

ACADEMIC
REGULATIONS
&
SYLLABUS

Faculty of Computer Science and Applications

Master of Computer Applications Programme

Education Campus – Changa, (ECC), hitherto a conglomerate of institutes of professional education in Engineering, Pharmacy, Computer Applications, Management, Applied Sciences, Physiotherapy and Nursing, is one of the choicest destinations by students. It has been transformed into Charotar University of Science and Technology (CHARUSAT) through an Act by Government of Gujarat. CHARUSAT is permitted to grant degrees under Section-22 of UGC- Govt. of India.

The journey of CHARUSAT started in the year 2000, with only 240 Students, 4 Programmes, one Institute and an investment of about Rs. 3 Crores (INR 30 million). At present there are seven different institutes falling under ambit of six different faculties. The programmes offered by these faculties range from undergraduate (UG) to Ph.D degrees including M.Phil. These faculties, in all offer 23 different programmes. A quick glimpse in as under:

Faculty	Institute	Programmes Offered
Faculty of Technology & Engineering	Charotar Institute of Technology	B.Tech M.Tech Ph.D
Faculty of Pharmacy	Ramanbhai Patel College of Pharmacy	B.Pharm M.Pharm Ph.D
Faculty of Management Studies	Indukaka Ipcowala Institute of Management	M.B.A PGDM Ph.D
Faculty of Computer Applications	Smt. Chandaben Mohanbhai Patel Institute of Computer Applications.	M.C.A Ph.D
Faculty of Applied Sciences	P.D.Patel Institute of Applied Sciences	M.Sc M.Phil Ph.D
Faculty of Medical Sciences	Charotar Institute of Physiotherapy Charotar Institute of Nursing	B.PT B.Sc (Nursing)

The development and growth of the institutes have already led to an investment of over Rs.63 crores (INR 630 Million). The future outlay is planned with an estimate of Rs. 250 Crores (INR 2500 Million).

The University is characterized by state-of-the-art infrastructural facilities, innovative teaching methods and highly learned faculty members. The University Campus sprawls over 100 acres of land and is Wi-Fi enabled. It is also recognized as the Greenest Campus of Gujarat.

CHARUSAT is privileged to have 300 core faculty members, educated and trained in Stanford, IITs, IIMs and leading Indian Universities, and with long exposure to industry. It is also proud of its past students who are employed in prestigious national and multinational corporations.

From one college to the level of a forward-looking University, CHARUSAT has the vision of entering the club of premier Universities initially in the country and then globally. **High Moral Values like Honesty, Integrity and Transparency** which have been the foundation of ECC continue to anchor the functioning of CHARUSAT. Banking on the world class infrastructure and highly qualified and competent faculty, the University is expected to be catapulted into top 20 Universities in the coming five years. In order to align with the global requirements, the University has collaborated with internationally reputed organizations like Pennsylvania State University – USA, University at Alabama at Birmingham – USA, Northwick Park Institute –UK, ISRO, BARC, etc.

CHARUSAT has designed curricula for all its programmes in line with the current international practices and emerging requirements. Industrial Visits, Study Tours, Expert Lectures and Interactive IT enabled Teaching Practice form an integral part of the unique CHARUSAT pedagogy.

The programmes are credit-based and have continuous evaluation as an important feature. The pedagogy is student-centred, augurs well for self-learning and motivation for enquiry and research, and contains innumerable unique features like:

- Participatory and interactive discussion-based classes.
- Sessions by visiting faculty members drawn from leading academic institutions and industry.
- Regular weekly seminars.
- Distinguished lecture series.
- Practical, field-based projects and assignments.
- Summer training in leading organizations under faculty supervision in relevant programmes.
- Industrial tours and visits.
- Extensive use of technology for learning.
- Final Placement through campus interviews.

Exploration in the field of knowledge through research and development and comprehensive industrial linkages will be a hallmark of the University, which will mould the students for global assignments through technology-based knowledge and critical skills.

The evaluation of the student is based on grading system. A student has to pursue his/her programme with diligence for scoring a good Cumulative Grade Point Average (CGPA) and for succeeding in the chosen profession and life.

CHARUSAT welcomes you for a Bright Future



CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

Faculty of Computer Science and Applications

ACADEMIC REGULATIONS

Master of Computer Applications (M.C.A.) Programme

Charotar University of Science and Technology (CHARUSAT)
CHARUSAT Campus, At Post: Changa – 388421, Taluka: Petlad, District: Anand
Phone: 02697-247500, Fax: 02697-247100, Email: info@charusat.ac.in
www.charusat.ac.in

Year - 2012

CHARUSAT

FACULTY OF COMPUTER SCIENCE AND APPLICATIONS

ACADEMIC RULES

Master of Computer Applications (M.C.A.) Programme

To ensure uniform system of education, duration of post graduate programmes, eligibility criteria for and mode of admission, credit load requirement and its distribution between course and system of examination and other related aspects, following academic rules and regulations are recommended.

1. System of Education

The Semester system of education should be followed across the Charotar University of Science and Technology (CHARUSAT) at Master's levels. Each semester will be at least 90 working days duration. Every enrolled student will be required to take a specified load of course work in the chosen subject of specialization and also complete a project/dissertation if any.

2. Duration of Programme

(i)	Postgraduate programme	Master of Computer Applications (M.C.A.)
	Minimum	6 semesters (3 academic years)
	Maximum	10 semesters (5 academic years)

3. Eligibility & Mode of admissions

Eligibility of a candidate and mode of admission to the programme will be according to the regulations for admission committee decided by Government of Gujarat from time to time.

4. Programme structure and Credits

A student admitted to a program should study the course and earn credits specified in the course structure. Please refer Annexure-A

5. Attendance

- 5.1 All activities prescribed under these regulations and listed by the course faculty members in their respective course outlines are compulsory for all students pursuing the courses. No exemption will be given to any student from attendance except on account of serious personal illness or accident or family calamity that may genuinely prevent a student from attending a particular session or a few sessions. However, such unexpected absence from classes and other activities will be required to be condoned by the Dean/Principal.
- 5.2 Student attendance in a course should be 80%.

6 Course Evaluation

- 6.1 The performance of every student in each course will be evaluated as follows:
- 6.1.1 Internal evaluation by the course faculty member(s) based on continuous assessment, for 30% of the marks for the course; and
 - 6.1.2 Final examination by the University through written paper or practical test or oral test or presentation by the student or a combination of any two or more of these, for 70% of the marks for the course.

6.2 University Examination

- 6.2.1 The final examination by the University for 70% of the evaluation for the course will be through written paper or practical test or oral test or presentation by the student or a combination of any two or more of these.
- 6.2.2 In order to earn the credit in a course a student has to obtain grade other than FF.

6.3 Performance at Internal & University Examination

- 6.3.1 Minimum performance with respect to internal marks as well as university examination will be an important consideration for passing a course. Details of minimum percentage of marks to be obtained in the examinations (internal/external) are as follows

Minimum marks in University Exam per subject (Theory and Practical)	Minimum marks Overall per subject
40%	50%

- 6.3.2 If a candidate obtains minimum required marks per subject but fails to obtain minimum required overall marks, he/she has to repeat the university examination till the minimum required overall marks are obtained.(As per the clause 8.2(vii))

7 Grading

7.1 The total of the internal evaluation marks and final University examination marks in each course will be converted to a letter grade on a ten-point scale as per the following scheme:

Grading Scheme (PG)

Range of Marks (%)	≥80	≥75 <80	≥70 <75	≥65 <70	≥60 <65	≥55 <60	≥50 <55	<50
Letter Grade	AA	AB	BB	BC	CC	CD	DD	FF
Grade Point	10	9	8	7	6	5	4	0

7.2 The student's performance in any semester will be assessed by the Semester Grade Point Average (SGPA). Similarly, his performance at the end of two or more consecutive semesters will be denoted by the Cumulative Grade Point Average (CGPA). The SGPA and CGPA are defined as follows:

(i) $SGPA = \frac{\sum C_i G_i}{\sum C_i}$ where C_i is the number of credits of course i
 G_i is the Grade Point for the course i
and $i = 1$ to n , n = number of courses in the semester

(ii) $CGPA = \frac{\sum C_i G_i}{\sum C_i}$ where C_i is the number of credits of course i
 G_i is the Grade Point for the course i
and $i = 1$ to n , n = number of courses of all semesters up to which CGPA is computed.

(iii) No student will be allowed to move further if CGPA is less than 3 at the end of every academic year.

(iv) A student will not be allowed to move to third year if he/she has not cleared all the courses of first year.

(v) In addition to above, the student has to complete the required formalities as per the regulatory bodies.

8 Awards of Degree

8.1 Every student of the programme who fulfils the following criteria will be eligible for the award of the degree:

8.1.1 He should have earned at least minimum required credits as prescribed in course structure; and

8.1.2 He should have cleared all evaluation components in every course; and

8.1.3 He should have secured a minimum CGPA of 5.0 at the end of the programme;

8.2 The student who fails to satisfy minimum requirement of CGPA will be allowed to improve the grades so as to secure a minimum CGPA for the award of degree. Only latest grade will be considered.

9 Award of Class:

The class awarded to a student in the programme is decided by the final CGPA as per the following scheme:

Distinction:	CGPA \geq 7.5
First class:	CGPA \geq 6.0
Second Class:	CGPA \geq 5.0

10 Transcript:

The transcript issued to the student at the time of leaving the University will contain a consolidated record of all the courses taken, credits earned, grades obtained, SGPA, CGPA, class obtained, etc.

Faculty of Computer Science and Application

Teaching and Examination Scheme (MCA Program)

SEMESTER-I

Course	Course Title	Teaching Scheme				Examination Scheme						Total
		Contact Hours			Credit	Theory			Practical			
		Theory	Pract	Total		Internal		Exter nal	Internal		Exter nal	
						Case Study	Tests		Term work	Tests		
CA701	Fundamentals of Programming	4	3	7	6	10	20	70	15	15	70	200
CA702	Fundamentals of Computer System Organization	4	-	4	4	10	20	70	-	-	-	100
CA703	Fundamentals of Operating Systems and Scripting	4	3	7	6	10	20	70	15	15	70	200
CA704	Software tools	2	3	5	4	-	20	30	15	15	70	150
MA701/ FI701	Foundations of Mathematics / Fundamentals of Commerce	4	-	4	4	10	20	70	-	-	-	100
CS701	Functional English and Communication skills	4	-	4	4	10	20	70	-	-	-	100
	Seminar *	-	2	2	1	-	-	-	-	-	-	-
	Remedial Session / Quizzes / Case Study Preparation **	-	3	3	1	-	-	-	-	-	-	-
Total		22	14	36	30	550			300			850

SEMESTER-II

Course	Course Title	Teaching Scheme				Examination Scheme						
		Contact Hours			Credit	Theory			Practical			Total
		Theory	Pract	Total		Internal		Exter nal	Internal		Exter nal	
						Case Study	Tests		Term work	Tests		
CA705	Advanced Programming and Data Structure	4	3	7	6	10	20	70	15	15	70	200
CA706	Object Oriented concepts and Programming in JAVA (JSE)	4	3	7	6	10	20	70	15	15	70	200
CA707	Relational Database Management System-I	4	3	7	6	10	20	70	15	15	70	200
CA708	Computer based Management Systems	4	-	4	4	10	20	70	-	-	-	100
MA702	Computer Oriented Numerical and Statistical Methods	4	3	7	6	10	20	70	15	15	70	200
	Seminar *	-	2	2	1	-	-	-	-	-	-	-
	Remedial Session / Quizzes / Case Study Preparation **	-	2	2	1	-	-	-	-	-	-	-
Total		20	16	36	30	500			400			900

SEMESTER-III

Course	Course Title	Teaching Scheme				Examination Scheme						
		Contact Hours			Credit	Theory			Practical			Total
		Theory	Pract	Total		Internal		Exter nal	Internal		Exter nal	
						Case Study	Tests		Term work	Tests		
CA801	Enterprise Computing through JAVA (JEE)	4	3	7	6	10	20	70	15	15	70	200
CA802	Relational Database Management System - II	4	3	7	6	10	20	70	15	15	70	200
CA803	Advanced Operating Systems	4	3	7	6	10	20	70	15	15	70	200
CA804	Object Oriented System Analysis and Design	4	-	4	4	10	20	70	-	-	-	100
CA805	Data Communication and Networks	4	-	4	4	10	20	70	-	-	-	100
CS801	Technical Writing And Content Management & Soft skill	4	-	4	4	10	20	70	-	-	-	100
	Seminar *	-	2	2	1	-	-	-	-	-	-	-
	Remedial Session / Quizzes / Case Study Preparation **	-	1	1	1	-	-	-	-	-	-	-
Total		24	12	36	32	600			300			900

SEMESTER-IV

Course	Course Title	Teaching Scheme				Credit	Examination Scheme						
		Contact Hours			Total		Theory			Practical			Total
		Theory	Pract	Total			Internal		Exter nal	Internal		Exter nal	
							Case Study	Tests		Term work	Tests		
CA806	Software Engineering	4	-	4	4	10	20	70	-	-	-	100	
CA807	Network Technologies	4	3	7	6	10	20	70	15	15	70	200	
CA808	Object Relational Mapping	4	3	7	6	10	20	70	15	15	70	200	
CA809	Business Process Modeling	4	3	7	6	10	20	70	15	15	70	200	
CA810 – 813	Elective-I #	4	3	7	6	10	20	70	15	15	70	200	
	Seminar *	-	2	2	1	-	-	-	-	-	-	-	
	Remedial Session / Quizzes / Case Study Preparation **	-	2	2	1	-	-	-	-	-	-	-	
Total		20	16	36	30	500			400			900	

Elective – I CA810: Embedded System & JME
CA812: Frame works and Applications

CA811: Data Warehousing and Mining
CA813: Open Source Software Solutions.

SEMESTER-V

Course	Course Title	Teaching Scheme				Examination Scheme						
		Contact Hours			Credit	Theory			Practical			Total
		Theory	Pract	Total		Internal		Exter nal	Internal		Exter nal	
						Case Study	Tests		Term work	Tests		
CA901	Enterprise Computing through .NET Frameworks	4	3	7	6	10	20	70	15	15	70	200
CA902	Web Technologies and Applications	4	3	7	6	10	20	70	15	15	70	200
CA903	Web Designing	4	3	7	6	10	20	70	15	15	70	200
CA904	Mini Project	-	4	4	2	-	-	-	15	15	70	100
CA905 - 908	Elective-II #	4	3	7	6	10	20	70	15	15	70	200
	Seminar *	-	2	2	1	-	-	-	-	-	-	-
	Remedial Session / Quizzes / Case Study Preparation **	-	2	2	1	-	-	-	-	-	-	-
Total		16	20	36	28	400			500			900

Elective – II

CA905: Gaming Applications
CA907: Windows Communications Foundation Framework

CA906: On-line Analytical Processing (OLAP)
CA908: Design Patterns and Component Reusability

SEMESTER-VI

Course	Course Title	Teaching Scheme			Credit	Internal	End Semester Examination		Total
		Contact Hours				Continuous Evaluation	Report	Presentation & Viva	
		Inst.	Industry	Total					
CA909	Project Work	2	28	30	30	200	200	400	800

Note:

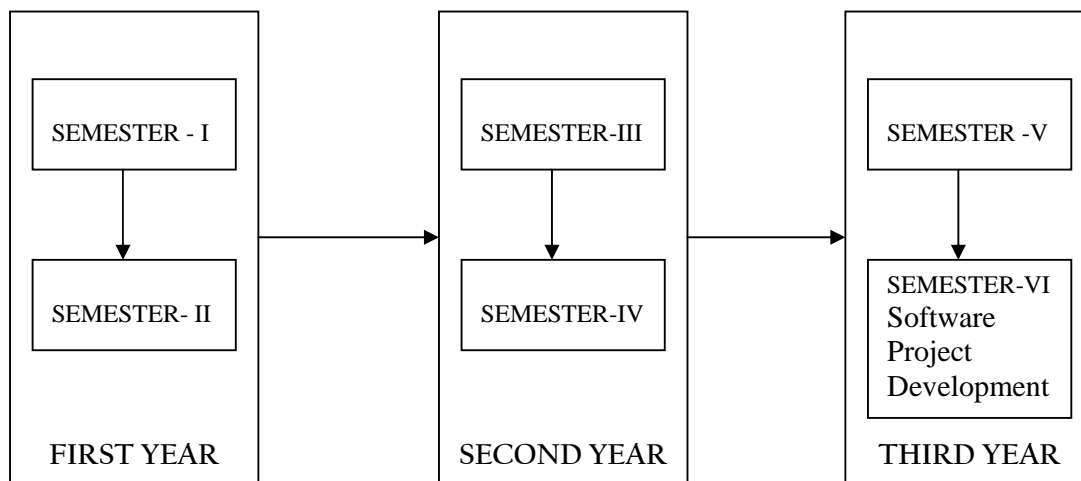
- * Each student will be required to give one seminar on some pre-allotted topic in the semester so as to earn the allotted credit.
- ** These sessions will be devoted for discussing difficulties of the students or to help them in preparation of case studies and for arranging quizzes. Each student will have to appear in all the quizzes so as to earn the allotted credit.
- # One Elective course should be selected out of the options provided, in Semester IV & Semester V. A course will be offered only if more than 10 students opt for the course.

Details of MCA Programme Structure, Credit Requirements and Specialisation

A1. Programme Structure

- A1.1 The programme is structured into *six semesters* of classroom contact-based work and a *Software Project Development Work*.
- A1.2 Each semester will be for a minimum of *90 working days* for classroom work, covering classroom contact sessions, laboratory/tutorial/library/case Studies/dissertation/Seminars and presentation, field-based as well as library/internet search-based assignments and projects, classroom exercises, management and simulation games, quizzes, and unit tests. The duration for any organisational attachment/training during the semester, internal evaluation examinations and final University examinations will be in addition to 90 working days.
- A1.3 The Software Development Project work will be for a minimum duration of 120 working days and will commence at the start of the sixth semester.
- A1.4 The structure of the MCA programme is as shown in the following figure:

Figure A1: MCA Programme Structure



A2. Credits

- A2.1 Any student of the MCA programme who earns 180 credits by pursuing the prescribed course work and passing all tests, examinations, assignments, laboratory work, projects and all other evaluation components as per the passing standards of the University will be eligible for the award of the Master of Computer Applications (MCA) degree.
- A2.2 The current distribution of credits over the three year period for classroom contact sessions and laboratory/ tutorial/ library/ Case Studies / Quizzes / Seminar sessions will be as follows:

TableA2: Semester-wise Distribution of Credits

Sl. No.	Semester	Number of Credits	Average Classroom Contact Hours per week	Average Tutorial/ Lab./ Case Studies / Seminars hours per week
1	Semester – I	30	22	14
2	Semester – II	30	20	16
3	Semester – III	32	24	12
4	Semester – IV	30	20	16
5	Semester – V	28	16	20
6	Semester - VI	30	02	28
	Total	180	104	106

- A2.3 A course will be of one or more credits as shown in the detailed list of courses for the programme.
- A2.4 All courses shown in the list of courses are compulsory for all MCA students. However, students will have the option of pursuing a total of three elective courses of their choice amounting to sixteen credits during the First , Forth and Fifth semesters.
- A2.5 Some courses will have only classroom contact sessions and some others will have tutorial/ laboratory/ library/ case studies / Seminar sessions in addition, as shown in the list of courses.

