M. Sc. (Information Technology)

Academic Year
2013-16

1. About Admission Procedure

M. Sc. Information Technology
Duration :(Four Semesters means Two Academic Years)
Intake: 32
Eligibility: i) Any Science Graduate with at least one optional subject as Computer Science/ InformationTechnology/ Mathematics/ Electronics/ Physics OR ii) Any Science graduate having Mathematics as one of the subject in XII Standard OR iii) B.E./ B. Tech.

Objective: The objective of this course is to fulfill the current needs of IT Industries and academicdevelopments in the relevant field. Most of the objectives of this course are to develop analytical, presentation, strategy formulation and personality development skills among the students, through which the students get trend for a carrier in IT industry.

M. Sc. Information Technology per Semester

Sr. No	Head	Fees
1	Tuition	20,000
2	Registration	50/-
3	Admission	200/-
4	Library	5,000/-
5	Laboratory	5,850/-
6	Medical Exam	100/-
7	MKCL	50/-
8	Avishkar, Indradhanushya and Other Students Activities	131/-
	Total	**31,231**

**Note: In second and fourth semesters students should pay only Tuition and Laboratory Fess.
Fees likely to be modified as per the university rule and regulation from time to time and will be applicable to the concern students**

Admission to the M. Sc. Computer Science and M. Sc. Information Technology course in the department will be done on the performance of CET score and on their performance in the qualifying graduate level examination.

The student will apply on the application form of the University provided with the prospectus/e-prospectus. Once the student is admitted to the concern department/ course, he/she will be promoted to next semester with full carryon; subject to the registration of student in every consecutive semester. Dropout student will be allowed to register for respective semester as and when the concerned courses are offered by the department, subject to the condition that his/her tenure should not exceed more than twice the duration of course from the date of first registration at parent department. The admission of concern student will be automatically get cancelled if he/she fails to complete the course in maximum period (Four years/Eight semesters).

2. About CBCS System

2.1 The CBCS System

Department of Computer Science and Information Technology adopted a credit-based system under the Academic Flexibility Program of the University from the academic year 2011-12. It is a flexible, cafeteria-type learning system with an inbuilt horizontal mobility for students to all desire units of education in the Department/Departments with provision for even inter Departmental mobility for students. CBCS operates on modular pattern based on module/units called "credits", wherein 'credit' defines the quantum of contents/syllabus prepared for a course/paper and determines the minimum number of teaching-learning hours required.

CBCS permits students to: I) Learn at their own pace, II) Choose electives from a wide range of elective courses offered by the department, III) Undergo additional/value added courses and acquire more than the required number of credits, depending upon the learner aptitude, IV) Adopt an interdisciplinary approach in learning, V) Make best use of the expertise of faculty across the Department, beside the particular department faculty and VI) Acquire knowledge, skill and attitude of learning outcomes through participatory teaching and learning and continuous evaluation process. This provides the flexibility to make the system more responsive to the changing needs of our students, the professionals and society. The credit-based system also facilitates the transfer of credits.

Credits and Degrees

i) A candidate who has successfully completed all the core courses, Elective/ Specialized courses and, seminars and project prescribed and or optional service courses approved by the University for the programwith prescribed CGPA shall be eligibleto receive the degree.

ii) One Credit shall mean one teaching period of one hour per week for one semester (of 15 weeks) for theory courses and two practical/laboratory/field/demonstration hours/ week for one semester.

iii) Every student will have to complete at least 100 credits to obtain the master's degree of M. Sc. Computer Science/ M. Sc. Information Technology (Post graduate degree) out of which 96 credits should be from this Department and four or eight credits of service courses from this or other Department. However the Department can design the curriculum of more credits and it will be compulsory for the students of this Department to complete the credits accordingly.

Courses

(i) Core Course: - A core course is a course that a student admitted to M. Sc. Computer Science/ M. Sc. Information Technology program must successfully completes to receive the degree. Normally no theory course shall have more than 4 credits.

(ii) Elective Course: Means a optional course from the basic subject or specialization.

(iii) Service course (SC): The service courses will be offered in third and fourth semesters in the department. Student should complete one service course in each semester.

(iv) Each Course shall include lectures / tutorials / laboratory or field work / Seminar / Practical training / Assignments / midterm and term end examinations/ paper / Report writing or review of literature and any other innovative practice etc., to meet effective teaching and learning needs.

(v) Attendance: - Students must have 75% of attendance in each Core and Elective course for appearing the examination. However student having 65% attendance with medical certificate may apply the H.O.D. for commendation of attendance.

Registration for Service Course:-

i) The student will register the service course of his interest after the start of semester in concerned department on official registration form. The teacher in-charge of the respective course will keep the record of the students registered. Maximum fifteen days period will be given from the date of admission for completion of registration procedure. The Departmental Committee shall follow a selection procedure after counseling to the students etc. to avoid overcrowding to particular course(s) at the expense of some other courses.

ii) No student shall be permitted to register for more than one service course in a semester.

iii) The University department shall decide the maximum number of students in each service course taking into account the teachers and Physical facilities available in the Department.

iv) The University may make available to all students a listing of all the courses offered in every semester specifying the credits, the prerequisites, a brief description or list of topics the course intends to cover, the instructor who is giving the courses, the time and place of the classes for the course. This information shall be made available on the University website.

v) Normally no service course shall be offered unless a minimum of 10 Students are registered.

vi) The student shall have to pay the prescribed fee per course per semester/year for the registration as decided by the University.

Departmental Committee:-

Every P.G. program of the University/College shall be monitored by a committee constituted for this purpose by the Department. The Committee shall consist of H.O.D. as a Chairman and some/all the teachers of the Department. as its members .

Results Grievances Redressal Committee:-

The University shall form a Grievance Redressal Committee for each course in each department with the Course Teacher and the HOD. This Committee shall solve all grievances relating to the Assessment of the students.

Grade Awards:-

(i) A ten point rating scale shall be used for the evaluation of the performance of the student to provide letter grade for each course and overall grade for the Master's Program. Grade points are based on the total number of marks obtained by him/her in all the heads of examination of the course. These grade points and their equivalent range of marks are shown separately in Table-I.

Table I: Ten point grades and grade description

Sr. No.	Equivalent percentage	Grade points	Grade	Grade description
1.	90.00-100	9.00-10	O	Outstanding
2.	80.00-89.99	8.00-8.99	A++	Excellent
3.	70.00-79.99	7.00-7.99	A+	Exceptional

4.	60.00-69.99	6.00-6.99	A	Very good
5.	55.00-59.99	5.50-5.99	B+	Good
6.	50.00-54.99	5.00-5.49	B	Fair
7.	45.00-49.99	4.50-4.99	C+	Average
8.	40.01-44.99	4.01-4.49	C	Below average
9.	40	4.00	D	Pass
10.	< 40	0.00	F	Fail

ii.) Non appearance in any examination/ assessment shall be treated as the students have secured zero mark in that subject examination/assessment.

iii.) Minimum D grade (4.00 grade points) shall be the limit to clear /pass the course/subject. A student with F grade will be considered as 'failed' in the concerned course and he/she has to clear the course by reappearing in the next successive semester examinations. There will be no revaluation or recounting under this system.

iv.) Every student shall be awarded Grade points out of maximum 10 points in each subject (based on 10 Point Scale). Based on the Grade points obtained in each subject, Semester Grade Point Average (SGPA) and then Cumulative Grade Point Average (CGPA) shall be computed. Results will be announced at the end of each semester and cumulative Grade card with CGPA will be given on completion of the course.

Computation of SGPA (Semester grade point average) & CGPA (Cumulative grade point average):
The computation of SGPA & CGPA, will be as below:

a. Semester Grade Point Average (SGPA) is the weighted average of points obtained by a student in a semester and will be computed as follows:

$$SGPA = \frac{Sum (Course Credit \times Number of Points obtained in a course by grade by the student)}{Sum \; Course \; Credit}$$

OR

$$SGPA = \sum_{I} C_i G_i / \sum_{i} C_i$$

Where, C_i=credit for i^{th} course; G_i=grade point secured by the student.

$\sum$ is overall the courses credited by the student in the semester.

Semester Grade Point Average (SGPA) for all the four semesters will be mentioned at the end of every semester.

b. The Cumulative Grade Point Average (CGPA) will be used to describe the overall performance of a student in all semesters of the course and will be computed as under:

$$CGPA = \frac{Sum (All four semester SGPA)}{Total Number of Semesters}$$

<div align="center">**OR**</div>

$$CGPA = \sum_k CkGk / \sum_k Ck$$

Where, C_k = credit for k^{th} course, G_k = grade point secured by the student.

$\sum$ *is overall the courses credited by the student in all the completed semesters.*

The SGPA and CGPA shall be rounded off to the second place of decimal.

Evaluation method:-

Each theory course will be of 100 Marks and be divided in to internal examination (Sessional) of 20 Marks and Semester end examination of 80 Marks. (20+80 = 100 Marks). Each Practical course will be of 50 marks. Research project if any, will be of 100 marks.

a. Internal Evaluation Method

There shall be two mid semester examinations, first based on 40 percent syllabus taught and second based on 60 percent syllabus taught. The setting of the question papers and the assessment will be done by the concerned teacher who has taught the syllabus. Average score obtained out of two mid semester examinations will be considered for the preparation of final sessional marks/grade.

b. Term end examination and evaluation

i. Semester end examination time table will be declared by the departmental committee and accordingly the concern course teacher will have to set question paper, conduct theory examination, conduct practical examination with external expert, evaluate, satisfy the objection / query of the student (if any) and submit the result to DC.

ii. The semester end examination theory question paper will have two parts (20+60 = 80 Marks) Part A will carry short question of 2-3 marks (fill in the blanks/ multiple choice questions/ matchcolumns / state true or false / answer in one sentence) as compulsory questions and it should cover entire syllabus. (20 Marks)Part B will carry 7 questions out of which there shall be at least one question from each unit student will have to answer any five questions out of 7

iii. Semester end Practical examinations will be of 50 marks each and students will be examined by one external and one internal examiner. Seminar and Project work (if any) will be evaluated by the external examiners along with guide.

iv. At the end of each semester the Committee of Department shall assign grade points and grades to the students.

v. The Committee of Department shall prepare the copies of the result sheet in duplicate.

vi. Every student shall have the right to scrutinize answer scripts of

Mid semester/Term endsemester examinations and seek clarifications from the teacher regarding evaluation of the scripts immediately thereafter or within 3 days of receiving the evaluated scripts.

vii. The Head of the department shall display the grade points and grades for the notice of students.

viii. The head of the department shall send all records of evaluation for Safekeeping to the Controller of Examinations as soon as all the formalities are over.

