

7. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER:

- i. Candidates shall register their names for the First Semester Examination after the admission in UG Courses.
- ii. Candidates shall be permitted to proceed from the First Semester up to Final Semester irrespective of their failure in any of the Semester Examination subject to the condition that the candidates should register for all the arrear subject of earlier semesters along the current (subsequent) Semester Subjects.
- iii. Candidates shall be eligible to go to subsequent semester, only if they earn, sufficient attendance as prescribed therefor by the Syndicate from time to time.

Provided in case of a candidate earning less than 50% of attendance in any one of the Semesters due to any extraordinary circumstances such as medical grounds, such candidates who shall produce Medical Certificate issued by the Authorised Medical Attendant (AMA), duly certified by the Principal of the college, shall be permitted to proceed to the next semester and to complete the Course of study. Such Candidates shall have to repeat the missed Semester by rejoining after completion of Final Semester of the course, after paying the fee for the break of study as prescribed by the University from time to time.

8. PASSING MINIMUM:

A candidate shall be declared to have passed:

- a) There shall be no Passing Minimum for Internal.
- b) For External Examination, Passing Minimum shall be of 40%(Forty Percentage) of the maximum marks prescribed for the paper for each Paper/Practical/Project and Viva-voce.
- c) In the aggregate (External + Internal) the passing minimum shall be of 40%
- d) He/She shall be declared to have passed the whole examination, if he/she passes in all the papers and practicals wherever prescribed / as per the scheme of examinations by earning 140 CREDITS in Parts-I, II, III, IV & V. He/she shall also fulfill the extension activities prescribed earning a minimum of 1 Credit to qualify for the Degree.

9. CLASSIFICATION OF SUCCESSFUL CANDIDATES:

PART- I TAMIL / OTHER LANGUAGES

TAMIL/OTHER LANGUAGES: Successful candidates passing the Examinations for the Language and securing the marks (i) 60 percent and above and (ii) 50 percent and above but below 60 percent in the aggregate shall be declared to have passed the examination in the FIRST and SECOND class, respectively. All other successful candidates shall be declared to have passed the examination in the THIRD Class.

PART – II ENGLISH

ENGLISH: Successful candidates passing the examinations for English and securing the marks (i) 60 percent and above and (ii) 50 percent and above but below 60 percent in the aggregate shall be declared to have passed the examination in the FIRST and SECOND Class, respectively. All other successful candidates shall be declared to have passed the examination in the THIRD class.

PART – III consisting of CORE SUBJECTS, ALLIED SUBJECTS:

Successful candidates passing the examinations for Core Courses together and securing the marks (i) 60 percent and above (ii) 50 percent and above but below 60 percent in the aggregate of the marks prescribed for the Core courses together shall be declared to have passed the examination in the FIRST and SECOND Class respectively. All other successful candidates shall be declared to have passed the examinations in the Third Class.

PART – IV (consisting of sub items 1 (a), (b) & (c), 2, 3 and 4) as furnished in the Regulations 4 Part-IV supra.

PART – V EXTENSION ACTIVITIES:

Successful Candidate earning of 1 credit SHALL NOT BE taken into consideration for Classification/Ranking/ Distinction.

9a GRADING SYSTEM

1. **Passing Minimum** is 40% of the ESE and also 40% of the maximum of that paper/course.
2. **Minimum Credits to be earned:**

For THREE year Programme: Best 140 Credits (Part I and II : Languages, Part III Major, Elective, Part –IV Soft skills and Part V :Extension activities)

3. **Marks and Grades:**

The following table gives the marks, grade points, letter grades and classification to indicate the performance of the candidate.

Conversion of Marks to Grade Points and Letter Grade (Performance in a Course / Paper)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Excellent
75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	Very Good
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
40-49	4.0-4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

C_i = Credits earned for course i in any semester.

G_i = Grade Point obtained for course i in any semester.

n refers to the semester in which such courses were credited.