Master of Computer Applications Programme

SYLLABI (Semester – I)

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

CA701: Fundamentals of Programming (6 credits)

Objective: To make students understand the simple programming paradigms and to develop in the students the ability to design an appropriate logic to solve a specific problem requiring these paradigms and to implement such logic using “C” computer language as a tool.

Pre-requisite: No additional pre-requisite is required.

Methodology & Pedagogy: During theory lectures illustrations of certain real world problems, which are to be solved using computers, will be discussed. Logic development tools will be introduced for solving such problems and “C” computer language will be introduced as a tool. During Practical sessions, students will be required to Develop Computer programs in “C” in order to solve moderate size real world problems.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Programming Paradigms and Illustration	6	3
2	Introduction to Programming Languages and Structured programming	6	3
3	Basics and Input-Output using “C” language	7	6
4	Arithmetic Computation and Conditional Branching	7	6
5	Iterative Execution	10	9
6	Implementation of General Data Structures using Arrays and Handling of Character Strings	12	9
	Total	48	36

Detailed Contents:

Unit-1. Programming Paradigms and Illustration: (6 Hours)

Some real world problems which are to be solved using computer, Evolving an algorithm for solving these problems, Care to be taken to implement such an algorithm on computer, Tasks involved in solving problems, Tasks carried out automatically through system software (e.g compiler, Linker, Loader) and Tasks requiring special attention of the User, Demonstration and understanding of some programs written in any computer language (e.g., “C” language), Illustration of good and bad programming.

Unit-2. Introduction to Programming Languages and Structured programming: (6 Hours)

Instruction and Program, Software and Hardware, Types of Software (System software and application software).

Programming languages: Machine language, Assembly level, High level language, 4GL., Introduction to Compiler, Interpreter, loader and linker, Classification of Programming languages i.e. procedural and non procedural languages,

Structure programming concept, Top-down analysis, Modular Programming, The process of programming, Representations of an Algorithm (Step form, flow chart, pseudo Code), key features of an algorithm (Sequence, decision, repetition), Strategies for designing algorithms.

Unit-3. Basics and Input-Output using “C” language: (7 Hours)

Introduction, Importance of C, Sample C programs, Basic structure of C programs, Programming style, Executing a C program, Character Set, C tokens, Static and dynamic memory allocation concepts, Keywords and Identifiers, Constants, Variables, Data types, Declaration of Variables, Assigning values to variables, Defining symbolic constants. Input and Output: Introduction, Basic screen and Keyboard I/O, Single Character(Non Formatted) Input and Output (e.g getchar, putchar, getch, putch, getche), Formatted Input and Output Functions(e.g printf, scanf), Illustration that covers all I/O programming concepts using “C”.

Unit-4. Arithmetic Computation and Conditional Branching (7 Hours)

Operators and Expression: Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bit-wise Operators, Special Operators, Arithmetic Expressions, Evaluation of expressions, Precedence of arithmetic operators, Some computational problems, Type conversions in expressions, Operator precedence and associativity, Mathematical functions.

Decision Making & Branching: Introduction, Decision making with IF statement, Simple IF statement, the IF ELSE statement, Nesting of IF ... ELSE statements, The ELSE IF ladder, The switch statement, the ternary (? :) Operator, the GOTO statement. Proper Illustration which includes operators and Decision Making Statements.

Unit-5. Iterative Execution: (10 Hours)

Introduction to Loop constructs, concept of Entry and Exit Control Loop, While Construct, FOR Construct, Do-While Construct, Appropriate Loop selection under different conditions, Control Statements for abnormal exit (e.g. return, break, continue), Nested Loops, Illustrations that require each of the repetitive statements.

Unit-6. Implementation of General Data Structures using Arrays and Handling of Character Strings: (12 Hours)

Arrays: Introduction, One-dimensional arrays, Two-dimensional arrays, Initialization of two-dimensional arrays, Concept of Multidimensional arrays, Sorting and Searching Array.

Stack: Definition and Examples, Representing Stack using static implementation, Stack operations, Representation of Infix, Prefix and postfix Expressions using Stack, Converting from one form to another, Expression Evaluation, Matching parentheses.

Queues: Definition and examples, Representing Queues using static implementation, Circular queues, Priority queues, Double-ended queues.

Handling of Character strings: Introduction, Declaring and initializing string variables, Reading string from terminal, Writing a string on the screen, Operations on characters, Putting strings together, Table of strings, Illustration which covers all the above data structures using “C”.

Core Books:

1. Brian Kernighan and Dennis Ritchie: C Programming Language, 2nd Edition, Pentice-hall publication.
2. R.G.Dromey: How to Solve it By Computer, Pentice-hall publication.
3. Behrouz A. Foruuzan & Richard F.: A Structured programming Approach Using “C”, 3rd Edition, Course Technology.

Reference Books:

1. Pradip Dey and Manas Gosh: Programming in “C”, 1st Edition, Oxford, 2007.
2. Jean-paul Trembly and Paul Sorenson: An Introduction to data structure with applications, 2nd Edition, 1984.
3. Yashwant Kanitkar: Let us C, 8th Edition, BPB Publication.
4. Herbert Schildt: C- The Complete Reference, Tata McGraw Hill
5. E.Balagurusamy: Programming in ANSI C, 4th Edition, Tata McGraw Hill, 2007.

CA702: Fundamentals of Computer System Organization (4 credits)

Objective: To develop the understanding of the elements of Computer Organization and Architecture. Also, build the Mathematical foundations for understanding the hardware operations of digital computers.

Pre- requisite: No additional pre-requisite required.

Methodology & Pedagogy: During theory lectures the emphasis will be given on the Mathematical foundations required to understand the basic operations of the Computers. Clear understanding of the Internal Hardware of the computer and various peripherals will be given. To get the complete feel about the computer Architecture the actual Hardware components will shown to the Students.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Data Coding Systems	7	-
2	Boolean Algebra and Logic Gates	9	-
3	Circuit Design Using Logic Gates	8	-
4	ALU & Digital Components	9	-
5	CPU, I/O & Memory Organizations	9	-
6	Peripheral Devices	6	-
	Total	48	-

Detailed Contents:

Unit 1. Data Coding Systems: (7 Hours)

Computer Organization: basic components of the computers and their organization.

Number Systems: Decimal System, Bistable Devices, Binary, Octal & Hexadecimal numbers. Number Base conversions.

Binary Operations: Addition, Subtraction, Multiplication, Division. Complements, Use of complements to represent Negative Number, Binary Number Complements, Complements in other Number Systems.

Binary codes: Weighted and Non-weighted codes, BCD Code, Excess Three (XS - 3) Code, Gray Code, Binary to Gray & Gray to Binary.

Error detecting and correcting codes, Parity and Hamming code.

Unit 2. Boolean Algebra and Logic Gates: (9 Hours)

Fundamental Concepts of Boolean Algebra: Basic Laws of Boolean Algebra, Logical Multiplication, Evaluation of Logical Expressions, Simplification of Expressions, Basic duality of Boolean Algebra, Derivation of a Boolean Expression, Sum of Products and Product of Sums, Derivation of Product-of-Sums expressions, Derivation of Three input variable expressions, Proof by Perfect induction, De Morgan's Theorems, Map Method for Simplifying Expressions, K-map (Four Variables), Cubes & covering, Don't Cares.

Logical Gates: AND & OR gates, Complementation & Inverters, Interconnecting gates, NAND & NOR gates, Design Using NAND Gates, Design Using NOR Gates, NAND to AND & NOR to OR gate Networks.

Unit 3. Circuit Design Using Logic Gates: (8 Hours)

Flip-Flops , Transfer Circuit , Clocks , Flip-Flop Designs , Gated Flip-Flop , Master Slave Flip-Flop , Shift Register , Binary Counter , BCD Counter , Counter Design .

Unit 4. ALU & Digital Components (9 Hours)

The Arithmetic-Logic Unit: Construction of the ALU, Integer Representation, Binary Half-Adder, Full-Adder, Parallel Binary Adder, Positive & Negative Numbers, Addition in the 1'S Complement System, Addition in the 2'S Complement System, Addition and subtraction in a parallel Arithmetic Element, Binary coded Decimal Adder, Shift Operations , Binary Multiplication , Binary Division.

Digital Components: Integrated Circuits, Decoders, NAND gate Decoder, Decoder Expansion, Encoders, Multiplexers, Memory Units, Random-Access Memory, Read Only Memory, Types of ROMs.

Unit 5. CPU, I/O & Memory Organizations (9 Hours)

Central Processing Units: Stack Organization (Intro.), Instruction Formats, Addressing modes.

Input-Output Organization: Peripheral Devices, Asynchronous Data Transfer, Handshaking, Modes of Transfer, Programmed I/O, Interrupt-initiated I/O, Direct Memory Access (DMA), Memory Access (DMA).

Memory Organization: Memory Hierarchy ,Main Memory ,RAM, ROM, Bootstrap Loader, Auxiliary Memory , Magnetic Disk , Magnetic Tape , Cache Memory (Intro) , Virtual Memory (Intro).

Unit 6. Peripheral Devices (6 Hours)

Peripheral Devices (Intro): Key Board, Mouse, Display Unit, Printer (Types), Scanner, OCR-OMR-MICR, Multimedia Projector, Graphical Devices, Mobile Devices.

Core Books:

1. Thomas C. Bartee: Digital Computer Fundamentals, 6th Edition, Tata McGraw Hill, 1985
2. M. Morris Mano: Computer System Architecture, PHI / Pearson Education, 3rd Edition, PHI / Pearson Education,,1993

Reference Books:

1. A. Anand Kumar: Fundamentals of Digital Circuits, PHI / Pearson Education,2nd Edition,
2. Albert Malvino, Jerald Brown : Digital Computer Electronics, 3 rd Edition, Tata McGraw Hill, 1992.

CA703: Fundamentals of Operating Systems and Scripting (6 credits)

Objective: The objective of this course is to provide working knowledge of operating systems which is crucial in effective operation and use of one's computer system. Also, to make students understand multi-user concepts, use of system editors, basic UNIX commands, and develop their ability to write script files.

Pre- requisite: No additional pre-requisite required.

Methodology & Pedagogy: In order to achieve the course objectives, students will first be introduced to the basic operating system concepts. Later, more advanced yet still user-level concepts will be explained through the discussion of specific operating system commands and scripting. During practical sessions, the students will be required to use DOS and UNIX commands to understand the system properties and to write script files.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Basic Concepts and Usage of OS	6	-
2	DOS	6	6
3	Unix overview and General purpose Utilities	8	6
4	The Shell and File Attributes	8	6
5	Editors and Filters	10	9
6	Shell Programming	10	9
	Total	48	36

Detailed Contents:

Unit 1. Basic Concepts and Usage of OS: (6 Hours)

Computer System Overview: Basic elements, Processor Registers, Instruction Cycle, Interrupts.

Operating System Overview: OS objectives and functions (OS as User/Computer interface, OS as Resource Manager)

Evolution of OS.

Unit 2. DOS: (6 Hours)

Basic commands: append, attrib, backup, chkdsk, cd, copy, diskcopy, doskey, edit, erase, delete, fdisk, find, label, mem, md, more, move, prompt, print, rename, restore, rd, scandisk, sort, sys, time, tree, deltree, type, format, unformat, ver, xcopy, ipconfig, hostname, ping, start, netstat.

Batch Files: Chaining and linking.

Unit 3. Unix overview and General purpose Utilities: (8 Hours)

History and Features of Unix OS, Directory structure.

Basic commands: date, clear, tput, cal, who, who am i, exit, echo, uname, man, tty, passwd, bc, time, script, spell, alias.

Navigating File System: pwd, cd, mkdir, rmdir, ls, cat, cp, rm, mv, file, wc, od, split, cmp, comm, diff.

Unit 4. The Shell and File Attributes: (8 Hours)

The shell: Wild card characters, Escaping (Backslash (\)), Quoting, Redirection, Pipes, Tees, Command Substitution, Shell Variables, Environment Variables.

Basic File attributes: changing File Permissions

More File attributes: File systems and Inodes, Hard links, Symbolic links, File Recovery.

Unit 5. Editors and Filters: (10 Hours)

Editors: vi, emacs, pico.

Simple Filters: head, tail, cut, paste, sort, uniq, nl, tr, grep.

Filters Using Regular Expressions.

Unit 6. Shell Programming: (10 Hours)

Making scripts interactive (read), Logical Operators, if conditional, case conditional, Loops, Command line arguments.

Core Books:

1. William Stallings: Operating Systems Internals and Design Principles, 5th Edition, PHI, 2005.
2. Sumitabha Das: Unix concepts & application, 4th Edition, Tata McGraw Hill, 1992.
3. Kenneth Rosen, Douglas Host, James Farber and Richard Rosinski: The Complete Reference, Tata McGraw Hill, 1999.

Reference Books:

1. Silberschatz: Operating System Concepts, 5th Edition, John Wiley & Sons (ASIA) Pte Ltd., 1998.
2. Mark G. Sobell: A Practical Guide to Linux, Pearson Education, 1997.

CA704: Software Tools (4 credits)

Objective: To make the students acquainted with Office automation software on Windows platform. Also to make them understand the concepts of Internet and to develop ability to design static and simple dynamic web pages.

Pre- requisite: No additional pre-requisite required.

Methodology & Pedagogy: During theory lectures students will be introduced to the basic concepts of computer system and Office automation software. The HTML and ASP semantics will be explained to develop the web pages and basic knowledge of web browsers and Internet concepts will be covered. During Practical sessions students will be made familiar with the working of various software packages for communication and analysis of data and web pages development using HTML. Each Student will be required to develop some case studies using these packages.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Introduction to Work Sheet	4	36
2	Advanced features of Work Sheet	5	
3	Database Management Software	5	
4	Hypertext Markup Language	3	
5	Introduction to Internet	2	
6	Introduction to Active Server pages	5	
	Total	24	

Detailed Contents:

Unit-1. Introduction to Work Sheet (4 Hours)

Worksheet Basics: Creating worksheet, entering data into worksheet, heading information, data text, alphanumeric values, saving & quitting worksheet. Opening and moving around in an exiting worksheet. Toolbars and Menus, Keyboard Shortcuts. Working with single and multiple workbooks: Copying, renaming, moving, adding and deleting, copying entries and moving between workbooks. Working with formulae & cell referencing. Performing Auto sum, copying formulae. Absolute & Relative Addressing. Editing & Formatting: Creating, editing and selecting ranges. Formatting of worksheet – Auto format, changing alignment, character styles, column width, date format, borders & colors, currency sign. Entering and erasing data, resizing rows and columns, conditional formatting, adding comments.

Graphs and charts: Using wizards, various charts type, formatting grid lines & legends, previewing & printing charts.

Database: Creation, sorting, query & filtering a database.

Functions: Database, Date, and Time, Maths & Trigonometry, Statistical, Text and Logical Function.

Unit-2 . Advanced features of Work Sheet (5 Hours)

Creating and Using Macros. Pivot Tables and Pivot Charts, using Pivot Table Wizard. Creating one-variable and two-variable data tables. What-if analysis using Goal seek and Scenario. Working with Add-ins, protecting and unprotect a worksheet and a workbook. Exporting Excel data in charts to word,power point and internet,Creating Excel Templates,Merging Spreadsheets in Excel,Convering Excel Worksheet in Access Database

Unit-3. Database Management Software (5 Hours)

Introduction to database, tables, records, fields, forms, queries, macros, modules and reports. Creating database with database wizard and from scratch, creating tables, defining data types and its properties. Refining and customizing a table, understanding and creating relationships and indexes. Entering data in datasheet view or through form, using form views, controlling form appearance using auto format, binding a form to data, working with controls, exporting data to other programs and databases. Sorting, filtering and querying data, using select queries, action queries, customizing queries. Creating forms and its layouts, creating, editing and executing macros, creating and printing reports and creating mailing labels.

Unit-4. Hypertext Markup Language(3 Hours)

Introduction to HTML: Creating HTML pages, forms using various controls- text boxes, radio buttons. Creating frames, formatting page with background color, fonts, and images.

Unit -5. Introduction to Internet (2 Hours)

Basic elements of WWW, Browsers, Internet services. Overview of Email concepts: Sending and receiving emails. Securing emails by digital certificates.

Unit -6. Introduction to Active Server pages(5 Hours)

How Active Pages works, Introduction to IIS, ASP Requirements, Intrinsic ASP Objects: Request, Response and Session.

Reference Books:

1. Office XP: The complete reference by Stephen l. nelson & Julia Kelly.
2. Microsoft office 2003 bible by Edward c. willett, wiley-dreantech India pvt. Ltd., wiley-india publications.
3. Internet: the complete reference, millennium edition by Margaret Levine young, Doug muder, tata McGraw hill publishing company, New Delhi.
4. Mastering frontpage-2000, Daniel a. tauber, Brenda kienal & molly e. holzschlag, BPB publications.
5. Mastering Active Server Pages 3, A .Russell Jones,BPB Publications.

MA701 : Foundations of Mathematics (4 credits)
(For Students with Commerce background only)

Objective: To introduce the basic concepts of Mathematics to students with Commerce background so as to bring them at par with the students with Science background.

Pre-requisite: No additional Pre-requisite required.

Methodology & Pedagogy: The emphasis during Lecture sessions will be on Understanding of Concepts rather than on complexities of Computational Techniques. Stress is also given on Visual perception through Mathematical Software. Relevant Illustrations will be provided from the Real World processes. Sufficient home assignments will be given to the students which will test their fundamentals and ability to relate Mathematical concepts with reality.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Sets, Relations and Functions	7	-
2	Concepts of Limit, Continuity and Differentiation	10	-
3	Concept of Integration	7	-
4	Matrices and Determinants	7	-
5	Equations and their solutions	9	-
6	Basic Statistics	8	-
	Total	48	-

Detailed Contents:

Unit-1. Sets, Relations and Functions: (7 Hours)

Sets, Number systems (Real and Complex numbers), Cartesian Product of sets, Relations, One-One, Many-One, One-Many, Many-Many Relations, Functions, Certain Standard functions (Polynomial, Algebraic, Exponential, Logarithmic, Trigonometric), Functions of several variables, graphical representations of functions, Visualization of graphs of standard functions, Curves and surfaces using Mathematical Software.