The University shall issue at the beginning of each semester a grade card for the student, containing the grades obtained by the student in the previous semester and his Semester Grade Point Average (SGPA). The grade card shall list:

(a) The title of the courses along with code taken by the student
(b) The credits associated with the course,
(c) The grade and grade points secured by the student,
(d) The total credits earned by the student in that semester.
(e) The SGPA of the student,
(f) The total credits earned by the students till that semester and
(g) The CGPA of the student (At the end of the IVth Semester).

Cumulative Grade Card

At the end of the IVth semester, the University shall issue Cumulative Grade Card to the Students showing details of Grades obtained by the student in each subject in all semesters along with CGPA and total credits earned.

3. Course Structure Academic Year 2013-14

Vertical Relative Distribution of Courses

Sem-I	Sem-II	Sem-III	Sem-IV
Object Oriented Programming in C++	Programming in Core Java	Programming in Advanced Java	VB.Net Technology
Computer System Architecture	Software Engineering and CASE tools	Decision Support System and Intelligent System	Major Project
Operating System	Data Structure and Algorithms	Network Security	Seminar
Relational Database Management System	Computer Network	Elective I:(Any one from list of Elective I) 1. XML.Net 2. Image Processing 3. Operating System for Mobile 4. ASP.Net 5. WML	Elective II: (Any one from list of Elective II) 1. Programming J2ME 2. Open Source Web Programming Using PHP 3. CORBA 4. GIS 5. Biometrics

Core Courses:

Semester-I

Course Code	Course Title	No. of Credits	No. of Hours / Week	Total Marks: 100	
				External	Internal
CSI401	Object Oriented Programming in C++	4	4	80	20
CSI402	Computer System Architecture	4	4	80	20
CSI403	Operating System	4	4	80	20
CSI404	Relational Database Management System	4	4	80	20
CSI451	Practical Bases on CSI401	2	4 (Per Batch)	50	-
CSI452	Practical Bases on CSI402	2	4 (Per Batch)	50	-
CSI453	Practical Bases on CSI403	2	4 (Per Batch)	50	-
CSI454	Practical Bases on CSI404	2	4 (Per Batch)	50	-
Total No of Credits in Sem-I		24	---	---	---

Semester II:

Course Code	Course Title	No. of Credits	No. of Hours / Week	Total Marks: 100	
				External	Internal
CSI405	Programming in Core Java	4	4	80	20
CSI406	Software Engineering and CASE Tools	4	4	80	20
CSI407	Data Structure and Algorithms	4	4	80	20
CSI408	Computer Networks	4	4	80	20
CSI455	Practical Bases on CSI405	2	4 (Per Batch)	50	-
CSI456	Practical Bases on CSI406	2	4 (Per Batch)	50	-
CSI457	Practical Bases on CSI407	2	4 (Per Batch)	50	-
CSI458	Practical Bases on CSI408	2	4 (Per Batch)	50	-
Total No of Credits in Sem-II		24	--	--	--

Semester III:

Course Code	Course Title	No. of Credits	No. of Hours / Week	Total Marks: 100	
				External	Internal
CSI501	Programming in Advanced Java	4	4	80	20
CSI502	Decision Support System and Intelligent System	4	4	80	20
CSI503	Network Security	4	4	80	20
CSI504	Elective I:(Any one from list of Elective I)	4	4	80	20
CSI551	Practical Bases on CSI501	2	4 (Per Batch)	50	-
CSI552	Practical Bases on CSI502	2	4 (Per Batch)	50	-
CSI553	Practical Bases on CSI503	2	4 (Per Batch)	50	-
CSI554	Practical Bases on CSI504	2	4 (Per Batch)	50	-
Total No of Credits in Sem-III		24	--	--	--

Semester IV:

Course Code	Course Title	No. of Credits	No. of Hours / Week	Total Marks: 100	
				External	Internal
CSI505	VB.Net Technology	4	4	80	20
CSI506	Elective II: (Any one from list of Elective II)	4	4	80	20
CSI555	Practical Based on CSI505	2	4 (Per Batch)	50	-
CSI556	Practical Based on CSI505	2	4 (Per Batch)	50	-
CSI557	Major Project	8	16 (Per Batch)	50	-
CSI558	Seminar	4	8 (Per Batch)	50	-
Total No of Credits in Sem-IV		24	--	--	--

Elective I:

Course Code	Course Title	No. of Credits	No. of Hours / Week	Total Marks: 100	
				External	Internal
CSI421	XML.NET	4	4	80	20
CSI422	Practical Based on CSI 421	2	4 (Per Batch)	50	-
CSI423	Image Processing	4	4	80	20
CSI424	Practical Based on CSI423	2	4 (Per Batch)	50	-
CSI425	Operating System for Mobile	4	4	80	20
CSI426	Practical Based on CSI425	2	4 (Per Batch)	50	-
CSI427	ASP.NET	4	4	80	20
CSI428	Practical Based on CSI427	2	4 (Per Batch)	50	-
CSI429	WML	4	4	80	20
CSI430	Practical Based on CSI429	2	4 (Per Batch)	50	-

Elective II

Course Code	Course Title	No. of Credits	No. of Hours / Week	Total Marks: 100	
				External	Internal
CSI431	Programming J2ME	4	4	80	20
CSI432	Practical Based on CSI 431	2	4 (Per Batch)	50	-
CSI433	Open source Web Programming using PHP	4	4	80	20
CSI434	Practical Based on CSI433	2	4 (Per Batch)	50	-
CSI435	CORBA	4	4	80	20
CSI436	Practical Based on CSI435	2	4 (Per Batch)	50	-
CSI437	GIS	4	4	80	20
CSI438	Practical Based on CSI437	2	4 (Per Batch)	50	-
CSI439	Biometrics	4	4	80	20
CSI440	Practical Based on CSI429	2	4 (Per Batch)	50	-

Service Courses:

The student should opt service courses of 8 credits either from parent department or other department.

Course Code	Course Title	No. of Credits	No. of Hours / Week	Total Marks: 100	
				External	Internal
CSI441	Aptitude	2	2	80	20
CSI442	Practical Based on CSI441	2	4 (Per Batch)	50	-
CSI443	Personality Development	2	2	80	20
CSI444	Practical Based on CSI443	2	4 (Per Batch)	50	-
CSI445	Communication Skills	2	2	80	20
CSI446	Practical Based on CSI445	2	4 (Per Batch)	50	-
CSI447	Computer Animation & Simulation	2	2	80	20
CSI448	Practical Based on CSI447	2	4 (Per Batch)	50	-
CSI449	Introduction to MATLAB	2	2	80	20
CSI450	Practical Based on CSI449	2	4 (Per Batch)	50	-

4. Detailed Syllabus

4.1 Semester-I

1. Object Oriented Programming in C++

Subject Reference No	CSI401	Subject Title	Object Oriented Programming in C++
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Course Objectives: By the end of the course students will be able to:
- Write C++ programs using the more esoteric language features.
- Utilize Object Oriented techniques to design C++ programs.
- Use the standard C++ library.
- Exploit advanced C++ techniques

Prerequisite: Student must aware of Programming using C and Programming language concepts.

UNIT I:
Principle of Object Oriented Programming: Introduction, Procedural Vs Object Oriented Programming, Classes, Object, Data Abstraction,Encapsulation, Inheritance, Polymorphism,Dynamic Binding, Message Passing, Object Oriented Languages, Object Based languages. Basics of C++: A Brief History of C & C++, C Vs C++, A Simple C++ Program, Application of C++, Structure & Class, Compiling &Linking, Tokens, Keywords, Identifiers & Constants, Basic Data Types, User-Defined Data Types, Symbolic Constant, Type Compatibility, Reference Variables, Operator in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators, Manipulators, Type Cast Operator.

UNIT II:
Decision making and looping Structures: If statement, if-else construct, use of logical operators and Compound Relational Tests, Nested if statements, The else if construct, the relational operators, the conditional expression (ternary) operator, The switch statement with or without break, The for statement, Nested for Loop, for loop variants, the while statement, Increment/decrement operators, Use of Break and Continue, the do-while loop. Functions In C++: The Main Function, Function Prototyping,Call by Reference Call by Address, Call by Value, Return by Reference, Inline Function, Default Arguments, Const Arguments, Function Overloading,FriendFunction.Arrays and Pointers: Declaration, Referring individual elements, Entering data into an array, readidata from an array, Array Initialization, Bounds checking. Passing array elements to a function, Introduction to Pointers, Pointers and Structures, Pointers and Functions, Pointers and Arrays, Operation on Pointers, Pointers to Functions, Two Dimension Arrays and pointers.

UNIT III:
Structures: Declaring structure, initializing structure, structure variables, accessing structure elements,Arrays of structure, Functions and Structures, Structures within structures, Structures

containing arrays, Union, Classes & Object: A Sample C++ Program with class, Defining Member Functions, Makingan Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within aClass, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Object as Function Arguments, Returning Objects, Constructor & Destructor: Constructor,arameterized Constructor, Multiple Constructor in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructor, Const Object Destructor.

UNIT IV:
Operator Overloading & Type Conversion: Defining operator Overloading, Overloading UnaryOperator, Overloading Binary Operator, Overloading Binary Operator Using Friends, Manipulating of String Using Operators, Type Conversion, Rules for Overloading Operators, Inheritance: DefiningDerived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance,Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Virtual Function & Polymorphism: Introduction, Pointer to Object, This pointer, Pointer to Derived Class, Virtual Function, Pure Virtual Function, Early Vs Late Binding. The C++ I/O System Basics: C++Streams, C++ Stream Classes, Unformatted I/O Operation, Formatted I/O Operation, Managing Output with Manipulators.

