

UNIVERSITY OF PUNE

Syllabus for Masters Degree in Computer Management M.C.M.

[M.C.M. Part I From Academic Year 2013-2014,
M.C.M. Part II From Academic Year 2014-2015]

(I) INTRODUCTION

1. The name of the programme shall be Masters' Degree in Computer Management (M.C.M.)
2. The knowledge and skills required to plan, design and build complex application software systems are highly valued in all industry sectors including business, health, education and the services. The basic objective of the Masters' Degree in Computer Management (M.C.M.) is to provide to the country a steady stream of competent young men and women with the necessary knowledge, skills and foundations for acquiring a wide range of rewarding careers into the rapidly expanding world of Information Technology.
In today's Global Economic scenario highly skilled versatile professionals with allround approach for problem solving is need of the hour. MCM program of Pune University wishes to create such professionals.
3. The Job Opportunities are :
 - a. Many graduates begin their careers as junior programmers and, after some experience, are promoted to senior programmers, systems analysts, programmer/analysts, software testers posts. Others seek entrepreneurial roles in the computer world as independent business owners, software authors, consultants, or suppliers of systems and equipment. Career opportunities exist in such areas as management, software and hardware sales, technical writing, training others on computers, consulting, software development and technical support.
 - b. Application areas include transaction processing (such as order processing, airline, railway reservations, banking systems), accounting functions, sales analysis, games, forecasting, simulation, database management, decision support data communications, and e-commerce.
4. The first two semesters of the programme is a mix of computer-related and general business courses. The computer-related courses use computers to introduce standard techniques of programming; the use of software packages systems analysis and design. The general business courses include the functional areas of management like the study of marketing management, financial management, operations management and general management. The course would emphasize the study and creation of business applications, rather than mere programming. Considering the current environment, fundamental concepts related to web-based applications are introduced. Inclusion of Mobile Technologies, Web technologies gives new platforms to students to work on.

In semesters III and IV, students are exposed to system development in the information processing environment, with special emphasis on Management Information Systems and Computer Resource Management. Specializations are included in IIIrd Semester which includes network Technology, Software Testing or Software Development. Inclusion of

specialization papers will improve thorough knowledge of students in that subject. It will also focus on particular technology in which student is more interested.

Colleges are given the opportunity to select Latest technology and prepare students in that Technology with the help of Departmental Subject. In addition Global Industry approved certifications could be offered as supplementary skill upgrade .

Soft skills techniques are covered in every semester, which will lead to overall personality development of the student and that will help them in their placement activities and to sustain in the organization successfully. Colleges are encouraged to teach minimum one foreign language in addition to English to enhance employability of students.

5. **Duration:** The M.C.M. program will be full-time two years Masters Degree in Computer Management.
6. The new curriculum would focus on imparting skills, necessary for developing a career in the field of business applications of computer, in emerging global scenario which emphasizes e-business in all sectors of the economy.
7. The institute should organize placement program for the MCM students, by interacting with the industries and software consultancy houses in and around the region in which the educational institution is located.
8. **Intake:** In each class, not more than 60 students will be admitted.

(II) ELIGIBILITY FOR ADMISSION

Graduates possessing any faculty of any statutory University shall be eligible for admission to the M.C.M. course.

(III) NUMBER OF LECTURES AND PRACTICALS :

Lectures and practicals should be conducted as per the scheme of lectures and practicals.

(IV) PRACTICAL TRAINING AND PROJECT WORK:

Towards the end of the second year of study, a student will be examined in the course "Project Work".

- a. Project Work may be done individually or in groups in case of bigger projects. However if project is done in groups, each student must be given a responsibility for a distinct module and care should be taken to monitor the progress of individual student.
- b. Student should take guidance from an internal guide and prepare a Project report on "Project Work" in 2 copies to be submitted to the Director of the Institute by 31st March. Wherever possible, a separate file containing source-code listings should also be submitted.
- c. The Project Work should be of such a nature that it could prove useful or be relevant from the commercial / management angle.
- d. The project report will be duly assessed by the Internal guide of the subject and marks will be communicated by the Director to the University after receiving the Seat numbers from the University along with marks of the internal credit for theory and practical to be communicated for all other courses.
- e. The project report should be prepared in a format prescribed by the University which also specifies the contents and the method of presentation.

- f. The project work will carry 250 marks for Internal assessment and 250 marks for external viva. The external viva shall be conducted by a minimum of two external examiners.
- g. Project Work can be carried out in the Institute or outside with prior permission of the Institute.
- h. The external viva-voce examination for Project Work would be held in March/April of the second year of study, by a panel of two external examiners.

(IV) ASSESSMENT

In total 98 credits represent the workload of MCM program.

Total credits=98,

1 credit = 15 lecture Hrs

100 Marks SUBJECT= 4 CREDITS

Semester	Credit Points
I	24
II	24
III	24
IV	26
Total	98

(V) EXAMINATION

Examinations shall be conducted at the end of each semester i.e. during April/May and also in October/November.

(VI) STANDARD OF PASSING

- a. The final total assessment of the candidates is made in terms of an Internal assessment and an external assessment for each course.
- b. For each paper, 50% marks will be based on internal assessment and 50% marks for semester end examination (external assessment), unless otherwise stated.
- c. The division of the 50% marks allotted to internal assessment of theory papers is on the basis of tutorial work and written test of 50 % marks, seminars and presentations 30% marks and attendance 20% marks.
- d. The internal marks will be communicated to the University at the end of each semester, but before the semester end examinations. These marks will be considered for the declaration of the results.
- e. Every candidate must secure 40% marks in each head of passing.
- f. The passing marks for external examination will thus be 20 out of 50 and for internal examination 20 out of 50 and aggregate marks taking both together will be 40 marks.
- g. In case of those students who have secured less than passing percentage of marks in internal i.e. less than 40%, the institute will administer a separate internal test. The

- results of which may be conveyed to the University as the Revised Internal Marks.
- h. In case the result of the internal test as above, results in lower marks than the original, the original figure of the marks will prevail. In short, the rule is higher of the two figures of the marks.
 - i. However, the institute will not administer any internal test, for any subject for those candidates who have already scored 40% or more marks in the internal examination.

(VIII) Conversion of Marks to Grade Points & Grades

The marks shall be converted to grade points and grades using Table I below.

Table I: Points Grading System

Sr. No.	Marks	Grade Point	Grade
1	> 85	10	A++
2	80 – 84	9	A+
3	75 – 79	8	A
4	70 -74	7	B++
5	65 – 69	6	B+
6	60 -64	5.5	B
7	55 – 59	5	C+
8	50 – 54	4.5	C
9	40 – 49	4	D
10	< 40	0	F

Every candidate must secure atleast Grade D in Concurrent Evaluation as well as University Examination as separate heads of passing for each course.

(ix) BACKLOG

Two semesters backlog can be carried to the third semester.

(X) CLASS

The performance of a student will be evaluated in terms of two indices, viz.

- a) *Semester Grade Point Average (SGPA)* which is the Grade Point Average for a semester
- b) *Cumulative Grade Point Average (CGPA)* which is the Grade Point Average for all the completed semesters at any point in time.

Semester Grade Point Average (SGPA): At the end of each semester, SGPA is calculated as the weighted average of GPI of all courses in the current semester

in which the student has passed, the weights being the credit values of respective courses.

SGPA = Grade Points divided by the summation of Credits of all Courses.

$$\text{SGPA} = \frac{\sum \{C * GPI\}}{\sum C} \text{for a semester.}$$

Where GPI is the Grade and C is credit for the respective Course.

Cumulative Grade Point Average (CGPA): Cumulative Grade Point Average (CGPA) is the grade point average for all completed semesters. CGPA is calculated as the weighted average of all GPI of all courses in which the student has passed up to the current semester.

Cumulative Grade Point Average (CGPA) for the Entire Course

$$\text{SGPA} = \frac{\sum \{C * GPI\}}{\sum C} \text{for all semesters taken together.}$$

Where GPI is the Grade and C is credit for the respective Course.

IMPORTANT NOTE:

If a student secures F grade in either or both of Concurrent Evaluation or University Evaluation for a particular course his /her credits earned for that course shall be ZERO.

Award of Grade Cards: The University of Pune under its seal shall issue to the learners a grade card on completion of each semester. The final Grade Card issued at the end of the final semester shall contain the details of all courses taken during the entire programme for obtaining the degree.

Final Grades: After calculating the SGPA for an individual semester and the CGPA for entire programme, the value shall be matched with the grade in the Grade Points & Descriptors Table as per the Points Grading System and expressed as a single designated GRADE (as per Table II) such as A++,A+,A, B, etc....

Table II: Grade Points & Descriptors

Sr. No.	Marks	Grade Point	Grade	Description	Descriptors	Class
1	> 85	10	A++	Superior / Outstanding	Demonstrates consistent evidence of superior accomplishment of the key concepts, knowledge, skills and competencies relative to programme requirements.	I
2	80 - 84	9	A+	Meritorious	Demonstrates frequent evidence of superior accomplishment of the key concepts, knowledge, skills and competencies relative to programme requirements.	I
3	75 - 79	8	A	Excellent	Demonstrates evidence of significantly higher accomplishment of the key concepts, knowledge, skills and competencies relative to programme requirements.	I
4	70 - 74	7	B++	Very Good	Demonstrates comprehensive grasp of the key concepts, knowledge, skills and competencies relative to programme requirements.	II
5	65 - 69	6	B+	Good	Demonstrates good grasp of the key concepts, knowledge, skills and competencies relative to programme requirements.	II
6	60 - 64	5.5	B	Average	Demonstrates fairly good grasp of the key concepts, knowledge, skills and competencies relative to programme requirements.	II
7	55 - 59	5	C+	Satisfactory	Demonstrates moderate grasp of the key concepts, knowledge, skills and competencies relative to programme requirements.	III
8	50 - 54	4.5	C	Acceptable	Demonstrates limited grasp of the key concepts, knowledge, skills and competencies relative to programme requirements.	III

9	40 – 49	4	D	Barely Acceptable	Demonstrates very limited grasp of the key concepts, knowledge, skills and competencies relative to programme requirements.	III
10	< 40	0	F	Needs Special Help	Minimum level has not been achieved relative to programme requirements.	

A student who secures grade D or above in a course is said to have completed /earned the credits assigned to the course. A student who completed the minimum credits required for the MCA programme shall be declared to have completed the programme.

NOTE:

The Grade Card for the final semester shall indicate the following, amongst other details:

1. Grades for concurrent and university evaluation, separately, for all courses offered by the student during the entire programme along with the grade for the total score.
2. SGPA for each semester.
3. CGPA for final semester.
4. Total Marks Scored out of Maximum Marks for the entire programme, with break-up of Marks Scored in Concurrent Evaluation and University Evaluation.
5. Marks scored shall not be recorded on the Grade Card for intermediate semesters.
6. The grade card shall also show the 10-point scale and the formula to convert GPI, SGPA, and/or CGPA to percent marks.

(XI) MEDIUM OF INSTRUCTION

The medium of instruction will be English.

(XII) REVISION OF SYLLABUS

As the computer technology is changing very fast, revision of the syllabus should be considered every 3 years.

(XIII) TEACHING AND PRACTICALS SCHEME

Each Session will be of 1 and 1/2 Hrs. (Includes Lecture & Practical) For a Year : 28 Weeks Teaching , 12 Weeks Vacation , 12 Weeks PL & Exam

Semester I

Subject Code	Subject Name	Internal	External	Credit Points
101	Fundamentals of Information Technology	50	50	4
102	C Programming & Data Structure	50	50	4
103	Software Engineering with UML	50	50	4
104	DBMS	50	50	4
105	Soft Skills	25	25	2
106	Practical (C & Case tools)	50	50	4
107	Soft Skills Practical-Word Power ,Business English	25	25	2
TOTAL		300	300	24

105, 106, 107 External evaluation to be carried out by one Expert from other college and one Expert from Internal Faculty appointed by Director of Institute.

Semester II

Subject Code	Subject Name	Internal	External	Credit Points
201	BA & ERP Tools	50	50	4
202	PPM & OB	50	50	4
203	Advanced RDBMS using Oracle	50	50	4
204	JAVA Programming	50	50	4
205	Technical Help Desk	25	25	2
206	Practical (Java & Oracle)	50	50	4
207	Soft Skills Practical - Group discussion & Interview Techniques	25	25	2
TOTAL		300	300	24

205 , 206 ,207External evaluation to be carried out by one Expert from other college and one Expert from Internal Faculty appointed by Director of Institute.