Unit-2. Concepts of Limit, Continuity and Differentiation: (10 Hours)

Concept of Limits, Evaluation Techniques, Continuity of functions, Concept of Differentiation, Derivatives of Standard Functions, Evaluation Techniques, Derivative as a Rate of Change, Maxima and minima of functions, Visualization of graphs of Continuous and Differentiable functions.

Unit-3. Concept of Integration: (7 Hours)

Indefinite Integrals (Primitives / Anti derivatives), Primitives of Standard Functions, Methods of Integration, Definite Integral, Integration as Area under the curve. Use of Mathematical Software for evaluating Derivatives, Indefinite and Definite Integrals.

Unit-4. Matrices and Determinants: (7 Hours)

Matrices, Matrix Operations, Properties of Matrix Operations, Determinants (up to order 3) and their properties, Cofactor expansion, The Inverse of a Matrix, The Rank of a Matrix and Applications. Eigen values and Eigen vectors.

Unit-5. Equations and their solutions: (9 Hours)

Polynomial equations in single & more than one variables, Solution of an equation, Graphical representation of an equation, Standard curves and surfaces, Determination of solution of Quadratic equations, System of Linear equations, Its Matrix representation, Consistency and solution of a System of Linear equation using Matrix Inversion,

Unit-6. Basic Statistics: (8 Hours)

Ungrouped and Grouped data, Diagrammatic Representation of Data, Measures of Central tendency, Measures of Dispersion, Computations of these measures through Statistical Software, Population space and events, Probability, Concept of Random Variable and Probability Distributions, Standard Probability Distributions (Binomial, Poisson, Exponential, and Normal)

Core Books:

1. Thomas G. B. and R. L. Finney: Calculus and Analytical Geometry, 9th Ed., Addison Wesley, 1996.
2. Erwin Kreyszig: Advanced Engineering Mathematics, 8th Ed., John Wiley & Sons, India, 1999

Reference Books:

1. Stewart James: Calculus Early Transcendental, 5th Ed., Thomson India, 2007
2. Wylie & Barrett: Advanced Engineering Mathematics, Mc graw Hill pub.
3. Greenberg M D: Advanced Engineering Mathematics, 2nd ed., Pearson Education

CS 701: Functional English and Communication Skills (4 credits)

Objectives:

1. To enable the students to know the functional aspects of English language so that they can use it in their day to day life i.e, introductions; asking personal information and they will be able to understand Technical conversation with ease.
2. To hone basic Communication Skills (Listening, Speaking, Reading, Writing) of the students by exposing them to the key communication techniques.

Pre-requisite: No additional Pre-requisite required.

Methodology & Pedagogy: Lectures will be taken in class room and practical training will be given in the language lab with the use of multi-media presentations / black board work and mix of both. Some assignments and Presentation Tasks will be given. Students will also be engaged in interpersonal communication activities such as group discussion, role plays, simulations, just a minute sessions, etc.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Communication Skills	7	-
2	Listening Skills	8	-
3	Speaking Skills	8	-
4	Reading Skills and Writing Skills	9	-
5	Functional English	9	-
6	Grammar and Vocabulary	7	-
	Total	48	-

Detailed Contents:

Unit-1. Communication Skills: (7 Hours)

Types of Communication, Barriers to Effective Communication, Principles of Communication, Verbal and Nonverbal Communication, Kinesics and Proxemics.

Unit-2. Listening Skills: (8 Hours)

Introduction to Listening, Purpose and Types of Listening, Active Listening V/s Passive Listening, Difference among Listening, Hearing and Overhearing, Traits of a good listener, Barriers to effective listening and Tips for effective listening.

Unit-3. Speaking Skill: (8 Hours)

Presentation, Group Discussion, Interviews, Cross-cultural Communication,

Unit-4. Reading Skills and Writing Skills: (9 Hours)

Reading Skills: Comprehension, Types, Techniques - Skimming and Scanning.

Writing Skills: Paragraph Development – Coherence – Topic Sentence, Supporting Sentence, Authentication and Examples, Letter Writing and Application Writing, Report Writing, Technical Description, Story Writing, Book Review.

Unit-5. Functional English: (9 Hours)

Introductions; asking personal information, possession; your name/his name, stating position/destination, Describing actions; stating destinations / future reference, ordering / offering / naming possibility / request / ability knowledge, Getting /giving information; jobs; habits; likes/dislikes, describe manner, habits / routines / timetables, comparison / possession / description, interests in past events / state experiences.

Unit-6. Grammar and Vocabulary: (7 Hours)

Tenses and the Concept of Time, Active and Passive Constructions, Direct – Indirect Speeches, Prepositions and Conditionals, Idioms, Confusables, One-word Substitutes, Synonyms, Antonyms.

Core Books:

1. Jones, Leo: Functions of English, Cambridge 1979.
2. Andrea J Rutherford: Basic Communication Skills for Technology, Pearson Education.
3. T M Farhathullah: Communication Skills for Technical Students, Orient Longman.

Reference books:

1. Abbs Brian & Ingrid Freebairn: Building Strategies, Longman 1979.
2. Jones, Leo: Notions of English, Cambridge 1982.
3. Robert O' Neill: "Kernel One" and "Kernel Two", Longman 1978 and 1982.
4. Peter Viney's & Hartley: "Streamline Departures" and "Streamline Connections" and "Streamline Destinations", Oxford 1978, 1979 and 1982.
5. Brian Abbs & Ingrid Freebairn: "Developing Strategies", "Studying Strategies" and "Opening Strategies, Longman 1980, 1981 & 1982
6. Michael Swann & Catherine Walter: "The Cambridge English Courses 1 & 2, Cambridge 1984 & 1985.
7. John & Liz Soars: "Headway Intermediate" & "Headway Upper Intermediate", Oxford 1984 and 1986.
8. Robert O'Neill (and Patricia Mugglestone's): "Fourth Dimension" & "Third Dimension", Longman 1986 & 1989
9. Allan Pease: Body Language, Sheldon Press, London)
10. Geoffrey Leech & Jan Swartvik: A Communicative Grammar of English, Longman.
11. K. R. Lakshminarayan: English for Technical Communication, Scitech Publications, Chennai.

FI701. Fundamentals of Commerce: (4 credits)
(For Students with NO Commerce background)

Objectives: The course is specially designed for students having no background of Commerce, with an objective to make them familiar with the basic terminology of four major components of Commerce, namely Finance, Business entities, Banking and Human Resource & Marketing Management.

Pre-requisite: No additional Pre-requisite required.

Methodology & Pedagogy: During theory sessions, the basic terminology along with concrete Illustrations will be discussed. Visits to different organizations and Industries will be arranged so that students can visualize the various business entities and commercial processes.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Basics of Accounts	9	-
2	Cost Accounting	7	-
3	Financial Management	8	-
4	Business entities	8	-
5	Banking	7	-
6	Human Resource & Marketing Management.	9	-
	Total	48	-

Detailed Contents:

Unit I. Basics of Accounts: (9 Hours)

- 1.1 Double Entry Book-keeping System
- 1.2 Recording Financial Transaction
- 1.3 Ledger posting
- 1.4 Preparation of Trial Balance
- 1.5 Preparation of Statutory Financial Statements
 - a. Profit & Loss account
 - b. Balance sheet
 - c. Cash flow Statement
- 1.6 Analysis of Financial Statement
 - a. Ratio Analysis
 - b. Common size B/S
 - c. Comparative Financial Statement

Unit 2. Cost Accounting: (7 Hours)

- 2.1 Meaning of Cost, Costing and Cost Accounting
- 2.2 Concept of Cost Centre and Cost Unit
- 2.3 Cost components and preparation of Cost sheet
- 2.4 Methods of Costing
- 2.5 Marginal Costing, Break-even Analysis
- 2.6 Make or buy decision

Unit 3. Financial Management: (8 Hours)

- 3.1 Meaning and functions of Financial Management
- 3.2 Sourcing of funds and cost of funds
- 3.3 Optimum utilizations of funds
- 3.4 Time value of money
- 3.5 Investment decision
- 3.6 Dividend decision
- 3.7 Working Capital Management
- 3.8 Taxation

Unit 4. Business Organization: (8 Hours)

- 4.1 Forms of business organization
- 4.2 sole proprietorship firm
- 4.3 Partnership firm
- 4.4 Joint stock Company
 - 4.4.1 Private Company
 - 4.4.2 Public Company
- 4.5 Co-operative Society
- 4.6 Public Trust.
- 4.7 Association of Persons (Joint Venture)

Unit 5. Banking: (7 Hours)

- 5.1 Introduction
- 5.2 Deposits Management, Types and Schemes
- 5.3 Management of Advances, Types
- 5.4 Banking Services, Banking Products
- 5.5 Core Banking
- 5.6 Fund management by Banks

Unit 6. Human Resource & Marketing Management: (9 Hours)

Human Resource:

- 6.1 HR planning
- 6.2 Selection
- 6.3 Development and Training
- 6.4 Salary / Wage Administration
- 6.5 Welfare and working conditions

Marketing Management:
6.6 Selling and Marketing compared
6.7 Core concepts of marketing
6.8 Product and Brand Management
6.9 Pricing Decisions.
6.10 Advertising and Sales promotion
6.11 Channels of Distribution
6.12 Logistic Management.

Reference books:

1. Dr. S.N. Maheshwari: Financial Accounting, Sultan Chand publication.
2. Dr. S.N. Maheshwari: Advanced Accounting, Sultan Chand publication.
3. M.N. Arora: Advanced Cost Accounting, Himalaya Publishing House
4. I.M.Pande: Financial Management.
5. B.S.Mathur: Banking Law & Practice.

Master of Computer Applications Programme

SYLLABI (Semester – II)

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

CA705. Advanced Programming & Data Structures (6 credits)

Objectives: To make students understand the Advanced programming concepts like Modular programming, File handling, Dynamic memory management and tools available in “C” to implement these features. To develop proficiency in the specification, representation, and implementation of advanced Data Structures such as Stack, Queue, Linked list, Graph and using them to develop Applications.

Prerequisites: Course CA701.

Methodology & Pedagogy: During theory lectures illustrations of certain real world problems, which require Advanced programming concepts, will be discussed. Tools available in “C” programming language for implementing these concepts will be introduced. Also, Representation and Implementation of Advanced Data Structures and related Algorithms will be discussed in details. During Practical sessions, students will be required to Develop Computer programs in “C” in order to solve moderate size real world problems.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Modular programming concepts and functions in “C”.	6	6
2	Pointer, Structure and Union data types in “C”.	9	6
3	File Handling and Additional Features of “C” .	9	6
4	Stack, Queues and Linked lists.	9	6
5	Graphs and graph theoretic Algorithms.	8	6
6	Tree Traversal Algorithms and Hash Tables	7	6
	Total	48	36

Detailed Contents:

Unit 1. Modular programming concepts and functions in “C”: (6 Hours)

Modular programming concepts and illustrations, Introductions to functions, Defining and accessing a function, Passing arguments to a function, Local and global variables, function prototypes, concept of Recursion and recursive functions, Library functions.

Unit 2. Pointer, Structure and Union data types in “C”: (9 Hours)

Dynamic memory Allocation, Pointer data type, Pointer declaration, Passing Pointer to a function, Pointers and One dimensional Arrays, Operations on pointers, Pointers and Multidimensional Arrays, Arrays, Passing functions to the other functions.
Structures and Unions: Defining and processing a Structure, User-defined data types, Structures and Pointers, Passing Structures to a function, Self-Referential structures, Unions, Relevant Applications.

Unit 3. File Handling and Additional Features of “C”: (9 Hours)

Opening and closing a data file, Creating and Processing a File, I / O operations through files, Unformatted data files.
Additional Features: Register Variables, Bitwise Operations, Bit Fields, Enumerations, Command Line Arguments, Macros, Pre-processors, Relevant Applications.

Unit 4. Stack, Queues and Linked lists: (9 Hours)

List: Singly and doubly Linked Lists, Circular lists, Multi lists, Implementation using Arrays and pointers, Polynomial and Sparse Matrix Representation using Linked Lists.
Stack: Implementation using Linked list, Applications: Function call, Recursion, Balancing of Parenthesis, Infix to Postfix conversion and evaluation of Postfix expressions.
Queue: Implementation of queue, circular queue, deque priority queue using Linked list
Application: Job scheduling

Unit5. Graphs and Graph theoretic Algorithms: (8 Hours)

Basic concepts of graph Theory, paths, reachability and connectedness, matrix representation of graphs, Traversals – DFS and BFS, Applications of graph – Shortest path (Dijkstra’s algorithm),
Trees, Binary trees, Forest, Representation using array and linked list, Minimal Spanning tree (Prim’s and Kruskal’s algorithm).

Unit 6. Tree Traversal Algorithms and Hash Tables: (7 Hours)

Operations on tree – Traversals, Tree Traversal Algorithms, Binary Tree traversal (Recursive and Non recursive implementation), Expression tree, Binary Search tree, , Heap tree (Applications in priority queues and sorting).
Hash tables: Introduction, Hash functions and Hash Keys, Collisions Resolving collisions, Rehashing.

Core Books:

1. Paul Tremblay, Paul G.Sorenson: An Introduction to Data Structures with Applications, Jean, 2nd Edition, Tata McGraw-Hill, (2007)
2. Brian Kernighan and Dennis Ritchie: C Programming Language, 2nd Edition, Pentice-hall publication.
3. Parag Dave & Himanshu Dave: Design and Analysis of Algorithms, Pearson Education (2008).

Reference Books:

1. Mark Allen Weiss: Data Structures and Algorithm Analysis in C, Pearson Education.
2. Gilberg & Forouzan: Data Structures: A Pseudo-code Approach with C, Cengage Learning.
3. Michael Berman: Data Structures Via C++: Objects by Evolution, Oxford Univ. Press (2004)
4. Horowitz, Sahni, Anderson-Freed: Fundamentals of Data Structures in C, 2nd edition, University Press, 2007.
5. Tenenbaum: Data Structures Using C & C++, PHI.
6. A V Aho, J E Hopcroft, J D Ullman: Data Structures & Algorithms, Pearson Education (1983).
7. D E Knuth: Sorting & Searching - The Art of Computer Programming, Vol. 3, Pearson Education (1998).
8. G. A.V.PAI Data structures and algorithms, concepts, Techniques and Applications, TMH , 1st Edition (2008)
9. Michel Goodrich: Algorithm design-foundation, analysis & internet examples, Roberto Tamassia, , Wiley

CA706. Object Oriented concepts and Programming in Java (JSE) (6 credits)

Objectives: This course is intended to emphasize the importance of Object oriented programming concepts and Java not only as an Object Oriented programming language but as a platform for developing Applications. The objectives also includes to extensively train the students in Core Java techniques and to Create simple Java applets for use in web pages.

Prerequisites: Course CA701.

Methodology & Pedagogy: During theory lectures illustrations emphasizing the need for Object Oriented Programming concepts will be discussed. Emphasize will be given on Core Java concepts, various Java packages, Multithreading, The collection framework, and GUI using AWT and Applets. During Practical sessions, students will be required to develop Simple Java programs, Develop simple to intermediate level applications on Java platform and create simple Java Applets for use in Web pages.

Outline of Course:

Title of unit		Minimum number of hours.	
		Theory	Practical
1	Basic concepts of OOP and Java	5	3
2	Basic syntax and class concept	9	6
3	Package concept & common classes from the java.lang package	7	3
4	Exception handling and Multithreading	10	9
5	The Collection framework, common classes from java.util and java.io packages	10	9
6	GUI using AWT and Applet	7	6
Total		48	36

Detailed Contents:

Unit 1. Basic concepts of OOP and Java: (5 Hours)

OOP concepts and Need, Class as a programmer defined data type, Methods in a class compared to functions in Procedural language, Illustrations to highlight these differences. JAVA as a OOP language and as a platform: Introduction, Applets and Applications, Security, Byte codes, Java Buzzwords, Simple, Multi-threaded, Architecture Neutral. The First Simple Program, Compiling and executing Java applications.

Unit 2. Basic syntax and class concept: (9 Hours)

Data Types, Variables and Arrays: Data Types in Java, Literals, Characters, Variable Declaration, Symbolic Constants, Type Casting, Arrays, Vectors, Array Declaration Syntax. Operating in Java: Arithmetic Operators, Basic Assignment Operators, Relational

Operators, Boolean Logical Operators, Ternary Operator, Operator Precedence Control Statements: Java's Selection Statements, Switch, Nested Switch, Iteration Constructs, Continue, Return.

Methods and Classes: Introduction to Class and Methods, Methods Overloading, Constructor Overloading, Objects as Parameters, Returning objects, Recursion, Understanding Static, Final, Nested and Inner Classes, The String Class, Command Line Arguments.

Inheritance: Inheritance Basics, Super Class Variable and Sub Class Object, Using Super to Call Superclass Constructors, Another Use of Super, Multilevel hierarchy, Calling Constructor, Overriding Methods, Abstract Classes and Interfaces, Defining Interface, final keyword and Inheritance, Object Class as super class of all the classes. strictfp modifier, native Methods, Problems with native Methods.

Unit 3. Package concept & common classes from the java.lang package: (7 Hours)

Packages: What is a Package, CLASSPATH environment variable, access specifiers, important Packages, Access Control / Visibility.

Handling Strings: String Length, Operations on Strings, Extract Character Methods, String Comparison Methods, Searching and Modifying, Data Conversion and Value of () Methods, Changing Case of Characters, String Buffer.

Exploring java.lang: Wrapper Classes and Simple Type Wrappers, Boxing and Unboxing conversions, Void, Abstract Process Class, Runtime Class and Memory Management, Other Programme Execution, System Class, Environment Properties, Using Clone () and Cloneable () Interface, Class and Class loader, Math Class.

Unit 4. Exception handling and Multithreading: (10 Hours)

Exception Handling: Fundamentals of Exception Handling, Throwable Class, Types of Exceptions, checked and unchecked Exceptions, try and catch Keywords, throw, throws and finally, Nested try Statements, Java Built in Exceptions, User Defined Exceptions.

Multithreaded Programming: The Java Thread Model, Priorities, Synchronization, Messaging, Thread, ThreadGroup Classes and Runnable Interface, Creation of Threads, Creating Multiple Threads, Synchronization and Deadlock, Why suspend(), resume() and stop() methods are deprecated. The volatile modifier.

Unit 5. The Collection framework, common classes from java.util, java.io and java.net packages: (10 Hours)

The classes and interfaces for the collection framework - Collection, Set, List, , Map, ArrayList, Vector, Hashtable and HashMap, Generics in Collection framework

The Utility Classes: The Enumeration Interface, StringTokenizer, Date, Calendar and Date Comparison, Observer and Observable.

java.io- File class in Java, Creating Directory, Input/Output Basics, Streams (Byte and Character), Reading From and writing to Console, Reading and Writing Files, PrintStream and PrintWriter Classes, the transient modifier, RandomAccessFile

Unit 6. GUI using AWT and Applet: (7 Hours)

AWT: Windows, Graphics and Text: AWT Classes, Window Fundamentals, Working With Frame Windows, Frame Window in An Applet, Event Handling in a Frame Window, A Window Program, Displaying Information While Working with Graphics and Color, Working With Fonts, Managing Text Output Using Font metrics, Exploring Text and Graphics.

