SYLLABUS

FOR

B. Sc. (Computer Science) Programme

H. N. B. GARHWAL UNIVERSITY
SRINAGAR (GARHWAL)

H.N.B. GARHWAL UNIVERSITY
(A Central University)
Regulations, Curricula, Syllabus and Scheme of Examinations (Credit and Semester System)
B.Sc. (Computer Science)
(With effect from session 2015-2016)

1. **Duration** of the B.Sc.(CS) program shall be 3 years, divided into 6 semesters. Each semester should have 15 – 18 weeks.

2. Eligibility for admission: Intermediate with Mathematics from any recognized Board.

All other ordinances related to examination and result declaration will be as per the ordinances framed by University for UG Courses.

Programme Structure

FIRST SEMESTER:

S. No	Course No.	Subject	Period			Sessional			Examination		Credit
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/AEC1	General English	2	-	-	10	20	30	70	100	2
2.	SET/CSE/BCS/C101	Programming in 'C'	4	-	-	10	20	30	70	100	4
3.	SET/CSE/BCS/C102	Fundamental of Computer	4	1	-	10	20	30	70	100	5
4.	SET/CSE/BCS/C103	Mathematical Foundation of Computer Science	4	1	-	10	20	30	70	100	5
Practical / Tutorial											
1.	SET/CSE/BCS/CP11	Programming in 'C'	-	-	3	30	-	30	70	100	2
2.	SET/CSE/BCS/CP12	PC Packages(Introduction to DOS & MS Office)	-	-	3	30	-	30	70	100	2
		Total	**14**	**2**	**6**	**100**	**80**	**180**	**420**	**600**	**20**

SECOND SEMESTER:

S. No	Course No.	Subject	Period			Sessional			Examination		Credit
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/AEC2	Environment Science	2	-	-	10	20	30	70	100	2
2.	SET/CSE/BCS/C201	Data Structures using C	4	-	-	10	20	30	70	100	4
3.	SET/CSE/BCS/C202	Computer Based Numerical Techniques	4	1	-	10	20	30	70	100	5
4.	SET/CSE/BCS/C203	System Analysis & Design	4	1	-	10	20	30	70	100	5
Practical / Tutorial											
1.	SET/CSE/BCS/CP21	Data Structures using C Lab	-	-	3	30	-	30	70	100	2
2.	SET/CSE/BCS/CP22	Computer Based Numerical Techniques Lab	-	-	3	30	-	30	70	100	2
		Total	**14**	**2**	**6**	**100**	**80**	**180**	**420**	**600**	**20**

TA   : Teacher Assessment

CT   : Class Test

ESE   : End Semester Examination

SUB TOT.   : Subject Total

TOT. : Total

THIRD SEMESTER:

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/C301	Object Oriented Programming using C++	4	-	-	10	20	30	70	100	4
2.	SET/CSE/BCS/C302	Computer Networks	4	1	-	10	20	30	70	100	5
3.	SET/CSE/BCS/C303	Operating Systems	4	1	-	10	20	30	70	100	5
4.	SET/CSE/BCS/SEC1	SEC1A	2	-	-	10	20	30	70	100	2
Practical / Tutorial											
1.	SET/CSE/BCS/CP31	Object Oriented Programming using C++ Lab	-	-	3	30	-	30	70	100	2
2.	SET/CSE/BCS/CP32	Computer Networks Lab	-	-	3	30	-	30	70	100	2
		Total	**14**	**2**	**6**	**100**	**80**	**180**	**420**	**600**	**20**

FOURTH SEMESTER:

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/C401	Design & Analysis of Algorithm	4	-	-	10	20	30	70	100	4
2.	SET/CSE/BCS/C402	Database Management System	4	1	-	10	20	30	70	100	5
3.	SET/CSE/BCS/C403	Software Engineering	4	1	-	10	20	30	70	100	5
4.	SET/CSE/BCS/SEC2	SEC2A	2	-	-	10	20	30	70	100	2
Practical / Tutorial											
1.	SET/CSE/BCS/CP41	Design & Analysis of Algorithm Lab	-	-	3	30	-	30	70	100	2
2.	SET/CSE/BCS/CP42	Database Management System Lab	-	-	3	30	-	30	70	100	2
		Total	**14**	**2**	**6**	**100**	**80**	**180**	**420**	**600**	**20**