Semester III

Subject Code	Subject Name	Internal	External	Credit Points
301	Information Security & Audit	50	50	4
302	Optional 1	50	50	4
303	Optional 2	50	50	4
304	Optional 3	50	50	4
305	Web Designing & Content MGMT	25	25	2
306	Specialization Practical & Mini Project	50	50	4
307	Soft Skills Practical – Technical Writing	25	25	2
Networking (302NT- 304)				
302NT	Basics of Networking			
303NT	Server & Desktop Technologies			
304NT	System Administration & Server Integration			
ST Software Testing (302ST, 303ST, 304ST)				
302ST	Software Quality Assurance			
303ST	Software Testing Processes & Documentation			
304ST	Software Test Planning and Documentation			
Software Development (302SD, 303SD, 304SD)				
302SD	Program and Design with ASP.NET			
303SD	Mobile Programming using Android			
304SD	Advanced JAVA			
TOTAL		300	300	24

305,306, 307 External evaluation to be carried out by one Expert from other college / Industry and one Expert from Internal Faculty appointed by Director of Institute.

Semester IV				
Subject Code	Subject Name	Internal	External	Credit Points
401	Current Trends in IT	50	50	4
402	Departmental Paper (Additional Input)	25	25	2
403	Project	250	250	20
TOTAL		325	325	26

402 External evaluation to be carried out by one Expert from other college /Industry and one expert from Internal Faculty appointed by Director of Institute.

403 External evaluation to be carried out by one Expert appointed by UoP and one expert from internal faculty appointed by Director of Institute.

Summary			
Semester	Total Internal Marks	Total External Marks	Credit Points
I	300	300	24
II	300	300	24
III	300	300	24
IV	325	325	26
Total	1225	1225	98

Total Marks : 2450

Total Credit points : 98

Semester – I			
Subject Code	Subject Title	Internal	External
101	Fundamentals of Information Technology	30	70
Objective: To give introduction to computer systems, operating systems, numbering systems, microprocessor, input output devices.			

Sr. No	Chapter Details	Nos. of Sessions	%	Reference Books
1	Introduction to Computer Systems Computer definition Characteristics of Computers Computer Generations (First, Second, Third, Fourth, Fifth with example) Types of Computers (Super computer, Mainframe computer, Mini computer, Micro computer) Digital Block Diagram and function of each unit of Block diagram	3	10	1,2,3,4
2	Input and Output Units of Computer System 1. Input devices (I : Keyboard, II : Pointing devices - Mouse, Joystick, Touch Screen, Light Pen, Stylus) II : Scanning devices (Optical Scanners, Bar Code readers, MICR, OCR, OMR) IV : Image capturing devices (Digital Camera, Digital video camera) V: Audio input devices-Microphone 2. Output devices (I : Monitors – Cathode ray tube, Flat panel monitor, II : Printers (Ink jet printer, Laser printer, Thermal printer, Dot matrix printer, Plotter, Photo printer) III : Audio output device – Speakers, Head phones)	4	10	1,2,3,4
3	Storage devices 1. Storage (I : Types of Memory – Primary and Secondary / RAM and ROM) II (Storage Capacity : Bit, Byte, MB, KB, GB, TB) III : Primary Storages (RAM, ROM, PROM, EPROM, Cache Memory, function of Cache Memory, Virtual Memory) IV : Secondary Storages(Punch Card, Magnetic Tape, Magnetic Disk, Floppy Disc, CD, DVD, Hard Disk, Pen Drive)	3	10	1,2,3,4
4	Processing device Process Devices : (I : Microprocessor, II : Specialty processor – Graphics co processor, Parallel processor)	3	9	1,3

5	Electronic data and coding system Number Systems (I : Types - Non Positional Number System, Positional Number System (Binary, Octal, Hexadecimal Number Systems),II : Conversion of One Number System to Another, III : Coding systems : BCD, EBCDIC, ASCII, Unicode)	3	12	1,3
6	Software system Software : I - Definition, II - Types of Software, III - Operating System : (Definition and Functions, Types of Operating System, Difference between Windows and Open source Operating System, Batch Processing, Spooling, Multiprocessing, Multiprogramming, Time- Sharing, On-Line Processing, Real-Time Processing	6	12	1,2,4,5
7	Operating Systems Process Management, CPU Scheduling, Memory Management, File Management	8	15	5,6
8	Computer Language I. Computer language : High Level Language, Low Level Language, II. Language Converter: Compiler, Interpreter, Assembler	2	10	1,3
9	Computer networking Networking, I : Computer network and its benefits II : Types of networks - LAN, WAN, MAN, Intranet, Internet III : Network Topologies, IV : OSI Model (Seven layers) V : Communication Media	5	12	7,8
10	Practical Hands on and presentations by students Practical Approach : Computer Assembly, Handling Boot Setup, Installation of Operating System and Server, Connecting your client to server, User and Workgroup Handling, General Operating system handling and current new topics in IT	3		

Books

1. Computer Fundamentals by P.K. Sinha,BPB Pub,4th Ed.
2. Computer Fundamental by Ram B, new Age International Pub, 4th Ed.
3. Computer Fundamental by Oka Milind M
4. Computer Fundamental by Rajaraman,PHI,4th Ed.
5. Operating System by Galvin,TMH,8th Ed.
6. Operating System by Achyut Godbole,TMH, 2nd Ed.
7. Computer Networks by Andrew S. Tanenbaum,Pearson,4th Ed.
8. Fundamentals of computer networks by Sudakshina Kundu

Website Links:

1. www.olearyseries.com

Semester – I			
Subject Code	Subject Title	Internal	External
102	C Programming & Data Structure	30	70
Objective: After completing this subject student will be able to understand and write programs by using C language along with basic concepts of Data Structures.			

Sr . No	Chapter Details	Nos. of Session	%	Reference Books
1	C Fundamentals A Brief History of C, C is middle-level Language, C is a Structured Language, C Character Set, Identifiers and Keywords under ANSI C. Data Types, Constants: int, float, double, char. Qualifiers: long, short, unsigned and signed. Escape sequences (like \n, \b etc.). Arithmetic Expressions and different built-in Operators. Pre-processor directives (like #include, #define), concept of header files, Symbolic constants, Comments, sizeof, steps involved in translation of C Program. Concept of typedef for renaming a built-in data type.	3	8	1,2,3,4
2	Flow Charts and Decision Table Flow Diagram, Flow Chart symbols and their use, System flowcharts, program flowcharts, outline flowcharts, detail flowcharts, flowcharts and signs of communications, flow lines, process decisions, connectors, terminals, flowcharts for simple programs-problems.	2	5	1,2,3
3	Built-in operators and functions. Console based I/O and related built-in I/O functions: printf(), scanf(), getch(), getchar(), putchar(), gets(), puts().	2	4	1,2,3,4
4	Decision and Case Control Structure if statement, if-else construct, use of logical operators and Compound Relational Tests, Nested if statements, The else if construct, the relational operators, the conditional expression (ternary) operator. The Switch Statement with or without break, concept of a case label, goto statement, concept of a goto label, comparison between goto and case	2	5	1,2,3,4

	labels.			
5	Loop Control Structure Concept of Loop, loops supported by 'C', concept of top tested and bottom tested loops, the for loop statement, Nested for Loop , for loop variants, the while loop statement, simple and nested while loop, Increment/decrement operators; Use of Break and Continue, the do-while loop, comparison between for, while and do while loops.	2	5	1,2,3,4,5
6	Storage Classes Automatic, Register, Static (local and global), External. Scope rules.	1	4	1,2,3,4,5
7	Arrays Concept of a collection, types of collections supported by 'C', Array collection and its features, concept of indexing, index variable, index type, positional value of a member of array collection, concept of dimension and size of an array, 'C' syntax for declaration of array, name of the array and its type, Referring individual elements, Entering data into an array, reading data from an array, concept of Array initialization and list of initializers, size option, Bounds checking, the concept of two dimension arrays and related syntax, similarities between dimension and nesting String	4	10	1,2,3,4,5,8
8	Functions Concept of a subprogram, the interface of a subprogram, role of a interface, Arguments of a subprogram, kinds of subprograms supported by C, return statement as an interface, local variables, Default Return type and the type void, Passing values between functions through interfaces, Declaration of function type, iterative and recursive subprograms, Recursion, concept of call by value, call by reference, return and their underlying implementation should be explained, similarities and differences between Function & Macros, concept of nested macros and their use, recursion as a special nested call.	4	12	1,2,3,4,5,8
9	Pointers Concept of Pointers, Pointer as an address variable, concept of a pointer data type and its syntax, built-in address operator, Pointers to existing variables of different data types and their uses, use of indirection operator, the name of the array as a pointer variable, Pointers and Arrays, Pointers arithmetic, use of unary operators (++ , --), One Dimension Arrays and Pointer, concept of array of pointers and simple use, command line arguments for the main, pointer as a	4	8	1,2,3,4,5,8

	return type of a function.			
10	<p>Structures</p> <p>Structure as a homogeneous and heterogeneous collection, possible applications, syntax of declaring structure, Initializing structures, structure variables, accessing structure elements using member operator, Arrays of Structures, and array as member of structure, conceptual difference between array and structure collection, Functions and Structures, nested structures, concept of anonymous structures and their use, Concept of self referential structure, pointer as member of structure and pointer to structure use of member selector operator(->), comparison between indirection (*) operator and member selector operator (->), structure as an argument to function and return type of a function.</p>	3	8	1,2,3,4,5,7,8
11	<p>Unions</p> <p>Concept of Union collection, Syntax of declaration and its use, comparison of Array, Structure and Union, array of unions and union as a member of structure, structure as a member of union and array as member of union, concept of memory saving and union, union as a generic data type, concept of anonymous union.</p>	2	2	1,2,3,4,5,7,8
12	<p>Console based I/O</p> <p>use of console as a file environment, use of keyboard and VDU as I/O files: Use of stdin, stdout, stderr and stderr as built-in file pointers for console environment, use of printf(), scanf() as fprintf() and fscanf(), use of fflush().</p>	2	5	1,2,3,4,5,7,8
13	<p>File based I/O</p> <p>Concept of a file, text files in 'C', concept of a predefined FILE pointer and its definition as given in header file stdio.h, meanings of different members of the structure representing FILE, Disk I/O Functions: High level file I/O or standard functions- fopen(), putc(), getc(), fclose(), fgets(), fputs(), feof(), simple file based programs showing the working of different members of FILE structure.</p>	3	10	1,2,3,4,5,7,8
14	<p>Dynamic Memory Allocation and Memory functions</p> <p>Concept of dynamic environment as run time environment, concept of dynamic memory management, use of built-in dynamic memory management tools of 'C' viz. malloc(), free(), simple programs using malloc () and free()</p>	2	6	1,2,3,4,5,7,8
15	<p>Bitwise Operator</p> <p>Concept of modifying the value using bit shifting, built-in bit shift operators left bit shift operator(<<) and right bit shift operator (>>) their uses, limitations of bitwise operators, use of bitwise relational operators.</p>	2	5	1,3,4,5,7,8

16	Data Structure Concepts Definition of data structure, Concept of Link list, Stack, Trees and Queue.	2	3	10,11,12
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Books:

1. Let us C by Yashwant Kanetkar, BPB,10th Edition
2. Magnifying C By Arpita Gopal PHI Publication
3. C Programming by Balgurusamy, Tata Mc-Graw Hill,5th Edition
4. Turbo C/C++ - The Complete Reference by H. Schildt.
5. Programming in C by S. Kochan,CBS
6. Born to code in C by H. Schildt.
7. The Art of C by H. Schildt.
8. C Programming by Kernighan and Ritchie – PHI pub,2nd Edition.
9. Programming in ANSI C by Agarwal
10. C Programming with Problem Solving by Jacqueline A Jones, Keith Harrow
11. Practical approach to Data Structure = Hanumant Thapa
12. Magnifying Data Structure By Arpita Gopal PHI Publication
13. Data Structure using C & C++ - Langsamy \
14. Data Structure Using C by Tanenbaum ,Pearson Pub.

Semester – I			
Subject Code	Subject Title	Internal	External
103	Software Engineering with UML	30	70
Objective: After completing this subject student will be able to understand the issues involved in implementing SSAD and OOAD concepts. Student will also be able to analyze project requirements and produce an initial design.			