AWT: Controls, Layouts and Menus: Control Fundamentals, Layouts, Menus, Dialog Class, Other Controls.

Event Handling in GUI applications: Event Delegation Model for handling Events.

Applet: Fundamentals Of Applets, Applet Class, Applet Life Cycle, A Simple Banner Applet, getDocumentBase(), getCodeBase(), showDocument(), AudioClip, AppletContext and AppletStub interface.

Core Books:

1. Pravin M. Jain: The class of JAVA, Pearson Education, 2011.
2. Herbert Schildt: The Complete Reference Java J2SE 5th Edition, TMH Publishing Company Ltd, NewDelhi.

Reference Books:

1. Ivor Horton: Beginning Java JDK 5 edition, Wiley Press, 2008.
2. Cay Horstmann and Gary Cornell: Core Java Volume 1- 8th ed. or later, Pearson Education, 2008.
3. Ken Arnold, James Gosling and David Holmes: The Java Programming Language, 4th ed., Addison Wesley.

CA 707. Relational Database Management System-I: (6 credits)

Objectives: This course is intended to emphasize the importance of the role of data, file management and database systems in information systems. To make students understand the database development activities, such as, data modeling, creation of databases and posing complex SQL queries during the system development cycle. Also, introduce the students to using and implementing Database systems for certain commercial applications

Prerequisites: Basic Knowledge of working with Computer.

Methodology & Pedagogy: During theory lectures illustrations of certain real world applications, which emphasize the importance of appropriate design of databases will be discussed. The fundamental concepts regarding database development activities, various database management systems and posing and solving queries will also be discussed. In addition there may be announced or unannounced quizzes/assignments.

During Practical sessions, students will be required to carry out case studies using the concepts and techniques they have learnt during theory session.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Introduction to Databases	6	3
2	Relational Data Model	9	6
3	Database Design	9	6
4	Relational Algebra and Calculus	6	3
5	Query Languages	9	9
6	Query Processing And Optimization	9	9
	Total	48	36

Contents:

Unit 1. Introduction to Databases: (6 Hours)

Basic Concepts: data, database, database systems, database management system, Purpose and advantages of Database management system (over file systems), data models: Introduction; Three level architecture, Overall architecture of DBMS, Various components of a DBMS, Overview of parallel databases, Overview of Distributed databases, Overview of Object oriented databases.

Unit 2. Relation Data Model: (9 Hours)

Relational Structure – tables (relations), rows (tuples), domains, columns (attributes), Entity sets, attributes, Types of entities, Relationships (ER) and Types of relationships, Database modeling using entity and relationships, Enhanced entity relationship diagrams, keys: super key, candidate keys, primary key, entity integrity constraints, referential integrity constraints.

Unit 3. Database Design: (9 Hours)

Relational structure – tables (relations), rows (tuples), domains, columns (attributes), Database design process, Anomalies in a database, Functional Dependencies (Lossless decomposition, Dependency preservation, Closure set of FD, Canonical Cover, Lossless Joins), Finding Candidate keys using Armstrong rules, Stages of Normalization: 1NF, 2NF, 3NF, BCNF (with general definition also) and Multivalued Dependency: 4NF & 5NF (Project Join NF) Translation of E-R schemes (logical design) to relational schemes (Physical design): A case study. Introduction to data dictionary, Usage of data dictionary.

Unit 4. Relational Algebra and Calculus: (6 Hours)

Basic operators (Select, project, union, set, difference, Cartesian product and rename) Additional operators (Set interaction, Natural Join, Division and Assignment operator), Insert, Update, Delete operators, Relational Calculus.

Unit 5. Query Languages: (9 Hours)

Query-by-example(QBE), Introduction to SQL, Overview of SQL, Basic queries in SQL, Advanced queries in SQL, Functions in SQL, Basic data retrieval, Aggregation, Categorization, Updates in SQLs, Views in SQL, Different types of views, Theoretical Updatability of Views, Embedded SQL and 4GLs.

Unit 6. Query Processing and Optimization: (9 Hours)

Overview, Query interpretation, Equivalence of expressions, Join strategies for parallel processing, Algorithm for executing query operations, Heuristics of Query Optimization Catalog information for cost estimation of queries, Basic query optimization strategies Selection operation, Sorting Join operation.

Core Books:

1. Silberschatz, Korth, Sudarshan: Database System Concepts, Fifth Edition, McGraw Hill
2. Elmasri, Navathe: Fundamentals of Database Systems, Fifth Edition, Pearson Education, (2008)
3. C.J.Date, a Kannan, S Swaminathan: An Introduction to Database Systems, Pearson Education, Eighth Edition (2006) (Equivalent Reading)

Reference Books:

1. S.K. Singh: Database Systems, Concepts, Design and Applications, Pearson Education
2. Ramakrishnan, Gehrke: Database Management Systems, Third Edition, McGraw Hill.
3. Peter Rob, Carlos Coronel: Database Systems, Design, Implementation and Management, seventh edition, Cengage Learning, (2007).
4. Ivan Bayross: SQL, PL/SQL – The programming Language Oracle.
5. Leon and Leon: Database management Systems, Vikas Publication.

CA708 : Computer Base Management Systems (4 credits)

Objectives: To emphasize the significance of Computer based Information systems in Management of Organizations and various Business Processes. Also, to make students familiar with the detailed functioning of commonly used Computer based Information Systems.

Pre-requisite: No additional pre-requisite required for Students with Commerce background. However, for other students pre-requisite is course FI701.

Methodology & Pedagogy: During the Theory sessions, illustrations of currently working real world computerized information system will be demonstrated. The broad classification of computer based management systems will also be discussed and various Illustrations of working systems in each class will be discussed. Industrial visits will be arranged in order to demonstrate actual functioning of such systems Students will be required to carry out a case study of some such system.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	CBMS Characteristics and Classification	7	6
2	Transaction Processing Systems (TPS)	7	6
3	Decision Support System (DSS)	10	6
4	Management Information System(MIS):	10	6
5	Knowledge Work Systems (KWS)	7	6
6	Executive Support Systems (ESS):	7	6
	Total	48	36

Detailed Contents:

Unit-1. CBMS Characteristics and Classification: (7 Hours)

System Concepts, Computer Based Management Systems and their characteristics, Demonstration of any working System with its pros and cons, Broad classification of CBMS.

Unit-2. Transaction Processing Systems (TPS): (7 Hours)

Transactions and their processing, Illustrations of Transactions in various working CBMS, Characteristics of Transaction Processing System (TPS), Illustrations and live demonstration of TPS such as Banking System, Railway reservation system etc.

Unit-3. Decision Support System (DSS): (10 Hours)

Business Intelligence and Decision support, Business value of Improved Decision making, Decision making Process, The difference between MIS and DSS, Types of DSS, Components of DSS, Business value of DSS, Web-based Customer DSS, Examples of DSS such as Manufacturing System, Capacity Requirements Planning for Equipment, Manpower and Time MRP, Production Planning- work order management – EOQ, EBQ etc,

Unit-4. Management Information System(MIS): (10 Hours)

Why and What is an Information System, A business perspective of MIS, Dimensions of MIS, The challenges of Information systems, Four Major types of MIS and their relationship with each other, Examples of MIS such as Sales and Marketing System, Finance and Accounting system etc,

Unit-5. Knowledge Work Systems (KWS): (7 Hours)

Important Dimensions of knowledge, Organizational learning and Knowledge Management, The Knowledge Management value change, Types of Knowledge Management Systems, differentiate them from Information Systems, knowledge workers and Knowledge work, Requirements of KWS, Examples of Knowledge work systems such as Computer Aided design, Virtual Reality systems, Investment workstations etc

Unit-6. Executive Support Systems (ESS): (7 Hours)

Characteristics of ESS, The purpose of ESS, The Role of ESS in the Firm, Business value of ESS, ESS for Competitive Intelligence, Monitoring Corporate Performance, Enterprise wide reporting and Analysis, Working Examples of ESS.

Core Books:

1. K. C. Laudon & J. P. Laudon: Management Information Systems, 9th Ed., Pearson Education, 2006.

Reference Books:

4. W.S. Jawadekar: Management Information Systems .
5. Jerome Kanter: Management Information Systems .
6. Gordon B. Davis: Management Information Systems .
7. P.T. Josep: E-Commerce A managerial Perspective-PHI Publication
8. Jeffery: Introduction to E-Commerce, TMH.

MA 702: Computer Oriented Numerical and Statistical Techniques

(6 credits)

Objective: To acquaint the students with the Numerical and Statistical techniques required for solving certain Real world problems and the Relevant Mathematical and Statistical software implementing such techniques. At the end of the course the students should be able to tackle moderate size real world problems using appropriate techniques and the software.

Pre-requisite: MCA113F course for Students with Commerce background and No additional prerequisite is required for students with Science background.

Methodology & Pedagogy: During Theory lectures illustrations of certain real world problems requiring Numerical computations and / or Statistical inference will be explained. Numerical and Statistical methods will be introduced as tools for solving such problems also be emphasized. During Practical sessions Mathematical and Statistical software implementing such techniques will be introduced and will be used to solve moderate size Real world problems.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Motivation and basics of Machine Computations	7	4
2	Solutions of single and systems of equations	10	8
3	Interpolation and Numerical Integration	7	6
4	Motivation and Basic Concepts of Statistics	7	4
5	Probability Distributions and Parameter Estimation	10	7
6	Statistical Inference	7	7
	Total	48	36

Detailed Contents:

Unit-1. Motivation and basics of Machine Computations: (7 Hours)

Illustrations of the Real world problems requiring Numerical Techniques to be taught in the Course, Complete case study presentation relating to some of these problems, Difference between Manual and Machine computations, Difference between Analytical and Numerical solutions, Exact and approximate solutions, Need for Numerical methods, Computer Arithmetic, Errors in Computations with Digital computers.

Unit-2. Solutions of single and systems of equations: (10 Hours)

Techniques for solutions of a single equation: Bisection Method, Regula Falsie method, Newton Raphson Method, Fixed point iteration Method, convergence criteria and Rate of Convergence.

Techniques for solving System of Linear equations: Direct methods viz. Gauss Elimination method, Cholesky LU Factorization method, error estimates for these methods, Iterative methods viz. Jacobi method, Gause Seidel method, convergence criteria for Rate of convergence for these methods, Use of Mathematical software implementing these methods for solving moderate size Real world problems.

Unit-3. Interpolation and Numerical Integration: (7 Hours)

Interpolation: Lagrange Interpolation Formulae, Newton Divided Difference Interpolation Formulae. Newton Forward Difference and Backward Difference Interpolation Formulae, Error estimates for these Formulae.

Numerical Integration: Trapezoidal Rule, Simpson's 1/3 and 3/8 rules, Error bounds and estimates for these rules, Use of Mathematical software implementing these methods for solving moderate size Real world problems.

Unit-4. Motivation and Basic Concepts of Statistics: (7 HourS)

Illustrations of the Real world problems requiring Statistical Techniques to be taught in the Course, Complete case study presentation relating to some of these problems, Experiments and their outcomes, Population and Samples, Elementary Sampling methods, Population Parameters and Sample Statistics, Graphical Comparisons of Data Sets, Events and Probability, Properties of Probability, Methods of Enumeration, Conditional Probability, Independent Events, Bayes Theorem.

Unit-5. Probability Distributions and Parameter Estimation: (10 Hours)

Probability Distributions: Discrete and Continuous Random Variables, Probability Density and mass functions, Mathematical Expectation, Discrete Distributions viz. Bernoulli Trials and the Binomial Distribution, The Poisson Distribution, Continuous Distributions viz. The Uniform and Exponential Distributions, The Gamma and Chi-Square Distributions, The Normal Distribution, Distributions of Functions of a Random Variable, Distributions of Two Random Variables, Distributions of the sample mean and the sample variance for a normal population, Chi-Square, t and F distributions. (The theorems with Statements only)

Parameter Estimation: Point Estimation methods viz. The method of moments and the method of maximum likelihood estimation, Interval Estimation Methods viz. Confidence Intervals for Mean of the Normal Distribution with known and unknown variance, Confidence Interval for variance of the Normal Distribution, Confidence Intervals for Difference of Two Means, Sample Size.

Unit-6. Statistical Inference: (7 Hours)

Testing of statistical hypothesis, Null hypothesis, tests of hypothesis and significance, Chi-square, t, z and F tests, Tests About Proportions, Tests of the Equality of Two Normal Distributions, Chi-Square Goodness of Fit Tests, Types of errors in Tests, Regression Analysis, Fitting of Straight lines, Correlation Analysis Contingency Tables, Analysis of Variance. Use of Statistical software implementing these methods for solving moderate size Real world problems.

Core Books:

1. S. P. Gordon & F. S. Gordon: Contemporary Statistics- A Computer Approach, McGraw Hill International Edition, 1994.
2. Steven C. Chapra & Raymond P. Canale: Numerical Methods for Engineers, Fifth Ed., Tata McGraw Hill, 2006.
3. Erwin Kreyszig: Advanced Engineering Mathematics, 8th Ed., John Wiley & Sons, India, 1999.

Reference Books:

1. Hogg & Tannis: Probability and Statistical Inference, Sixth Ed., Prentice-Hall, NJ, USA, 2000.
2. Larsen & Marx: An Introduction to Mathematical Statistics and Its Applications, Third Ed., Prentice Hall, NJ, USA, 2001.
3. John H. Mathews & Kartis D. Fink: Numerical Methods using Matlab, Forth Ed., Pearson Education.
4. D. N. Datta: Computer Oriented Numerical Methods, Vikas Pub. House, 2008.

Master of Computer Applications Programme

SYLLABI (Semester – III)

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

CA 801 – Enterprise Computing Through Java (JEE) (6 Credits)

Objectives: The objective of the course is to

- Develop proficiency in the advanced features of the Java Programming Language like RMI, JDBC, JavaBeans and Internationalization features.
- Be able to develop web applications using the Servlet Technology.
- Be able to parse XML files using the Java APIs using SAX Parser and the DOM model both.
- Be able to understand and use the JUnit framework for testing, and get an Idea about the Test Driven Development process.
- Be able to use the Ant tool for building and deploying Java applications

Prerequisites: CA706. Object Oriented concepts and Programming in Java (JSE)

Methodology & Pedagogy: During theory lectures illustrations emphasizing the need for advanced features of Java Programming Language will be given. During Practical sessions, students will be required to develop Web Applications using Servlet Technology & advanced features of Java Programming Language. Also student will be required to develop code to parse XML Documents using SAX parser & using the DOM as well as to create Ant builds for java application & run JUnit tests..

Learning Outcomes: Upon successful completion of the syllabus students shall be able to understand and use advanced features of Java Programming Language, Test driven development Process and will be able to use tools like JUnit, Ant to build and deploy Real world Three tier Applications.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Java Networking & Distributed Objects	7	3
2	Database Programming & Frameworks for Building, Testing & Deploying Java Applications:	10	6
3	Internationalization & Localization, XML, JavaBeans Components	7	3
4	Java Web Application Components-I	10	9
5	Java Web Application Components-II	10	9
6	Advanced Servlet Features & Security:	4	6
	Total	48	36

Detailed Contents:

Unit 1. Java Networking & Distributed Objects (7 Hours)

Java Networking: Connecting to a server, Implementing Servers, Interruptible Sockets, and Making URL Connections.

Distributed Objects: The Roles of Client and Server, Remote Method Calls, RMI Programming Model, Parameter Passing in Remote Methods

Unit 2. Database Programming & Frameworks for Building, Testing & Deploying Java Applications (10Hours)

Database Programming: The Design of JDBC, The Structured Query Language, JDBC Configuration, Executing SQL Statements, Query Execution, Scrollable & Updatable Result Sets, Row Sets.

Frameworks: Introducing Ants, A First Ant Building, Understanding Ant data types & Properties, Testing with JUnit

Unit 3. Internationalization & Localization, XML, JavaBeans Components (7 Hours)

Internationalization & Localization: Locals, Number Formats, Date & Time, Collation, Message Formatting, Text Files & Character Sets, Resource Bundles.

XML: Introducing XML, Parsing an XML Document, Validating an XML Document, Locating Information with XPath, Using Namespaces, Streaming Parsers, Generating XML Documents, XSL Transformations.

JavaBeans Components: Why Beans? , The Bean-Writing Process, Using Beans to Build an Application.

Unit 4. Java Web Application Components-I (10 Hours)

Understanding Web Applications: Understanding Web Components, Servlets (Overview), JSP Pages, Introducing the MVC Design Pattern, Understanding Containers, Packaging Web Applications, Web Application Structure, JAR Files, WAR Files, HTTP, GET Request Method, POST Request Method, GET & POST in HTML Form Processing, Other Request Methods, The HTTP Response, Using Deployment Descriptors.

Unit 5. Java Web Application Components-II (10 Hours)

Working with Servlets: Introducing Servlet, Introducing Servlet & the MVC Pattern, Introducing javax.servlet Package, Introducing the Servlet Interface, Introducing the GenericServlet Class, Introducing HTTP & Servlets, Understanding the Request/Response Cycle, Input & Output Streams, Introducing Servlet/ Container Communication, Introducing ServletContext, Understanding the Deployment Descriptor, Introducing ServletContext Lifecycle Classes, RequestDispatcher Interface, Using Filters & RequestDispatcher

Unit 6. Advanced Servlet Features & Security: (4 Hours)

Understanding the Stateless nature of HTTP, Why Track Client Identity & State? , Maintain Sessions, Session Management Using the Servlet API, and Concepts of Filters.

Core Books:

1. Cay S Horstmann, Gary Cornell: Core Java 2, Volume 2 – Advanced Features, Eighth Edition, Pearson Education, 2009.
2. Sue Spielman and Meeraj Kunnumpurath: Pro J2EE 1.4, Wiley Computer Publishing, 2004.
3. Steve Loughran, Erik Hatcher: ANT In Action, Second Edition, Wiley-Dreamtech/Manning., 2007.

Reference Books:

1. Alexander V Konstantinou, William Wright, Chad Darby and others: Beginning Java Networking, Shroff Publishers and Distributors, 2001.
2. Jim Farley, William Crawford, Justin Gehland, Prakash Malani and John G Norman: Java Enterprise In A Nutshell, Third Edition, Shroff Publishers and Distributors, 2006.
3. Joseph O'Neil: JavaBeans Programming – from the Ground Up, Fourth Reprint, Tata McGraw-Hill Publishing Company Limited, 2000.
4. Marty Hall, Larry Brown: Core Servlets and JavaServer Pages, Volume 1 : Core Technologies, Second Edition, Pearson Education , 2003.
5. Marty Hall, Larry Brown: Core Servlets and JavaServer Pages, Volume 2 : Advanced Technologies, Second Edition, Pearson Education, 2008.
6. Steve Holzner: Ant The Definitive Guide, Second Edition, Shroff Publishers and Distributors, 2006.