TA : Teacher Assessment

CT : Class Test

ESE : End Semester Examination

SUB TOT. : Subject Total

TOT. : Total

FIFTH SEMESTER:

S. No	Course No.	Subject	Period			Sessional			Examination		Credit
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/DSE1	DSE1A	4	-	-	10	20	30	70	100	4
2.	SET/CSE/BCS/DSE2	DSE2A	4	1	-	10	20	30	70	100	5
3.	SET/CSE/BCS/DSE3	DSE3A	4	1	-	10	20	30	70	100	5
4.	SET/CSE/BCS/SEC3	SEC3A	2	-	-	10	20	30	70	100	2
Practical / Tutorial											
1.	SET/CSE/BCS/CP53	DSE1A Lab	-	-	3	30	-	30	70	100	2
2.	SET/CSE/BCS/CP54	DSE2A Lab	-	-	3	30	-	30	70	100	2
		Total	**14**	**2**	**6**	**100**	**80**	**180**	**420**	**600**	**20**

SIXTH SEMESTER:

S. No	Course No.	Subject	Period			Sessional			Examination		Credit
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/DSE4	DSE4A	4	1	-	10	20	30	70	100	5
2.	SET/CSE/BCS/DSE5	DSE5A	4	1	-	10	20	30	70	100	5
3.	SET/CSE/BCS/SEC4	SEC4A	2	-	-	10	20	30	70	100	2
Practical / Tutorial											
1.	SET/CSE/BCS/CP61	DSE4A Lab	-	-	3	30	-	30	70	100	2
2.	SET/CSE/BCS/CP62	Project	2	2	6	50	-	50	150	200	6
		Total	**12**	**4**	**9**	**110**	**60**	**170**	**430**	**600**	**20**
Total Credits											**120**

TA	: Teacher Assessment	
CT	: Class Test	
ESE	: End Semester Examination	
SUB TOT.	: Subject Total	
TOT.	: Total	

<div align="center">

Discipline Specific Elective Papers

</div>

DSE 1A -Discipline Specific Elective-1 **(Choose One)**

1. Visual Programming (VB, VC++)
2. Internet Technologies
3. Programming in JAVA

DSE 3A: Discipline Specific Elective-3 **(Choose One)**

1. Network Security
2. Data Mining
3. E-commerce

DSE 2A: Discipline Specific Elective-2**(Choose One)**

1. Computer Graphics
2. C#
3. .NET Technology

DSE 4A: Discipline Specific Elective-4 **(Choose One)**

1. Multimedia Technology
2. Software Engineering
3. Unix & Shell Programming

DSE 5A: Discipline Specific Elective-4 **(Choose One)**

1. Artificial Intelligence
2. Wireless and Mobile Computing
3. Unified Modeling Language

Skill Enhancement Courses

SEC1A (Choose One)

SEC1A.1   Office Automation Tools

SEC1A.2   Cyber Laws

SEC1A.3   Basic Programming Skills

SEC2A (Choose One)

SEC2A.1   Modeling and Simulation

SEC2A.2   Graph Theory

SEC2A.3   Boolean Algebra

SEC3A (Choose One)

SEC3A.1   System Administration and Maintenance

SEC3A.2   Software Testing Concepts

SEC3A.3   Multimedia and Applications

SEC4A (Choose One)

SEC4A.1   Android Programming

SEC4A.2   XML Programming

SEC4A.3   PHP Programming

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/AEC1	General English	2	-	-	10	20	30	70	100	2

AECC: General English

Introduction: Theory of Communication, Types and modes of Communication

Language of Communication: Verbal and Non-verbal (Spoken and Written) Personal, Social and Business Barriers and Strategies Intra-personal, Inter-personal and Group communication

Speaking Skills: Monologue Dialogue Group Discussion Effective Communication/ Mis- Communication Interview Public Speech

Reading and Understanding Close Reading Comprehension Summary Paraphrasing Analysis and Interpretation Translation(from Indian language to English and vice-versa) Literary/Knowledge Texts

Writing Skills Documenting Report Writing Making notes Letter writing

References :

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	SET/CSE/BCS/C101	Programming in 'C'	4	-	-	10	20	30	70	100	4

Programming in 'C'

Programming in C: History, Introduction to C Programming Languages, Structure of C programs, compilation and execution of C programms. Debugging Techniques, Data Types and Sizes, Declaration of variables, Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor

Operators: Unary operators, Arithmetic & logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation. Control Statements: if-else, switch, break, continue, the comma operator, go to statement.