Sr. No	Chapter Details	Nos. of Sessions	%	Reference Books
1	Overview of Software Development with SSAD 1.1 Basic System Development Life Cycle with different users and their role in SDLC. 1.2 Different Approaches and Models for System Development. 1.2.1 Waterfall Model 1.2.2 Spiral Model, Prototyping 1.2.3 RAD 1.2.4 Rational Unified Process with Four Major phases:- Inception , Elaboration, Construction, Transition.	5	15	1,4,5,6,7,9,14
2	Overview of Software Development with OOAD 2.1 Object and Classes 2.2 Abstraction and Encapsulation 2.3 Methods and Message 2.4 Interfaces, Inheritance and Polymorphism	3	5	7,11,12,14
3	Requirement Determination and Specifications 3.1 Requirement Investigation & Fact Finding Methods. 3.2 Requirements definition, Types of Requirements - Functional and Non-Functional, Quality criteria, Fundamental problems in defining Requirements. 3.3 Software requirement Specification (SRS) - Structure and contents of the requirements specification analysis modeling,	5	20	1,2,4,10
4	Requirement Analysis and Design (SSAD & OOAD) 4.1 Decision Analysis Tools : Decision Tables , Decision Trees & Structured English 4.2 Functional Decomposition Diagram (FDD)	12	25	1,4,5,6,8, 9,10

	4.3 Process modeling through Logical Data Flow Diagrams. CLD,DFD,ERD & Normalized File Layouts.			
5	UML 5.1 Use-case Driven Object oriented Analysis - The UML approach, Develop use-case Model & Description of Use case Diagram. 5.2 Activity Diagram 5.3 Sequence diagram and Collaboration Diagram. 5.4 Class Diagram <ul style="list-style-type: none"> • Containment and Composition • Aggregation • Inheritance, Sub Types and IS-A Hierarchies. • Association and Link Relationships 5.5 State Transition Diagram.	12	25	7,11,12,13,14
6	6.1 Design of output, Design Types Of Output 6.2 User Interface design: Elements of good design, design issues, Features of modern GUI, Menus, Scroll bars, Windows, Buttons, Icons, Panels, Error Messages etc.	3	10	1,4,7,8

Note:

1. System concept, Types and Characteristics of System can be explained in brief just to get idea about what is system and how it works.
2. Methodology must be case study oriented throughout the syllabus.
3. Faculty must design different cases based on SSAD and/or OOAD, which will impart insight knowledge for the preparation towards presentation and project.
4. ER model and Normalization for mapping with table design will be covered in DBMS .

References

1. Software Engineering Pressman, TMH,7th Ed.
2. Magnifying Object Oriented Analysis and Design By Arpita Gopal and Netra Patil PHI Publications
3. System Analysis and Design Jalote, Narosa Pub, 3rd Ed
4. Software Engineering Sommerville, Pearson,8th Ed
5. Software Engineering W S Jawadekar, TMH.
6. System Analysis & Design methods Whiten, Bentley, ,TMH,7th Ed.
7. System Analysis & Design Elias Awad, Galgotia Pub,
8. Object Oriented Modelling & Design James Rumbaugh, PHI.
9. Analysis & Design of Information System James Senn, TMH, 2nd Ed.
10. Analysis & Design of Information System V. Rajaraman, ,PHI,3rd Ed.
11. Software Engineering Concepts Richard Fairley, ,TMH.
12. Object Oriented Analysis and Design with Applications by Grady Booch., Benjamin / Cummings , 1994., Pearson,3rd Ed.
13. Object – Oriented Modeling and Design by J Rumbaugh, M Blaha, W .Premarlani, PHI Pub.

14. Object-Oriented Software Engineering by Ivar Jacobson Pearson Education INC,CENGAGE Learning Pub.
 15. Object Oriented System Development by Ali Bahrami, TMH Pub.

Semester – I			
Subject Code	Subject Title	Internal	External
104	Database Management System	30	70
Objective: After completing this subject student will be able to learn detail concepts of DBMS and understand concept of database design as an implementing point of view by using SQL.			

Sr. No	Chapter Details	Nos. of Sessions	%	Reference books
1	Basic concepts 1.1 Database and Need for DBMS 1.2 Characteristics of DBMS 1.3 Database Users 1.4 3-tier architecture of DBMS (its advantages over 2-tier) 1.5 Views of data-schemas and instances 1.6 Data Independence	2	10 %	1, 2
2.	Data Models 2.1 Introduction to various data models – Record based & Object based 2.2 Cardinality Ratio & Relationships 2.3 Representation of entities, attributes, relationship attributes, relationship set 2.4 Generalization, aggregation 2.4 Structure of relational Database and different types of keys	6	15%	1,2,3,4
3.	Relational Model 3.1 Codd's rules 3.2 Relational data model & relational algebra 3.2.1 Relational model concept 3.2.2 Relational model constraints 3.2.3 Relational Algebra 3.3 Relational database language Data definition in SQL, Views and Queries in SQL, Specifying constraints and Indexes in SQL, Specifying constraints management systems, Oracle / Ingres/ SQL Server / My SQL	8	20%	1,2,3,4,6
4	Relational Database design 4.1 Database Design – ER to Relational 4.2 Functional dependencies	7	20%	6,7

	4.3 Normalization Normal forms based on primary keys (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF) 4.4 Loss less joins and dependency preserving decomposition			
5	Transaction And Concurrency control 5.1 Concept of transaction, ACID properties 5.2 Serializability 5.3 States of transaction, 5.4 Concurrency control 5.4.1 Locking techniques 5.4.2 Time stamp based protocols 5.4.3 Granularity of data items 5.5 Deadlock	6	15%	5,6,7,8
6	Crash Recovery and Backup 7.1 Failure classifications 7.2 storage structure 7.3 Recovery & Atomicity 7.4 Log base recovery 7.5 Recovery with concurrent transactions 7.6 Failure with loss of Non-Volatile storage 7.8 Database backup & recovery from catastrophic failure 7.9 Remote Backup System	4	10%	4,7,8
7	Security and privacy 8.1 Database security issues 8.2 Discretionary access control based on grant & revoking privilege 8.3 Mandatory access control and role based access control for multilevel security 8.4 Encryption & public key infrastructures	3	5%	10
8	Data Warehousing and Data Mining Concept, Architecture, Various tools in Data Warehousing, Tools in Data Mining, Applications of Data Warehousing and Data Mining, Difference between Data mining and normal query.	4	5%	9

Books :

1. Introduction To Database Systems By C.J.Date, Pearson.
2. Data Base System Concept by Korth, TMH, 5th Ed.
3. Data Management Systems by Alexis Leon, Mathew Leon
4. Principals of Database Management by James Martin, PHI.
5. Computer Database Organization by James Martin, PHI, 3rd Ed.
6. Relational database design for Micro Computers applications by Prentice Hall(Jackson)
7. Introduction to Data Management Systems by Atul Kahate, Pearson Education Pub.

8. Fundamentals of Database Systems by Elmasri, Navathe, Pearson, 5th Ed
9. Data Mining: Concepts and systems - Jiawei nan, Micheline Kamber, (Morgan Kaufmann publishers)
10. Database systems : "Design implementation and management"- Rob Coronel, 4th Edition, (Thomson Learning Press)

Semester – I				
Subject Code	Subject Title	Internal	External	
105	Soft Skills	70		
Objectives: 1. To encourage the all round development of students by focusing on soft skills. 2. To make student aware about the importance, the role and the content of soft skills through instruction, knowledge acquisition, and practice etc.				
Chapter	Chapter Details	No. of Sessions	%	Reference Books
1	Self Development and Assessment Self-Assessment Self-Awareness, Perception and Attitudes Values and Belief System Personal Goal Setting Career Planning, Self-Esteem, Building of Self-Confidence	5	10	Group I
2	Stress Management Introduction, Stress Management Techniques (Games, Yoga, and Music Therapy), Emotional Quotient, Dealing With People, Failure, Issues (difference of opinions), Discrimination on the grounds of Ethnicity, Nationality, Gender, Sexual Orientation, Zero and No Tolerance Zones, Team Work, Creating and Maintaining Impression, Counseling, Motivation.	5	10	Group II
3	Components of communication, Principles of Communication Definition, Communication Block Diagram, barriers, listening skills, Verbal Communication Planning, Human as an Information Processor, Preparation, Delivery, Feedback and Assessment of activities like; <ul style="list-style-type: none"> - Public speaking - Group Discussion - Oral Presentation skills, - Perfect Interview - Listening and observation skills, Body language - Use of Presentation graphics - Use of Presentation aids, Study of communication. 	10	30	Group III
4	Written Communication Technical Writing-Technical Reports	10	30	Group IV

	<ul style="list-style-type: none"> - Project Proposals - Brochures, - Newsletters, <ul style="list-style-type: none"> o Technical Articles o Technical Manuals o Official/Business Correspondence <ul style="list-style-type: none"> - Business letters - Memos <p>Progress report, Minutes of meeting, Event reporting, Use of style, Grammar and Vocabulary for effective technical writing, Use of : Tools, Guidelines for technical writing, Publishing.</p>			
5	<p>Morals, Ethics and Etiquettes Indian Moral System, Business Ethics, Etiquettes in social as well as Office settings, Email etiquettes Telephone and Short Message Service (Mobile SMS) Etiquettes, Engineering ethics and ethics as an IT professional, Civic Sense.</p>	05	10	Group V
6	<p>Other Skills Managing time Meditation, Understanding roles of Engineer, and their Responsibility Exposure, to work environment And culture in today's job Places, Improving Personal Memory, Study skills that include Rapid reading, Notes taking, Complex Problem Solving, Creativity, Leadership Skills.</p>	05	10	Group VI

References for students for self-improvement by self-study

Group I :

1. You Can Win - Shiv Khera - Macmillan Books - 2003 Revised Edition
2. 7 Habits of Highly effective people - Stephen Covey, , Pocket Books
3. You Can Heal Your Life – Louise Hay

Group II :

4. Tim Hindle, "Reducing Stress", Essential Manager Series DK Publishing
5. Robert Heller, "Effective Leadership", Essential Manager series DK Publishing

Group III :

6. Business Communication - Asha Kaul, , PHI
7. Business Communication - M. Balasubramanyam
8. Business Communication – K. K. Sinha
9. Business Communication – Dr. Anjali Ghanekar

Group IV :

10. John Collin, "Perfect Presentation", Video Arts MARSHAL
11. Jenny Rogers " Effective Interviews", Video Arts MARSHAL
12. Raman Sharma, " Technical Communications", OXFORD
13. Sharon Gerson, Steven Gerson "Technical writing process and product",
14. Pearson Education Asia, LPE third edition.

15. R. Sharma, K. Mohan, Business correspondence and report writing",
16. TAG McGraw Hill ISBN 0-07-044555-9
17. Video for technical education catalog, National education and Information Films Ltd. Mumbai.
18. Management training and development catalog, National education and Information Films Ltd. Mumbai.
19. XEBEC, "Presentation Book 1,2,3", Tata McGraw-Hill, 2000,ISBN 0-40221-3

Group V:

20. Sheila Cameron, "Business Student Handbook", Pitman Publishing
21. Newstrom Keith Davis," Organizational Behavior", Tata McGraw-Hill, 0-07-460358-2

Group VI:

22. Dr. R. L. Bhatia, " Managing time for competitive edge"
23. Lorayne Lucas "Memory Book"

It is proposed that expert from industry be invited to conduct lectures and workshops to understand the industry soft-skill requirement.

Semester – I			
Subject Code	Subject Title	Internal	External
106	C and Case Tools Practical	100	

The practical sessions and assignments would be based on the topics covered in the subject code – 102 and 103

- Find Area, Perimeter of Square & Rectangle.
- Find max. Among 3 nos.
- Check leap year
- Factorial of Number
- Calculate a^b
- Prime Number.
- Perfect Number.
- Armstrong Number.
- Floyd's Triangle
- Fibonacci Series
- Inter conversion of Decimal, Binary & Hexadecimal no.
- LCM & GCD of numbers
- Insert & Delete an element at given location in array.
- Transpose of matrices
- Multiplication of matrices
- Display upper & lower diagonal of matrices
- Array of Structure e.g. student result, Employee pay slip , Phone bill
- Function with no parameter & no return values
- Function with parameter & return values
- Function with parameter & no return values
- Function with call by reference
- Recursion function e.g. sum of digit, reverse of digit
- String manipulation function e.g. string copy, concatenation, compare, string length, reverse
- Pointer Arithmetic
- File handling e.g. Read / Write file, copy file, merging file

- Random access of file
- File handling with command line arguments
- Macro expansion
- File Inclusion

Note: this is not limited subject teacher can include new assignments based on syllabus.