UNIT V:
Working with Files: Introduction, Classes for File Stream Operation, Opening & Closing Files, Detectionof End of File, More about Open( ): File modes, File pointer & manipulator, Sequential Input & outputOperation, Updating a File : Random Access, Command Line Arguments. Exception handling AndTemplate: Exception Handling Fundamentals, The try Block, the catch Exception Handler, The throw Statements, The try/throw/catch sequence, Exception Specification, Unexpected Exception, Catch – All Exception Handlers, Throwing an exception from handler, Uncaught Exception, Generic Function, A function with Two Generic Data Types, Explicitly Overloading a Generic Function, Overloading a Function Template

Books :
1. C++: The Complete Reference by Herbert Schildt

References:
1. Turbo C++ ByLafore R.
2. Let us C++ ByKanetkarYashvant.
3. Object Oriented Programming with C++ : E. Balagurusamy
4. C++ Primer : Stanley Lippman&Lajoi
5. C++ Programming Language : BjarneStroustrup
6. C++ Programming Bible : Al Stevens & Clayton Walnum

Lab Exercise: CSI451 Practical based on CSI401
At least two experiments should be carried out on each unit.

2. Computer System Architecture

Subject Reference No	CSI-402	Subject Title	Computer System Architecture
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs. /Week	4 Theory, 4 Practical/Per Batch	External (Semester Exam)	80%

Objective: To study the basic working and organization of various components of computer systems. Prerequisite: Student must aware of basics of digital electronics, microprocessor architecture, ALP

UNIT I: Data Representation: Introduction, Data types, Complements, Fixed Point and Floating Point representation, Error Detecting Codes.

UNIT II: Digital Logic Circuits: Digital Computers, Logic Gates, Boolean algebra, Ma Simplification, Combinational Circuits, Flip-Flops Sequential Circuits.

UNIT III: Digital Components: Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit.

UNIT IV: Central Processing Unit: Introduction, general Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC).

UNIT V: I/O& Memory Organization: Peripheral Devices, Input Output Interface, Asynchronous Data Transfer, Modes of Transfer, Direct Memory Access, Input-Output Processor, and Serial Communication, Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Text Book:
1. Computer System Architecture-M. Morris Mano, PHI Publication, ISBN-81-203-0855-7.Third Edition.
2.

References:
1. Computer Organization and Architecture- William Stallings – Fifth Edition.
2. Structured Computer Education – Andrew S Tanenbaum-(Prentice Hall)-Fourth Edition.

Lab Exercise: CSI452 Practical based on CSI402
At least two experiments should be carried out on each unit.

3.   Operating System

Subject Reference No	CS1403		Subject Title	Operating System
No of Credits	4 Theory, 2 Practical		Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical		External (Semester Exam)	80%

Objective: This course explores the learners about operating system and their components. This covers the fundamental functionality of Operating system like memory management, process management, I/O management, storage management. Make them ready to analyze the real perspective of operating system in network, distributed, parallel and multi core environment.

Prerequisite: Student must know Computer system architecture in order to understand functioning of operating system and must have knowledge of disk operating systems.

UNIT I:
Overview: Introduction, history of operating system, Memory Management: Processes in memory. Logical addresses. Partitions: static *versus* dynamic, free space management, external fragmentation,Segmented memory. Paged memory: concepts, internal fragmentation, page tables. Demand paging/segmentation. Replacement strategies: FIFO, LRU (and approximations), NRU, LFU/MFU, MRU.

UNIT II:
Cache Management: Allocation and de-allocation techniques, coherence technique, Processes and Scheduling: Job/process concepts. Scheduling basics: CPU-I/O interleaving, (non-)preemption, context switching, Scheduling algorithms: FCFS, SJF, SRTF, priority scheduling, round robin, Combined schemes Process details like creation PCB, process view, Thread and interprocess Communication.

UNIT III:
Lower Process Management: Process Synchronization, Deadlocks, Live locks, I/O Subsystem: General structure. Polled mode *versus* interrupt-driven I/O, Application I/O interface: block and character devices, buffering, blocking *versus* non-blocking I/O, Other issues: caching, scheduling, spooling, performance, File-system Interface, File System Implementation, Mass Storage Structure, File concept, Directory and storage services, File names and meta-data, Directory name-space: hierarchies, DAGs, hard and soft links, File operations, Access control, Existence and concurrency control.

UNIT IV:
Protection and Security: Requirements, Subjects and objects, Design principles, Authentication schemes, Access matrix: ACLs and capabilities, Combined scheme, Covert channels.

UNIT V:
Case Studies:

- The Linux System
- Windows XP

Books:

1. Abraham Silberscatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts ", 7thed John Wiley and Sons, Inc 2005.
2. William Stallings, "Operating Systems: Internals and design Principles", 5th Ed Prentice –hall, 2005.
3. Andrew Tanenbaum, "Modern operating systems" 3rd Ed, Pearson Education.

Lab Exercise: CSI453 Practical based on CSI403
At least two experiments should be carried out on each unit.

4. Relational Database Management System

Subject Reference No	CSI404	Subject Title	Relational Database Management System
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Objective: The course aims to give the students both the theoretical and practical foundation in Data Base Management Systems. Student will also learn advanced concepts as well as new trends in the field. This Tocourse has two main objectives:

- provide students with an understanding of the relational model, relational database design, and SQL.
- Students will construct SQL queries using SQL.
- To provide students with a working knowledge of the underlying architecture and implementation of modern database systems.
- Students will study different concepts like, Integrity Constraints, indexing methods, transaction management, query processing, etc.

Prerequisite: Before attending this course student must aware with basics of database management systems, working with queries etc.

UNIT I:
Overview of Database Concepts: Introduction, Basic Concepts, View of data, Data models, E-R diagrams, DBA, DB Users. Mapping Cardinalities, Keys, Database Languages, Relational Model: Structure of relational database models, Relational Algebra, Modification of database, Views, SQL: Background, Basic Structure, Different Operations, Functions, Queries, Relations, Views, Indexing and Hashing: Basic Concepts, Indexing. Types of Indexing, Hashing, B+, B- Trees, Static Hashing, Dynamic Hashing.

UNIT II:

Relational Database Design: Functional Dependencies, Normalization, Types of Normalization, QueryProcessing: Overview, Transformation of relational expressions, evaluation of expressions, measures of query cost, architecture of query processing model, distributed query processing

UNIT III:
Transactions: Concept, Transaction States, ACID property, Concept of Serializability, testing for serializability, analysis of different types of schedules like : conflict equivalent, conflict serializable, concept of conflict serializability, etc. Concurrency Control: Protocols for Concurrency control: Timestamp, Lock-based, granting of locks, two phase locking protocol, graph based protocol, etc, Concept pf multiple granularity, Deadlock handling.

UNIT IV:
Database Recovery : Failure Classification, Storage structure, recovery and atomicity, check points, types of recovery like, log based recovery, shadow paging etc. Database System Architectures: Centralized Systems, Client-Server systems, Parallel and distributed systems, Network types, Distributed Databases: Distributed data storage, data replication, data fragmentation.

UNIT V:
New Applications: DSS, MIS, Data Mining, Data Warehousing, Types of Databases, New Trends in databases, Introduction to RDBMS: Concept, types, examples, applications.

Books:
1. Silberschatz, Korth, &Sudarshan, *Database System Concepts*, 5th edition, McGraw-Hill (2005).
2. Elmasri&Navathe, *Fundamentals of Database Systems*.
3. Introduction to Database Systems,Bipin C. Desai
1. http://www.bell-labs.com/topic/books/db-book
2. www.mit.ocw.edu/

Lab Exercise: CS1454 Practical based on CS1404
At least two experiments should be carried out on each unit.

4.2 Semester-II

1. Programming in Core Java

Subject Reference no	CSI405	Subject Title	Programming in Core Java
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Course objective

The course provides students with the knowledge and skills needed to develop applications in Java for the Microsoft and sun platform. The course focuses on fundamental concepts, designing user interfaces, program structure, language syntax, and implementation details. This is the first course in the Java Certification Exam and will serve as the entry point for other Advance Java Courses.

Audience

This course is intended for both novice and experienced programmers who have a minimum of three months programming experience of Object Oriented Programming.

At Course Completion

After completing this course, students will be able to:

- Create a simple Java Application based on the Java Foundations.
- Use of Java forms and controls to create a user interface.
- Create and use variables and arrays.
- Create and use Class, Interfaces, Packages and predefined utility classes.
- 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 behavior to the classes
- Resolve syntax, run-time, and logic errors by using the structured exception handling.
- Enhance the user interface by adding menus, status bars, and toolbars.

Prerequisites

Before attending this course, students must have:

- Student should know the Object oriented programming Concepts

– Or –

- Understanding of the basics of structured programming, including concepts such as flow control, variables and parameters, and function calls.