For a Semester :

$$\text{GRADE POINT AVERAGE [GPA]} = \frac{\sum_i C_i G_i}{\sum_i C_i}$$

Sum of the multiplication of grade points by the credits of the courses

$$\text{GPA} = \frac{\text{-----}}{\text{Sum of the credits of the courses in a semester}}$$

For the entire programme:

$$\text{CUMULATIVE GRADE POINT AVERAGE [CGPA]} = \frac{\sum n \sum_i C_{ni} G_{ni}}{\sum n \sum_i C_{ni}}$$

$$\text{CGPA} = \frac{\text{Sum of the multiplication of grade points by the credits of the entire programme}}{\text{Sum of the credits of the courses of the entire programme}}$$

CGPA	GRADE	CLASSIFICATION OF FINAL RESULT
9.5-10.0	O+	First Class - Exemplary *
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction *
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
4.5 and above but below 5.0	C+	Third Class
4.0 and above but below 4.5	C	
0.0 and above but below 4.0	U	Re-appear

* The candidates who have passed in the first appearance and within the prescribed semester of the UG Programme (Major, Allied and Elective courses alone) are eligible.

10. RANKING:

Candidates who pass all the examinations prescribed for the course in the FIRST APPEARANCE ITSELF ALONE are eligible for Ranking/ Distinction.

Provided in the case of Candidates who pass all the examinations prescribed for the Course with a break in the First Appearance due to the reasons as furnished in the Regulations. 7 (iii) supra are only eligible for classification.

11. Question Paper Pattern

	SECTION – A (30 words)	
10 OUT OF 12	- 10 X 2 marks	= 20 marks
	SECTION – B (200 words)	
5 out of 7	- 5 x 5 marks	= 25 marks
	SECTION – C (500 words)	
3 out of 5	- 3x 10 marks	= 30 marks

	TOTAL	= 75 marks

QUESTION PAPER FOR PRACTICALS

The external examiner will prepare a question paper on the spot with the help of the Question Bank supplied by the Controller's office.

APPENDIX - B

COURSE OF STUDY

The Course of Study shall comprise the study of Part-I to Part-V Courses; .

PART - I TAMIL/OTHER LANGUAGES comprise the study of:

Tamil or any one of the following Modern (Indian or Foreign) or classical languages at the optional candidate, according to the syllabi and text-books prescribed from time to time.

- (i) Modern (Indian) - Telugu, Kannada, Malayalam, Urdu & Hindi.
- (ii) Foreign - Chinese, French, German, Italian, Japanese, & Russian
- (iii) Classical - Sanskrit, Arabic & Persian.

AND

PART – II ENGLISH according to the syllabi and text-books prescribed from time to time.

PART – III CORE COURSES Comprise the study of (A) Main Subjects; (B) Allied Subjects; (C) Electives with three courses:

(A) MAIN SUBJECTS:

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(B) ALLIED SUBJECTS:

Each candidate shall choose the Allied subjects prescribed in the Scheme of Examinations.

PART – IV

1.(a) Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two course (level will be at 6th Standard).

(b) Those who have studies Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Advanced Tamil comprising of two courses.

(c) Others who do not come under a + b can choose non-major elective comprising of two courses.

2. SKILL BASED SUBJECTS (ELECTIVE) - (SOFT SKILLS)

3. ENVIRONMENTAL STUDIES

4. VALUE EDUCATION

PART – V EXTENSION ACTIVITIES

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SYLLABUS (w.e.f. 2011-2012)

Semester I

Core 1: Algebra and Trigonometry- I	Syllabus same as in BSC mathematics Algebra and Trigonometry- I
Core 2: Calculus and Co-ordinate Geometry of 2 Dimensions	Syllabus same as in BSC mathematics Calculus and Co-ordinate Geometry of 2 Dimensions