Semester – I			
Subject Code	Subject Title	Internal	External
107	Soft Skills Practical-Word Power, Business English	30	
<p>Objective: To improve the vocabulary of English and comfort ability with business English. Use of language lab is also encouraged and lot of hearing practice, reading and understanding exposure should be given to the students.</p>			

Semester – II				
Subject Code	Subject Title	Internal	External	
201	Business Application and ERP Tools	30	70	
<p>Objective :</p> <p>1. The processes and practices in business and their applications are taught in subject. Student will go through Design to Development life cycle typically carried out in an industry. 2. He will gain domain knowledge in various fields and come to know about HR , manufacturing practices.</p> <p>3. Also the financial aspect of business and management will be taught to student through this subject</p>				
Sr. No	Chapter Details	No. of Sessions	%	Reference Books
1	<p>Manufacturing: Product Life Cycle Management, BOM processing with product configuration, MPS, Capacity Requirements Planning for Equipment, Manpower and Time, MRP, Production Planning - work order management - EOQ, EBQ. Shop floor control - calculation of labour efficiency, productivity and equipment down - time analysis Material procurement - Indenting, Purchasing, Vendor analysis, supplier's, Bill passing and receipt of material. Stock accounting and control - raw material, work-in-process and Finished goods Job / Product / WIP costing - Standard, FIFO, LIFO, Avg, Wtd. Avg Sub-contracting of work to outside vendors</p>	10	20	1,4,9,10

2	Sales And Distribution: Sales Budgeting - Market segments / Customers / Products Customers Enquiry and preparation of Quotation Customer Order processing - from Order acknowledgement to dispatch and invoicing Pending Customer orders - follow up Sales Analysis Network of Sales outlet - Distributed Databases While explaining this application consider an organisation manufacturing multiple products with sales outlets spread across the country	6	10	1,2,3,4,5
3	Financial Accounting: Accounting General Ledger Balance Sheet, P&L , Schedules Trial Balance Journals / Day books Ratio / Expense analysis Account Receivable Account Payables	6	15	1,4,6,14
4	Human Resource: Employee Database, Recruitment Employee appraisal, Employee training, Leave accounting, Payroll, Salary calculation and reporting Income Tax calculation and reporting, Loan accounting PF and gratuity, Bonus, Ex-gratia, Incentive, Superannuation , Arrears calculation	6	10	1,2,3,4,7,8,14
5	Enterprise Resource Planning: Introduction, What Is ERP? Need of ERP. Advantage of ERP, Growth of ERP ERP Implementation Life Cycle: Evaluation and selection of ERP package Project planning, Implementation, Team Training and Testing End User Training and Going Live Post Evaluation and Maintenance	6	20	1,4,11,12,14
6	ERP Case Studies Post Implementation review of ERP packages in manufacturing, Services and Others Organizations. (Free ERP tools should be downloaded and demonstrated in the class.)	6	25	11,12,13,14

Books :

1. MIS by W.S. Jawadekar, TMH, 4th Ed.
2. Engineering MIS for Strategic Business Processes By Arpita Gopal – Excel Publications
3. MIS by Jerome Kanter, PHI pub.
4. MIS by Gordon B. Davis, TMH, 2nd Ed.
5. MIS by Laudon and Laudon, Pearson Pub, 10th Ed.
6. Marketing Management by Philip Kotler, PHI pub, 13th Ed.
7. Fundamentals of Financial management by Prasanna Chandra, TMH, 7th Ed.
8. Personnel management by C. B. Mammoria, Himalaya pub, 29th Ed.
9. Human Resource and Personnel Management by K Aswathapa, TMH, 5th Ed.
10. Production and Operations Management by Mayer
11. Modern Production Management by R V Badi, Oxford, 2nd Ed.
12. Enterprise Resource Planning Alexis Leon, TMH, 2nd Ed.
13. ERP Ware: ERP Implementation Framework, V.K. Garg & N.K. Venkita Krishnan
14. ERP Concepts & Planning V.K. Garg & N.K. Venkita Krishna, PHI, 2nd Ed.

Semester – II			
Subject Code	Subject Title	Internal	External
202	Principles of Management and Organizational Behavior	30	70
Objective: The basic management concepts and use of management principles in the organization will be introduced to student through this elaborative subject.			

Sr. No	Chapter Details	Nos. of Sessions	%	Reference Books
1	Essence of Management 1.1 The need, scope 1.2 Meaning and Definition 1.3 The process of Management 1.4 Managerial levels/Hierarchy 1.5 Managerial functions Planning Organizing Staffing Directing Controlling 1.6 Managerial skills Technical Conceptual Human Resource 1.7 Types of managers Functional Specialize Generalize 1.8 Line and staff managers	4	10	1,2,3,4,5
2	Evolution of Management Thought 2.1 Historical perspective 2.2 Classical Theories Taylor Fayol 2.3 Behavioral HR Approach Behavioral Science and Approach 2.4 Management Science Approach 2.5 System approach-with reference to management, organization and MIS	5	10	1,2,3,4,5

	2.6 Contingency approach			
3	Managerial Decision Making 3.1 Introduction 3.2 Decision making environment Open Systems Closed system Decision making under certainty Decision making under uncertainty Decision making under risk 3.3 Decision Types /models Structured decisions Unstructured decisions Programmable decisions Non programmable Decisions Classical Model Administrative model 3.4 Decision making tools Autocratic Participative Consultative 3.5 Herbert Simson's Model 3.6 Principle of Rationality / Bounded Rationality	4	10	1,2,3,4,5
4	Organization 4.1 Introduction -definition 4.2 Need for Organization 4.3 Process of Organizing 4.4 Organizational structure Functional organization Product Organization Territorial Organization	2	5	3,4,5
5	Organizational Behavior 5.1 Definition / Concepts 5.2 Need /importance/ relevance 5.3 An overview	2	5	7,8
6	Individual Behavior and Self Understanding 6.1 Ego State 6.2 Transactional Analysis 6.2 Johari Window	4	10	7,8
7	Group and Group Dynamics	4	10	6,7,8,9
8	Team Building	4	10	
9	Global Cultural Behavior	2	05	
10	Leadership	3	8	
11	Conflict Management	3	8	
12	Motivation : Concept, Theory X, Y and Z	3	9	

Important Note: The topics in Units 3,4,5 and 6 should be covered with the help of at-least one exercise each. All topics in Organizational Behavior should be covered with the help of role plays, case studies, simulation, games etc.

1. Principles and Practices of Management by Koontz & O'Donelle, TMH,7th Ed.
2. Principles & Practices of Management by L.M.Prasad,S. Chand And Sons pub.
3. Management Today Principles and Practices by Burton & Thakur,
4. Management Principles & Functions by Ivancevich & Gibson , Donnelly
5. Organisational Behavior by Stephen Robbins,Pearson,13th Ed.
6. Organisational Behavior by Keith Davis
7. Organisational Behavior by Fred Luthans,TMH,10th Ed.
8. Organisational Behavior by Dr. K. Ashwatthapa,PHI,7th Ed.
9. PPM & OB by Dr. S. Kulkarni

Semester – II			
Subject Code	Subject Title	Internal	External
203	ADVANCED RDBMS USING ORACLE	30	70
Objectives : This subject will enhance database handling , data manipulation and data processing skills through SQL & PL/SQL, which will help them in developing data centric computer applications.			

Sr. No.	Chapter details	No. of sessions	Weight age %	Reference Books
1	Queries Select with all options Operators Arithmetic Comparison Logical (in, between, like, all, %, _, any, exists, is null, and ,or, not, Distinct) Order by clause	2	12.5	1,2,3,4,5
2	SQL Functions Date Sys_date , next_day, Add_months, last_day, months_between, Numeric round, trunc, abs, ceil, cos, exp, floor Character initcap, lower, upper, ltrim, rtrim, translate, length, lpad, rpad, replace Conversion to_char, to_date, to_number Miscellaneous Uid, User, nvl, vsize, decode, rownum Group function avg, max, min, sum, count, with Group by and Having Clause Nested functions	3		1,2,3,4,5
3	Joins Simple join Equi join Non equi join Self join Outer join Set operators (Union, union all, intersect, minus)	4	12	1,2,3,4,5
4	Sub queries and Correlated query	2		1,2,3,4,5

5	DML statements (Insert, Update, Delete with where clause) TCL (Commit, Rollback, Savepoint) Locks in Oracle DDL Statements	1	7.5	1,2,3,4,5
		1		1,2,3,4,5
		1		1,2,3,4,5
		1		1,2,3,4,5
6	Data types Character Char,Varchar/varchar2, Long Number Number (p) - fixed point, Number (p,s) - floating point Date Raw Long raw Introduction to LOB data types (CLOB,BLOB, BFILE)	1	5	1,2,3,4,5
7	Table Create, Alter, Drop, Truncate, Rename Constraints (Primary key, Foreign Key, Unique Key, Check, Default, Not Null, On delete, Cascade) Column level and Table level constraints Oracle Objects Views, Sequences, Synonyms, Index (Define, Alter and Drop) Introduction to Oracle Architecture Creating Users and assigning privileges	7	12.5	1,2,3,4,5
8	PL / SQL Introduction to PL/SQL Advantages of PL/SQL PL/SQL Character Set Data types -Character, Raw, rowid, boolean, binary, integer, number, Variable, constant PL/SQL blocks Attribute - % type, % rowtype operators function comparison, numeric, character, date control structure sequential - goto Error handling concept of exception pre defined exceptions -no_data_found, cursor_allready_open, dup_val_on_index, storage_error, program_error,zero_divide, invalid_cursor, login_denied, invalid_number, too_many_rows, dbms_output, user_defined exceptions	5	12.5	8,9
10	Composite Data types Record, Declaration, refer, record assignment Table declaration, table attributes (count, delete, exists, first, last, next, prior)	1	5	8,9

11	Database Triggers Types of Triggers Enabling, disabling Predicates- inserting, updating, deleting Procedures and Functions Definition, Implementation and Execution Packages	4	12	8,9
12	Creating an Oracle Database Use DBCA to create a database, to delete a database, to manage templates Managing the Oracle Instance Use Enterprise Manager Use SQL*Plus and iSQL*Plus to access the Oracle Database Modify database initialization parameters Describe the stages of database startup Describe the database shutdown options View the database alert log Use dynamic performance views	2	5	10,11,12
13	Performing Database Backup Create consistent database backups Back up your database without shutting it down Create incremental backups Automate database backups Backup a control file to trace Monitor flash recovery area Performing Database Recovery Recover from loss of a Control file Recover from loss of a Redo log file Recover from loss of a system-critical data file Recover from loss of a non system-critical data file	2	10	10,11,12
14	Moving Data Describe the general architecture of Data Pump Use Data Pump export and import to move data between Oracle databases Load data with SQL Loader Use external tables to move data	1	6	10,11,12

Books:

1. SQL - The complete Reference by Groff James & Weinberg Paul.,TMH,2nd Ed.
2. SQL for Professionals by Kishore Swapna & Naik Rajesh,TMH.
3. SQL from the ground up by Pyofinch Mary
4. SQL Unleashed by Ladanyi Hans.
5. Oracle 7 by Ivan Bayross,BPB Pub.
6. Understanding SQL by Gruber Martin,BPB Pub.
7. Teach yourself SQL in 14 days by Morgan Bryan & Perkins Jeff
8. Oracle PL/SQL Programming by Scott Urman
9. Teach yourself PL/SQL in 21 days by Lucus Tom,techmedia,2nd Ed.
10. OCP: Oracle 10g Certification Kit (1Z0-042 and 1Z0-043)

11. Oracle Database 10g OCP Certification All-In-One Exam Guide (Oracle Database 10g Handbook) by Damir Bersinic, John Watson
12. Oracle Database 10g DBA Handbook by Kevin Loney, Bob Bryla, Publisher McGraw-Hill

Websites:

<http://education.oracle.com>

Semester – II			
Subject Code	Subject Title	Internal	External
204	Java Programming	30	70
Objective: To enable the students to understand the core principles of the Java Language and use visual tools to produce well designed, effective applications and applets.			