Loops: for, while, do-while.

Functions: built-in and user-defined, function declaration, definition and function call, parameter passing: call by value, call by reference, recursive functions, multifile programs.

Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure. And address of (&) operator, pointer to pointer, Dynamic Momory Allocation, calloc and malloc functions, array of pointers, function of pointers, structures and pointers.

References:

1. V. Rajaraman, "Fundamentals of Computers", PHI
2. Pater Norton's "Introduction to Computer", TMH
3. Hahn, "The Internet complete reference", TMH
4. Peter Nortton's, "DOS Guide", Prentice Hall of India
5. Gottfried, "Programming in C, Schaum's Series Tata McGraw Hill

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	SET/CSE/BCS/C102	Fundamental of Computer	4	1	-	10	20	30	70	100	5

Fundamental of Computer

Introduction to Computers: Computer hardware Components, Disk Storage, memory, keyboard, mouse, printers, monitors, CD etc., and their functions, Comparison Based analysis of various hardware components.

Basic Operating System Concepts: MS-DOS, WINDOWS, Functional knowledge of these operating systems. Introduction to Basic Commands of DOS, Managing File and Directories in various operating Systems, Introduction to internet, Basic terms related with Internet, TCP/IP.

Algorithm development, techniques of problem solving, flowcharting, stepwise refinement algorithms for searching, sorting (exchange and insertion), merging of ordered lists.

Programming : Representation of integer, character, real, data types, constraints and variables, arithmetic expressions, assignment statement, logical expression; sequencing, alteration and interaction, arrays, string processing sub programs, recursion, files and pointers.

Structured programming concepts : Top down design, development of efficient programs; Program correctness; Debugging and testing of programs.

Element of a computer processing system : Hardware CPU, storage devices and media, VDU, input-output devices, data communication equipment software-system software, application software.

Programming languages : Classification, machine code, assembly language, higher level languages, fourth generation languages.

References :

1. Raja Raman V : Fundamentals of Computers
2. Sanders D.H. : Computers Today

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
4.	SET/CSE/BCS/C103	Mathematical Foundation of Computer Science	4	1	-	10	20	30	70	100	5

Mathematical Foundation of Computer Science

Relation: Type and compositions of relations, Pictorial representation of relations, Equivalence relations, Partial ordering relation.

Function: Types, Composition of function, Recursively defined function.

Mathematical Induction: Piano's axioms, Mathematical Induction, Discrete Numeric Functions and Generating functions, Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients, Asymptotic Behaviour of functions

Algebric Structures: Properties, Semi group, monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups.

Prepositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram.

References:

1. Liptschutz, Seymour, "Discrete Mathematics", TMH.

2. Trembley, J.P. & R. Manohar, "Discrete mathematical Structure with Application to Computer Science", TMH.

3. Kenneth H. Rosen, "Discrete Mathematics and its applications', TMH.

4. Doerr Alan and Levasseur Kenneth, "Applied Discrete Structure for Computer Science, Galgotia Pub. Pvt. Ltd.

5. Gersting "Mathematical Structure for Computer Science", WH freeman and Macmillan

6. Kumar Rajendra, "Theory of Automata: Languages and Computation", PPM

7. Hopcroft J.E. Uliman J.D., "Introduction to Automata Theory, Language and Computation" Narosa Pub. House, New Delhi.

8. C.L.Liu "Elements of Discrete Maehmatics", McGraw Hill.

9. Peter Grossman, "Discrete Mathematics for Computer", Palgrave Macmillian.

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/AEC1	Environment Science	2	-	-	10	20	30	70	100	2

Ability Enhancement Compulsory Course (AECC – Environment Studies)

Introduction to environmental studies • Multidisciplinary nature of environmental studies; • Scope and importance; Concept of sustainability and sustainable development.

Ecosystems • What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems : a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Natural Resources : Renewable and Non-renewable Resources • Land resources and landuse change; Land degradation, soil erosion and desertification. • Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. • Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). • Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Biodiversity and Conservation • Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots • India as a mega-biodiversity nation; Endangered and endemic species of India • Threats to biodiversity : Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity. • Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Environmental Pollution • Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution • Nuclear hazards and human health risks • Solid waste management : Control measures of urban and industrial waste. • Pollution case studies.