UNIT I:

Java Introduction: The Java Environment – Overview, Writing a Java Program, Obtaining The Java Environment, Setting up your Java Environment, Creating a Class That Can Run as a Program, The main() Method, Useful Stuff Necessary to go Further, System.out.println(), Using the Java Documentation, B. Java Basics: Basic Java Syntax: General Syntax Rules, Java Statements, Blocks of Code, Comments, Variables:,Data types, Primitive Data Types, Object Data Types, Literal

Values, Constants and the final keyword, Mathematics in Java: Expressions, Operator Precedence, Multiple Assignments, Order of Evaluation, Bitwise Operators, Compound Operators, Expressions that Mix Data Types: Typecasting Creating and Using Methods, Creating Methods, Variable Scope

UNIT II:A. Java Objects: Objects: Object-Oriented Languages, Object-Oriented Programs, Encapsulation, Creating and Using an Instance of an Object, References Defining a Class, Constructors, MethodOverloading, The this Keyword, static Elements, Garbage Collection, Java Packages, Dealing withKeyboard Input, String, StringBuffer, and StringBuilder, Creating Documentation, Comments and Using javadoc, Javadoc Comments B. Comparisons And Flow Control Structures: Controlling Program Flow:Boolean-Valued Expressions, Complex boolean Expressions, Simple Branching, Two Mutually Exclusive Branches, Nestedif... elseStatements-Comparing a Number of MutuallyExclusive Options, Comparing a Number of Mutually ExclusiveOptions- The switchStatement, Comparing Objects, Conditional Expression, while and do. . .while Loops, for Loops, Additional Loop Control: break and continue,Breaking Out of a Loop, Continuing a Loop, Classpath, Code Libraries, and Jar files, Using CLASSPATH Creating a jar File (a Library) C. Arrays and Vectors: Arrays : Defining and Declaring Arrays,Instantiating Arrays, Initializing Arrays, Working With Arrays, Array Variables, Copying Arrays, Arrays of Objects, Enhanced for Loops - the For-Each Loop, Multi-Dimensional Arrays, Multidimensional Arrays in Memory, Example - Printing a Picture, Typecasting with Arrays of Primitives, Using Vectors: Defining Vectors and using Vectors

UNIT III:A. Inheritance: Inheritance: Derived Class Objects, Polymorphism, Inheritance and References Dynamic Method Invocation, Creating a Derived Class, Inheritance and Access Inheritance and Constructors - the super Keyword, Derived Class Methods That Override Base Class Methods Inheritance and Default Base Class Constructors, The Instantiation Process at Runtime, Typecasting with Object References: Typecasting, Polymorphism, and Dynamic Method Invocation, More on Overriding, Object Typecasting Example, Checking an Object's Type: Using instanceof, Typecasting with Arrays of Objects, OtherInheritance-Related Keywords: abstract, final, Methods Inherited from Object B. Packages andInterfaces: Interfaces: Creating an Interface Definition, Implementing Interfaces: Implementing Interfaces – Example, Reference Variables and Interfaces, Calling an Interface Method, Interfaces and Inheritance: Some Uses for Interfaces, Interfaces and Event-HandlingInterfaces and "PluggableComponents", Packages: Creating and using packages, Access C. Inner Classes: Inner Classes, NestedClasses,Inner Class Syntax, Instantiating an Inner Class Instance from Within the Enclosing Class, Inner Classes Referenced from Outside the Enclosing Class Working with Inner Classes D. Exceptions:Exceptions: Handling Exceptions, Exception Objects: Attempting Risky Code - try and catch, Guaranteeing Execution of Code - the finally Block, Letting an Exception be Thrown to the Method Caller, Throwing an Exception, Exceptions and Inheritance, Exception Class, Constructors and Methods, Creating and Using Your Own Exception Classes, Rethrowing Exceptions, Initializer Blocks, Static Initializer Blocks, Assertions

UNIT IV:A. Utility Classes: Collection Interfaces, Concrete collections, Collections framework, Algorithms, LegacyCollections Streams: Output Streams, Input Streams, Filter Streams, Readers and Writers B. Applet andSwings: Applet: Applet Life Cycle, Passing Parameters to Applet, Delegation Event Model, Awt Components, Awt Events, using listeners, Working with Graphics, Loading Image and Multimedia objects in applets.

UNIT V: Working with Swings: Using JFC Foundations, Preparing Frame, Panel, working with Graphics, Adding Components, Adding Events, Creating and Using Menu-bar, toolbars, SDI and MDI Java Frames.

Text books:
Books
1. Java 2 Complete Reference by Herbert Schieldt (Sixth Edition)
2. Core Java Vol 1: Sun Press, Eighth Edition
3. Core Java Vol 2: Sun Press

Additional Reference
1. Programmer's Guide to Java™ Certification, A: A Comprehensive Primer, Khalid A. Mughal, Rolf W. Rasmussen, Second Edition, August 04, 2003, Addison Wesley.

Web Reference
1. http://www.javapassion.com/javaintro/
2. Presentation Slides (Available in .ppt format)

E-book:
1. Java 2 Complete Reference by Herbert Schieldt (Fourth Edition)

Lab Exercise: CSI455 Practical based on CSI405
   At least two experiments should be carried out on each unit.

2   Software Engineering and CASE Tools

Subject Reference No	CSI406	Subject Title	Software Engineering and CASE Tools
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Objective :
This course aims to give students both a theoretical and a practical foundation in software engineering. In the theoretical part, students will learn about the principles and methods of software engineering, including current and emerging software engineering practices and support tools. In the practical part, students will become familiar with the development of software products from an industry perspective, including generation of appropriate documents, under tight schedules and limited resources. Because this is a writing component course, there will be heavy emphasis on written communication skills.

Prerequisite :
   • Basic understanding of software development process.

UNIT-I:

Software and software process models: software categories and characteristics, legacy software, software myths, Software engineering-A layered technology, A process framework, waterfall model, incremental and evolutionary models. Requirement engineering: Requirement engineering task, initiating the requirement engineering process, eliciting requirements, developing use cases, building analysis model, Negotiating requirements, validating requirements, data modeling, functional modeling and behavioral modeling.

UNIT-II:

Design Engineering: Design process and design quality, design concepts, design model, architecturaldesign, Interface design.

UNIT-III

Testing Strategies and Tactics: Unit testing, integration testing, validation testing, system testing, whitebox testing, black box testing.

UNIT-IV:

Product Metrics: Software quality, framework for product metrics, Metrics for analysis model, Metricsfor design model, Metrics for source code. Metrics for testing, metrics for maintenance.

UNIT-V:

Managing Software Projects: Management spectrum, people, product, process, project, softwareproject estimation, decomposition techniques, Empirical estimation, project scheduling and tracking, risk management, Quality management and change management.

Textbooks:
    1. R. Pressman, Software Engineering: A Practioner's Approach, 6th Edition.2005.

Lab Exercise: CSI456 Practical based on CSI406
    At least two experiments should be carried out on each unit.

3.   Data Structures and Algorithms

Subject Reference No	CSI407	Subject Title	Data Structure and Algorithms
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Objective

This course is designed for the students to learn principals of Data structure, Algorithms and understand issues related to allocation of memory, optimization of Algorithms, Time and Space Complexity associated with Algorithms, Sorting, Searching Algorithms applied on data structures. The course covers fundamental data structures, including lists, stacks, queues, trees, and graphs, and it examines classic algorithms that use these structures for tasks such as sorting, searching, pattern

matching, and data compression. Techniques for analyzing the efficiency of algorithms are also studied. Key notions of object-oriented programming, including encapsulation and abstract data types, are emphasized.

At Course Completion
After completing this course, students will be able to:
- Understand structure and behavior of Algorithms
- Better scope to write effective programs
- The course content helpful in the preparation of UGC-SET/NET, DRDO entry level Examinations
- This course will be the basic course for learning Algorithms and Approximation of Algorithms related research

Prerequisites
Before attending this course, students must have introductory concepts of like set theory, Principals of programming languages, Introductory Object oriented programming paradigm

Course Outline

UNIT-I:
Introduction: Need of Data structures and Algorithms, Writing Algorithms, Testing Algorithms using Hand runs, Building Algorithms, Data Structures types like Linear, Non Linear, and Abstract Data Types, Data Structure operations like Traversing, Searching, Sorting, insertion, Deletion.

UNIT –II:
Elementary Data Structures: Arrays- Ordered List, Sparse Metrics, Array Representations, Stacks and Queues: -Organization, Operations, multiple stacks, types of queues, Linked Lists:- Singly Linked List, Doubly Linked List, Doubly Linked List and Dynamic Storage management, Garbage collection and Compaction.

UNIT –III:
Trees: Terminology, Binary Trees, Tree representation, Tree traversal, Threaded Binary Trees, Binary Search trees, B Tree, Binomial Heaps: Binomial Heap Operations, Fibonacci Heap: Mergable Heap operations.

UNIT –IV:
Graph Algorithms: Terminology and Representation, Traversal: BFS, DFS, Connected Components and Spanning trees, Shortest path: Dijkstra's, Bellman-ford, Single Source Shortest Path, All Pair shortest path Floyd-Warshall Algorithm, Transitive closure

UNIT –V:
Searching and Sorting: Linear Vs Binary search. Sorting: - Insertion Sort, Merge Sort, Quick sort, RadixSort, Design and Analysis Techniques: Dynamic Programming:- Elements of Dynamic Programming, Matrix Multiplication, Longest Common Subsequence Problem, Introduction to Greedy Algorithms, Amortized Analysis Methods, time and Space Complexity of Algorithm.

Text Books

1. Fundamentals of Data Structures by Ellis Horowitz and SartajSahani.
2. Introduction to Algorithms by Thomas H Coreman et.al, PHI Publication

Home work (Term Work)

Every student is required to prepare a separate notebook for the course. Home work will be given after completion of the unit and student has to submit the home work on the date declared in the class.

Lab Exercise: CSI457 Practical based on CSI407

At least two experiments should be carried out on each unit.

4 Computer Networks

Subject Reference no	CSI408	Subject Title	Computer Network
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Objective: To Study various structure and topologies of communication mediums

Prerequisite: Student must have knowledge of operating systems and data communications.

UNIT I:

Introduction to Computer Networks: Types of Network, Topologies, Client Server Model, Connection-oriented, connection less services, Transmission Media-Guided, Unguided, types of it, types of cables, VLANs, VPNs, Multiplexing, Bit rate, Baud Rate, Bandwidth etc. Network Hardware Components: Hub, Switch, Bridge, Router, Repeater, Gateway, etc. Reference Models: Introduction, ISO-OSI Referencemodel, TCP/IP reference model, comparison of OSI and TCP/IP models, Asynchronous Transfer Mode (ATM): Cells, Header and Cell Formats, Layers in ATM

UNIT II:

Data Link Layer: Introduction, DLL Protocols, Frame Relay, X.25 protocol, MAC subs layer protocols, Local Area Networks (LANs): IEEE 802.4 and 802.5 Protocols, Performance of Ethernet and Token ring protocols, FDDI Protocol, Distributed Queue Dual Bus (DQDB) protocol, Network layer and Transport layer Introduction, Routing Algorithms, Congestion Control, TCP and UDP services, Multicasting, Spanning Tree.