Sr. No	Chapter Details	Nos. of Sessions	%	Reference Books
1	Fundamentals of OOP What is OOP Difference between Procedural and Object oriented programming Basic OOP concept - Object, classes, abstraction, encapsulation, inheritance, polymorphism	2	5%	Teach Yourself Java 2 in 24 Hours By Rogers Cadenhead http://www.roseindia.net/
2	Introduction to JAVA History of Java Features of Java JDK Environment Java Virtual Machine Java Runtime environment	1	3%	Programming with java, A Primer by E. Balguruswamy, TMH, 4 th ed. http://www.roseindia.net/
3	Programming Concepts of Basic Java Data Types in Java Java coding Conventions Expressions in Java Control structures, decision making statements Arrays and its methods	2	5%	Just Java by Peter Van der Liden http://www.roseindia.net/
4	Java classes Define class with instance variables and methods Object creation of class Accessing member of class Argument passing Constructors Method overloading Static members this keyword Inner classes	4	10%	OOP with Java An ultimate Tutorial by Jaffry A Borrer, http://www.free-ed.net/free-ed/infotech/informit/itlc07.asp

	Wrapper Classes Garbage collection			
5	Inheritance Super class & subclass Access Modifiers Abstract method and classes method overriding final keyword super keyword down casting and up casting dynamic method dispatch	4	10%	Programming with java, A Primer by E. Balguruswamy, TMH, 4 th Ed. http://www.roseindia.net/
6	Packages and Interfaces Importing classes User defined packages Implementing interfaces User defined interfaces Adapter classes	3	10%	Java: The Complete Reference Patrick by Naughton, Herbert Schildt, TMH, 7 th Ed.
7	Exception handling Types of Exceptions try, catch, finally, throw, throws keywords creating your own exception nested try blocks multiple catch statements exception and inheritance user defined exceptions	4	7%	Java 6 Programming Black Book By Kogent Solution Inc, dreamTech Pub. java.sun.com
8	Multithreading Multithreading Concept Thread Life Cycle Thread Priorities Thread synchronization Thread scheduler	3	10%	Programming with java by E. Balguruswamy, TMH, 4 th Ed.
9	Abstract Window Toolkit Components and Graphics Layout managers Border ,Grid ,Flow ,Box ,Card, Gird Bag, Containers, Frames and Panels Event Delegation Model Anonymous Classes	4	5%	Java: The Complete Reference Patrick by Naughton, Herbert Schildt, TMH, 7 th Ed.
10	Swing Features of swing Swing components JButton, JRadioButton, JTextArea, JComboBox, JTable, JProgressBar, JSlider, JDialog	5	12%	Core Swing: Advanced Programming By Kim Topley

11	Applets Applet life cycle Creating applet Inter applet communication Parameters to applet Event handling in applet	4	10%	Programming with java by E. Balguruswamy, TMH, 4 th Ed.
12	Java Utility Packages Hash table , Vector, Math, Enumeration, Iterator, System, Random, String, StringBuffer	1	4%	Java: The Complete Reference Patrick by Naughton, Herbert Schildt, TMH, 7 th ed.
13	Streams and File File class tests and utilities Stream classes InputStream , FileInputStream , ObjectInputStream OutputStream, FileOutputStream, Object OutputStream, DataOutputStream Reader and Writer classes Reader, BufferedReader , InputStreamReader, FileReader, Writer, BufferedWriter, FileWriter, PrintWriter, Serialization and de serialization	3	9%	Java Programming Cookbook By Schildt, TMH, 7 th Ed.

Semester – II			
Subject Code	Subject Title	Internal	External
205	TECHNICAL HELP DESK	70	
<p>Objective : Candidates can expect to gain knowledge and understanding in the following upon successful completion of the education</p> <ul style="list-style-type: none"> • Service Management as a practice (Comprehension) • Service Lifecycle (Comprehension) • Key Principles and Models (Comprehension) • Generic Concepts (Awareness) • Selected Processes (Awareness) • Selected Roles (Awareness) • Selected Functions (Awareness) • Technology and Architecture (Awareness) • ITIL Qualification scheme (Awareness). 			

Sr. No	Chapter Details	Nos. of Sessions	%	Reference Books
1.	Service Strategy Describe basics of Value Creation through Services	2	7%	1 to 7

2.	<p>Service Design</p> <p>04-3. Understand the importance of People, Processes, Products and Partners for Service Management</p> <p>04-4. Discuss the five major aspects of Service Design:</p> <p>Service Portfolio Design</p> <p>Identification of Business Requirements, definition of Service Requirements and design of Services</p> <p>Technology and architectural design</p> <p>Process design</p> <p>Measurement design</p>	4	12%	1 to 7
3.	<p>Continual Service Improvement</p> <p>04-8. Discuss the Plan, Do, Check and Act (PDCA) Model to control and manage quality</p> <p>04-9. Explain the Continual Service Improvement Model</p> <p>04-10. Understand the role of measurement for Continual Service Improvement and explain the following key elements:</p> <p>The role of KPIs in the Improvement Process</p> <p>Baselines</p> <p>Types of metrics (technology metrics, process metrics, service metrics)</p> <p>Processes</p> <p>The purpose of this unit is to help the candidate understand how the Service Management processes contribute to the Service Lifecycle, to explain the high level objectives, scope, basic concepts, activities and challenges for five of the core processes and to state the objectives and some of the basic concepts for thirteen of the remaining processes including how they relate to each other.</p> <p>The list of activities to be included from each process is the minimum required and should not be taken as an exhaustive list.</p>	2	12%	2,3
4.	<p>Service Strategy</p> <p>05-1. State the objectives and basic concepts for:</p> <ul style="list-style-type: none"> • Demand Management <p>Challenges in managing demand for services</p> <p>Activity-based Demand Management (Patterns of business activity (PBAs))</p> <p>Business activity patterns and user profiles (User profiles)</p> <ul style="list-style-type: none"> • Financial Management <p>Business Case</p>	4	10%	2,3,4
5.	<p>Service Design</p> <p>Explain the high level objectives, scope, basic concepts, process activities, key metrics (KPI's), roles and challenges for:</p> <p>Service Level Management (SLM)</p> <p>Service-based</p> <p>SLA Multi-level SLAs</p> <p>Service level requirements (SLRs)</p> <p>SLAM chart</p> <p>Service review</p>	6	12%	1

	<p>Service improvement plan (SIP)</p> <p>. State the objectives, basic concepts and roles for:</p> <ul style="list-style-type: none"> • Service Catalogue Management • Availability Management <p>Service availability Component availability Reliability Maintainability Serviceability</p> <ul style="list-style-type: none"> • Information Security Management (ISM) <p>Security framework Information security policy Information security management system (ISMS)</p> <ul style="list-style-type: none"> • Supplier Management <p>Supplier Contract Database (SCD) Capacity Management Capacity plan Business capacity management Service capacity management Component capacity management IT Service Continuity Management Business Continuity Plans Business Continuity Management Business Impact Analysis Risk Analysis</p>			
6.	<p>Service Transition</p> <p>Explain the high level objectives, scope, basic concepts, process activities, key metrics, roles and challenges for:</p> <p>Change Management Types of change request Change process models and workflows (big table) Standard change Remediation Planning Change Advisory Board / Emergency Change Advisory Board Service Asset and Configuration Management (SACM) The Configuration Model Configuration items Configuration Management System (CMS) Definitive Media Library Configuration baseline</p> <p>05-6. State the objectives and basic concepts for: 05-61 Release and Deployment Management 05-62 Knowledge Management DIKW & SKMS</p>	6	12%	1
7.	<p>Service Operation</p> <p>05-7. Explain the high level objectives, scope, basic concepts, process activities, metrics, roles and challenges for: Incident Management</p>	8	10%	1 to 71 to 7

	<p>Problem Management</p> <p>05-8. State the objectives, basic concepts and roles for:</p> <ul style="list-style-type: none"> • Event Management • Request Fulfillment • Access Management 			
8	<p>Functions</p> <p>The purpose of this unit is to help the candidate to explain the role, objectives, organizational structures, staffing and metrics of the Service Desk function and to state the role, objectives and overlap of three other functions.</p> <p>Specifically, candidates must be able to:</p> <p>06-1. Explain the role, objectives, organizational structures, staffing and metrics of:</p> <ul style="list-style-type: none"> • The Service Desk function <p>06-2. State the role, objectives and organizational overlap of:</p> <ul style="list-style-type: none"> • The Technical Management function • The Application Management function • The IT Operations Management function (IT Operations Control and Facilities Management) 	4	10%	1 to 7
9	<p>Roles</p> <p>The purpose of this unit is to help the candidate to account for the role and to be aware of the responsibilities of some of the key roles in Service Management.</p> <p>Specifically, candidates must be able to:</p> <p>07-1. Account for the role and the responsibilities of the</p> <ul style="list-style-type: none"> • Process owner • Service owner <p>07-2. Recognize the RACI model and explain its role in determining organizational structure</p>	2	5%	1 to 7
10	<p>Technology and Architecture</p> <p>The purpose of this unit is to help the candidate to:</p> <p>08-2. Understand how Service Automation assists with integrating Service Management processes</p>	2	10%	1 to 7

Reference books:

1. Service Strategy :ITIL Service Strategy defines the strategic management approach to IT service management (ITSM).
2. ITIL V3 Foundation Handbook
3. Pocketbook from the Official Publisher of ITIL - Pack of 10
4. Read itSMF's An Introductory Overview of ITIL® V3. Free
5. Van Haren: Passing the ITIL Foundation Exam: 2011 Edition.
6. Art of Service book-and-training for ITIL 2011 seems to sell a lot on Amazon.
7. ITIL Lifecycle Suite 2011 Edition.

Semester – II			
Subject Code	Subject Title	Internal	External
206	Practical (Java & Oracle)	100	
Objective : To get assignments solved based on Java and Advanced RDBMS using Oracle			

Semester – II			
Subject Code	Subject Title	Internal	External
207	Soft Skills Practical - Group Discussion	30	

Semester – III			
Subject Code	Subject Title	Internal	External
301	INFORMATION SECURITY AND AUDIT	30	70
Objective: To create awareness about the values of Information and how the Information security practices are meticulously implemented in IT companies worldwide.			

Sr.No	Chapter Details	Nos. of Sessions	%	Reference Books
1	Global information systems and their evolution, basics of information systems, role of the Internet and the World Wide Web	5	10	1.10
2	Understanding about the threats to information systems security Building blocks of InfoSec, How Organizations manage security of their information systems	5	10	1.10
3	Information security risk analysis fundamentals Importance of physical security and biometrics controls for protecting information systems assets	4	10	1.10
4	Security considerations for the mobile work force	2	5	1.10
5	Network security perspectives, networking and digital communications (overview only), security of wireless networks.	4	10	1.10
6	Cryptographic techniques and Encryption, Intrusion Detection Systems and Firewalls, security of virtual private networks	3	8	1.10
7	Security issues in application development with emphasis on integration of enterprise applications, database security, operating security and security of electronic mailing systems	3	8	1.10
8	Security models and frameworks and standards through introduction to the ISO 27001, SSE-CMM (systems security engineering - capability maturity model), COBIT (Control Objectives for Information and related technologies) and the Sarbanes-Oxley Act (SOX) and SAS 70 (statement on auditing standards)	5	15	1,4,10
9	Privacy Fundamentals, business practices' impact on data privacy, technological impact on data privacy, privacy issues in web services and applications based on web services	3	8	3,10
10	Information security best practices - staffing, audits, disaster recovery planning and business continuity planning and asset Management	3	8	5,10
11	Ethical issues and intellectual property concerns for information security professionals - copy right, data protection etc. matters	3	8	6,10

Reference Books:

1. Information security policies, procedures and standards by Thomas Pettier.
2. Information security Management Hand book- 5th Edition-HAROLD F. TIPTON

3. Computer security by Alfred Basta, Wolf Halton
4. Information security policies- Thomas R.Peltier, Peltier R. Peltier
5. Electronic Signature law by L Padmavathi
6. Network Security by Ankit Fadia
7. Security Plus study guide by Michael Cross, Norrris Johnson
8. Information systems control and Audit by Ron Weber, Pearson Pub.
9. IS control journals from ISACA
10. Information Systems Security: Security Management, Metrics, Frameworks And Best Practices (With Cd) : Nina Gobole
11. Information Security policies made easy version 10: Charles Cresson Wood

Reference websites:

12. www.searchsecurity.techtarget.com
13. www.secure-byte.com
14. www.security-internal-audit.com
15. www.ngssecure.com/services
16. www.pcisecuritystandards.org

Semester – III			
Subject Code	Subject Title	Internal	External
302NT	Basics of Network Technologies	30	70
Objectives : Students will be able to learn networking concepts with practical as well as theoretical concepts after studying this subject			

SR. No.	Chapter details	No. of sessions	%	Reference Books
1	Basic Theory Types of Networks Peer-Peer Networks Client/Server Networks Host Terminal Network Wireless Network Wi-Fi Network Virtual Private Network Internet Intranet	2	7.5	1,2,3
2	Protocols Network Protocols TCP/IP (IP4 & IP6) SPX/IPX NETBEUI Tunneling Protocols PPTP, L2TP,IP,SEC Application Protocols FTP,TELNET,HTTP,HTTPS Mail Protocols SMTP,POP,IMAP Frame Formats & Standards Ethernet 802.2,802.3 Wireless 802.11a,802.11g	6	15	1,2,4

3	Network Components Connectivity Components Connectors RG45, Cables CAT 5, CAT 5E, CAT 6 Ethernet Cards, HUBS, Switches, Routers Modems Dial-up Modem , ISDN Modem DSL(Cable) Modem Using Ethernet Card for Accessing Internet	4	10	1,2,4
4	Topologies (Bus, Star, Ring and Wireless loop)	1		1,2,3