Semester II

Core 5: Algebra and Trigonometry II	Syllabus same as in BSC mathematics Algebra and Trigonometry- II
Core 6: Calculus and Differential Geometry	Syllabus same as in BSC mathematics Calculus and Differential Geometry

Semester III

Core 9: Differential equations and Laplace transforms	Syllabus same as in BSC mathematics Differential equations and Laplace transforms
Core 10: Coordinate geometry of 3 dimensions and probability	Syllabus same as in BSC mathematics Coordinate geometry of 3 dimensions and probability

Semester IV

Core 11: Vector Calculus, Fourier series and Fourier Transforms	Syllabus same as in BSC mathematics Vector Calculus, Fourier series and Fourier Transforms
Core 12: STATICS	Syllabus same as in BSC mathematics STATICS

Semester V

Core 13: Algebraic Structures –I	Syllabus same as in BSc mathematics Algebraic Structures -I
Core 14: Real Analysis –I	Syllabus same as in BSC mathematics Real Analysis –I
Core 15: Dynamics	Syllabus same as in BSC mathematics Dynamics

Semester VI

Core 19: Algebraic Structures –II	Syllabus same as in BSC mathematics Algebraic Structures –II
Core 20: Real Analysis –II	Syllabus same as in BSC mathematics Real Analysis –II
Core 21: Complex Analysis	Syllabus same as in BSC mathematics Complex Analysis

List of Allied Subjects

1. Physics-I
2. Chemistry-I
3. Calculus of finite differences and Numerical Analysis-I
4. Mathematical Statistics-I
5. Physics-II (Pre-requisite Physics-I)
6. Chemistry-II (Pre-requisite Chemistry-I)
7. Calculus of finite difference and Numerical Analysis-II (Pre-requisite Calculus of finite difference and Numerical Analysis-I)
8. Mathematical Statistics-II (Pre-requisite Mathematical Statistics-I)

Title of the Course/	OBJECT ORIENTED PROGRAMMING USING C++		
Core 3	I Year & First Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in C++.		
Course outline	Unit 1: Procedure oriented programming (POP) – Examples - Object oriented programming (OOP) – Examples – OOPs concepts – Comparison of POP and OOP – Applications OOPs.		
	Unit-2: Introduction to C++; Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++; Pointers - Functions in C++ - Main Function - Function Prototyping - Parameters Passing in Functions - Values Return by Functions - Inline Functions – Friend Functions.		
	Unit 3: Classes and Objects; Constructors and Destructors; Type of Constructors; Type Conversions - Function overloading – Operator overloading.		
	Unit-4: Inheritance: Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance. Virtual Functions and Polymorphism; Managing Console I/O operations.		
	Unit-5: Working with Files: Classes for File Stream Operations - Opening and Closing a File - End-of-File Deduction - File Pointers - Updating a File - Error Handling during File Operations - Command-line Arguments.		

Recommended Texts

- i. E. Balagurusamy,1995, Object Oriented Programming with C++, Tata McGraw-Hill Publishing Company Ltd.**
- ii. Robert Lafore, Object Oriented Programming in Microsoft C++, Galgotia publication.**
- iii. H.Schildt, C++,1998, The Complete Reference-1998-TMH Edition, 1998**

Title of the Course/	PRACTICAL – C++ Programming		
Core 4 practicals	I Year & First Semester	Credit: 4	
Objective of the course	This course deals with practical implementation of simple problems using C++.		
Course outline	<ol style="list-style-type: none"> 1. Simple interest calculation. 2. Determining the Perimeter and Area of a Triangle. 3. Solving Quadratic equation. 4. Program to calculate the average of ‘n’ numbers 5. Program to demonstrate Function overloading 6. Program to demonstrate Operator overloading 7. Program to demonstrate inheritance (Single, Multiple). 8. Virtual functions. 9. Program to copy the content of one file to another. 		