CA 802: Relational Database Management Systems –II (6 Credits)

Objectives: This course is intended to give students advanced concepts of Relational Database Management System, security aspects of databases and introduction to other databases. Also concepts and practical aspects of data manipulation using stored procedures and triggers will be given.

Prerequisites: CA 707 Relational Database Management System-I.

Methodology & Pedagogy: During theory sessions detailed understanding of query and Transaction process mechanism, Database backup, recovery and security mechanism will be given. Students will also be taught how to write stored Procedures and how to trigger these procedures using specific procedural language.

During Practical sessions, students will be required to carry out case studies using the concepts and techniques they have learnt during theory sessions.

Learning Outcomes: Upon successful completion of the syllabus students shall be able to handle multiple transactions effectively, Design Stored procedures, utilization of triggers / cursors to control and retrieve data efficiently. In turn students will be able to generate back end support for any business application.

Outline of Course:

Unit No.	Title of unit	Minimum number of hours	
		Theory	Practical
1	Transaction Processing and Concurrency control	6	36
2	Database backup and Recovery	6	
3	Implementing Security in Databases	6	
4	Object Relational and Extended Relational Databases	9	
5	Other Data models for Advanced Applications	6	
6	Stored Procedures and Triggers	15	
	Total	48	

Detailed Contents:

Unit 1. Transaction Processing and Concurrency control (6 Hours)

Transaction concepts: Transaction execution and Problems, Transaction execution and control with SQL, Transaction properties, Transaction log, Concurrency control, Locking methods for concurrency control, Timestamp methods for concurrency control, Optimistic methods for concurrency control (Read phase, validation phase, Write phase), Deadlock handling - detection and resolution

Unit 2. Database backup and Recovery (6 Hours)

Need of Database backup, Database backup techniques, Types of Database failures, Types of Database recovery (Forward recovery, Backward recovery, Media recovery), Recovery techniques (Deferred Update, Immediate update, Shadow Paging, Checkpoints), Buffer management.

Unit 3. Implementing Security in Databases (6 Hours)

Security & integrity threats, Defense mechanisms, Statistical database auditing & control, Granting/revoking of privileges using SQL

Unit 4. Object Relational and Extended Relational Databases (9 Hours)

Database design for an ORDBMS, Nested relations and collections, Storage and access methods, An overview of SQL3, Systems comparison of RDBMS, OODBMS, ORDBMS

Unit 5. Other Data Models for Advanced Applications (6 Hours)

Active database concepts. Temporal database concepts.; Spatial databases, Concepts and architecture; Deductive databases and Query processing; Mobile databases, Geographic information systems.

Unit 6. Stored Procedures and Triggers (15 Hours)

Understanding the main features of Stored Procedures, Stored Procedures Architecture, advantages of using procedures, Basic code structure, variables, conditional statements, looping (loop statements, while loops, for loops, Cursor FOR loops) Stored procedures (Functions, procedures, packages and triggers)

Core Books:

1. Ramakrishnan, Gehrke: Database Management Systems, Third edition, McGraw Hill.
2. Ivan Bayross: SQL, PL/SQL – The programming Language Oracle.

Reference Books:

1. Silberschatz, Korth, Sudarshan: Database System Concept, Fifth Edition, McGraw Hill.
2. Elmasri Navathe: Fundamentals of Database Systems, Third edition, Addison Wesley.
3. Peter Rob, Carlos Coronel: Database Systems: Design, Implementation and Management, seventh edition, Thomson Course technology.

CA 803 - Advanced Operating Systems (6 Credits)

Objective: The objective of this course is to provide an understanding for a thorough knowledge of processes, scheduling concepts, memory management, I/O and file systems in an operating system, the concepts underlying the design and implementation of operating systems.

Prerequisites: CA703 and CA705

Methodology & Pedagogy: In order to achieve the course objectives, students will be introduced to the major operating system concepts through the discussion of various system calls and system programs, using advance shell features and using perl.

Learning Outcomes: Upon successful completion of the syllabus students will have in depth understanding of computer system, facilities provided by an Operating System for application development and system programming.

Outline of Course:

Unit No.	Title of unit	Minimum number of hours	
		Theory	Practical
1	Process and Thread Management	6	6
2	Concurrency Management	8	9
3	Virtual Memory Management	7	-
4	Scheduling and I/O Management	9	-
5	File system Structure	8	9
6	Advance Shell Programming	10	12
	Total	48	36

Detailed Contents:

Unit-1. Process and Thread Management (6 Hours)

Process Concept: Process States, Process Description (Process table, Process Image, Process control Block), Process Control (Process Creation, Process Termination, Process Switching, Mode Switching).

Thread Concept: Benefits of using thread, multithreading, user level and kernel level threads.

System Programming: process table, using fork(),exit(),wait(),exec(), creating threads using POSIX standards.

Unit-2. Concurrency Management (8 Hours)

Mutual Exclusion : Hardware support, semaphores, monitors, message passing

Classical problems of concurrency: Producer/Consumer problem, Reader's Writers Problem, Dining Philosopher's problem.

Deadlock and Starvation: Reasons for deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Starvation.

Unit-3. Virtual Memory Management (7 Hours)

Memory management requirements: Relocation, Protection, Sharing, Logical and Physical Organization.

Hardware and control structures : Paging , Segmentation, Combined Paging and Segmentation

OS policies for virtual memory : Fetch policy, Placement policy, Replacement policy, Resident set management, Cleaning policy.

Unit-4. Scheduling and I/O Management (9 Hours)

Uniprocessor Scheduling algorithms: First Come First Served, Round Robin, Shortest Process Next, Shortest Remaining Time, Feedback.

I/O Management : Different types of I/O Devices, Organization of I/O function, I/O Buffering, Disk Scheduling, RAID.

Unit-5. File system Structure (8 Hours)

File Management : File Organization and Access, File Directories, File Sharing Record Blocking.

Secondary storage management: File allocation methods, Free space management

System Programming using files : system call basics and library functions , opening and closing files, using I/O calls, Buffered and unbuffered I/O, Handling errors.

Unit-6. Advance Shell Programming (10 Hours)

Using awk and sed: Basics of sed, Building Interval Regular Expression (IRE) , Tagged Regular Expression (TRE) using sed, Simple awk filtering, splitting a line into fields, formatting output, using variables and expressions, the comparison operators, number processing, the BEGIN and END sections, built-in variables, arrays, looping.

perl : Creating programs using string handling functions, loops, lists and scalar arrays, handling associative arrays, using file handles to access a file or stream, test file attributes, develop subroutines.

program development tool : Handling multisource C applications, Compiling and linking the application, make (identifying dependencies, removing redundancies, using macros, ar (archive).

Shell Programming: String Handling, shell functions, Using eval, Using exec.

Core Books:

1. Silberschatz :Operating System Concepts :8th Edition : John Wiley & Sons (ASIA) Pte Ltd., 2009.
2. Sumitabha Das :Unix concepts & application :4rd Edition : Tata McGraw Hill : 1992
3. Kenneth Rosen, Douglas Host, James Farber and Richard Rosinski: The Complete Reference: Tata McGraw Hill:1999.
4. Andrew S. Tanenbaum,"Modern Operating Systems",Prentice Hall of India Pvt. Ltd, 2003.

Reference Books :

1. William Stallings :Operating Systems Internals and Design Principles: 5th Edition : PHI : 2005
2. Mark G. Sobell : A Practical Guide to Linux: Pearson Education:1997
3. Harvey M. Deitel," Operating Systems",2nd Edition, Pearson Education Pvt. Ltd, 2002.

CA804. Object Oriented System Analysis and Design (4 Credits)

Objectives:

- To model a software intensive system using UML
- To understand modeling different views of a system and constructing these views using diagrams.
- Using case study approach to learn object oriented modeling using tools.

Prerequisite: CA706

Methodology & Pedagogy: During theory lectures, concepts of object oriented analysis and design will be discussed using industry standard Unified Modeling Language. Through case study based approach students will be asked to design different views of real world systems using UML tools.

Learning Outcomes: Upon successful completion of the course, students shall be able to analyze and design different views of any system using UML tools.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours
		Theory
1	UML Conceptual Model	7
2	Basic Structural Modeling	9
3	Basic Behavioral Modeling	7
4	Architectural Modeling	7
5	View and Diagrams	8
6	Tool based design of different views	10
	Total	48

Detailed Contents:

Unit-1 UML Conceptual Model (7 Hours)

The importance of modeling, Four Principles of Modeling, The essential blueprint of a software system, Object oriented Modeling, Overview of UML, Three steps of understanding the UML, Software Architecture, The software development process, Classes and Components, Static Models and Dynamic Models, Connection among models, Extending UML

Unit-2 Basic Structural Modeling (10 Hours)

Classes: Classes, attributes, operations and responsibilities, modeling vocabulary of system, Modeling distribution of responsibilities in a system, Modeling non software things, Modeling primitives types, Making quality abstractions

Relationship: Dependency, generalization, and association relationships, □□ modeling simple dependencies, Modeling single inheritance Modeling structural relationships, Creating webs of relationships

Common Mechanisms: Stereo types, tagged values, and constraints, Modeling comments, Modeling new building blocks, Modeling new properties, Modeling new semantics, Extending the UML

Unit-3 Basic Behavioral Modeling (7 Hours)

Interactions: Roles, links, messages, actions, and sequences, modeling flows of control, Creating well-structured algorithms

Use Cases: Use cases, actors, include, and extend, modeling the behavior of an element, Realizing use cases with collaborations

Unit-4 Architectural Modeling (7 Hours)

Components: Components, interfaces, and realization, Modeling executables and libraries, Modeling tables, files, and documents, modeling an API, Modeling source code, Mapping between logical and physical models

Deployment: Nodes and connections, Modeling processors and devices, modeling the distribution of components, Systems engineering

Collaborations: Collaborations, realizations, and interactions, modeling the realization of a use case, modeling the realization of an operation, modeling a mechanism, Reifying interactions

Patterns and Framework: Patterns and frameworks, modeling design patterns, modeling architectural patterns, making patterns approachable
, Forward and reverse engineering

Unit-5 Views and Diagrams (8 Hours)

Diagrams: Diagrams, views, and models, modeling different views of a system, modeling different levels of abstraction, modeling complex views, Organizing diagrams and other artifacts.

Structural Diagrams: Class Diagram, Object Diagram

Behavioral Diagrams: Use Case Diagram, Interactions Diagrams: Sequence and collaboration diagram, Activity Diagram

Architectural Diagram: Component Diagram

Unit-6 Tool based design of different views (10 Hours)

Introduction to Rational Rose: What is rational rose,views,navigations

UML Diagrams in Rational Rose: Use Case View, Logical View, Component View, Deployment View

Case Study of any system using this tool

Core Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Addison Wesley.
2. Jacobson, Booch, Rumbaugh, The Unified Software Development Process. Pearson Education, 1999.
3. Wendy Boggs, Michel Boggs: Mastering UML with Rational Rose, Sybex.

Reference Books:

1. Craig Larman : Applying UML and Patterns : An Introduction to object oriented analysis and design and iterative development, 3rd Edition, Prentice Hall.
2. Jhon Deacon : Object Oriented analysis and design, Addison-Wesley, 2005.

CA 805. Data Communication and Networks (4 Credits)

Objectives:

- Emphasizing the importance of data communication networks of various geographical spread.
- Understand network communications from the viewpoint of the 7 standard layers.
- Understanding various aspects of network security.

Prerequisite: CA702 and CA703

Methodology & Pedagogy: During theory lectures, the ISO/OSI 7-layered model for understanding network communications will be discussed in depth. Using the case study approach, the components of Institute's computer network will be demonstrated. Proxies, Firewalls and other security mechanisms deployed on the network will be practically taught.

Learning Outcomes: Upon successful completion of the course the students shall be able to understand the networks and should be able to design medium sized networks.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours
		Theory
1	Introduction	7
2	Data link layer	7
3	Medium Access Control layer	9
4	Network layer	8
5	Transport layer	8
6	Network Security	9
	Total	48

Unit 1 Introduction (7 Hours)

Introduction, Network Hardware, Software, Reference Model, Internet, ATM, Physical Layer, Transmission Media, Wireless Transmission, Switching - circuit switching, packet switching, message switching, hybrid switching -j Communication satellites.

Unit 2 Data link layer (7 Hours)

Data Link Layer design issues, Error detection and correction, link protocols, Sliding Window protocols, Data Link Layer in the Internet

Unit 3 Medium Access Control layer (9 Hours)

Medium access layer, Channel allocation problem, Multiple access protocols, Ethernet, Wireless LAN, Bluetooth.

Unit 4 Network layer (8 Hours)

Network Layer, design issues, Routing Algorithms, Congestion Control algorithms, Internetworking, Internet Protocol, IP address, Internet Control Protocol.

Units 5 Transport layer (8 Hours)

Transport Layer, Design issues, Connection Management - addressing, establishing and releasing a connection, Simple Transport Protocol, Internet Transport protocol, E-mail,

Unit 6 Network Security (9 Hours)

Network security, Cryptography, Digital Signature, Management of Public keys, Communication Security, Web Security, Social Issues.

Core book:

I.A.S. Tanenbaum: Computer Networks, Fourth Edition, Pearson Education , 2003.

Reference Books:

1. Fred Halsall: Data Communications, Computer Networks and Open Systems, 4th Edn, Pearson Education, 2003.
2. B. Forouzan: Introduction to Data Communication and Networking, 3rd Edn, TMH, 2004.

CS 801. Technical Writing and Content Management & Soft skill (4 Credits)

Objectives:

- To Develop Technical Writing Skills of the students (Technical Documents, Manuals, WEB page, BLOGs, Letters / e-mails)
- To improve presentation skills of students.
- To develop behavior skills of the students.
- To enable them effectively utilize the latest content management approaches and systems for better organization.

Pre- requisite: Course CS 701

Methodology & Pedagogy:

- Classroom Teaching will be facilitated by Reading Materials, Explanations on the Blackboard and PowerPoint Presentations.
- Interpersonal Activities such as group discussions, role plays, simulations, just a minute sessions and presentations will be incorporated in the classroom to acquaint themselves with the practical issues regarding soft skills. They will be facilitated by an extensive use of multi-media presentations and listening exercises.
- A case study will be given to the students which will carry 10% weight age.
- Two evaluations (through written tests) - Internal (at Department / Institute Level) and External (at University Level) will have 20% and 70% of the Theory Marks weight age respectively.

Learning Outcomes:

- The students will get the ability to communicate effectively with co-workers, employers, clients and customers, friends and family members.
- The students will be able learn how to manage self in the work place needed for career development. In addition to this, they will be able to communicate and manage relationships at different levels.
- They will gain the ability to recognize symptoms of stress and learn management strategies to cope up with it.
- They will derive leadership skills to improve team results.

Outline of Course:

Unit No.	Title of unit	Minimum number of hours
		Theory
1	Sentence Structure, Style, Professional Communications and Resumes	8
2	Writing Process and Professional Document Design	8
3	Finding Information, Documentation Styles and Content Management	8
4	Business Communication	8
5	Behavioral Skills	8
6	Training in Group Discussion (GD) and Personal Interview (PI)	8
	Total	48

Detailed Contents:

Unit1: Sentence Structure, Style, Professional Communications and Resumes (7 Hours)

STUDENTS WILL LEARN

- The basics of writing
- Various sentence structures to avoid misinterpretations from their writings
- To write effective letters and emails

MAJOR COMPONENTS

Sentence Structure and Style

problems with modifiers; mixed constructions; coordination and subordination; parallelism; needed words and sentence variety

Professional Communications and Resumes

employment communication; types of business messages; business-letter format; memo format; e-mail strategies and format; resume writing.

Unit 2: Writing Process and Professional Document Design (7 Hours)

STUDENTS WILL LEARN

- To draft different types of documents
- To write, rewrite and proofread documents
- To format documents

MAJOR COMPONENTS

Writing Process

planning and drafting the technical documents; selecting and using writing structures; reviewing and revising; proofreading the final manuscripts

Professional Document Design

fonts, margins, line spacing, alignment, headings, highlighting; notices, tables, graphs and charts; illustrations and equations.

Unit3: Finding Information, Documentation Styles and Content Management (7 Hours)

STUDENTS WILL LEARN

- The ways to find information
- The difference between search and research
- To evaluate the information
- Various documentation styles such as IEE, APA, CSE and MLA
- The basics of content management
- To create and manage blogs
- Create, edit and publish contents
- Understand the digital content copyright law

MAJOR COMPONENTS

Finding Information

Researching: inside and outside the library; research process, information cycle; types of information resources; evaluating what you find, saving information you find
Documentation Styles: IEE, APA, CSE and MLA Style of Documentation

Content Management

web publishing fundamentals; major CMSs on web; identifying your reader, identifying your content; creating content, editing content, publishing content; information architecture fundamentals; meta data and classification, navigation, search, layout and design.

Unit 4: Business Communication(7 Hours).

STUDENTS WILL LEARN

- To deliver short presentations
- To write clear and concise documents to accomplish business objectives
- To fine-tune language to improve persuasiveness and impact
- To enhance e-mail communication by creating clear and specific messages
- The pre-requisites of effective meetings

MAJOR COMPONENTS

Business Communication

communications skills, current English usage; debates, language games, situational dialogues, précis writing, essay writing;

Presentation Skills

preparing for effective presentations; presentation for small groups and large groups; marketing and business presentations;

Business Correspondence

principles of clear writing; often misused words; applications and requests, routine messages, memos, report writing; positive and negative responses to requests; preparation of agenda and minutes, organizing meetings; business etiquette, telephone etiquette, e-mail etiquette.

Unit 5: Behavioral Skills (7 Hours)

STUDENTS WILL LEARN

- The team building skills
- To set goals and negotiate
- The qualities of great leader
- The lessons from lives of leaders

MAJOR COMPONENTS

psychological tests, aptitude and personality assessment; team Skills, team building and leadership, evolution of groups into teams, group dynamics; emergence of leadership, conflict management, inter dependency; time management; prioritization and goal setting, negotiations, social skills, assertive skills and cross-cultural communications

Leadership Skills

Concepts of leadership, leadership styles; insights from great leaders

Unit 6: Training in Group Discussion (GD) and Personal Interview (PI)(7 Hours)

STUDENTS WILL LEARN

- The basics of selection process
- Interview techniques and how to manage oneself during an interview
- How to leave a good impression after an interview

MAJOR COMPONENTS

Overview of selection process, dealing with placement consultants and headhunters; references – how to get effective references from past and current employers; Group Discussions: Concepts and Practice; effective interview techniques, mock interviews, stress interviews; review and feedback

Core Books:

1. David A McMurrey and Joanne Buckley: Handbook on Technical Writing.
2. M S Rao and Ramana P S V: Soft Skills for Better Employability.
3. Dharmesh K Mishra: Soft Skills: An Essential Ingredient For Success.
4. Anitha Arunsimha: Soft Power: An Introduction to Core and Corporate Soft Skills.
5. Bill Trippe: Perspectives on Content Management.