<p>5</p>	<p>Microsoft Network Technology a. Features of Microsoft Windows Server 2003 Server Roles File and print server Web server and Mail server Web application services Terminal server Remote access and virtual private network(VPN) server Directory services, Domain Name system(DNS), Dynamic Host Configuration Protocol(DHCP) server, and Windows Internet Naming Service(WINS) b. Services Clustering Services Network load Balancing Security Common Language Runtime Internet Information Services(IIS 6.0) File and Print Services Active Directory Microsoft Software Update Services Storage Management Terminal Service Enterprise UDDI service Windows Media Services Microsoft .NET Framework Automated Deployment Service Windows Rights Management Service(RMS) Windows SharePoint Service c. Features of various types of Servers Standard Server Enterprise Server Data Center Server Web Server Small Business Server d. Installation Installing 2003 Server Server Application Installation Installing and Configuring terminal Server Remote Installation Services Implementing Active Directory and domain Implementing Group Policy Implementing Web services using IS Implementing Remote Access Services RADIUS Server Implementing Windows 2003 VPN Configuring Printer Configuring Backup Adding users to groups Configuring Firewall Configuring DHCP Server Building small office and home network using WIN XP and WIN 2000 Installing .NET Frame on Clients</p>	<p>17</p>	<p>35</p>	<p>5,6</p>
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6	<p>LINUX Network Technology</p> <p>a. Concepts Linux File System and structure Default directories Network services http,https,ftp,nfs,BOOTP,DHCP</p> <p>b. Basic commands User Management File Management Process Management Printer and Device Management Network Management Package Management</p> <p>c. Installation Installing Linux server from CDs Installation Types Installation Class Preparing Partitions Selecting Packages Creating Boot Disk Installing from Network Installation Server Selecting Installation source Configuring x-windows Configuring apache web server Configuring DHCP server Configuring firewalls Installing and configuring packages Preparing Remote boot thin client for Linux(pxes) (for Linux RedHat Fedora 3 is to be used)</p>	10	32.5	7,8
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Books:

1. Introduction to Networking Richard McMohan Tata McGraw Hill Publication
2. Computer Network Fundamentals and application - R S Rajesh Vikas Publication
3. Computer Networks by J S Katre
4. The complete Reference – Networking by Craig Zacker, TMH.
5. Unleashed Windows 2003 Server - Todd Brown & Chris Miller Techmedia, SAMS Publication
6. Microsoft Windows 2000 Professional - Paul Cassel Techmedia SAMS Publication
7. The complete reference – Linux (6th Edition),TMH,6th Ed.
8. Fedora 3 Bible - Christopher Negus Wiley Publication

Websites: www.microsoft.com/windowsserver2003/
[www.technet.microsoft.com/hi-in/windowsserver/bb429524\(en-us\).aspx](http://www.technet.microsoft.com/hi-in/windowsserver/bb429524(en-us).aspx)
www.redhat.com
www.wikipedia.org

Other References: Help section of windows server 2003

Semester – III			
Subject Code	Subject Title	Internal	External
303NT	Server & Desktop Technologies	30	70
Objective: We aim to introduce the hardware components and their internal architecture. It also aims at teaching students about how to assemble a PC or Server machine and carryout basic trouble shooting. It also gives and insight about the contemporary desktop OS like Windows xp and Windows 7 and their installation and administration.			

Sr. No	Chapter Details	No of Sessions	%	Reference Books
1	Introduction to Computers Hardware RAMS-SDRAM,DDR1,DDR2, etc BIOS Mother boards SMPS Graphic adapter cards Ethernet cards USB, Serial and parallel ports Rack and Tower Servers	6	10	5
2	Booting problems and their rectification	4	10	3
3	CPU Organization CPU Building Blocks CPU Registers and BUS Characteristics Registers & System Bus Characteristics. Interface Basics (Only Block Diagram) + Local Bus features & Types should be covered. Addressing Modes Interrupts: Concepts and types Instruction and Execution Interrupt cycle Hardwired and Micro Program control RISC and CISC Pipelining – Data Path, Time Space Diagram, Hazards. Instruction + Arithmetic Pipelining + RISC Pipelining	7	15	2,3,4
4	Processor Architecture Components of Microprocessor, I/O Ports 16-Bit (80286) Architecture 32-Bit (80486) Architecture Super scalar Architecture in Pentium Processors 64-Bit (Pentium Dual-Core) Architecture	6	15	6
5	Introduction to Windows XP Installing Windows XP Professional Edn. User management Disk management-Basic and dynamic disks, Disk	6	15	1

	backup and restore Recovery Console Repairing windows xp Partition types Hardware and driver installation Software installation TCP/IP based network installation Installing autoupdates and Service packs Security policies User profile management: Roaming and mandatory			
6	Introduction to Windows 7 operating System Upgrading from windows xp to Windows 7 Windows 7 clean install Partition types Hardware and driver installation Network installation Configuring wi-fi and Bluetooth	5	15	7
7	Introduction to Printers Types of printers Parts to printers Installing and troubleshooting printers	2	10	5
8	Drives – HDD,FDD,CD,DVD, Removable drives, Pen Drives, Wireless devices, Fault finding devices Other software’s – Antivirus, Diagnostic tools, Data Recovery tools	4	10	5

Reference books:

1. MCSA/MCSE Self-Paced Training Kit (Exam 70-270): Installing, Configuring, and Administering Microsoft® Windows® XP Professional
2. Intel Micro Processors Barry Brey Pearson’s Pub,6th ed.
3. Computer Organization & Architecture Carpinell, Pearson pub.
4. An Introduction to Intel Family of Processors -James Antonolcos, Pearson Pub.

Websites:

1. www.intel.com
2. en.wikipedia.org
3. www.pcguides.com
4. www.netlib.org

Semester – III			
Subject Code	Subject Title	Internal	External
304NT	System Administration & Server Integration	30	70
Objective: To enlighten students about the various server operating systems and its administration			

Sr. No	Chapter Details	No. of Sessions	%	Reference Books
1.	Introduction Distributed Operating System Difference Between Distributed & Centralized OS Advantages of Distributed OS Types of Distributed OS NOS Architecture	2	5	1,2,3
2.	Introduction to different Server Roles: DHCP, DNS, Application Server, File and printer Server, WINS, VPN	2	5	5,6,8
3.	Windows 2003 Server Installation of Windows 2003	2	10	5,8
4.	Windows 2003 Active Directory Installation of Active directory, Concept of Domains, Structure of Active Directory, Group policies, User Group management, User Management	4	20	5,8
5.	Windows 2003 Server Roles Installation of DNS Server Installation of DHCP Server Installation of Terminal Server Installation of VPN server Installation of IIS Server (including Web Services) Configuring Windows Firewall Configuring WSUS Backup Management Installing .NET Frame on Clients	10	15	5,8
6.	Windows 2008 Server Features and functionality of Active Directory Domain Services. Manage users and service accounts. Manage groups. Manage computer accounts. Implement a Group Policy infrastructure. Secure administration. Configure Domain Name System. Administer AD DS domain controllers. Manage sites and Active Directory Replication.	8	10	9,10

6.	Introduction to Fedora Linux Introduction to Linux, partition types, Directory structure of Linux, Boot loaders, File Types Architecture of Linux (Kernel and Shell),	4	10	4
7.	Installation of Fedora Core OS Boot media types, Installation of Fedora (GUI and text based)	2	10	4
8.	Linux Server services DHCP server installation DNS server installation Samba server installation Group management User management File management Firewall installation Package management (yum, rpm, etc) Network configuration Apache server installation: default web site and virtual hosting x-windows system(including Gnome and KDE)	6	15	4

NOTE: Preferable to use Fedora Core 4 and above for practical of Linux

Reference Books :

1. Operating System: Achyut Godbole, TMH, 2nd Ed.
2. Operating System: Galvin, Wiley, 8th Ed
3. System Programming & OS: D.M. Dhamdhare, TMH, 2nd Ed.
4. The Complete Reference: Red Hat Enterprise Linux & Fedora Edition by Richard L. Petersen and Ibrahim Haddad, Wiley Pub.
5. MCSE 4-in-1 study system - dreamtech
6. Introduction to Networking Recharad McMohan Tata McGraw Hill Publication
7. Computer Network Fundamentals and application - R S Rajesh Vikas Publication
8. Unleashed Windows 2003 Server - Todd Brown & Chris Miller Techmedia SAMS Publication
9. Microsoft Windows 2008 - BPB publication
10. Microsoft Windows Server 2008 Administration in Simple Steps- Steve Seguis - Dreamtech Publication

Websites : www.microsoft.com/server/2003/

<http://fedoraproject.org/>

Semester III			
Subject Code	Subject Title	Internal	External
305	Web Designing & Content Management	70	
Objective: This course enables students to understand web page site planning, content management and maintenance. The course also explains the concepts of developing basic and advanced HTML, HTML5 pages with the help of Content Management System tools.			

Sr. No	Chapter Details	No. of Sessions	%	References
1	HTML Introduction To HTML, WWW, W3C, Common HTML Tags and attributes, Ordered & Unordered Lists, Inserting image Links – Text and image links, Tables, Frames Forms - Introduction with text box, text area, buttons, List box, radio, checkbox etc.	4	10	1,3,9,12
2	HTML5 HTML5 – Introduction, features, elements & attributes in HTML5, <canvas>, <video>, <audio>. Introduction to Scalable Vector Graphics (SVG), Geolocation, Form input types, HTML5 web storage - Intorduction of HTML5 Web workers	8	20	1,3,9,12
3	CSS Introduction to Style Sheet, types of style Sheets - Inline, External, Embedded CSS. Text formatting properties, CSS Border, margin properties, Positioning. Use of classes in CSS, color properties, use of <div> & 	4	10	1,3,9,12
4	JavaScript Intro to script, types, intro of JavaScript, JavaScript identifiers, operators, control & looping structure, Intro of Array, Array with methods, Math, String, Date Objects with methods. User defined & Predefined functions, DOM objects, Window Navigator, History, Location, Event handling, Validations on Forms	6	15	2,3,12

Sr. No	Chapter Details	No. of Sessions	%	References
6	Content Management Systems (CMS) Introduction to CMS – Setting site goals; Identifying target audiences, Wireframing and planning site function and flow.	1	5	1,3
7	Wordpress & JOOMLA Introduction to web CMS – Wordpress, Understanding the differences between Wordpress.com sites and Wordpress.org sites, Setting up and installing a Wordpress site, Finding and adding templates to a new site, Customize site features, Overview of administrative functions, Adding extra functionality of Wordpress blogs, Promoting new blog sites Introduction, features & benefits to JOOMLA Installation of JOOMLA.	8	20	10,11
8	Applications of CMS Design and creation of one content management based site.	5	10	10,11,13,14

References:

Books:

1. Complete reference HTML & CSS, 5th Edition, Thomas A Powell, Tata McGraw Hill.
2. JavaScript Bible
3. HTML, DHTML, JavaScript, Perl & CGI by Ivan Bayross
4. Internet Technology at work by Hofstetter Fred
5. Beginning XML, Wrox Press
6. XML how to Program by Deitel & Deitel.
7. Programming the World Wide Web by Robert W. Sebesta
8. Web enabled Commercial Application Development using HTML, DHTML
9. HTML 5 For iOS and Andriod by Robin Nixon –Tata McGraw Hill
10. Professional WordPress: Design and Development by Brad Williams, David Damstra, Hal Stern
11. Joomla Explained your step by step guide by Stephen Burge

Websites:

12. www.w3schools.com
13. www.wordpress.com
14. www.joomla.org

Semester – III			
Subject Code	Subject Title	Internal	External
302ST	Software Quality Assurance	30	70
Objective : To enable student to learn Software Quality Assurance good practices with the help of various techniques, Strategies and tools.			