Title of the Course/	DATA STRUCTURES		
Core 7	I Year & second Semester	Credit: 4	
Objective of the course	This course introduces the various types of Data Structures		
Course outline	<p>Unit 1: Data Structures: Definition of a Data structure - primitive and composite Data Types, Arrays, Operations on Arrays, Order lists.</p> <p>Unit-2: Stacks – Operations on stack - Applications of Stack - Infix to Postfix Conversion – Evaluation of postfix expression; Recursion. Queues - Circular Queue - Operations on Queues, Queue Applications.</p> <p>Unit 3: Singly Linked List - Operations, Application - Representation of a Polynomial, Polynomial Addition; Doubly Linked List – Operations.</p> <p>Unit-4: Trees: Binary Trees – definitions – Binary search tree - Conversion of Forest to Binary Tree, Operations - Tree Traversals;</p> <p>Unit-5 : Graph - Definition, Types of Graphs – memory representation – Graph traversal. Hashing Tables and Hashing Functions – handling collisions.</p>		

1. Recommended Texts

i..E.Horowitz and S.Shani,1999,Fundamentals of Data Structures in C++ , Galgotia Pub.

2.Reference Books

- i.R. Kruse C.L. Tondo and B. Leung ,1997, Data Structures and Program design in C, PHI.
- ii.Cangsam,Augenstein,Tenenbaum,Data Structures using C & C++,PHI
- iii.D.Samantha,2005, Classic Data Structures, PHI,New Delhi.

Title of the Course/	PRACTICAL II – DATA STRUCTURES USING C++		
Core 8 practical	I Year & second Semester	Credit: 4	
Objective of the course	This course deals with practical implementation of Data Structure using C++.		
Course outline	<ol style="list-style-type: none"> 1. Implement PUSH, POP operations of stack using Arrays. 2. Implement PUSH, POP operations of stack using Pointers. 3. Implement add, delete operations of a queue using Arrays. 4. Implement add, delete operations of a queue using Pointers. 5. Addition of two polynomials using Arrays and Pointers. 6. Binary tree traversals using recursion. 7. Depth First Search and Breadth first Search for Graphs using Recursion. 		

Title of the Course/	DATABASE MANAGEMENT SYSTEMS USING VISUAL BASIC		
Core 17	III Year & Fifth Semester	Credit: 4	
Objective of the course	This course introduces the Visual basic language and the basic concepts of database management systems		
Course outline	<p>Unit 1: Form –Form Property - variables – data types – string – numbers - Writing simple programs – toolbox – Creating controls – name property – command button – access keys – image controls – text boxes – labels – Radio buttons- Check box - Frame- message boxes.</p> <p>Unit-2:Displaying information – Determinate loops – indeterminate loops – conditional statement – built-in functions (String, Numeric) – functions and procedures. Arrays – controls arrays – Lists box combo boxes.</p>		

	Unit 3: – Flex grid control – projects with multiple forms – Menus-MDI forms. Data access techniques: SQL- DDL- DML and Query command. ADO – Connection object – Recordset object – Connecting VB with Back end RDBMS.
	Unit-4: Database Management System – Advantages – Components – Feasibility Study – Class Diagram – Events - Normalization – 1 NF – 2 NF – 3 NF
	Unit-5: Forms and Reports: Design of form and Report – Form Layout – Reports – Procedural Languages – Data on Form - Programs to Retrieve and Save Data.

Recommended Texts

1. Gary Cornell. *Visual Basic 6 from the Ground up*. Tata McGraw Hill – 1999.
2. G. V. Post – Database Management Systems Designing and Building Business Application – McGraw Hill International edition – 1999.

Reference Books

- 1.Raghu Ramakrishnan – Database Management Systems – WCB/McGraw Hill – 1998.
- 2.C.J. Date – An Introduction to Database Systems – 7th Edition – Addison Wesley - 2000.
3. Noel Jerke. *Visual Basic 6 (The Complete Reference)* Tata McGraw Hill,1999.