Environmental Policies & Practices • Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture 2/2 • Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD). • Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

Human Communities and the Environment • Human population growth: Impacts on environment, human health and welfare. • Resettlement and rehabilitation of project affected persons; case studies. • Disaster management : floods, earthquake, cyclones and landslides. • Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan. • Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. • Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Field work • Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc. • Visit to a local polluted site-Urban/Rural/Industrial/Agricultural. • Study of common plants, insects, birds and basic principles of identification. • Study of simple ecosystems-pond, river, Delhi Ridge, etc.

References:

1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	SET/CSE/BCS/C201	Data Structures using C	4	-	-	10	20	30	70	100	4

Data Structures using C

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off. Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered list, Sparse Matrices, and Vector. Stacks: Array Representation and Implementation of stack, Operations and Stacks: Push and POP, Array Representation of Stack, Linked Representation of stack, Operations Associated with Stacks, Application of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes, recursion in C.

Queues: Array and linked representation and implementation of queues, Operations on Queue; Create, Add, Delete, Full and Empty, Circular queue, Dequeue, and Priority Queue. Link List: Representation and implementation of Singly linked lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Trees: Basic terminology, Binary Tree, Binary tree representation algebraic Expressions, Complete Binary Tree, Extended Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary trees.

References:

1. Horowitz and Sahani, "Fundamentals of data Structures" Galgotia
2. R. Kruse etal, "Data Structures and Program Design in C" Person Education
3. A.M. Tenenbaum etal, "Data Structures and Program Design in C" Person Education
4. Lipschutz, "Data Structure", TMH
5. K Loudon, "Mastering Algorithms With C", Shroff Publishers and Distributors
6. Bruno R Preiss, "Data Structure and Algorithms with Object Oriented Design Pattern in C++, Jhon Wiley & Sons, Inc.
7. Adm Frozdek, "Data Structures and Algorithms in C++" Thomson Asia
8. Pal G. Sorenson, "An Introduction to Data Structures with Application", TMH

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	SET/CSE/BCS/C202	Computer Based Numerical Techniques	4	1	-	10	20	30	70	100	5

Computer Based Numerical Techniques

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation.

Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration method, Regula-Falsi method, Newton Raphson method, Secant method, Rate of convergence of iterative methods.

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct method and pivoting, III conditioned system of equations, Refinement of solution. Gauss Seidal iterative method, Rate of Convergence. Interpolation and approximation: Finite Differences, Difference tables. Polynomial Interpolation: Newton's forward and backward formula Central Difference Formulae: Gauss forward and backward formula, stirling's Bassel's Everett's formula. Interpolation with unequal intervals: Language's Interpolation, Newton Divided difference formula, Hermite's interpolation Approximation of function by Taylor's series and Chebyshev polynomial.

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapazoidal rule, Simpon's rules, Boole's Rule Euler-Maclaurin Formula Solution of Differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta methods, Predictor-corrector method, Automatic error monitoring, stability of solution.

References:

1. Rajaraman V., :Computer Oriented Numerical Methods". PHI
2. Gerald and Wheatley, "Applied Numerical Analyses", AW
3. Jain, Lyengar and Jain, "Numerical Methods for Scientific and Engineering Computations:, New Ager Int.
4. Grewal B.S., "Numerical methods in Engineering and Science. Khanna Publishers, Delhi.
5. T.Veerarajan, T Ramchandran, "Theory and Problems of Numerical Methods", TMH

S. No	Course No.	Subject	Period			Sessional			Examination		Credit
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
4.	SET/CSE/BCS/C203	System Analysis & Design	4	1	-	10	20	30	70	100	5

System Analysis and Design

System Concepts and Information System Environment: The System Concept, Definition, Characteristics of Systems, Elements of a System, Open and Closed and closed system, Formal & Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

The System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation & Maintenance.

The Role of the Systems Analyst: Historical Perspective, Academic & Personal Qualifications, the multifaceted role of the Analyst, The Analyst/User Interface, Behavioral issues.

Systems Planning & Initial Investigation: Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Information Gathering: Kind of Information needed. Information about the firms, Information gathering tools, the art of Interviewing, Arranging the Interview, Guides to Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

The Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.

Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, Requirements form Design.