Sr.No	Name of topic	No of sessions	%	Reference books
1	Software project Management 1.1 Software projects 1.2 Project Life Cycle and stakeholders 1.3 Scope management, Time management, Risk Management	8	20	2,3,5
2	Software quality 2.1 Definition 2.2 Software errors, software faults and software failures 2.3 Software quality assurance – definition and objectives 2.4 Software quality assurance vs. software quality control 2.5 The objectives of SQA activities	4	15	1,2,3,4
3	Pre-project SQA Components 3.1 Contract Review 3.2 Development and Quality Plan	4	10	1
4	SQA components in Project life cycle activities assessment. 4.1 Verification and Validation 4.2 Various types of Reviews 4.3 Inspections 4.4 Walkthrough 4.5 Software testing 4.6 Impact of CASE Tools	4	10	1
5	SQA Infrastructure Components 5.1 Procedures and procedure manuals 5.2 Templates and Checklists 5.3 Staff training 5.4 Corrective and preventive actions 5.5 Documentation control	6	12	1
6	Software Quality Factors 6.1 McCall's Quality Model 6.2 Product, Process quality metrics	3	8	1,2,3,4

7	Standardization 7.1 ISO 9001 and ISO 9000-3 7.2 SEI-CMM, 7.3 IEEE 1012 standard 7.4 ISO/IEC 12207 standard.	7	15	1,2,3,4
8	Configuration Management 8.1 Change control 8.2 Release and version control 8.3 Software configuration management audit	4	10	2,3

Reference books

1. Software Quality Assurance from theory to implementation – Danial Galin
2. Software Project management - Edwin Bennatan
3. Software Engineering Roger S. Pressman, TMH, 7th Ed.
4. Software Quality Assurance : Principles and Practices Nina Godbole,
5. Project Management Body of Knowledge – PMI
6. www.softwarecertifications.org

Semester – III			
Subject Code	Subject Title	Internal	External
303ST	Software Testing Processes and Documentation	30	70
Objective : To enable student to learn Software Testing processes with the help of various software testing techniques, Strategies, tools and technologies			

Sr.No	Chapter Details	No of sessions	%	Reference books
1	Software Testing Principle Defects – Process defects, design defects, data defects Reducing the frequency of defects in software development Factors affecting software testing Testing constraints Life cycle testing Tester’s workbench	6	15	1,3,4,5
2.	Levels of testing Verification and Validation Functional and structural testing Static and dynamic testing V Concept of testing with testing stages	4	12	1,2,3
3	Testing Process and Techniques Software testing process Structural testing techniques Functional testing techniques White box and black box testing Incremental testing Thread testing Requirement tracing	10	25	1,2,3,4,5
4	Building Test Environment Managements support Test work processes Test Tools	06	15	1,5
5	Testing software developed by contractor Challenges in testing acquitted software COTS Software Test Process Contracted software test process	04	8	1,4,5
6	Testing Software Controls Principles and concepts of Internal controls Internal control models Testing of internal controls	04	10	1,4,5
7	Testing Security Controls Building a Penetration Point Matrix Creation of security awareness policy, strategy Technique to test security	02	5	1,4,5

8	Testing new Technologies Testing Web Based , distributed Applications Testing Wireless Technologies 8.3 Testing e-Commerce application	04	10	1,4,5
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Reference Books

- 1 CSTE Common Body of Knowledge (www.softwarecertifications.org)
- 2 Software Engineering , R. Pressmen, TMH, 7th Ed.
- 3 Software Engineering, Sommerville, Pearson, 8th Ed.
- 4 Introducing Software Testing Louise Tamres
- 5 Effective Methods for software Testing William Perry
- 6 Software Testing in Real World Edward Kit
7. Software Testing Techniques, Boris Beizer, dreamTech pub, 2nd Ed.

Semester – III			
Subject Code	Subject Title	Internal	External
304ST	Software Test Planning and Documentation	30	70
Objective : Explain test plan formats, risk management in testing, defect management and test report generation tools, case studies.			

So	Name of topic	No of sessions	%	Reference books
1	Pre requisites of Test Planning Risk associated with software development Risk associated with software testing Risk Analysis Risk Management	5	12	1,2,3
2	Preparation of Test Plan 2.1 Test Objectives, acceptance criteria 2.2 Assumptions 2.3 Constraints 2.4 Characteristics of software being developed 2.5 Develop test Matrix 2.6 Define Test Administration 2.7 Test Plan standards	8	22	1,4,5,6
3	Test Case Design 3.1 Functional test cases 3.2 Structural test cases 3.3 Erroneous test cases 3.4 Stress test cases 3.5 Test Script	7	20	1,2,3,4

	3.6 Use Cases			
4	Perform tests and recording 4.1 Use of tools in testing 4.2 perform Unit test 4.3 Perform Integration test 4.4 Perform System Test	5	10	1
5	Defect Management	3	8	,5,6
6	Tools used to prepare test report 6.1 Pareto Charts and voting 6.2 Cause and Effect Diagrams 6.3 Check sheet 6.4 Histogram 6.5 Run charts, control charts 6.6 Scatter Plot diagram 6.7 Regression analysis and Multivariate analysis 6.8 benchmarking and QFD	4	12	1,4,5,6,7
7	Test Result Reporting Current status test reports Final Test reports	4	8	1,4,5,6,7
8	User Acceptance Testing 8.1 User's Role and tester's role 8.2 Acceptance test plan and execution	3	5	1,2,3,4,5
9	Introduction to TMM	1	3	1

Reference Books

1. CSTE Common Body of Knowledge (www.softwarecertifications.org)
2. Software Engineering , 6th Edition R. Pressmen, ,TMH,7th Ed
3. Software Engineering Sommerville. 8th Ed.
4. Introducing Software Testing Louise Tamres
5. Effective Methods for software Testing William Perry
6. Software Testing in Real World Edward Kit
7. Software Testing Techniques Boris Beizer

Semester – III			
Subject Code	Subject Title	Internal	External
302SD	ASP.NET using C#	30	70
Objectives : To understand the DOTNET framework, C# language features and Web development using ASP.NET			

Sr. No.	Chapter Details	No. of Sessions	%	Reference Books
1	Introduction to C# a. Language features i. Variables and Expressions, type conversion ii. Flow Control iii. Functions, Delegates iv. Debugging and error handling, exception handling (System Defined and User Defined) b. Object Oriented Concepts i. Defining classes, class members, Interfaces, properties ii. Access modifiers, Implementation of class, interface and properties iii. Concept of hiding base class methods, Overriding iv. Event Handling c. Collections, Comparisons and Conversions i. Defining and using collections, Indexers, iterators ii. Type comparison, Value Comparison iii. Overloading Conversion operators, as operator	6	10	1,3,4,9
2	ASP.NET 3.5 .NET Framework , Types of Websites , Webpage Syntax, Solution Files, Intrinsic Objects in ASP.net	2	8	3,5,10,12
3	Web Forms: Standard Controls(i) Web Control Class Buttons, Text Boxes Labels Literals, Place Holders, Hidden Field Control, File Upload Control	2	7	3,5,10,12
4	Web Forms: - Standard Controls(ii) Image Controls, Image Buttons, Image Maps, List Boxes, Dropdown, Lists Bulleted Lists, Hyper Links Link Buttons Check Boxes Check Box Lists Radio Buttons ,Radio Button Lists , Tables Panels, View Multiview, Calender	3	6	3,5,10,12
5	Navigation Controls:- Tree View Control Menu Control SiteMapPath Control Wizard Control	2	2.5	3,10,12
6	Validation Controls:- Required Field Validators, Comparison Validators, Range Validators , Regular Expression Validators, Custom Validators Validation Summaries Validation Groups	2	6	3,5,10,12
7	ADO.NET (Working with Database) nnections , Executenonquery, Executescalar ,Executereader , DataAdapter, Dataset , GridView, DataList DetailsView FormView, Repeater SqlDataSource, AccessDataSource, ObjectDataSource XmlDataSource, SiteMapDataSource	6	18	4,5,7,11,12
8	LINQ LINQ Queries, Standard Query operators, LINQ to ADO.NET, Lambda Expressions	2	6	4,5,7,11,12

9	Login Controls: Login Control, Login View Control, LoginStatus Control, Login Name Control, Password Recovery Control, CreateUserWizard Control, ChangePassword Control	2	6	4,5,7,11,12
10	Master Pages & Themes Simple Master Page Nested Master Page Configuring Master Page Creating Themes Applying Themes, Applying Stylesheet	2	5	4,5,7,11,12
11	ASP.NET Web Services Creating Web Service, Declaring WebService, Setting the WebService Attribute Deploying the Web Service Simple Object Access Protocol	3	5	10,11,12
12	ASP.NET AJAX AJAX Server Controls, Creating AJAX Application, AJAX Control Toolkit	2	5	5,10,11,12
13	Exception Handling	1	2.5	5,10,11,12
14	Crystal Reports Creating Crystal Reports	2	5	5,10,11,12
15	XML Creating XML , Documents Read and Write XML Repeater	1	2.5	5,7,10,12
16	WPF,WCF & WWF Introduction, XAML Browser Application, Working with WPF Controls, Introduction to WCF Introduction to WWF	1	2,5	5,7,10,12
17	Deployment Deploy Windows Application, Deploying Website, Publishing Website	1	3	5,7,10,12

Recommended Text and Reference books:

1. Beginning Visual C#, Wrox Publication
2. Professional Visual C#, Wrox Publication
3. Inside C#, by Tom Archer ISBN: 0735612889 Microsoft Press Â© 2001, 403 pages
4. Beginning ASP.NET 3.5, Wrox Publication
5. Programming ASP.NET 3.5 by Jesse Liberty, Dan Maharry, Dan Hurwitz, O'Reilly
6. Illustrated C# 2008, Solis, Publication APRESS, ISBN 978-81-8128-958-2
7. Professional C# 4.0 and .NET 4by Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson,
8. Morgan Skinner, WROX
9. Beginning C# Object-Oriented Programming By Dan Clark , Apress Pub
10. ADO.NET Examples and Best Practices for C# Programmers, By Peter D. Blackburn Apress Pub.
11. Database Programming with C#, By Carsten Thomsen, Apress Pub.
12. Mastering ASP.Net - BPB Publication

Semester – III			
Subject Code	Subject Title	Internal	External
303SD	Mobile Programming using Android	30	70
Objective : This course introduces mobile application development for the Android platform. Students will learn skills for creating and deploying Android applications, with particular emphasis on software engineering topics including software architecture, software process, usability, and deployment.			

Sr.No.	Name of The Chapter	Nos. of Session	%	References
1	Introduction to Android <ul style="list-style-type: none"> • A little Background about mobile technologies • Android – An Open Platform for Mobile development • Android SDK Features • Android versions and features 	6	15	1,2,5
2	Tools for Development <ul style="list-style-type: none"> • Installing Android • First Android application • Running on Emulator • Android development Tools • Eclipse, IDEs and Tools 	2	5	1,3,4,7
3	Android Architecture and OOPS <ul style="list-style-type: none"> • Building Blocks of Android • Java Classes and Objects • Class Methods and Instances • Inheritance and Polymorphism in Java • Interface and Abstract class 	4	10	1,3,6
4	Android UI and Advance Java <ul style="list-style-type: none"> • Fundamental Android UI Design • Introducing Views • In Creating new Views • Introducing Layouts • Creating new Views • Using resources • Complex UI components • Building UI for performance • Using themes • Debugging Android Code 	8	20	1,6,7
5 Page # 56	Android Graphics and Multimedia <ul style="list-style-type: none"> • Basic Graphics • Input Handling • Playing Audio & Video 	6	15	1,3,7

	<ul style="list-style-type: none"> Recording Audio and Video Adding new media to media store Raw Audio Manipulation 			
6	Database and Content Providers <ul style="list-style-type: none"> Introducing Android Databases Introducing SQLite on Android SQLiteOpenHelper and creating a database Opening and closing a database Working with cursors Inserts, updates, and deletes Creating new content Provider Using Content providers Native Android Content provider 	8	20	1,3,5,7
7	Services, Broadcast Receivers, Preferences <ul style="list-style-type: none"> Overview of services in Android Implementing a Service Service lifecycle Bound versus unbound services Broadcast Receiver Life Cycle Introduction to Preference Types of Preference 	6	15	1,6,7
8	Live Project			

References:

1. **Professional Android 2 Application Development Paperback**

Author, Reto Meier, Wrox Publications

2. **Hello, Android** by Ed Burnette, SPD, 3rd Ed.

3. **Professional Android Application Development** by Reto Meier, Wiley India Pub.

4. <http://developer.android.com>

5. **Android In Action** By W. Frank Ableson, dreamTech Pub.

6. **ANDROID DEVELOPMENT FOR DUMMIES** by Android guru Donn Felker

7. **Programming Android** by Zigurd Mednieks, G. Blake Meike, Laird Dornin and Masumi Nakamura

Semester – III			
Subject Code	Subject Title	Internal	External
304SD	Advanced Java	30	70
Objective : student will be able to do socket programming, develop server side applications with database handling using servlets and JDBC, struts framework.			