UNIT III:

IP Addressing & DNS: What are IP address?, The hierarchical scheme pf IP addresses, class A,B,C,D IP address, Subnetting Network, Subnet Masks, MAC address, IPv4 and IPv6 IP address, The Domain Name System, zones of DNS, Switching: Switching concept, Circuit Switching, Packet Switching, Virtual circuits& data grams, Message switching, Queuing models, ASN(abstract syntax Notation).

UNIT IV:
Network Security: Cryptography, Algorithms: Secret key and Public key, DNS-Domain Name Service, Digital Signature, Firewalls, Proxy server.

UNIT V:
Special Topics: Next Generation Networks, Data Centers, Cloud Computing, Bluetooth Technology, Green Networking, GSM, GIS, etc.

Books:
1. Computer Networks – A. Tanenbaum, (PHI pub.)
2. Data and Computer Communication – Willam Stallings, PHI pub.

References:

1. Data Communication & Network – Forouzan (TMH)
2. Internetworking with TCP/IP Vol-1 – Comer (PHI pub.)
3. Data Communications and distributed Networks-V.B, Black, (Prentice Hall pub.)

Lab Exercise: CS1458 Practical based on CS1408
At least two experiments should be carried out on each unit.

****

1.   Programming in Advance Java

Subject Reference No	CSI501		Subject Title	Programming in Advance Java
No of Credits	4 Theory, 2Practical		Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical		External (Semester Exam)	80%

Course Objective
This course assumes that students are aware of core java programming and hence it starts from threading and goes up to web programming. It covers some advance topics of reflection, applets, swings, JDBC, Networking, JSP and Servlet.

At Course Completion
After complication of this course students can write good application based on java. Students can appear for java certification examinations. Student can also work on networking and web projects.

Prerequisites
Student should know the programming in core java.

UNIT I:
Threading: Threading Basics: Java Thread Model, Creating and Running Threads, Manipulating ThreadState, Thread Synchronization, Volatile Fields vs. Synchronized Methods, wait and notify, join and sleep, The Concurrency API, Atomic Operations, Reflection: Uses for Meta-Data, The Reflection API, The Class<T> Class, The java.lang.reflect Package, Reading Type Information, Navigating Inheritance Trees, Dynamic Instantiation, Dynamic Invocation, Reflecting on Generics

UNIT II:Java Database Connectivity: JDBC, JDBC Architecture (type 1, type 2, Type 3, type 4) the java.sql.* package, Connection, ResultSet, Statements

UNIT III:Servlets: Web Application Basics: How the Web works, Thin Clients, TCP/IP, HTTP overview, Brief HTML review, Overview of Java EE, servlets & Web applications., Servlet Basics, Servlet API:-HTML Forms, HTTP: Request-response, headers, GET, POST, Overview: How Servlets Work, Servlet Lifecycle: init(), service(), destroy(), Requests and responses, Core Servlet API: GenericServlet, ServletRequest, and ServletResponse, HTTP Servlets: HttpServletRequest, HttpServletResponse and HttpServlet, Accessing Parameters, Additional Servlet Capabilities, HTTP headers and MIME types RequestDispatcher: Including and forwarding, Sharing data with the request object attributes, Sharing data with ServletContext attributes, Error Handling.

UNIT IV:Java Server Pages: Basics and Overview, JSP architecture, JSP tags and JSP expressions, Fixed Template Data, Lifecycle of a JSP, Model View Controller (MVC), Model 1/Model 2 Architecture, Data Sharing among servlets & JSP: Object scopes or "buckets", Request, application, session and page scope, Predefined JSP implicit objects (request, session, application, page), <jsp:useBean>, <jsp:getProperty>,<jsp:setProperty>, <jsp:include>, <jsp:forward>, More JSP

Capabilities and Session Management, HTTP as a stateless protocol, Hidden form fields, Cookies: Overview, API, Using cookies, Session overview: Cookies and session tracking, HttpSession, Putting data into a session object, Retrieving data from a session object, Using session data in servlets and JSPs Additional JSP Capabilities, Exception handling and error pages, Directives (page, include, others), Import declarations, Multithreading considerations and data safety, SingleThreadModel interface, Additional JSP Capabilities, JSP Directives, JSP Error Pages, JSP and Java Declarations, Scriptlet overview, Scriptlet syntax

UNIT V:JSTL: Using Custom Tags, Custom tags overview, Reducing JSP complexity, Tag Libraries, Tag Library Descriptor (TLD), Loading a tag library in a web app, The JSTL, JSP Expression Language (EL), Using custom tags, The c:url, c:param, c:forEach, c:out tags, Overview of JSTL libraries, The JSTL Expression Language, Expressions, Type Coercion, Operators, String concatenation, Implicit Objects, The Core JSTL Library, General Purpose: c:out, c:set, c:catch, Conditional: c:if, c:choose,, Overview of other capabilities, Additional Topics : Servlet Filter overview, Filtering examples, lifecycle, & filter chains, Filter API, Modifying a request, Modifying a response, Struts Overview Advanced MVC – Struts overview, Command and State patterns, Struts View and Controller elements

Books:
1. Java 2 Complete Reference by Herbert Schieldt (Sixth Edition)
2. Core Java Vol 1: Sun Press
3. Core Java Vol 2: Sun Press

Additional Web Reference
http://www.javapassion.com/javaintro/
Presentation Slides (Available in .ppt format)

E-book:
1. Java 2 Complete Reference by Herbert Schieldt (Fourth Edition)

Lab Exercise: CSI55 Practical based on CSI501
At least two experiments should be carried out on each unit.

2. Decision support System & Intelligent System

Subject Reference No	CSI502	Subject Title	Decision Support System and Intelligent system
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Objective: To provide the logic based frameworks for design and implementation of Decision Support System and Intelligent system

Prerequisite: To aware about classification mechanisms

UNIT I:

Decision Support and Business Intelligence- Decision Support Systems and Business Intelligence: Opening Vignette: Toyota Uses Business Intelligence to Excel, Changing Business Environments and Computerized Decision Support, Managerial Decision Making, Computerized Support for Decision Making, An Early Framework for Computerized Decision Support, The Concept of Decision Support Systems (DSS), A Framework for Business Intelligence (BI), A Work System View of Decision Support, The Major Tools and Techniques of Managerial Decision Support, Implementing Computer-Based Managerial Decision Support Systems, Computerized Decision Support, Decision Making, Systems, Modeling, and Support: Opening Vignette: Decision Making at the U.S. Federal Reserve, DecisionMaking: Introduction and Definitions, Models, Phases of the Decision Making Process, Decision Making:The Intelligence Phase, Decision Making: The Design Phase, Decision Making: The Choice Phase, DecisionMaking: The Implementation Phase, How Decisions are Supported, Decision Support SystemsConcepts, Methodologies, and Technologies: An Overview: Opening Vignette: Decision Support System Cures for Healthcare, DSS Configurations, DSS Description, DSS Characteristics and Capabilities, Components of DSS, The Data Management Subsystem, The Model Management Subsystem, The User Interface (Dialog) Subsystem, The Knowledge-Based Management Subsystem, The User, DSS Hardware, DSS Classifications

UNIT II:

Modeling and Analysis: Opening Vignette: "Winning Isn't Everything... But Losing Isn't Anything:" Professional Sports Modeling for Decision Making, MSS Modeling, Static and Dynamic Models, Certainty, Uncertainty, and Risk, MSS Modeling with Spreadsheets, Decision Analysis with Decision Tables and Decision Trees, The Structure of Mathematical Models for Decision Support, Mathematical Programming Optimization, Multiple Goals, Sensitivity Analysis, What-IF, and Goal Seeking Problem Solving SearchMethods, Simulation, Visual Interactive Simulation, Quantitative Software Packages and Model, Base Management, Business Intelligence Special Introductory Section: The Essentials of Business Intelligence: A Preview of the Content of Chapters, The Origins and Drivers of Business Intelligence, TheGeneral Process of Intelligence Creation and Use, The Major Characteristics of Business Intelligence, Towards Competitive Intelligence and Advantage, The Typical Data Warehouse and BI User Community,Successful BI Implementation, Structure and Components of BI, Conclusion: Today and Tomorrow DataWarehousing: Opening Vignette: Continental Airlines Flies High with Its Real-Time Data Warehouse, Data Warehousing Definitions and Concepts, Data Warehousing Process Overview, Data Warehousing Architectures, Data Integration, and the Extraction, Transformation, and Load (ETL) Process, Data Warehouse Development, Real-Time Data Warehouses, Data Warehouse Administration and Security Issues

UNIT III:

Business Analytics and Data Visualization: Opening Vignette: Lexmark International Improves Operations with BI, The Business Analytics Field-An Overview, Online Analytical Processing (OLAP), Reporting and Queries, Multidimensionality, Advanced Business Analytics, Data Visualization, Geographic Information Systems, Real-Time Business Intelligence, Automated Decision Support, and Competitive Intelligence, Business Analytics and the Web: Web Intelligence and Web Analytics, Usage, Benefits, and Success of Business Analytics Data, Text, and Web Mining: Opening Vignette: Highmark,Inc., Data Mining Concepts and Applications, Data Mining Techniques and Tools, Data Mining Project Process, Text Mining, Web Mining Neural Networks for Data Mining: Opening Vignette: Using NeuralNetworks to Predict Beer Flavors From Chemical

Analysis, Basic Concepts of Neural Networks, Learning in Artificial Neural Networks, Developing Neural Network Systems, A Sample Neural Network Project, Neural Networks Paradigms, Applications of Neural Networks, A Neural Network Software Demonstration Business Performance Management: Opening Vignette: Cisco and the Virtual Close,Business Performance Management Overview, Strategize: Where Do We Want to Go? Plan: How Do We Get There? Monitor: How are We Doing? Act and Adjust: What Do We Need to Do Differently? Performance Measurement, Bpm Methodologies, Bpm Architecture and Applications, Performance Dashboards, Business Activity Monitoring (BAM)