Master of Computer Applications Programme

SYLLABI (Semester – IV)

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

CA 806. Software Engineering (4 Credits)

Objectives: -

- Viewing software development process as an Engineering activity.
- Appreciate the importance of having a process for software development and understanding the Unified Process (UP) in detail.
- Understand the various activities undertaken for a software development project using Object Oriented Analysis and Design with UML Tools

Prerequisites: Course CA804.

Methodology & Pedagogy: During theory lectures concept of Object Oriented software engineering will be discussed with real world examples. A real life system will be taken as a case study through out the course, developing various modules phase by phase. UML Tools will be used throughout the system development process.

Learning Outcomes: Upon successful completion of the course, the students will be able to understand concepts of software engineering and how to engineer entire software systems with aid of UML tools and Unified Process.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours of Theory
1	Introduction to software engineering and process models	6
2	Software Development Process	6
3	The inception phase	10
4	The elaboration phase : Analysis	8
5	The elaboration phase : Design	8
6	Construction and Transition phases	10
	TOTAL	48

Unit 1. Introduction to Software Engineering and process models (6 Hours)

Recap of UML: Introduction to modelling, importance of modelling, Different views and their relationships; Diagrams, Model elements, General Mechanisms; General mechanisms – Adornments, Notes, Specifications. Modelling Dynamic and Physical structures of system, Model quality.

Understanding the term Engineering, computer programming v/s software engineering, Science vs Engineering, Software engineering concepts – Software project, stakeholder, system, activities, roles, work products, deliverables, methodology.

Unit 2. Software Development Process (6 Hours)

Software development – Software development Lifecycle, processes and activities, IEEE Standards; Models for software development – sequential models, iterative models

Characteristics of an ideal development process – use case driven, architecture centric, iterative and incremental process ; the unified software development process.

Unified process: The dynamic structure - Inception, Elaboration, Construction, and Transition phases; The static structure – different workflows, roles and artefacts.

The concept of a use-case, capturing functional requirements, unified process as a Use-case driven process. Use case diagram, use case model of a system.

Unit 3. The inception phase (10 Hours)

Inception phase – objective; Activities of Inception phase: business modelling, requirements, analysis; Artifacts – vision document, candidate architecture, project plan, establishing the business case.

Business modelling – objectives, advantages, business use-case model, business object model.

Finding use cases, finding actors, relationship between actors, relationships between use cases, documenting use cases – using templates, using UML diagrams – activity diagram, sequence diagram.

Unit 4. The elaboration phase : Analysis (8 Hours)

Elaboration phase – Objectives, activities – finding more actors and use cases, Prioritizing use cases, Detailing use cases. Prototyping user interfaces.

Software architecture – Organization of the system, structural elements and their interfaces, composition, Architecture representation. Unified process as architecture centric process.

Architectural analysis, analyzing use-cases, identifying and analyzing classes, Class diagram, representing relationships and associations, Object diagram. Package - a general organizing construct, analyzing packages. Representing the analysis model.

Unit 5. The elaboration phase : Design (8 Hours)

Designing the system – The goal of design workflow, developing architectural design, Using component diagram and communication diagram.

Designing use-cases, designing classes, designing subsystems; Using sequence diagrams and state diagrams. Design model; architectural implementation of the system.

Test work flow: planning a test, designing a test – integration test, system test, regression tests, structuring test procedures, implementing tests, performing tests.

Unit 6. The construction and transition phases (10 Hours)

Construction phase – Objectives, activities – Detailing all remaining use-cases, structuring the use-case model, completing analysis and design activities, implementing classes, performing unit tests – black box tests and white box tests.

Transition phase: objectives, beta release, responding to beta tests, adapting the product to various environments, ending the project, planning next release.

Planning software deployment, deployment view - deployment diagrams, modelling of nodes, Allocating components to nodes.

Tools to support the life cycle: Requirement management, Visual modelling, Programming tools, Tools for quality assurance.

Core Books:

1. Jacobson, I., Booch, G. and Rumbaugh, J.: The unified software development process, AWL, 1999.
2. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Addison Wesley.

Reference Book:

Booch, G. et al : Object Oriented Analysis and Design with applications, 3/e, Addison-Wesley, 2007.

CA 807. Network Technologies (6 Credits)

Objectives: -

- Understanding internet technologies and protocols.
- Understanding working of network based applications like e-mail, telnet, ftp etc.
- Distinguish various types of network services.
- Understanding Switching and Routing in details.

Prerequisites: Course CA805.

Methodology & Pedagogy: During theory sessions the students shall be introduced to various internet and intranet technologies and network services. As a case study an Institute level Network design, devices, components and security mechanism will be demonstrated. During practical sessions students will be trained to develop network based applications using available technologies.

Learning Outcomes: Upon successful completion of the syllabus students will be able to design and deploy Institute level network and will be able to develop network based applications.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Addressing Techniques	7	36
2	Internet Protocol (TCP/IP)	8	
3	Routing	8	
4	UDP and Mobile IP	8	
5	Internetworking and Applications	8	
6	Internet Security	9	
	TOTAL	48	

Unit 1 Addressing Techniques (7 Hours)

Classful Internet Addresses, Mapping Internet Addresses (ARP), Determining An Internet Address (RARP)

Unit 2 Internet Protocol (TCP/IP) (8 Hours)

Internet Protocol: Connectionless Datagram Delivery, Internet Protocol: Routing IP Datagrams, Internet Protocol : Error and control Messages, ICMP

Unit 3 Routing (8 Hours)

Congestion, Router Discovery and solicitation, Classless and Subnet Address Extensions, Transparent routers, Proxy ARP and Subnet addressing, CIDR, Subnet routing

Unit 4 UDP and Mobile IP (8 Hours)

User Datagram Protocol, Reliable Stream Transport Service, Sliding Window, TCP, Karn's Algo, Congestion, RED Silly window syndrome, starting and closing TCP connection, Mobile IP

Unit 5 Internetworking and Applications (8 Hours)

Private Network Interconnection (NAT, VPN), Bootstrap and autoconfiguration (BOOTP , DHCP), BOOTP, DHCP, The domain name system (DNS), DNS, Resolution, Caching, Mapping, Queries ,Applications : Remote Login (TELNET, Rlogin), Applications : File Transfer and Access (FTP, TFTP, NFS)
Applications : File Transfer and Access (SMTP, POP, IMAP, MIME)

Unit 6 Internet Security (9 Hours)

Electronic mail, TCP/IP, SMTP, MIME, Applications : World Wide Web
Internet Security and Firewall Design, Internet Security, Firewalls

Core Book:

Duglas E Comer: Internetworking with TCP/IP Volume – I, Fourth Edition, PHI.

Reference Book:

Behrouz A. Forouzan: TCP / IP Protocol Suite, Third Edition.

CA 808. – Object Relational Mapping (6 Credits)

Objectives:

- To make students acquainted with the specification of the Java API for the management of persistence and object/relational mapping with Java EE and Java SE.
- To provide an object / relational mapping facility for the Java application developer using a Java domain model to manage a relational database.

Prerequisites: Course CA 706 and CA 801.

Methodology & Pedagogy: During theory lectures specifications of latest version of Java API, Facility of Object Relational mapping, Java Domain Model and application development using these tools for managing Relational Databases will be discussed. During Practical sessions students will be required to develop Java programs for relevant applications using the above tools.

Learning Outcomes: Upon successful completion of the course the students shall be able to use java API, XML Object / Relational mapping descriptors for developing meaningful applications.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Introduction to Java Persistence API, Entities	8	36
2	Entity Operations	8	
3	Query Language	8	
4	MetaModel API and Criteria API	8	
5	Metadata Annotations and Metadata for Object / Relational Mapping	8	
6	XML Object/Relational Mapping Descriptor	8	
	TOTAL	48	

Unit 1: Introduction to Java Persistence API, Entities (8 Hours)

Introduction to Java Persistence API, Object-Relational Mapping, Entity class, Access type, Primary keys and entity identity, Embeddable classes, Collation of embeddable classes and basic types, Map Collections, Mapping defaults for Non-Relationship fields or properties, Entity relationships, Relationship mapping defaults, Inheritance, Inheritance mapping strategies

Unit 2: Entity Operations (8 Hours)

Entity Manager, Entity Instance's life cycle, Persistence Context Lifetime, Locking and Concurrency, Entity listeners and Callback methods, Bean validations, Caching, Query APIs

Unit 3: Query Language (8 Hours)

Statement types, Abstract schema types and query domains, the FROM clause and Navigational declaration, Joins, WHERE clause, Conditional expressions, GROUP BY, HAVING, SELECT clause, ORDER BY clause, Bulk Update and Delete operation, NULL values, Equality and Comparison Semantics.

Unit 4: MetaModel API and Criteria API (8 Hours)

MetaModel API Interface, MetaModel, Criteria API Interface

Unit 5: Metadata Annotations and Metadata for Object/Relational Mapping (8 Hours)

Callback Annotations, Annotations for Queries, References to EntityManager and EntityManagerFactory, Annotations for Object/Relational Mapping

Unit 6: XML Object/Relational Mapping Descriptor (8 Hours)

XML overriding rules, persistence-unit-defaults Sub elements, Other Sub elements of the entity-mappings element, entity Sub elements and Attributes, mapped-super class Sub elements and Attributes, embeddable Sub elements and Attributes , XML Schema

Core Books:

1. Linda DeMichiel, Sun Microsystems, Michael Keith: Oracle Corporation
Java Persistence API Specification ,Sun Microsystems,2006

Reference Books:

1. Mike Keith, Merrick Schincariol Pro JPA 2: Mastering the Java™ Persistence API
Publisher: Apress; 1 edition, 2009.
2. Mike Keith, Merrick Schincariol Pro EJB 3: Java™ Persistence API
Publisher: Apress; 1 edition, 2006.

CA 809. Business Process Modeling (6 Credits)

Objectives :

Business Process Modeling is an important knowledge domain to understand and redesign the business processes. Redesigning the business processes is required to increase the efficiency of business operations and optimum solution of enterprise resources. ICT is an important tool to enable business process remodeling. This course equip the students with understanding of business process and applying ICT for it.

- Gain an overview of how Business Process Modeling and Analysis has led to the development of large software application such as ERP, SCM and e-Commerce.
- Understanding analysis and redesigning of business process
- Understanding use or proven tools and techniques for documenting/ modeling, analyzing and reengineering key elements of business functions.
- Understanding the skills needed to implement Business Process Modelling.
- Implementation of (redesigned or reengineered) business processes

Prerequisites: Course CA 708

Methodology & Pedagogy: During theory lectures concepts of Business process models and their implementation will be discussed. Emphasize will be given on using proven techniques for documenting, analyzing and redesigning key elements of business functions. This will be done by use case analysis approach. Actual examples of business functions will be given as case studies.

Learning Outcomes: Upon successful completion of the course students shall be able to understand and analyze the business processes and modeling, analyzing and redesigning techniques for these processes. Students will also get overall idea about role of BPM in development of large software applications such as ERP, SCM and E-Commerce.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Overview of Company Organization and Business Processing	7	36
2	Modeling/ Documentation	9	
3	Redesign	8	
4	Execution and Improvement	10	
5	In depth Study of One Type of Process Automation	6	
6	Future of Business Process Automation	8	
	Total	48	

Detailed Course Content

Unit 1: Overview of Company Organization and Business Processing (7 Hours)

Business Process Change and the Manager's Job, The Evolution of an Organization's Understanding of Process, The Variety of Options, The Variety of Solutions.

Organizations as Systems, systems and Value Chains, Business Process Reengineering, The Role of Information Technology in BPR, Misuses of BPR, Workflow and Packaged Applications, Software Engineering, The Rummler-Brache Methodology, ISO 9000 and Six Sigma Methodology, Changes in Business and IT in the Late 1990s, Mergers, Acquisitions and Globalization.

Unit 2: Modeling/ Documentation (9 Hours)

Modeling Organizations-The Traditional View of an Organization, The systems view of an Organization, Models and Diagrams, Organization Diagrams, Organization Diagrams and Processes, Systems and Processes

Modeling Processes- Process Diagram Basics, More process notation, IS, COULD, and SHOULD Process Diagrams, Levels of Analysis.

Unit 3: Redesign (8 Hours)

Why have methodologies? How does it all begin? What happens? Who makes it all happen? Various Phases of redesigning

- * Planning for Redesign Effort
- * Analysis of an Existing process
- * Design of a new or Improved process
- * Development of Resources for an Improved process
- * Managing the transition to new process.

Types of process redesign patterns, the reengineering pattern, the simplification pattern, the valued-added analysis pattern, and the gaps and disconnects pattern.

Unit 4: Execution and Improvement (10 Hours)

Managing Business Processes, The role of manager, a closer look at manager's job, how to manage a process? Goals, measures and monitoring, the balanced scorecard approach, continuous measurement, and improvement, management redesign at Chevron

Process Improvement: Six Sigma, the six Sigma concept, the six Sigma approach to process improvement, six Sigma Teams, Phases in six Sigma project, Alternative Approaches to Process Improvement.

Unit 5: In depth Study of One Type of Process Automation (6 Hours)

Business Process Automation: Workflow Systems, Types of Workflow Systems, Two Case studies: Anova and iJET Travel Intelligence, workflow and XML, Generic Business Process Languages and Web Services, The future of Workflow and Business Process Workflow Languages.

Unit 6: Future of Business Process Automation (8 Hours)

E-Business applications, a customer focus, websites and portals, analyzing Customer-Oriented processes, customer-oriented E-Business redesign, Supplier-Oriented E-Business Redesign, how Do Companies structure supply chain applications, E-Business Marketplaces, Directly Linked Supply Chain Systems.

Core Book:

1. Paul Harmon: Business Process Change-A managerial guide, to improve, redesign and automating process. Morgan Kaufmann Publishers. www.mkp.com
2. John Halt: A Pragmatic Guide to Business Process Modeling, Second Edition, BCS Special Priced Titles Viva Books Pvt. Ltd.,2010.

USEFUL LINKS – GENERAL INFO

<http://www.businessballs.com/business-process-modelling.htm>

http://www.projectperfect.com.au/info_business_process_modelling_overview.php

USEFUL LINKS – COMMERCIAL/ PRODUCT INFO

http://www.ibm.com/developerworks/websphere/library/techarticles/0705_fasbinder/0705_fasbinder.html

http://www.sparxsystems.com/business_process_model.html

CA 810. Embedded Systems and JME (6 Credits)

Objectives: -

- Understanding the Java micro edition architecture
- Understanding processor architecture for use in embedded system.
- Develop Java applications for hand-held devices with the Java Micro Edition
- Build functional MIDlets.

Prerequisites: Course CA 706 and CA 801

Methodology & Pedagogy: During theory sessions concepts of embedded system and Java Micro edition will be discussed. Students will be assigned a case study of some embedded systems. During practical sessions students will be trained to develop embedded systems using JME platform.

Learning Outcomes: Upon successful completion of the syllabus students will be able to design embedded systems using JME platform.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Introduction and overview	6	3
2	Embedded and real-time systems	6	3
3	Java Micro Edition Specifications	8	3
4	Developing applications for hand-held devices	8	9
5	Writing Java applications for PDAs	8	9
6	Programming Mobile Devices	12	9
	TOTAL	48	36

Detailed Contents:

Unit: 1 Introduction and overview (6 Hours)

Java applications for consumer devices, Understanding JME Configurations, Connected Device Configuration, Connected Limited Device Configuration Profiles, Current Profiles, Mobile Information Device Profile, Platform Standardization, Anatomy of MIDP Applications, Advantages of MIDP, Portability, Security

Unit: 2 Embedded and real-time systems (6 Hours)

Applications for embedded processors, Requirements of modern embedded and real-time systems, The Java real-time specification, Accessing hardware devices

Unit: 3 Java Micro Edition Specifications (8 Hours)

Introduction to Micro Edition, A new virtual machine, New and changed classes, Configurations and profiles, Mobile Information Device Profile, Architecture/MIDlet suite, Application management, Creating JAR/JAD, Accessing JAR/JAD within MIDlet

Unit: 4 Developing applications for hand-held devices (8 Hours)

Development Tools, Software install & configuration, Command line development Compatibility with desktop VMs, Managing limited memory and processing power, Writing native interfaces, Packaging MIDlet/Java packages/Wireless Toolkit, Working with configurations and profiles, Connected Limited Device Configuration (CLDC), Mobile Information Device (MID) Profile

Unit: 5 Writing Java applications for PDAs (8 Hours)

Tailoring the runtime environment, Building graphical user interfaces (GUIs), Accessing networking services, Testing applications using simulators

Unit: 6 Programming Mobile Devices (12 Hours)

The Mobile Information Device Profile (MIDP), Overview, Tooling Up, Debugging Your MIDlets, Creating Source Code, Compiling a MIDlet, Preverifying Class Files, Sun's JME Wireless Toolkit Emulators, The Wireless Toolkit Devices, Running MIDlets, Using the Emulator Controls, Tour of MIDP Features, MIDlet Life Cycle, Generalized User Interface, Packaging Your Application, Manifest Information, Creating a MIDlet Descriptor, Using an Obfuscator, Running on a Real Device, MIDlets and the Display, Basics of MIDlets/MIDlet lifecycle/MIDlet API, Communication between application manager & MIDlet, Querying attributes in JAD/JAR, Exceptions/Display & Displayable Basics of MIDlets/MIDlet lifecycle/MIDlet API, Communication between application manager & MIDlet, Querying attributes in JAD/JAR, Exceptions/Display & Displayable

Core Books:

1. Eric Giguere: Data Java 2 Micro Edition: Professional Developer's Guide, John Wiley & Sons, 2000.
2. James White: Java 2 Micro Edition, Manning Publications; 1st edition, 2002.

Reference Books:

John W. Muchow: Core J2ME Technology, Prentice Hall PTR; 1st edition, 2001.

CA 811. Data Warehousing and Mining (6 Credits)

Objectives:

- To understand how to turn data into information and turn information into knowledge.
- How to provide a consolidated, flexible and meaningful data repository to end user for reporting and analysis through Data Warehousing Concepts.
- How to generate meaningful patterns in large quantity of data automatically or semi automatically through concepts of data mining.
- To be able to apply these concepts to develop meaningful applications and to know the recent trends of data mining.

Prerequisites: Course CA707 and CA802.

Methodology & Pedagogy: During theory lectures concepts of data mining with related technologies will be discussed. In practical sessions data mining tools will be introduced and will be used to design meaningful applications. Through case study based approach how data mining concepts are to be implemented in real application will be discussed.