Title of the Course/	PRACTICAL III : RDBMS LAB		
Core 18 practicals	III Year & Fifth Semester	Credit: 4	
Objective of the course	This course trains the students to implement the database applications.		
Course outline	<p>Use VB as the front end tool and any RDBMS (Oracle or MySQL or any standard RDBMS) as the back end tool. Create database and performing the operations given below using a Menu Driven program: Insertion, (b)Deletion, (c)Modification, (d)Generating simple reports.</p> <p>Payroll Mark sheet Processing Savings bank account for banking Student information system Electricity bill preparation system Telephone directory maintenance.</p>		

Title of the Course/	OPERATING SYSTEMS		
Core 22	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces the functions of operating systems.		
Course outline	<p>Unit 1: Introduction: Views –Goals –Types of system – OS Structure –Components – Services - System Structures – Layered Approach - Virtual Machines - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process – Threads - Interprocess Communication. CPU Scheduling : CPU Schedulers – Scheduling criteria – Scheduling Algorithms</p> <p>Unit-2:- Process Synchronization: Critical-Section problem - Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Critical Region – Monitors. Deadlock : Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock.</p> <p>Unit 3: Memory Management: Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space - Contiguous Allocation – Internal & External Fragmentation . Non Contiguous Allocation: Paging and Segmentation schemes – Implementation – Hardware Protection – Sharing - Fragmentation.</p> <p>Unit-4: Virtual Memory :: Demand Paging – Page Replacement - Page Replacement Algorithms – Thrashing. – File System: Concepts – Access methods – Directory Structure –Protection Consistency Semantics – File System Structures – Allocation methods – Free Space Management.</p> <p>Unit-5 : I/O Systems: Overview - I/O Hardware – Application I/O Interface – Kernel I/O subsystem – Transforming I/O Requests to Hardware Operations – Performance. Secondary Storage Structures : Protection – Goals- Domain Access matrix – The security problem – Authentication – Threats – Threat Monitoring – Encryption..</p>		

1. Recommended Texts

i. Silberschatz A., Galvin P.B., Gange., 2002 , Operating System Principles ,Sixth Edition, John Wiley & Sons.

2. Reference Books

i. H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition,Addison Wesley.

Title of the Course/	PROGRAMMING IN JAVA		
Core 23	III Year & sixth Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in JAVA		
Course outline	Unit 1: Introduction to Java-Features of Java-Basic Concepts of Object Oriented Programming-Java Tokens-Java Statements-Constants-Variables-Data Types- Type Casting-Operators-Expressions-Control Statements: Branching and Looping Statements.		
	Unit-2: Classes, Objects and Methods-Constructors-Methods Overloading-Inheritance-Overriding Methods-Finalizer and Abstract Methods-Visibility Control –Arrays, Strings and Vectors-String Buffer Class-Wrapper Classes.		
	Unit 3: Interfaces-Packages-Creating Packages-Accessing a Package-Multithreaded Programming-Creating Threads-Stopping and Blocking a Thread-Life Cycle of a Thread-Using Thread Methods-Thread Priority-Synchronization-Implementing the Runnable Interface .		
	Unit-4: Managing Errors and Exceptions-Syntax of Exception Handling Code-Using Finally Statement-Throwing Our Own Exceptions-Applet Programming-Applet Life Cycle-Graphics Programming-Managing Input/Output Files: Concept of Streams-Stream Classes-Byte Stream Classes-Character Stream Classes – Using Streams-Using the File Class-Creation of Files-Random Access Files-Other Stream Classes.		
	Unit-5: : Network basics –socket programming – proxy servers – TCP/IP – Net Address – URL – Datagrams -Java Utility Classes-Introducing the AWT: Working with Windows, Graphics and Text-AWT Classes- Working with Frames-Working with Graphics-Working with Color-Working with Fonts-Using AWT Controls, Layout Managers and Menus.		