References:

1. Elias M.Awad, "Systems Analysis & Design" Galgotia Publication
2. Hoffer, "Modern Systems Analysis & Design" Addision Wesley
3. Kendall, "Introduction to System Analysis & Desogm", McGraw Hill

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/C301	Object Oriented Programming using C++	4	-	-	10	20	30	70	100	4

Object Oriented Programming using C++

Introduction: Introduction to OOP, Basic Concepts of OOP, Applications of OOP. Introduction to C++, Introduction to C++ stream I/O, declarations in C++, Creating New data types in C++, function Prototypes, Inline functions, Reference Parameters, Const Qualifier, Dynamic memory allocation, default arguments, Unary Scope resolution operator, Linkage specifications.

Class, Constructors, Friend Class : Introduction, Comparing class with Structure, Class Scope, Accessing Members of a class, Constructor, Destructor, Const objects, Const member functions, Friend class, Friend function, This pointer, Data abstraction and Information hiding, container classes and Iterators

Overloading & Inheritance: Operator Overloading, Fundamentals, Restrictions, Overloading stream, Insertion and stream extraction operators, Overloading unary & binary operators, Converting between types, Overloading ++ and --. Inheritance, Introduction, Protected members, Casting base _class pointers to derived _class pointers Overloading Base class members in a Derived class, Public, Protocols and Private inheritance, Direct base classes and Indirect Base Classes, Using Constructors and Destructors in Derived classes, Implicit Derived class object to base class object conversion.

Virtual Functions : Introduction, Type fields and switch statements, Virtual functions, Abstract base classes and concrete classes, Polymorphism, Dynamic binding, Virtual destructors.

C++ Stream I/O : Streams, Stream Input, Stream Output, Unformatted I/O, Stream manipulators, Stream format states, Stream error, States.

References:

1. Deitel H.M. & Deitel P.J. – "How to Program C++" – PHI – 2003
2. Al stevenes – "C++ Programming" – Wiley dreamtech – 2003.
3. Herbert Scheldt, "Complete Reference".
4. E. Balagurusamy "Object Oriented Programming with C++".
5. Yashwant Kanetkar, "Let Us C++".
6. C++ Programming by Herbert Scheldt – 2004.

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	SET/CSE/BCS/C302	Computer Networks	4	1	-	10	20	30	70	100	5

Computer Networks

Introductory Concepts: Goals and Applications of Networks, Network structure and architecture, the OSI reference model, services, networks topology, Physical Layer transmission, switching methods, Integrated services digital networks, terminal handling.

Medium Access sub Layer: Channel allocations, LAN protocols, ALOHA Protocols-Pure Aloha, slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, IEEE standards, FDDI, Data Linked Layer elementary data link protocols, sliding windows protocols, error handling, High Level Data Link Control.

Network Layer: Point-to Point networks, routing algorithms, congestion control algorithms, internetworking, TCP/IP packet, IP addresses, Ipv6.

Transport Layer: Design issues, connection management, TCP window Management, User Datagram Protocol, Transmission Control Protocol.

Application Layer: Network Security, Domain Name System, Simple Network Management Protocol, Electronic mail, File Transfer Protocol, Hyper Text Transfer Protocol.

References:

1. A.S. Tanenbaum, "Computer Networks, 3rd Edition," PHI
2. W.Stallings, "Data and Computer Communication" Macmillan Press
3. Comer, "Internetworking with TCP/IP" PHI
4. Comer, "Computer networks & Inter" PHI
5. Forouzan, "Data Communication and Networking:. TMH

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	SET/CSE/BCS/C303	Operating Systems	4	1	-	10	20	30	70	100	5

Operating System

Operating system- definition, simple batch system, Time sharing system, Real time system, storage hierarchy, operating system service.

Process concept, process Scheduling, operating on process, co-operating process.

CPU Scheduling concepts, Scheduling algorithms, process synchronization, critical section problem, synchronization hardware, semaphores.

Deadlocks, deadlock characterization, deadlock prevention, avoidance detection and recovery.

Storage management Resident monitor, Logical versus physical address space, swapping, and segmentation, SCM.

Virtual memory, Demand paging, page replacement and page replacement algorithms, allocation of frames, thrashing.

File System: File supports, access methods, allocation methods-contiguous, linked and index allocation, directory system – single level, tree structured, acyclic graph and general graph directory, file protection.

Secondary storage structure: Disk structures, disk scheduling disk management, allocation methods, free space management.