Learning Outcomes: Upon successful completion of the syllabus students shall be able to learn how to develop data warehouse of any organization and how to retrieve hidden and useful data from large data set using techniques of data mining.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Introduction to Data Mining	8	36
2	Data Warehouse and OLAP Technology for Data mining	7	
3	Data Preprocessing and Data Mining Primitives	6	
4	Mining Association rule in large Databases	10	
5	Classification and cluster analysis	9	
6	Applications and Trends in Data Mining Data Mining Applications	7	
	TOTAL	48	

Detailed Contents:

Unit 1. Introduction to Data Mining: (8 Hours)

Motivation and importance, What is Data Mining, Relational Databases, Data Warehouses, Transactional Databases, Advanced Database Systems and Advanced Database Applications, Data Mining Functionalities, Classification of data mining Techniques- generalization, summarization and characterization, Interestingness of a pattern Classification of Data Mining Systems, Major issues in Data Mining.

Unit 2. Data Warehouse and OLAP Technology for Data mining (7 Hours)

What is a Data Warehouse? Multi-Dimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Development of Data Cube Technology, Data Ware housing to Data Mining.

Unit 3. Data Preprocessing and Data Mining Primitives (06 Hours)

Data Preprocessing: Why Pre-process the Data? Data Cleaning, Data Integration and Transformation Data Reduction, Discretization and Concept Hierarchy Generation
Data Mining Primitives: What defines a Data Mining Task? A Data Mining query language Designing Graphical Use Interfaces Based on a Data Mining Query language Architectures of Data Mining Systems.

Unit-4. Mining Association rule in large Databases (10 Hours)

Association Rule Mining, Mining Single -Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

Unit-5. Classification and cluster analysis (9 Hours)

Classification: Concepts and Issues regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods like k-Nearest Neighbor Classifiers, Case-Based Reasoning, Generic Algorithms, Rough Set Approach, Fuzzy Set Approaches, Prediction, Classifier Accuracy.

Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, a Categorization of Major Clustering Methods.

Unit-6. Applications and Trends in Data Mining Data Mining Applications (7 Hours)

Data Mining for Financial Data Analysis, Data Mining for the Retail Industry, Data Mining for the Telecommunication Industry, Data Mining for Biological Data Analysis, Data Mining in Other Scientific Applications, Data Mining for Intrusion Detection, Social Impacts of Data Mining, Trends in Data Mining.

Core Book:

Jiawei Han and Micheline Kamber :Data Mining Concepts and Techniques, 2nd Edition, Elsevier, 2006

Reference Books:

1. Adriaan: Introduction to Data Mining, Addison Wesley Publication.
2. A.K.Pujari: Data Mining Techniques, University Press.
3. Alex Berson, Stephen J Smith: Data Warehousing, Data Mining, & OLAP, Tata McGraw Hill, 2004.
4. Anahory and Murray: Data warehousing in the real world, Pearson Education /Addison Wesley.

CA 812. Framework & Application (6 Credits)

Objectives:

- Understanding the role and importance of different frameworks in general and java frameworks in particular.
- Study one of the frame work in details (like Spring Framework)
- Developing applications using frame work.

Prerequisites: Course CA706 and CA801.

Methodology & Pedagogy: During theory sessions the students shall be introduces to various concepts of general frameworks and details regarding one of the framework. During practical sessions students will be trained to develop applications using the particular framework.

Learning Outcomes: Upon successful completion of the syllabus students shall be able to understand overall nature of frameworks and acquire in depth knowledge of atleast one framework and develop applications using the same.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Introduction to Spring	6	36
2	Beans and Containers	8	
3	The Application Context, Data Validation and Conversion	10	
4	Aspect-Oriented Programming	6	
5	Spring Web MVC	9	
6	Using JDBC and Hibernate with Spring	9	
	TOTAL	48	

Unit 1 : Introduction to Spring (6 Hours)

Introduction, Characteristics of framework, Types of framework(Existing frameworks),What is Spring?, Overview of the Spring Framework, Spring Philosophies, Spring Documentation, Java 5 Language Features, A Simple Example, Wiring Bean, Configuring a Properties File, Schema-Based Configuration

Unit 2: Beans and Containers (8 Hours)

Spring Containers, Spring Configuration File, Spring Beans, Using the Container, The BeanFactory Interface, Singleton vs. Prototype, Bean Naming, Dependency Injection,Setter Injection, Constructor Injection

Unit 3: The Application Context, Data Validation and Conversion (10 Hours)

The ApplicationContext Interface, Accessing Application Components, Accessing Resources, Internationalization with MessageSource, Application Events, The Validator Interface, The Errors Interface, The ValidationUtils Class, Validator Example, Testing the Validator, Property Editors, Custom Property Editors

Unit 4: Aspect-Oriented Programming (6 Hours)

Aspect-Oriented Programming, AOP Concepts, AOP Proxies, The AOP Alliance, Types of Advice, AOP Example

Unit 5: Spring Web MVC (9 Hours)

Spring Web MVC, The DispatcherServlet, Writing a Controller, A Simple View Page, Configuring the Controller, Adding a View Resolver, Adding a Message Bundle, Adding Business Classes, Adding Test Data, Accessing a Database, Adding a Form, Updating the Database, Integrating Hibernate

Unit 6: Using JDBC and Hibernate with Spring (9 Hours)

A Simpler Approach, Working with the HSQLDB Database, The JdbcTemplate Class, Exception Translation, Updating with the JdbcTemplate
Queries using the JdbcTemplate, Mapping Results to Java Objects, What is Hibernate?, Hibernate Sessions, The HibernateTemplate, Sample Class and Mapping File, Creating and Saving a New Entity, Locating an Existing Entity, Updating an Existing Entity, Hibernate Query Language, Executing Queries

Core Books:

1. Rod Johnson, Juergen Hoeller, Alef Arendsen, Thomas Risberg, Colin Sampaleanu: Professional Java Development with the Spring Framework.
2. Rod Johnson: J2EE Applications Without EJB, Wiley Publication.
3. Craig Walls, Ryan Breidnbach: Spring in Action, 3rd Edition.

Reference Books:

1. Rod Johnson: J2EE Design and Development, ISBN: 9780764543852
- 2 API Documentation (From net)

CA 813. – Open Source Software Solutions (6 Credits)

Objective: The objective of this course is to provide an understanding for open source movement worldwide, learning popular open source platforms like “Linux” OS and software development using LAMP.

Pre-requisite: Course - CA703 and CA704 (Working knowledge of Linux and Html)

Methodology & Pedagogy: In order to achieve the course objectives, students will be introduced to the open source concepts, various products like linux, apache, mysql and php.

Learning Outcomes: Upon successful completion of the syllabus students shall be able to understand and use open source software, able to develop applications using LAMP.

Outline of Course:

Unit No.	Title of unit	Minimum number of hours	
		Theory	Practical
1	Introduction to open source soft wares and their Configuration	6	3
2	Overview of PHP structure and syntax	8	6
3	Accessing Mysql with PHP	6	3
4	Working with user data and error handling	10	9
5	Object Oriented Programming using PHP	8	6
6	Application Development and MVC architecture using PHP	10	9
	Total	48	36

Detailed Contents:

Unit – 1: Introduction to open source soft wares and their Configuration (6 Hours)

Overview of Open Source Soft wares, Widely used open source products, Development philosophy, Open source vs. closed source, Open source software vs. free software, Open source vs. source-available, Pros and cons, Development tools, The distribution terms of open source software, open source technology importance, Free and Open Source Software (FOSS), Configuring apache, Configuring Mysql, Configuring PHP

Unit – 2: Overview of PHP structure and syntax (8 Hours)

Background information of php, Using variables, operators and expressions
Conditional statements and iterations in PHP: Conditional Statements: if statement, switch statement.
Looping : for loop, while loop, do..while statement, for each statement.
Functions and Arrays in PHP: php functions, creating array.

Unit – 3: Accessing Mysql with PHP (6 Hours)

Mysql structure, Connectivity, Querying the database

Unit – 4: Working with user data and error handling (10 Hours)

Handling HTML forms with PHP, Sessions, Cookies, Handling and avoiding errors, Exception Handling.

Unit – 5: Object Oriented Programming using PHP (8 Hours)

Creating classes and objects in PHP, Working with methods, Inheritance, Constructors, Destructors, Self and parent keyword, Object cloning, Object Oriented Programming using MySQL DB

Unit – 6: Application development and MVC architecture using PHP(10 Hours)

Introduction to MVC architecture, Steps to build application using PHP, Building applications using PHP, Deployment and execution

Core Books:

1. Sharnam Shah, Vaishali Shah: LAMP programming for professionals, Shroff Publishers, December 2009
2. Matt Doyle: Beginning PHP 5.3, Wrox Publication, 2010 Edition

Reference Books :

1. Jason Garner, Morgan Owens, Elizabeth Naramore, Matt Warden, Jeremy Stolz: Professional LAMP: Linux, Apache, MySQL and PHP Web Development (Paperback) Wrox, 2005.
2. Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass: Beginning PHP6. Apache and MySQL Web Development, Wrox, 2005

Master of Computer Applications Programme

SYLLABI
(Semester – V)

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

CA 901 – Enterprise Computing Through .Net Framework (6 Credits)

Objectives: The objectives of the course are to

- Use forms and controls to create a user interface.
- Create and use Sub and Function procedures, including predefined functions.
- Implement decision structures and loops by using conditional expressions.
- Validate user input for fields, controls, and forms.
- Apply object-oriented programming techniques to create classes, add methods, and add properties.
- Create a simple ASP .NET Web Forms application that uses an XML Web Service through SOAP.
- Access and manipulate data in a Microsoft Access or Microsoft SQL Server database by using Microsoft ADO.NET.

Prerequisites:

- Familiarity with basic concepts of object oriented programming
- Familiarity with Extensible Markup Language (XML) concepts

Methodology & Pedagogy:

During theory lectures illustrations emphasizing the need for advanced features of .Net framework and ASP.Net will be given. During Practical sessions, students will be required to develop Web Applications using ASP.Net. Also student will be required to develop and consume web services using SOAP.

Learning Outcomes:

Upon successful completion of the syllabus students shall be able to understand .Net Framework and well use the main features of the integrated development environment (IDE), Create an application using ASP.Net Concepts.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Introduction to .Net Framework	5	3
2	ASP.Net Page Development	10	9
3	ASP.Net Database Programming	9	9
4	Working with ASP.Net Applications	7	3
5	Building ASP.Net Web Services	10	9
6	Advanced ASP.Net	7	3
	Total	48	36

Detailed Contents:

Unit 1. Introduction to .Net Framework(5 Hours)

Introducing the .Net Framework, Benefits of .Net Framework, Elements of .Net Framework, Introducing ASP.Net, Setting up Development Environment, Creating an ASP.Net Application – Creating a VB Web Application and creating a C# Web Application, Deploying an ASP.Net Application

Unit 2. ASP.Net Page Development (10 Hours)

Structure of an ASP.Net page, Building forms with web controls – Label, Text box, Checkbox and checkboxlist, Radiobutton and Radiobuttonlist, Listbox, Dropdownlist, Hyperlink, image, table, button, Working with events, Validating User Input, Using Rich Web Controls – AdRotator, Calendar, Treeview, Tabstrip, Debugging ASP.Net Pages

Unit 3 ASP.Net Database Programming (9 Hours)

Introduction to ADO.Net – ADO.Net Basics, ADO.Net Object Model, Binding data to web controls, working with Data Grid and Data List, Working dataset – DataTables and DataViews, Working with XML – Overview of XML Classes and using XML with Datasets

Unit 4. Working with ASP.Net Applications(7 Hours)

Creating Asp.Net Application – Using Application State and Using web.config file, Tracking User Sessions – Using browser cookies and session state, Application Tracing and Error Handling – Responding to Errors, Tracing and Monitoring Application

Unit 5. Building ASP.Net Web Services(10 Hours)

Introduction to web services, Web Service Infrastructure, Understanding SOAP, Building Web Service, Deploying Web Service, Publishing Web Service, Finding Web Service, Consuming Web Service

Unit 6. Advanced ASP.Net (7 Hours)

Working with view State, Understanding Code Behind, Working with File System – Using Files and directories, Sending E-mail from an ASP.Net Page

Core Books:

1. Stephon Walther: ASP.Net Unleashed, BPB publication
2. Mridila Parihar, Essam Ahmed : ASP .Net Bible, Wiley, 2004

Reference Books:

1. Kogent Solutions Inc.: ASP.Net 3.5 Black book, Dreamtech press, 2009
2. Bill Eyjen, Scott Hanselman, Devin Rader: Professional ASP.Net 3.5 (sp1) In C# and VB, Wiley India Edition
3. Mesbah Ahmed, Chris Garrett, Jeremy Faircloth, Chris Payne: ASP.Net Programming Developer's Guide, Dreamtech, First Edition 2002
4. A. Russell Jones, Mike Gunderloy: .Net Programming 10-Minute Solutions, BPB Publications
5. Greg Buczek: ASP.Net Developer's Guide, Tata McGraw Hill Edition Forrth Edition, 2005
6. Greg Buczek: ASP.Net Tips & Techniques, Tata McGraw Hill Edition - 2002.

CA902 - Web Technologies and Applications (6 Credits)

Objective: The objective of the course is to highlight the features of different concepts involved in Web Technology and apply it in real life applications.

Prerequisites: CA704 Software Tools
CA801 Enterprise Computing through Java (JEE).

Methodology & Pedagogy:

During theory sessions topics related to common technologies and techniques used in the development of Web-based applications ie. server-side and client-side programming will be covered with suitable examples. During Practical sessions, students will be required to develop Applications using the concepts of Javascript, JSP and JSTL. Student will be also explored to MVC architecture, ajax and struts framework.

Learning Outcomes:

Upon successful completion of the syllabus students shall be able to understand the concepts of web technologies and apply web technologies concepts to develop web applications.

Outline of Course:

Unit No.	Title of unit	Minimum number of hours	
		Theory	Practical
1	JavaScript	7	3
2	Ajax Framework	7	6
3	JSP	14	12
4	Using JSTL	5	3
5	The Struts Framework : Basics	10	6
6	The Struts Framework: Validating user Input	5	6
	Total	48	36

Detailed Contents:

Unit 1. Java Script (7 Hours)

Overview of Java Script, Primitives, Operations and Expressions, Screen Output and Keyboard Input, Control Statement, Object Creation and modification, Arrays, Functions, Constructors, Pattern Matching using regular expressions

Unit 2.AJAX Framework (7 Hours)

Introducing Prototype and Scriptaculous,Introducing Quick Gallery, Simplifying Ajax with Prototype, Using Prototype's advanced Ajax features

Unit 3. JSP (14 Hours)

Overview of JSP Technology, Invoking Java Code with JSP Scripting elements, Controlling the structure of generated servlets: The JSP Page directive, Including files and Applets in JSP Pages, Using JavaBeans Components in JSP Documents, Integrating Servlets and JSP: The MVC Architecture, Simplifying access to Java Code: The JSP 2.0 Expression Language.

Unit 4. Using JSTL (5 Hours)

Tag Libraries: The Basics, JSP Standard Tag Library (JSTL)

Unit 5. The Struts Framework: Basics (10 Hours)

Understanding struts, Setting up struts, Struts flow of control, Processing requests with action objects, Handling request parameters with form beans, prepopulating and redisplaying input forms, Struts framework – i18n and layout: Using properties files, internationalizing applications,.

Unit 6. The Struts Framework: Validating user Input (5 Hours)

Laying out pages with tiles, Using tiles Definitions, Struts framework – validating input: validating in the Action class, validating in the Form Beans, Using the automatic validation framework

Core Books :

1. Ivan Bayross, “Web Enabled Commercial Application Development Using HTML, DHTML, PERL, Java Script”, BPB publications, Revised Edition
2. Dave Crane , Bear Bibeault and Tom Locke, “Prototype and Scriptaculous in Action”, Manning Publication
3. Marty Hall and Larry Brown, “Core Servlets and JavaServer Pages Volume - 1”, Pearson Education, 2nd Edition

Reference Books:

1. Web Technologies Black Book, Dreamtech press
2. Chuck Cavaness , Programming Jakarta Struts, O’Reilly Publication
3. Sue Spielman and Meeraj Kunnumpurath , Pro J2EE 1.4 From Professional to Expert , APress Publication
4. Robert W. Sebsta, Programming the World Wide Web, Pearson Education
5. Marty Hall, Larry Brown and Yaakov Chaikin, Core Servlets and JavaServer Pages Volume - 2 , Prentice Hall, 2nd Edition

CA903- Web Designing (6 Credits)

Objectives: The objective of the course is to provide basic understanding of:

- how to design professional web page templates with graphics
- how to specifically design web page to rank high in search engine
- how to select a quality and professional web hosting provider
- how to develop web site promotional strategies

Pre-requisite: CA704. Software Tools

Methodology & Pedagogy:

During theory sessions topics related to common technologies and techniques used in the designing of web-based applications will be covered with suitable examples. During Practical sessions, students will be required to design and develop entire web sites using several web designing tools.

Learning Outcome:

Upon successful completion of the course, the students shall be able to design and develop full fledged websites with graphics, having good promotional strategies and ranking in search engine.

Outline of the Course:

Unit No.	Unit Title	Minimum number of hours	
		Theory	Practical
1	Web Design Introduction	7	-
2	Layout & Graphic Design	9	9
3	Text Multimedia	7	6
4	Audio-Video Multimedia	9	9
5	Animation	8	9
6	Content Management System & Advanced Web Design	8	3
	Total	48	36

Detailed Contents:

Unit 1. Introducing Web Design(7 Hours)

Website and Web Application, Web Design and Development, W3C (World Wide Web Consortium), Web 2.0, Web Design Strategies, Audio Streams and Video Streams

Unit 2. Layout Design(9 Hours)

HTML - Adding Images, Objects, Making Links and Linking Images & Objects, Using HTML Tiles

DHTML – Dynamic Graphics, Dynamic Content, Dynamic Applications

CSS - CSS Basics, Internal Style Sheet, External Style Sheet, Inline Style Sheet, Multiple Style Sheets

Graphics – Images, 2D Images & 3D Images, Logo – Characteristics and Development

Unit 3. Multimedia Text (7 Hours)

Introduction to Multimedia and Multimedia Projects - Introduction, Usage of Multimedia, Stages of a Multimedia Project, the Multimedia Team
Text in Multimedia - Power of Meaning, Fonts and Faces, Using Text in Multimedia, Computers and Text, Font Editing, Hypermedia, Hypertext
Images in Multimedia - Organizing Tools, Bitmap Images, Vector Drawings, 3-D Drawing and Rendering, Color, Image File Formats

Unit 4. Audio – Video Multimedia(9 Hours)

Sound in Multimedia - Power of Sound, Digital Audio, Audio File Formats, MIDI versus Digital Audio, Adding Sound to Your Multimedia Project
Video in Multimedia - Using Video, Analog Display Standards, Digital Display Standards, Digital Video, Video Recording, Shooting and Editing Video, Optimizing Video Files

Unit 5. Animation(8 Hours)

Introduction to Animation - Power of Motion, Principles of Animation, Animation by Computer, Making Animations
Designing for the World Wide Web - Working on the Web, Text for the Web, Images for the Web, Sound for the Web, Animation for the Web

Unit 6. Content Management System & Advanced Web Design(8 Hours)

Introduction to Content Management System (CMS), CMS Types, CMS Working and CMS Applicability
Web Promotion Search Engine Optimization - Using Good Keywords For Keyword Research, Creating The Title Tag And Meta Tags For Your Website, Optimizing Your Website For Search Engine - Keyword Density And Content, Submitting Your Site To The Search Engines, Increase Your Rankings By Building Your Link Popularity

Core Books:

1. Richard York :Beginning CSS: Cascading Stylesheets for Web Design ,Wrox Press (Wiley Publishing) , 2005.
2. Tay Vaughan: Multimedia : Making it Work, 7th Edition, Tata McGraw Hill Publication.
3. Chris Grover: Flash CS5 – The Missing Manual, First Edition, SPD O'Reilly Publication.
4. Deepak Bansal :A Complete Guide to Search Engine Optimization .
5. Dan Thies : SEO Fast Start: A Simple, Step by Step System For Better Results

Reference Books:

1. David Mc Farland : CSS: The Missing Manual, O'Reilly , 2006.
2. James E. Shuman:Multimedia in *Action*, Cengage Learning.