UNIT IV:
Collaboration, Communication, Group Support Systems, and Knowledge Management-Collaborative Computing-Supported Technologies and Group Support Systems: Opening Vignette: Collaborative Design at Boein-Rocketdyne, Making Decisions in Groups: Characteristics, Process, Benefits, and Dysfunctions, Supporting Groupwork with Computerized Systems, Tools for Indirect Support of Decision Making, Integrated Groupware Suites, Direct Computerized Support for Decision Making: From GDSS to GSS, Products and Tools for GDSS/GSS and Successful, Implementation, Emerging Collaboration Support Tools: From VoIP to Wikis, Collaborative Efforts in Planning, Design, and theProject Management, Creativity, Idea Generation and Computerized Support Knowledge Management: Opening Vignette: Simens Knows What It Knows through Knowledge Management, Introduction to Knowledge Management, Organizational Learning and Transformation, Knowlege Management Activities, Approached to Knowledge Management, Information Technology in Knowledge Management,Knowledge Management Systems Implementation, Roles of People in Knowledge Management, Ensuring the Success of Knowledge Management Efforts, Intelligent Systems-Artificial Intelligence and Expert Systems: Opening Vignette: Cigna Uses Business Rules to Support Treatment Request Approval,Concepts and Definition of Artificial Intelligence, The Artificial Intelligence Fields, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, How Expert Systems Work-Inference Mechanisms, Problem Areas Suitable for Expert Systems, Development of Expert Systems, Benefits, Limitations and Success Factors of Expert Systems, Expert Systems on the Web

UNIT V:
Advanced Intelligent Systems: Opening Vignette: Improving Urban Infrastructure Management in the City of Verdum, Machine Learning Techniques, Case-based Reasoning, Genetic Algorithmsundamentals, Developing Genetic Algorithm Applications, Fuzzy Logic Fundamentals, Natural Language Processing, Voice Technologies, Developing Integrated Advanced System. Intelligent Systems over the Internet: Opening Vignette: NetFlix Gains High Customer Satisfaction from DVDRecommendation, Web-Based Intelligent Systems, Intelligent Agents: An Overview, Characteristics of Intelligent Agents, Why Use Intelligent Agents, Classification and Types of Intelligent Agents, Internet- Based Software Agents, DSS Agents and Multi-agents, Semantic Web: Representing Knowledge forIntelligent Agents, Web-Cased Recommendation Systems, Managerial Issues of Intelligent Agents Implementing Decision Support Systems- Systems Development and Acquisition: OpeningVignette: Osram Sylvania Thinks Small, Strategizes Big- Develops the InfoNetHR Portal System, What Types of Support Systems Should We Build? The Landscape and Framework of MSS Applications Development, Development Options for MSS Applications, Prototyping: A Practical MSS Development Methodology, Criteria For Selecting a Development Approach, Third-Party Providers of MSS Software Packages and Suites, Connecting to Databases and Other Enterprise Systems, Rise of Web Services, XML,and Service-Oriented Architecture,

End-user Developed MSS, Vendor and Software Selection and Management, Putting the MSS Together and Implementation Issues Integration, Impacts, and the Future of Management Support Systems: Opening Vignette: Elite-Care Supported by IntelligentSystems, Systems Integration: An Overview, Types of MSS Integration, Integration with Enterprise Systems and Knowledge Management, The Impacts of MSS: An Overview, MSS Impacts on Organizations, MSS Impacts on Individuals, Automating Decision Making and the Manager's Job, Issues of Legality, Privacy, and Ethics, Intelligent and Automated Systems and Employment Levels, Other Societal Impacts and the Digital Divide, The Future of Management Support Systems

Books:
1. Decision Support and Business Intelligence Systems, Turban, Pearson Education

References:
1. Decision Support Systems, George M. Marakas, 2nd Edition, Pearson Education
2. Decision Support Systems, Janakiraman V.S. and Sarukesi. K., Prentice Hall of India
3. Decision Support System and Management, Lofti, McGraw Hill Inc., International Edition, New Delhi.

Lab Exercise: CSI56 Practical based on CSI502

At least two experiments should be carried out on each unit.

3 Network Security

Subject Reference No	CSI503		Subject Title	Network Security
No of Credits	4 Theory, 2 Practical		Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical		External (Semester Exam)	80%

Objective: To learn various techniques to secure information while traveling through different communication mediums

Prerequisite: Student must know basics of data communications, protocols, and concepts of computer networks

UNIT I:
1 - Overview
2 - Classical Encryption Techniques
3 - Block Ciphers

UNIT II:
4 - Advanced Encryption Standard
5 - Confidentiality Using Symmetric Encryption
6 - Number Theory

UNIT III:
7 - Public-Key Cryptography and RSA

8 - Public-Key Cryptosystems
9 - Hash Algorithms

UNIT IV:
10 - Digital Signatures
11 - Authentication Applications
12 - Electronic Mail Security

UNIT V:
14 - Web Security
15 - Intruders
16 - Malicious Software
17 - Firewalls

Textbook
1. The official course text is Cryptography and Network Security: Principles and Practice; Second Edition . By William Stallings, Prentice Hall, Hardcover
2. Network Security Essentials : Applications and Standards by William Stallings. Prentice Hall, Hardcover, Published November 1999, 366 pages, ISBN 0130160938

References:
- Cryptography: Theory and Practice by Douglas R. Stinson, CRC press, hardcover.
- Secrets and Lies: Digital Security in a Networked World by Bruce Schneier John Wiley, Published August 2000, 412 pages, ISBN 0471253111.
- A Course in Number Theory and Cryptography (Graduate Texts in Mathematics),(Hardcover) by Neal Koblitz Number theory with computer applications, by RamanjuacharyKumandari and Christina Romero (1998)
- Get details of threats to information and system security. Discuss Virus, worms, Trojans etc in details.
- Study any library for packet tearing and packet sniffing.
- Implement Generic Cipher, Fiestal Cipher and DEC
- Implement Packet Sniffing using the library studied in Assg No 2
- Study of Firewall
- Implementing firewall in Windows server/ Linux Server

Lab Exercise: CS156 Practical based on CS1503
At least two experiments should be carried out on each unit.

1. XML.NET

Subject Reference no	CSI421		Subject Title	XML.NET
No of Credits	4 Theory, 2 Practical		Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical		External (Semester Exam)	80%

Course Objective

XML is everywhere in the Microsoft® .NET Framework, from Remoting to Web services and from data access to configuration. Student will learn about the extensive XML core classes in .NET and find out how to program against its parser in-depth guide

At Course Completion

After completion of this course student can apply XML knowledge in scripting the web pages and write good applications using XML.NET

Prerequisite

Student must know web programming, design of web pages, client side scripts using VBScript of JavaScript.

Course Outline

UNIT I:

XML.NET Parsing Model: XML in DOTNET framework, Core classes for parsing, XML and ADO.NET, Application configuration, interoperability, XML API in DOTNET framework, DOTNET framework reader and writer, XML Reader, XML writer, XML Reader: Programming interface of Reader, the XmlReader Class, parsing with XmlTextReader Class, Parsing XML fragments, Writing custom XML readers.

UNIT II:

XML data Validation: the XmlValidatingReader Class, using DTD and XDR schemas, XML Schema API,XML Writers: Programming XML Writer Interface, XmlWriter base Class, XmlTextWriter base class, Writing Well formed XML text, Writing custom XML Writers, Read/Write XML streaming parser.

UNIT III:

XML Data Manipulation: XML DOM programming Interface: XmlDocument Class, XmlNodeBase class, XPath, XPath in XML DOM, the .NET XPath Navigation API, the XPathNavigator Class, XPath Iterators.

UNIT IV:

XML data Transformation: XSLT, Template programming, instruction, .NET framework XLT processor, XSLT Extension objects.

UNIT V:
XML and Data Access: Reading XML data from database, XML data readers, A disconnected XML data readers, writing XML data to databases, SQLXML managed classes.

Book:
1. Applied XML Programming for Microsoft® .NET, Dino Esposito, by Microsoft press.

Lab Exercise: CSI422 Practical based on CSI421
At least two experiments should be carried out on each unit.

2. Image Processing

Subject Reference No	CSI423		Subject Title	Image Processing
No of Credits	4 Theory, 3 Practical		Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 3 Practical		External (Semester Exam)	80%

Objective: It focuses on material on Image Processing that is fundamental and has a broad scope of application.

Prerequisite: Student must aware of linear algebra, logic and digital signals.

Course Contents

UNIT I:
Digital Image Fundamentals, Image Enhancement in the Spatial Domain,

UNIT II:
Image Enhancement in the Frequency Domain, Image Restoration, Color Image Processing.

UNIT III:
Wavelets and Multiresolution Processing, Image Compression

UNIT IV:
Morphological Image Processing, Image Segmentation

UNIT V:
Representation and Description, Object Recognition

Text Book
1. Digital Image Processing, 3/e, Rafael C. Gonzalez, Richard E. Woods. Pearson Education, ISBN: 9788131726952

Lab Exercise: CSI424 Practical based on CSI423
At least two experiments should be carried out on each unit.

3 Operating system for Mobile

Subject Reference No	CSI425		Subject Title	Operating System for Mobile
No of Credits	4 Theory, 2 Practical		Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical		External (Semester Exam)	80%

Course Objective:
To learn the working of smart devices system software.

Prerequisite:
Student must have basic knowledge of operating systems.

Course Outline

UNIT I: Class Name Conventions on Symbian OS, Leaves: Symbian OS Exceptions, The Cleanup Stack

UNIT II: Two-Phase Construction, Descriptors: Symbian OS Strings, Good Descriptor Style

UNITIII: Dynamic Arrays and Buffers, Event-Driven Multitasking Using Active Objects, Active Objects under the Hood.

UNIT IV: Symbian OS Threads and Processes, The Client–Server Framework in Theory, The Client–Server Framework in Practice, Binary Types, ECOM

UNIT V:
Panics, Bug Detection Using Assertions, Debug Macros and Test Classes, Compatibility

Text Book

1. Symbian OS Explained, Effective C++ Programming for Smartphones, Jo Stichbury, John Wiley & Sons, ISBN 0-470-02130-6

Lab Exercise: CSI426 Practical based on CSI425
At least two experiments should be carried out on each unit.