1. Recommended Texts

i.E. Balagurusamy,2004,Programming with JAVA, 2nd Edition,Tata McGraw-Hill Publishing Co.Ltd.

ii.Herbert Schildt,2005,The Complete Reference Java™ 2, 5th Edition,Tata McGraw-Hill Publishing Co. Ltd.

2. Reference Books

i. Y. Daniel Liang ,2003, An Introduction to JAVA Programming, Prentice-Hall of India Pvt. Ltd.

ii. Cay S. Horstmann and Gary Cornell,2005, Core Java™2 Volume I-Fundamentals, 7th Edition- Pearson Education.

iii. Ken Arnold, James Gosling and David Holmes,2003, The Java™ Programming Language, 3rd Edition, Pearson Education.

Title of the Course/	PRACTICAL -IV : JAVA PROGRAMMING LAB		
Core 24	III Year & sixth Semester	Credit: 4	
Objective of the course	This course gives the practical training in JAVA programming		
Course outline	<p>APPLICATIONS:</p> <ol style="list-style-type: none"> 1. Substring Removal from a String. Use String Buffer Class. 2. Determining the Perimeter and Area of a Triangle. Use Stream Class. 3. Determining the Order of Numbers Generated randomly using Random Class. 4. Usage of Calendar Class and Manipulation. 5. Implementation of Point Class for Image Manipulation. 6. String Manipulation Using Char Array. 7. Database Creation for Storing E-mail Addresses and Manipulation. 8. Implementing Thread based Applications and Exception Handling. 9. Textfiles (copy, display, counting characters, words and lines) 10. Data file creating and processing for electricity billing. <p>APPLETS:</p> <ol style="list-style-type: none"> 11. Working with Frames and Various Controls. 12. Working with Dialog Box and Menus. 13. Working with Colors and Fonts. 		

CORE 16 : DISCRETE MATHEMATICS

Credits – 5

Instructional hours: 5

Unit I: Integers;

sets, some basic properties of integers, mathematical induction, divisibility of integers, representation of positive integers.

Section 1.1 , 1.2, 1.3, 1.4, 1.5 omit 1.6

Unit II: Boolean algebra;

Boolean algebra, Two-element Boolean Algebra, Disjunctive Normal Form, Conjunctive Normal Form

Section 5.1, 5.2, 5.3, 5.4

Unit III: Boolean algebra and its applications;

Application, Simplification of circuits, Designing of switching circuits, Logical Gates and Combinatorial Circuits

Section 5.5, 5.6

Unit IV: Recurrence relation and generating functions;

Sequence and recurrence relation, Solving recurrence relations by iteration Method, Modelling of Counting problems by recurrence relations, Linear (difference equations) recurrence relations with constant coefficients, Generating functions, Sum and Product of two Generating Functions, Useful generating functions, Combinatorial problems

Section 6.1 to 6.6 omit 6.7

Unit V: Introduction to graph theory;

Introduction, Walk, Path and Cycles, Euler Circuit,

Section 7.1, 7.2, 7.3 omit 7.4

Contents and treatment as in introduction to Discrete Mathematics, 2nd edition, 2002 by M. K. Sen and B. C. Chakraborty Books and Allied private Ltd., Kolkata.

Reference Books:

1. Discrete mathematics for computer scientists and mathematicians by J. L. Mertz, Abraham Kendel and T. P. Baker prentice-hall, India.
2. Discrete mathematics for computer scientists by John Truss-Addision Wesley.
3. Elements of Discrete Mathematics, C. L. Liu, New York Mcgraw-Hill, 1977.
4. Discrete mathematical structures with applications to computer science, J. T. Tremblay and R. P. Manohar, New York, Mcgraw-hill, 1975.
5. Discrete mathematical structures, Bernard Kolman, Robert C. Busby, Shron Ross, 3rd edition, 1998, Prentice hall of India, New Delhi.