Reference Links:

<http://www.htmlhelp.com/reference/css/>
<http://anaturb.net/CSS/css.htm>

CA 904 - MINI PROJECT (2 Credits)

Objective:

The project work constitutes a major component in most of the professional programmes and it is to be carried out with due care and should be executed with seriousness by the students. The objective of the project is to motivate them to work in emerging / latest technologies, help the student to develop ability to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories, this project will help the student make ease and provides enough experience to carry out the larger project in the sixth semester.

Steps Involved In The Project Work :-

The complete project work should be done by the student only. The role of guide should be about guidance wherever any problem encounters during project. The following are the major steps involved in the project, which may help you to determine the milestones and regulate the scheduling of the project:

- Select a suitable topic of your interest.
- Prepare the project proposal in consultation with the project guide.
- Proforma for Approval of Project duly filled and signed by both the student and Project Guide with date.
- Prepare project report according to the specific format.

Evaluation Of Project:

The project report shall normally be written in English in the specified format and shall be characterized by significant contribution to knowledge in the field. Normally two copies of the report are to be submitted for evaluation. The Project report prepared according to approved guidelines and duly signed by the supervisor(s) and the Head of the Department shall be submitted to the Head of the Institution. The evaluation scheme of Project is as under:

Course Title	Teaching Scheme			Credit	Internal	End Semester Examination	Total
	Contact Hours				Continuous Evaluation	Viva	
	Inst.	Industr y	Total				
Mini Project	4	-	4	2	30	70	100

The internal evaluation of project is done based on progress reports and internal presentations.

The final evaluation of the project will be based on the project report submitted and a Viva-Voce Examination by a Board of Examiners.

If a candidate fails to submit the project report on or before the specified deadline, he/she is deemed to have failed in the Project Work and shall re-enroll for the same in a subsequent semester. If a candidate fails in the viva-voce examinations of Project work he/she shall resubmit the project report within specified duration decided by university. The resubmitted project will be evaluated during the subsequent academic session. A copy of the approved project report after the successful completion of viva examinations shall be kept in the library of the college / institution.

CA905: Gamming Applications (6 Credits)

Objectives: This course focuses on the design and development of computer game applications. It will provide the skills necessary to enter the computer games industry as an applications programmer. Also, it will develop students' programming abilities from the basics to the full set of skills needed to implement a complex interactive computer game. The students will study software technologies related to game development, as well as the art and design principles needed to create compelling games.

Prerequisites:CA706. Object oriented concepts and Programming in JAVA (JSE)
CA801. Enterprise Computing through JAVA (JEE)

Methodology and Pedagogy:

During theory lectures, basic and advanced concepts of Design and Development of Gamming Applications will be given. During practical sessions, students will be required to develop the various programmes based on Gamming Applications using JAVA with appropriate editor.

Learning Outcomes:

Upon successful completion of the syllabus, students will become familiar with the basic processes of creating a computer game including design, implementation and testing design and develop gamming applications using JAVA as a tool.

Outline of Course:

Unit No.	Title of unit	Minimum number of hours	
		Theory	Practical
1	Basics of Computer Games	06	36
2	Game Design Process	06	
3	Game Programming - I	09	
4	Game Programming - II	09	
5	Advanced Technologies in Gamming Applications	09	
6	Installation and Deployment of Gamming Application	08	
Total		48	

Detailed Contents:

Unit 1. Basics of Computer Games(6 Hours)

Introduction to Games, Games Concept, Games History, Taxonomy of Computer Games, Game structure types, Single player Vs. Multiplayer games. 2D Vs. 3D games

Unit 2. Game Design Process(6 Hours)

Starting the design process, Game design principles, Traditional engineering Vs. Game engineering, Game design principles, Game design process

Unit 3. Game Programming – I (9 Hours)

Languages and architecture, Memory and I/O systems, Windows and Applets, 2D Images and animation, Image loading and Visual effects, Creating 2D Games

Unit 4. Game Programming - II (9 Hours)

3D Graphics and Software Rendering, 3D Scene Management, Path Finding and Collision Detection, Sprites and animation, keyboard and mouse input, Loading and Playing sounds, MIDI files

Unit 5. Advanced Technologies in Gaming Applications (8 Hours)

Introduction to Artificial Intelligence (AI), AI in games, First Person Shooters, Network Virtual Environment, Networked games, Network Chat

Unit 6. Installation and Deployment of Gaming Applications(8 Hours)

Installation of a game, Testing and Web deployment of a game, publishing the game, Case study

Core Books:

1. Charles River Media :Introduction to Game Development, Steve Rabin (ed.), 2005.
2. Andrew Davison :Killer Game Programming in Java, O'Reilly, 2005.
3. Jonathan S. Harbour, Thomson: Beginning Java Game Programming, Second Edition, course technology PTR.
4. David Brackeen ,Developing Games in Java, New Riders Games ,August 31, 2003, ISBN-10: 1592730051, ISBN-13: 978-1592730056.

Reference Books:

1. Jonathan S. Harbour:Game Programming All in One, Course Technology PTR, 3rd edition ,October 23, 2006, ISBN-10: 1598632892, ISBN-13: 978-1598632897 .
2. Thompson, Berbank-Green, Cusworth: Game Design, Game Design Course: Principles, practice, and techniques--the ultimate guide for the aspiring game designer, Wiley, 2007.

CA 906 –On-line Analytical Processing (6 Credits)

Objectives: The objective of the course is to

- Be able to differentiate OLAP and OLTP.
- Be able to analyze, design and develop OLAP application that transforms raw business data into strategic business insights.
- Be able to design and generate reports of both desktop and web based applications.

Prerequisites: CA 707. Relational Database System-I
CA 802. Relational Database System-II
CA 811. Data Warehousing and mining

Methodology & Pedagogy:

During theory lectures basic and advanced concepts of OLAP will be given. During practical sessions, students will be required to design and develop OLAP based application using ORACLE tool. Also student will be required to design and generate appropriate reports for any business organization.

Learning Outcomes:

Upon successful completion of the syllabus students shall be able to design and develop OLAP based application using ORACLE tool. Also students shall be able to design appropriate reports for both desktop and web based applications.

Outline of the Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Introduction to OLAP	8	36
2	Design an Overall Methodology	10	
3	Building an OLAP Analytic Workspace Using Tool	8	
4	Advanced Concepts in OLAP Analytic Workspace	8	
5	Reporting from an OLAP Application	7	
6	Real world examples of OLAP and related cases	7	
	Total	48	

Detailed Contents:

Unit I: Introduction to OLAP (8 Hours)

Demand for Online analytical processing, need for multidimensional analysis, fast access and powerful calculations, limitations of other analysis methods, OLAP definitions and rules, OLAP characteristics, major features and functions, general features, dimensional analysis, what are hypercubes? Drill-down and roll-up, slice-and-dice or rotation, OLAP

models, overview of variations, the MOLAP model, the ROLAP model, ROLAP versus MOLAP, OLAP implementation considerations

Unit 2: Design an Overall Methodology(10 Hours)

General Design Principles : Iterative Process, User Requirement drive design,Dimension Type,Data Types,Different Views of data,User access and security needs planning,Training and Testing

Designing an Oracle OLAP Analytic Workspace : Determining dimensions from user requirements,Relating Oracle OLAP data to star dimension model,Mapping Relational data to multidimensional objects,Determining dimensions of cubes,Designing Oracle OLAP cubes, Summary of Oracle OLAP Design Process,OLAP Architecture

Unit 3: Building an OLAP Analytic Workspace Using Tool(8 Hours)

Oracle OLAP Dimension Overview, From source to cubes with Analytic workspace manager, Adding business-savvy calculations to cube

Unit 4 : Advanced Concepts in OLAP Analytic Workspace(8 Hours)

Managing workspaces with OLAP worksheet, working with Cube-Organized materialized views, managing security of cubes and dimensions, Creating Advanced cubes for typical business purpose, Using SQL with OLAP

Unit 5: Reporting from an OLAP Application(7 Hours)

User Discovery, Types of Reports, Desirable functionality in web based OLAP reporting, Desirable functionality in desktop based OLAP reporting, Understanding Deployment options, Third party reporting applications.

Unit 6: Real world examples of OLAP and related cases(7 Hours)

Accelerating a Data Warehouse, Analyzing Projections, Analyzing Financial Data, Oracle OLAP case studies.

Core Books:

1. Michael Scrader,Dan Valmis,Mike Nader,Chris Calterbos,Dave Collins,Mitch Campbell,Floyd Conrad : Oracle Essbase & Oracle OLAP (Paperback), Tata McGraw-Hill Publishing Company Limited, 2009
2. Alex Berson and Smith :Data Mining and Data Warehousing and OLAP ,McGraw Hill Publication.

Reference Books:

1. Sergei Arkhipenkov,Dmitri Golubev : Oracle Express Olap, Charles River Media,2001.
2. Erik Thomsen : OLAP Solutions : Building Multidimensional Information System, second edition, wiley publication-2002.
3. Wrembel, Christian Koncilia : Data Warehouses and OLAP , IRM press

CA907- Windows Communications Foundation Framework (6 Credits)

Objectives: The Objectives of this course are:

- To provide a deep understanding of the broad technology of WCF
- To provide demonstrations of major WCF capabilities.
- To provide platform to perform most of WCF options.

Prerequisites:

- Good knowledge and experience in one .NET language (C#, VB.NET).
- Some knowledge of web service programming.

Learning Outcomes:

Upon successful completion of the syllabus

- Students will get a deep understanding of the broad technology of WCF.
- Students will have seen demonstrations of major WCF capabilities.
- Students will be able to perform most of WCF options, mentioned in the syllabus.

Outline of Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Introduction to WCF	8	6
2	Understanding WCF	10	6
3	Programming WCF	10	9
4	WCF transactions and security	8	9
5	Customization, Interpretability and integration of WCF	8	3
6	Deploying WCF	6	3
	Total	48	36

Detailed Contents:

Unit 1. Introduction to Windows Communication Foundation(8 Hours)

Evolution of WCF, Evolution of Service Oriented Architecture (SOA), What is WCF, Where does WCF Services fit in, WCF architecture, The makeup of WCF, WCF features, WCF Concepts, Messages, Channels, Services, Behaviors, WCF programming model, Installing WCF, Creating your first WCF service.

Unit 2. Understanding Windows Communication Foundation (10 Hours)

Addresses, Understanding and programming WCF addresses, Understanding and programming WCF bindings, Understanding and programming WCF contracts,

Unit 3. Programming Windows Communication Foundation (10 Hours)

Clients, client communication patterns, creating client code, Services, Service's types, contracts and end points, Services behavior, Handling WCF Exceptions/Faults

Unit 4. WCF transactions and security (8 Hours)

Transactions overview, Transactions attribute in system and service model, Reliable sessions, Message exchange, security messages, Queues, Security overview, Security behaviors and bindings, Security clients and services,

Unit 5. Customization, Interpretability and integration of WCF(8 Hours)

Extending Service host and service model layer, Extending channel layer, Extending bindings, Interpretability and integration

Unit 6. Deploying Windows Communication Foundation(6 Hours)

Installing WCF services, Upgrading services, Managing WCF, Tracing, message logging, Service Configuration Editor, Hosting WCF services,

Core Books:

1. Scott Klein :Professional WCF Programming, WROX Publication April 2007.
2. Craig McMurty, Marc Mercuri, Nigel Watling, Matt Winkler :Windows Communication Foundation Unleashed, SAMS Publication March 2007.

Reference Books:

1. Michele Leroux Bustamante:Learning WCF: A Hands-on Guide, 1st edition, O'Reilly Media.
2. Steve Resnick , Richard Crane , Chris Bowen: Essential Windows Communication Foundation (WCF): For .NET Framework 3.5, 1 edition, Addison-Wesley Professional.

CA908: Design Patterns and Component Reusability (6 Credits)

Objectives: This course is intended to give students advanced concepts of designing a software code, concepts of reusability of the code in different applications on different platforms. Practical aspects of the development of component will give students real world hands on experience.

Prerequisites: CA706. Object oriented concepts and Programming in JAVA
CA806. Software Engineering

Methodology and Pedagogy:

During theory sessions detailed understanding of software architecture, and design patterns with help of a case study and various design patterns in detail. Students will also be taught how to use these patterns in various applications. During practical sessions students will be required to carry out case studies using the concepts and techniques they have learnt during theory sessions.

Learning Outcomes:

Upon successful completion of the syllabus students shall be able to understand the importance of designing components.

Outline of Course:

Unit No.	Title of the Unit	Minimum Numbers of hours	
		Theory	Practical
1	Software Architecture	8	36
2	Introduction to Design Patterns	8	
3	A Case Study	8	
4	Creational Pattern	8	
5	Structural Pattern	8	
6	Behavioral Pattern	8	
	Total	48	

Detailed Contents :

Unit 1. Software Architecture (8 Hours)

Introduction to Software Architecture- Scope of software architectures - Arriving at an architecture - Domain-specific software architectures (DSSA) -Architectural Styles- Service-Oriented Architectures

Unit 2. Introduction to Design Patterns (8 Hours)

What Is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

Unit 3. A Case Study (8 Hours)

Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.

Unit 4. Creational Patterns (8 Hours)

Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

Unit 5. Structural Pattern (8 Hours)

Adapter, Bridge, Composite, Decorator, açade, Flyweight, Proxy.

Unit 6. Behavioral Patterns Part-I (8 Hours)

Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

Core Books :

1. Erich Gamma :Design Patterns , Pearson Education.
2. D.E. Perry and A.L. Wolf: Foundations for the Study of Software Architecture, ACM SIGSOFT Software Engineering Notes, vol. 17, no. 4, pp. 40-52, October 1992.

Reference Books :

1. Mark Grand :Pattern's in JAVA Vol-I ,Wiley DreamTech.
2. Mark Grand :Pattern's in JAVA Vol-II ,Wiley DreamTech.
3. Mark Grand : JAVA Enterprise Design Patterns Vol-III ,Wiley DreamTech.
4. Eric Freeman :Head First Design Patterns ,Oreilly-sp
5. Alan Shalloway :Design Patterns Explained ,Pearson Education.

Master of Computer Applications Programme

SYLLABI (Semester – VI)

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

CA909: Project Work (30 Credits)

1. OBJECTIVES:

- Application of knowledge and techniques learnt in theoretical classes for developing the s/w for real problems or inventing new things related to original concept.
- Gives an insight into the working of the real organizations/companies.
- Gaining deeper understanding in specific functional areas.
- Helps in exploring career opportunities in their areas of interest.

2. PROJECT/DISSERTATION WORK:

Students of MCA have to do the Project work in an Industrial/ Research Organization of computer field. Project work shall be carried out under the supervision of a qualified teacher in the Department as well as an expert from organization. Students have to meet the institute supervisor periodically and to attend the project/dissertation review meetings for evaluating the progress. The Project work shall be pursued for a minimum of 16 weeks during the semester.

2.1 MORI Principle to choose the topic:

Final semester project work is important and challenging element of MCA study. Selection of topic of project work is very crucial and important aspect of that. Following are important principles that will help students to select the appropriate topic of project work.

- **Manageable:** your project topic must be sufficiently focused so that it is possible for you to do the topic justice within the available time (one semester). You may have a real interest in, say, *'the impact of technology computers on Indian Economic Growth since Independence'*, but you certainly won't be able to cover this topic in any detail in the space of one semester
- **Original:** this relates to the above point, since a topic that is focused and manageable is more likely to be one that has not been written about too extensively, thus leaving room for your original contribution. Ideally you will find an interesting and well-chosen topic which will impress those marking your work.
- **Relevant:** your project should clearly be relevant to some aspect of your studies, but it might also be relevant to your plans for, say, postgraduate study or a career. The dissertation may also be relevant in the sense that it plays to some of your established strengths, such as a particular course module or topic that you have enjoyed studying and in which you have previously done well.
- **Interesting:** you are obviously more likely to enjoy and be successful in your dissertation if it is of real interest to you and to those marking your work. Ask yourself if you are sufficiently committed to your idea to be able to give it your best throughout the duration of your project. You should also ascertain whether your

supervisor finds the idea interesting during your initial discussions with her or him.

2.2 EVALUATION OF PROJECT/DISSERTATION WORK:

The project report shall normally be written in English in the specified format and shall be characterized by significant contribution to knowledge in the field. Normally two copies of the report are to be submitted for evaluation. The Project report prepared according to approved guidelines and duly signed by the supervisor(s) and the Head of the Department shall be submitted to the Head of the Institution. The evaluation scheme of Project/Dissertation is as under:

Teaching Scheme			Credit	Internal	End Semester Examination		Total
Contact Hours				Continuou s Evaluation	Report	Presentation & Viva	
Inst.	Industry	Total					
2	28	30	30	200	200	400	800

The internal evaluation of project is done based on progress reports and internal presentations.

The final evaluation of the project will be based on the project report submitted and a Viva-Voce Examination by a Board of Examiners.

If a candidate fails to submit the project report on or before the specified deadline, he/she is deemed to have failed in the Project Work and shall re-enroll for the same in a subsequent semester. If a candidate fails in the viva-voce examinations of Project he/she shall resubmit the project report within specified duration decided by university. The resubmitted project will be evaluated during the subsequent academic session. A copy of the approved project report after the successful completion of viva examinations shall be kept in the library of the college / institution.