4 ASP.NET

Subject Reference No	CSI427		Subject Title	ASP.NET
No of Credits	4 Theory, 2 Practical		Assignment/ Sectionals	20%

Total Contact Hrs/Week	4 Theory, 4 Practical	(Internal) External (Semester Exam)	80%

Course Objective

The entire world is at fingertip of user due to easy access of internet. The design and development of web application has emerged with lots of potential. Students are exposed to the technology of MicrosoftASP.NET which is widely adopted by the industry to build customized web applications. In this course student will learn how to use ASP.NET for building good web application using databases, security and web services.

At Course Completion

After completion of course student can build dynamic Web application and can undertake commercial web development.

Prerequisite

Student must have knowledge of HTML, DHTML, client side web scripting using VBScript and Java Script. Knowledge of ASP will be added advantage.

Course outline

UNIT I:

ASP.NET programming model: Introduction, event driven programming over http, http protocol, structure of ASP.NET page, ASP.NET component model, ASP.NET Provider model, Anatomy of ASP.Net Page: Invoking page, Page class, Page Life cycle.

UNIT II:

ASP.NET Core Server controls: Generalities of Server Controls, Properties, events and methods of Control class, HTML controls: Generalities of HTML controls, HTML Containers, HTML input controls,Web controls: Generalities of Web Control, core web control, misc web control, Validation controls: Generalities of validation controls, Gallery of controls, Programming with Web forms; HtmlFrom Class, Multiple forms, cross page postings, Page errors, Page Personalization.

UNIT III:

Ritch Page Composition: Working with master page, working with themes, working with wizards, ADO.NET data Providers, Connecting to data sources: connection strings, connection pooling, Executing commands: ADO Data Readers, Data Adapters, working with transactions, procedures etc. Data container objects: Data sets, Data tables, Data Relations, Data binding models: expressions and components.

UNIT IV:

Creating bindable grid of data: DataGrid Control, GridView control, Managing list of records: ListView control and Managing views of records: DetailView Control, FromView Control, Initializationof Application: HttpApplicationClass, Application module, methods and events of HttpApplication Class, The global.asax file, HttpContext Class, Server Object, HttpResponse Object, HttpRequest Object.

UNIT V:

ASP.NET state management: Application state, Session State: working with session state, customizing session state, view state of page. ASP.NET caching: Caching Application data, the CacheClass, ASP.NET Security: Using Form authentication, membership and role management API, Security related controls, AJAX Enabled web services: Web services as application specific services, remote call via web services,

Book:
1. Programming with Microsoft ASP.NET 3.5 by Dino Esposito, Microsoft Press
2. Programming with Microsoft ASP.NET 4.0 by Microsoft Press.

Web reference
1. http://msdn.microsoft.com/en-us/library/4w3ex9c2.aspx

Lab Exercise: CSI428 Practical based on CSI427
At least two experiments should be carried out on each unit.

5 WML

Subject Reference no	CSI429		Subject Title	WML
No of Credits	4 Theory, 2 Practical		Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical		External (Semester Exam)	80%

Objective:
To introduce wireless application protocol technology and applications.To introduce technology of mobile phones and pocket computers. To impart skills in WML and SDK.The next generation of mobile communicators is here, and delivering content to them will mean programming in WML (Wireless Markup Language) and WMLScript, the languages of the Wireless Application Environment (WAE). The WAE allows information in almost all applications to be formatted for display on mobile devices, such as cell phones, and enables the user to interact with the information. Why learn yet another technology? According to some estimates, 75 percent of web document viewing by the year 2002 will be through non-desktop devices, many using wireless technologies. Clearly, the future is wireless. For web developers who want to get up to speed quickly in these languages, Learning WML &WMLScript maps out in detail the WAE and its two major components, WML and WMLScript. Fortunately, the WAE provides a World Wide Web-like model for writing applications, incorporating several key features of the Web to ease the transition for developers. Almost all wireless applications can be written with WML, which replaces HTML in the wireless environment, and WMLScript, which replaces JavaScript. With this course, web developers with some knowledge of programming and C, Java, or JavaScript syntax can easily master both languages

Prerequisite:
Some knowledge of programming and C, Java, or JavaScript syntax

Course Contents:
UNIT I:

Basic concepts of WAP, WAP Client, WAP browser, working of WAP application, basic advantages, various applications, WAP Project elements.

UNIT II:

The WML language - character set, variable types, cards elements, attributes, entities, WML variables and contexts, tasks and events, WML user interaction, WML timers, Decks, templates, cards, Text and image formatting, Handling audio.

UNIT III:

WML Script Language: Character set, data types, identifiers, functions and events, operators, expressions, program control, standard libraries, browser library.

UNIT IV:

WAP application development with WML and WML Script, a calculator and a game development, SDK for WAP development

UNIT V:

Emerging topics in mobile communications – technology convergence in mobile phones- GSM standard telephones, WAP Gateway.

Text Book

1. Learning WML, and WMLScript, Martin Frost, October 1, 2000, O'Reilly Media, Inc.ISBN-13: 978- 1-56592-947-0

Lab Exercise: CS1430 Practical Based on CS1429
At least two experiments should be carried out on each unit.

4.4 *Semester-IV*

1. **Programming VB.NET**

Subject Reference no No of Credits	CSI505 4 Theory, 2 Practical	Subject Title Assignment/ Sectionals (Internal)	Programming VB.NET 20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Course Objective

The course provides students with the knowledge and skills needed to develop applications in Microsoft Visual Basic .NET for the Microsoft .NET platform. The course focuses on user interfaces, program structure, language syntax, and implementation details. This is the first course in the Visual Basic .NET curriculum and will serve as the entry point for other .NET courses.

Audience

This course is intended for both novice and experienced programmers who have a minimum of three months programming experience and have basic Microsoft Windows navigation skills.

At Course Completion

After completing this course, students will be able to:
- Create a simple Visual Basic .NET–based application based on the Windows Application template.
- Use forms and controls to create a user interface.
- Create and use variables and arrays.
- 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.
- Resolve syntax, run-time, and logic errors by using the debugger and structured exception handling.
- Enhance the user interface by adding menus, status bars, and toolbars.
- Create a simple Visual Basic .NET–based Web Forms application that uses an XML Web Service.
- Access and manipulate data in a Microsoft Access or Microsoft SQL Server™ database by using Microsoft ADO.NET.
- Build, package, and deploy an application.A

Prerequisites

Before attending this course, students must have:
- Windows navigation skills.
- Experience (at least three months) with developing applications in either a graphical or non-graphical environment.

- Understanding of the basics of structured programming, including concepts such as flow control, variables and parameters, and function calls.

UNIT I:

Getting Started: This module introduces Visual Basic .NET and explains how it fits into the .NET platform. It explains how to use the programming tools in Microsoft Visual Studio .NET and provides enough practice so that students can create their first application in Visual Basic .NET.
- Basic .NET Concepts,
- Exploring the Development Environment
- Creating a Visual Basic .NET Project

Using Variables and Arrays: This module explains how to name, declare, assign values to, and use variables and constants. It explains how to declare variables with different levels of scope, how to create your own data structures, and how to convert variable values from one data type to another. It also describes how to store data in an array.
- Introduction to Data Types
- Using Variables
- Variable Scope
- Converting Data Types
- Creating and Using Structures
- Storing Data in Arrays

UNIT II:

Working with Procedures:This module describes how to create and use Sub and Function procedures, including predefined functions, and how to structure code for increased reusability.
- Creating Procedures
- Using Procedures
- Using Predefined Functions

Decision Structures and Loops: This module explains how to implement decision structures and loop structures to control program output and execution.
- Using Conditional Expressions
- Using Decision Structures
- Using Conditional Loop Structures

Validating User Input: This module explains how to validate user input at both the field level and the form level. It describes how to handle invalid input by providing error messages and guiding users through the process of finding and fixing errors. It describes how to use control properties and methods to restrict and validate data entry.
- Restricting User Input
- Validating Field Data
- Validating Form Data

UNIT III:

Object-Oriented Programming in Visual Basic .NET: This module explains how to create and use classes. The module explains the concepts of abstraction, encapsulation, instantiation, initialization, constructors, and destructors. This module also describes inheritance, polymorphism, and namespaces.
- Understanding Classes

- Working with Classes
- Using Shared Members
- Inheritance, Polymorphism, and Namespaces

Handling Errors and Exceptions: This module explains types of errors that can occur in a program and explains how to use the debugging tools provided with Visual Basic .NET to help diagnose and correct the errors. These tools include the Visual Studio .NET debugger, debugging windows, and structured exception handling.

- Types of Errors
- Using the Debugger
- Handling Exceptions

UNIT IV:

Working with Forms and Controls: This module explains fundamental programming concepts, including event-driven programming, classes, objects, properties, methods, and events. This module also explains how to use forms and controls to create a user interface. This includes the following: how to create a form, set properties, call methods, and write code for events; how to add controls to a form; how to manage multiple forms; how to use message boxes; how to use naming conventions; and how to format and document code.

- Understanding Programming Concepts
- Working with Windows Forms
- Working with Controls
- Styling Your Code

Enhancing the User Interface: This module explains how to create menus, status bars, and toolbars to enhance the usability of an application

- Creating Menus
- Creating Status Bars
- Creating Toolbars

UNIT V:

Using ADO.NET: This module explains how to use ADO.NET with a Windows Forms application to create, read, update, and delete records in Access and SQL Server databases.

- Database Concepts
- Overview of ADO.NET
- Working with Data

Deploying Applications: This module explains how to deploy applications by using Visual Studio .NET. The module also describes deployment options available in Visual Basic .NET, and how to create and configure a setup project for a Windows-based application.

- Introduction to Deployment
- Deploying a Windows-based Application

Lab Exercise: CSI555 Practical based on CSI505
At least two experiments should be carried out on each unit.

1. J2ME

Subject Reference No	CSI431		Subject Title	J2ME
No of Credits	4 Theory, 2 Practical		Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical		External (Semester Exam)	80%

Objective

The key to Java 2 Micro Edition (J2ME) Application Development is the clear, concise explanations of the J2ME technology in relation to the existing Java platform. This course assumes proficiency with Java and presents strategies for understanding and deploying J2ME applications. The course presents numerous real-world examples, including health care and financial sector examples from the authors' professional experience.