Sr.No	Chapter Details	Nos. of Sessions	%	Reference Books
1	Networking Networking basics, Socket, port, Proxy servers, Internet addressing and URL, java.net -networking classes and interfaces, Implementing TCP/IP based Server and Client. Classes to be covered Socket, ServerSocket, IPAddress, URL connections; Programs on chatting 1-1 & 1-M (Threading)	5	15	Java All-In-One Desk Reference For Dummies By Doug Lowe Java 2 Programing Little Black Book By Alain Trottier
2	Introduction of JDBC Types of JDBC Drivers, Writing JDBC applications using select, insert, delete, update; Types of Statement objects (Statement, PreparedStatement and CallableStatement); ResultSet, ResultSetMetaData; Inserting and updating records, Connection Pooling.	5	15	Java Programming With Oracle Jdbc By Donald Bales Jdbc, Servlets, And Jsp Black Book, New Edition
3	Introduction of RMI Architecture (No programming is expected)	1	5	http://www.roseindia.net/ Java and network programming By Krishmurty
4	Introduction to Java Bean Rules for writing a Simple Bean	1	5	Enterprise Java Beans By Valesky
5	Java Naming Directory Interface concept JNDI Architecture,	1	5	Java Server Programming Java Ee5 Black Book, Platinum Ed By Kogent Solutions Inc
6	Introduction of Servlet	10	20	Developing Java

	Student should know how to configure TOMCAT; directory structure for a web Application; Servlet API Overview; Writing and running Simple Servlet. Servlet Life Cycle, GenericServlet and HttpServlet, ServletConfig & ServletContext; Writing servlet to Handle Get and Post Methods, Reading user request data; Writing thread safe servlets, Http Tunneling, Concept of cookie, Reading and writing cookies; Need of Session Management. Types of Session management; Using HttpSession Object ; Servlet & JDBC			Servlets James Goodwill. Techmedia Inside Servlets – Dustin R. Callway- Pearson Education O’Reilly Book on Servlet and JSP
7	JSP (Java Server Pages) Why JSP? JSP Directives, writing simple JSP page; Scripting Elements; JSP Actions: JSP & Java Beans; JSP Actions: include, forward and plugin, Managing sessions using JSP; JSP & Databases; Error Handling in JSP; Writing custom tags; JSTL - c, x, fn, sql, fn, Expression Language, Implicit objects - (request, response, pageContext, session, application), Comments; Java Beans and JSP; Different scopes in a JSP page; Using JDBC in JSP; Study and Development of a Web Application and an Assignment. Tags c:out, c:set, c:if, c:catch, c:choose, c:when, c:otherwise, c:redirect, c:forEach, fmt:parseDate, fn:escapeXml, sql:query, sql:update	10	20	JSP Professional Wrox Press Java Server Programming Volume I and II Wrox Press O’Reilly Book on Servlet and JSP Jdbc, Servlets, And Jsp Black Book, New Edition
8	Introduction to Struts (A Web Application Framework) - struts-config.xml; Understanding MVC architecture; ActionServlet, Action Form, Action Mapping, Action classes	3	5	Java Server Programming Black Book: 2007 Platinum Ed By Kogent Solutions Inc
9	Introduction of eclipse Overview Of eclipse Sample Program execution using eclipse	2	5	www.ibm.com Eclipse 2 For Java Developers By Berthold Daum
10	Introduction of hibernate Overview Of hibernate Hibernate Architecture	2	5	Professional Hibernate By Eric Pugh, Joseph D. Gradecki

	Understanding Hibernate <generator> element			
	Understanding Hibernate O/R Mapping			

Semester – III			
Subject Code	Subject Title	Internal	External
306	Specialization Practical And Mini project	100	
<p>Objective : To make practice of developing a good web application using the techniques students have learnt during the semester, a small project will be done by the student as an assignment.</p> <p>Students are expected to undertake domain analysis of various business domains and think in terms of analysis and development of information systems for them. Packages like tally needs to be studied in detail to understand accounting process of any standard organization.</p> <p>Students are expected to spend 6 hours per week. At the end of semester the students are expected to understand how Information Systems work.</p>			

Semester – III			
Subject Code	Subject Title	Internal	External
307	Soft Skills Practical – Technical Writing	30	
<p>Objective : To improve the vocabulary of English and comfort ability with business English. Use of language lab is also encouraged and lot of hearing practice, reading and understanding exposure should be given to the students.</p> <p>After completion of 1st year students can appear for Cambridge English exam.</p>			

Semester – IV			
Subject Code	Subject Title	Internal	External
401	Current Trends in IT	30	70
Objective : To make students aware with the changes in technologies, applications and systems around us.			

Sr. No	Topic Details	Nos. of Session	%	Reference Books
1	Social Networking: Definition, Overview of Social Networking Sites, Types of Social Networking Sites: General purpose, Niche Advantages of Social Networking Sites, Drawbacks of Social Networking Sites, Features And Need of Social Networking, Security Issues with Social Networking Sites, Examples	8	20	
2	Cloud Computing: Definition, Cloud Architecture, Cloud Storage, Cloud Types: The NIST Model, The Cloud Cube Model, Deployment Models, Service Models Cloud Computing Service Models: 1. Infrastructure as a Service(IaaS) 2.Platform as a Service(PaaS) 3. Software as a Service(SaaS) Benefits of Cloud Computing Disadvantages of Cloud Computing Cloud Security	8	20	2,6
3	Enterprise Content Management: ECM Introduction, Definition, Process, Types of Content, Examples Content Management System(CMS) Overview and examples, Electronic Document Management(EDM) : introduction, Need, Examples	6	20	5
4	e-Learning: Definition, Introduction, Types of e-Learning: 1.Learner-led e-Learning 2.facilitated e-Learning 3.Instructor-led e-Learning 4. Embedded e-Learning Telemonitoring And e-Coaching e-Learning Models: 1. WBT 2.CBT 3.LMS 4.LCMS	8	20	1

	5.Virtual School Systems e-Learning Tools And Technologies: E-Mail,Online Discussion, Chat and Instant Messaging,Voting,Whiteboard, Application Sharing,Conferencing, Online Meeting Tools Standards for e-Learning Case Study			
5	e/m-Commerce: e-Commerce definition, Models of e-Commerce, Electronic Payment Systems: Credit/Debit Cards, Smart Cards, Paypal, e-Billing,e-Micropayments Point Of Sales System(POS): Meaning, Uses m-Commerce: Overview of mobile-Commerce, Attributes of m-Commerce, Drivers of m-Commerce, m-Commerce Security issues, Mobile ATM(ICICI Bank Case Study) Applications of m-Commerce: 1.Mobile Financial Applications, m-wallet 2.Mobile Shopping 3.Advertising And Content provision Case-Study	10	20	3,4

References:

Sr. No.	Book	Author
1.	E-Learning Tools and Technologies	William Horton, Katherine Horton,Wiley Pub.
2.	Cloud Computing Bible	Barrie Sosinsky,Wiley India pub
3.	E-Commerce	C.S.V. Murthy,Himalaya Pub.
4.	E-World (Excel Publications)	Arpita Gopal and Chandrani Singh
5.	Electronic Commerce A Managerial Perspective	Efraim Turban, Pearson Pub.
6.	Decision Support Systems and Intelligent Systems	Efraim Turban, Jay Aronson, Pearson,7 th Ed
7.	Cloud computing	Michael Miller, Pearson Pub.
8.	Internet (Use of Search Engines Google & yahoo etc)	

Semester – IV			
Subject Code	Subject Title	Internal	External
402	Departmental Paper (Additional Input)	70	

Semester – IV			
Subject Code	Subject Title	Internal	External
404	Soft Skill Practical – Presentation & Interview skill	30	
<p>Assessment Guidelines for term-work assessment</p> <ol style="list-style-type: none"> 1. Written Communications <ul style="list-style-type: none"> - Students could submit for example - Personal resume, essay - Technical document or business document 2. Spoken communication <ul style="list-style-type: none"> - One elocution event of say 8-10 minutes individually - One group discussion or group presentation event 3. Overall participation in soft skills based lab activities <ul style="list-style-type: none"> - Attendance and enthusiasm - Participation and contribution in event management, organizing - Group games, group exercises, interpersonal skills observed - Quality of journal for soft skills laboratory indicating personal progress, participation. 4. Guidelines for batch wise Time management for laboratory sessions (Two hour session at a time) <ul style="list-style-type: none"> - Batches could be of size 25 to 30 students. - Written communication exercises could be done for whole batch at same time. (3 Sessions) <ul style="list-style-type: none"> - Spoken communications exercises can be done with around 10-15 students covered in one two hour slot so total need for exercises. (2 sessions) 5. Group discussions could be done for groups of 5-8 students at a time for half so total need for two group discussions for each student of the batch will be required. (2 sessions) 6. Sessions could be organized for trainers to give directions, knowledge, experience sharing or common viewing of training material on Video etc. (4 sessions) 7. Group exercises for team building, role playing and interaction with professional. (3 sessions) 			

Semester – IV			
Subject Code	Subject Title	Internal	External
403	Project	120	280

Semester – IV

Project Evaluation Phases Recommended				
Phase	Description	Internal	External	TimeLine
1	SRS Document	30	50	3rd Week
2	Design document	30	50	7th Week
3	Executable/User Interface	30	50	12th Week
4	Test plan and Documentation	30	50	16th Week
5	Project Viva/Presentation	80		20th Week

General Instruction Regarding Preparation of Project Report For MCM-II - SEM-IV

TYPING

1. The typing shall be standard 12 pts in double spaced using black ink only
2. Margins must be Left 2 inches Right 1.5 inches Top 2 inches Bottom 1.5 inches
3. Paper A4 size Bond Paper

COPIES

Two hard-bound copies

(Black Rexine with Golden Embossing as per format displayed herewith)

One original and one clean Xerox Copy.

FORMAT FOR TITLE PAGE AND FOR EMBOSSING

<p style="text-align: center;">PROJECT REPORT ON</p> <p style="text-align: center;">[NAME OF THE SYSTEM]</p> <p style="text-align: center;">[NAME OF THE COMPANY[</p> <p style="text-align: center;">BY</p> <p style="text-align: center;">[NAME OF STUDENT]</p> <p style="text-align: center;">UNIVERSITY OF PUNE</p> <p style="text-align: center;">MASTER IN COMPUTER MANAGEMENT</p> <p style="text-align: center;">[INSTITUTE Name]</p> <p style="text-align: center;">PUNE-4110..</p> <p style="text-align: center;">20012-2014</p>

The Guidelines regarding the documentation and scope of project are mentioned here below

MCM-II SEM-IV (COMMERCIAL SYSTEM PROJECTS)

Project Report should be submitted in following format for Commercial Application Projects viz. Payroll, Sales, Purchase, Inventory, Book Shop, Examination system etc. Where VB, Access, Oracle, ASP and Java is used.

2 Blank Pages at beginning Title Page

Certificate from Company

Certificate from Guide

Acknowledgement

Index with printed Page Numbers

CHAPTER 1 : INTRODUCTION

- 1.1 Company Profile
- 1.2 Existing System and Need for System
- 1.3 Scope of Work
- 1.4 Operating Environment - Hardware and Software

CHAPTER 2 : PROPOSED SYSTEM

- 2.1 Proposed System
- 2.2 Objectives of System
- 2.3 User Requirements

CHAPTER 3 : ANALYSIS & DESIGN

- 3.1 Data Flow Diagram (DFD)
- 3.2 Functional Decomposition Diagram (FDD)
- 3.3 Entity Relationship Diagram (ERD)
- 3.4 Data Dictionary
- 3.5 Table Design
- 3.6 Code Design
- 3.7 Menu Tree
- 3.8 Menu Screens
- 3.9 Input Screens
- 3.10 Report Formats
- 3.11 Test Procedures and Implementation

CHAPTER 4 : USER MANUAL

- 4.1 User Manual
- 4.2 Operations Manual / Menu Explanation
- 4.3 Forms and Report Specifications

Drawbacks and Limitations Proposed Enhancements Conclusion Bibliography ANNEXURES:

ANNEXURE 1 : INPUT FORMS WITH DATA

Project report should be submitted in following format for project using OOAD, Embedded System, WAP and other technologies and Web Deployed Systems where C, C++, J2EE, .NET, OOAD and JAVA, SDK's, API's are used.

***** TECHNICAL PROJECTS *******

2 Blank Pages at beginning Title Page

Certificate from Company

Certificate from Guide

Acknowledgement

Index with printed Page Numbers

CHAPTER 1 : INTRODUCTION

1.1 Company Profile

1.2 Existing System and Need for System

1.3 Scope of Work

1.4 Operating Environment - Hardware and Software

1.5 Detail Description of Technology Used

CHAPTER 2 : PROPOSED SYSTEM

2.1 Proposed System

2.2 Objectives of System

2.3 User Requirements

CHAPTER 3 : ANALYSIS & DESIGN

3.1 Object Diagram

3.2 Class Diagram

3.3 Use Case Diagrams

3.4 Module Hierarchy Diagram

3.5 Component Diagram

3.6 Deployment Diagram (in case of Web Deployment)

3.7 Module Specifications

3.8 Interface Diagram (in case of WAP and Embedded Systems)

3.9 Web Site Map Diagram (in case of Web Site)

3.10 User Interface Design (Screens etc.)

3.11 Table specifications (in case back end is a database)

3.12 Test Procedures and Implementation

CHAPTER 4 : USER MANUAL

4.1 User Manual

4.2 Operations Manual / Menu Explanation

4.3 Program Specifications / Flow Charts

Drawbacks and Limitations

Proposed Enhancements

Conclusion

Bibliography ANNEXURES:

ANNEXURE 1 : USER INTERFACE SCREENS

ANNEXURE 2 : OUTPUT REPORTS WITH DATA (if any)

ANNEXURE 3 : SAMPLE PROGRAM CODE (which will prove sufficient development is done by the student)

2 Blank Pages at the end.

Internal [30] Marks Breakup	
Unit Test Marks	5
Prelim Marks	5
Assignment	5
Presentations/Case-Study/Group Activity	10
Attendance	5
Total Marks	30