Course Contents

UNIT I:

Java 2 Micro Edition Overview, Historical Evolution, Micro Edition–Related Java Specification Requests, J2ME Configurations and Profiles, Sun J2ME Software Development Kits, Tools and Third-Party Products for J2ME Application Development, Developing a Simple Application, The Connected Limited Device Configuration, General CLDC Limitations, CLDC Application Design, CLDC APIs, CLDC Profiles, Java Application Deployment, JAM on MIDP, JAM for PDAP.

UNIT II:

MIDP Programming, MIDlets, High-Level API, Low-Level API, MIDP 2.0 Additions, PDAP Programming, PDAP Application Life Cycle, PDA User Interface,

UNIT III:

Data Persistency, RMS Basics, Basic Functionality of the Class RecordStore, A Simple Diary Application Using RMS, Record Listeners, Storing Custom Objects, Ordered Traversal: Comparators and Record Enumerations, The Search Problem, Networking: The Generic Connection Framework, Creating a Connection—The Connector Class, Connection Types, GCF Examples, MIDP 2.0 Additions to the javax.microedition.io Package.

UNIT IV:

PIM: Accessing the Personal Information Manager, General PIM API Design, Addressbook API, Calendar API, ToDo API, Contact Sample Application, Chapter 8. Size Does Matter: Optimizing J2ME Applications, Reducing Class File Sizes, Freeing Unused Variables and Resources, Loop Condition Checking, Avoiding Recursion, Using Arrays Instead of Vectors, Using Record Stores Instead of Heap Memory, Distributing Functionality over Several Small MIDlets, Fragmentation Problems, User Interface Issues.

UNIT V:

Strings, Manipulating and Searching Strings, Regular Expressions, POSIX-Style Regular Expressions, Perl-Compatible Regular Expressions, Arrays: Indexed Versus Associative Arrays, Identifying Elements of an Array, Storing Data in Arrays, Multidimensional Arrays, Extracting Multiple Values, Converting Between Arrays and Variables, Traversing Arrays, Sorting, Acting on Entire Arrays, Using Arrays

UNIT III:
Classes and Objects: Terminology, Creating an Object, Accessing Properties and Methods, Declaring a Class, Introspection, Serialization, Web Techniques: HTTP Basics, Variables, Server Variables, Server Information, Processing Forms, Setting Response Headers, Session, cookies, files, Maintaining State, SSL, Using PHP to Access a Database: Relational Databases and SQL, Mysql database Basics, Advanced Database Techniques

UNIT IV:
Graphics: Embedding an Image in a Page, The GD Extension, Basic Graphics Concepts, Creating and Drawing Images, Images with Text, Dynamically Generated Buttons, Scaling Images, Color Handling, PDF: PDF Extensions, Documents and Pages, Text, Images and Graphics, Navigation, Other PDF Features

UNIT V:
XML : Lightning Guide to XML, Generating XML, Parsing XML, Transforming XML with XSLT, Web
Services, Security: Global Variables and Form Data, Filenames, File Uploads, File Permissions, Concealing PHP Libraries, PHP Code, Shell Commands, Security Redux, Application Techniques, Code Libraries, Tinplating Systems, Handling Output, Error Handling, Performance Tuning.

Reference Book
1. PHP 5.1 for beginners by Evan Bayross and Sharman Shah, SPD Publications
2. Programming PHP by RasmusLerdorf and Kevin Tatroe, Orilly Publications

Lab Exercise: CS1434 Practical based on CS1433
At least two experiments should be carried out on each unit.

3   COBRA

Subject Reference no	CS1435	Subject Title	CORBA
No of Credits	4 Theory, 2 Practical	Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Course Objective
Course Objective is to provide the details of CORBA in terms of client and server architecture to the students and use of Java ORB for implementation of CORBA. The case studies included in unit 3 gives clear idea about the functionality of CORBA using java ORB.

At Course Completion
After completion of course, student can write distributed application using Java ORB.

Prerequisite
Knowledge of Object oriented programming with C++ and Java is desirable.

Course Outline
UNIT I:
Introduction of CORBA, Distributed Objects, CORBA Components, Object Management Architecture, CORBA Services, CORBA Business objects. Object Web reference CORBA, CORBA and Java objects, CORBA Java/ IDL Mapping.

UNIT II:
Static CORBA, Mapping CORBA IDL to Java, ORBlets and Applets, CORBA-enabled Applet, Java ORB and C++ ORB. Dynamic CORBA: CORBA Naming services, CORBA Object naming. Client/ Server naming scenario, creating namespace, finding objects.

UNIT III:
Dynamic Invocations, Dynamic Invocation interfaces, CORBA Case studies with a) Socket vs CORBA/ Java ORB, Java sockets, java streams, Datagram socket, buffered socket, Data stream socket, b) HTTP/CGI versus CORBA/Java ORB, c) Servlet versus CORBA/Java ORB, d)RMI versus CORBA/Java ORB.

UNIT IV:
DOM versus CORBA/ Java ORB: Looking DCOM through CORBA, DCOM style interfaces, DCOM and Java,CORBA Initialization interfaces, Server side of CORBA: CORBA::BOA interface, CORBA::POA interface,Object activation, POA Interfaces, Metadata: CORBA IDL, CORBA interface repository, CORBA IDL to Java Mapping: CORBA Modules, Exceptions, Parameter and Holder Classes, Helper Classes, Attributes.

UNIT V:
CORBA constant, CORBA Primitive types, CORBA Constructed types, interfaces, sequences, arrays, structures, enums, unions, typedefs, CORBA Serverside mapping: Inheritance, Delegations, CORBA pseudo objects: CORBA::ORB mapping, CORBA::Object mapping, CORBA::NamedValue Mapping, CORBA::NVList Mapping, CORBA::Request Mapping, CORBA:: ServerRequest and DSI mapping, CORBA::TypeCode

Reference Book
1. Client /Server Programming with Java and CORBA (Paperback) by Dan Harkey and Robert Orfali, John Wiley and Sons
2. Advance CORBA Programming with C++ by Michi Henning, Addison Wesley Professional Computing Series.

Lab Exercise: CS1436 Practical based on CS1435
At least two experiments should be carried out on each unit.

4 GIS

Subject Reference no No of Credits	CSI437 4 Theory, 2 Practical	Subject Title Assignment/ Sectionals (Internal)	GIS 20%
Total Contact Hrs/Week	4 Theory, 4 Practical	External (Semester Exam)	80%

Objective

Introduction to Geographic Information Systems is a course designed to provide students in a solid foundation in both GIS concepts and the use of GIS. Introduction to GIS strikes careful balance between GIS concepts and hands-on applications. The main portion of the course presents GIS terms and concepts and helps students learn how each one fits into a complete GIS system. At the end of the course students can work with actual GIS exercises and the necessary data to solve the problem.

Prerequisite:

To aware about remote sensing basics

Course Contents:

UNIT I:

Introduction: Coordinate Systems, Vector Data Model, Raster Data Model **UNIT II:**

UNIT II:

GIS Data Acquisition, Geometric Transformation, Spatial Data Editing, Attribute Data Management

UNIT III:

Data Display and Cartography, Data Exploration, Vector Data Analysis, Raster Data Analysis

UNIT IV:

Terrain Mapping and Analysis, Viewsheds and Watershed, Spatial Interpolation

UNIT V:

Geocoding and Dynamic Segmentation, Path Analysis and Network Applications, GIS Models and Modeling

Text Book:

1. Introduction to Geographic Information Systems with Data Files CD-ROM, Kang-tsung Chang,2010, Tata McGraw-Hill, ISBN: 9780077294366

Lab Exercise: CSI438 Practical based on CSI437
At least two experiments should be carried out on each unit.

5   Biometrics

Subject Reference no	CS1439		Subject Title	Biometrics
No of Credits	4 Theory, 2 Practical		Assignment/ Sectionals (Internal)	20%
Total Contact Hrs/Week	4 Theory, 4 Practical		External (Semester Exam)	80%

Objective

Biometric recognition, or simply biometrics, is a rapidly evolving field with applications ranging from accessing one's computer, to gaining entry into a country. Biometric systems rely on the use of physical or behavioral traits, such as fingerprints, face, voice and hand geometry, to establish the identity of an individual. The deployment of large-scale biometric systems in both commercial (e.g., grocery stores, amusement parks, airports) and government (e.g., US-VISIT) applications, increases the public's awareness of this technology. This rapid growth also highlights the challenges associated with designing and deploying biometric systems. Indeed, the problem of biometric recognition is a grand challenge in its own right. The past five years have seen a significant growth in biometric research resulting in the development of innovative sensors, robust and efficient algorithms for feature extraction and matching, enhanced test methodologies and novel applications. These advances have resulted in robust, accurate, secure and cost effective biometric systems. The main objective of this course is study the basics and advanced development of biometrics.

Prerequisite:

Student must have knowledge of image processing, pattern recognition and neural networks

Course Contents

UNIT I:

Foreword by James L. Wayman, San Jose State Fingerprint Recognition.- Face Recognition.- Iris Recognition.-University.- Preface.- Introduction to Biometrics.- Recognition.- Hand Geometry Recognition.- Gait

UNIT II:

The Ear as a Biometric.- Voice Biometrics.- A Palmprint Authentication System.- On-Line Signature Verification.- 3D Face Recognition.-

UNIT III:

Automatic Forensic Dental Identification.- Hand Vascular Pattern Technology.-

UNIT IV:

Introduction to Multibiometrics: Multispectral Face Recognition.-Multibiometrics Using Face and Ear.- Incorporating Ancillary Information in Multibiometric Systems.-

UNIT V:

The Law and the Use of Biometrics.- Biometric System Security.- Spoof Detection Schemes.- Linkages between Biometrics and Forensic Science.- Biometrics in Government Sector.- Biometrics in the Commercial Sector.- Biometric Standards.- Biometrics Databases.- Index.

Text Book

1. Handbook of Biometrics, Jain, Anil K.; Flynn, Patrick; Ross, Arun A. (Eds.), 2008, Springer, ISBN 978-0-387-71040-2

Lab Exercise: CSI440 Practical based on CSI439
At least two experiments should be carried out on each unit.