References:

1. Peterson Abraham & Silbesschatz, Peter Galvin: Operating system concepts.   .

2. Mandnick and Donovan   : Operating system (Mc–Graw Hill) 1996.

3. Tanenbaum A.S.   : Modern Operating system, (PHI) 1998.

4. Growley,   : Operating system a design Approach .

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
4.	SET/CSE/BCS/SEC1	SEC1A	2	-	-	10	20	30	70	100	2

SEC1A.1   Office Automation Tools

Introduction to MS office, Word Processing: Formatting Text, Pages, Lists, Tables, Spreadsheets: Worksheets, Formatting data, creating charts and graphs, using formulas and functions, macros, Pivot Table

Presentation Tools: Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide shows, using transitions, animations

References:

1. Sushila Madan , Introduction to Essential tools,JBA,2009.

2. Anita Goel, Computer Fundamentals, Pearson, 2012

SEC1A.2 HTML Programming

Introduction, The Basics: The Head, the Body, Colors, Attributes, Lists, ordered and unordered

Links : Introduction, Relative Links, Absolute Links, Link Attributes, Using the ID Attribute to Link Within a Document,

Images: Putting an Image on a Page, Using Images as Links, Putting an Image in the Background

Tables: Creating a Table, Table Headers, Captions, Spanning Multiple Columns, Styling Table

Forms: Basic Input and Attributes, Other Kinds of Inputs, Styling forms with CSS,Where To Go From Here

References:

1. Introduction to HTML and CSS -- O'Reilly , 2010

2. Jon Duckett, HTML and CSS, John Wiely, 2012

SEC1A.3 Cyber Laws

Definitions, Digital Signature And Electronic Signature, Penalty and Compensation for damage to computer, computer system, etc.

Tampering with Computer Source Documents, Punishment for sending offensive messages through communication service, etc.

Punishments for dishonestly receiving stolen computer resource or communication device, Punishment for identity theft. Punishment for cheating by personation by using computer resource, Punishment for violation of privacy, Punishment for cyber terrorism, Punishment for publishing or transmitting obscene material in electronic form, Punishment for publishing or transmitting of material containing sexually explicit act, etc. in electronic form, Punishment for publishing or transmitting of material depicting children in sexually explicit act, etc. in electronic form, Breach of confidentiality and privacy

References:

1. M. Merkow, J. Breithaupt, Information Security Principles and Practices, Pearson Education.2005

2. G.R.F. Snyder, T. Pardoe, Network Security, Cengage Learning, 2010

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/C401	Design & Analysis of Algorithm	4	-	-	10	20	30	70	100	4

Design & Analysis of Algorithm

Introduction: Algorithms, Analysis of Algorithms, Design of Algorithms, and Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences. Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort, Sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort Medians and order statistics.

Elementary Data Structure: Stacks, Queues, Linked list, Binary Search Tree, Hash Table.

Advanced Data Structure: Red Black Trees, Splay Trees, Augmenting Data Structure Binomial Heap, B-Tree, Fibonacci Heap, and Data structure for Disjoint Sets. Union-find Algorithm, Dictionaries and priority Queues, mergeable heaps, concatenable queues.

Advanced Design and Analysis Techniques: Dynamic Programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis.

Graph Algorithms: Elementary Graph Algorithms, Breadth First search, Depth First search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Traveling Salesman Problem.

Randomized Algorithms, String Matching, NP-Hard and NP-Completeness Approximation Algorithms, Sorting Network, Matrix Operations, Polynomials & the FFT, Number Theoretic Algorithms.

References:

1. Horowitz Sahani, "Fundamentals of Computer Algorithms." Galgotia
2. Coremen Leiserson etal, "Introduction to Algorithms", PHI
3. Brassard Brately, :Fundamental of Algorithms" PHI
4. M.T. Goodrich etal, "Algorithms Design" John Wiley
5. A.V. Aho etal. "The Design and analysis of Algorithms" Person Education
6. Algorithms & Data Structure: Boldwin Scragg, Wiley dreamtech

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	SET/CSE/BCS/C402	Database Management System	4	1	-	10	20	30	70	100	5

Data Base Management System

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DMI, Overall Database structure. Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Relational Data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joints, Unions, Intersection, Minus, Cursors in SQL. PL/SQL, Triggers and clusters.

Database Design & Normalization: Functional dependencies, normal forms, first, second third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design

References:

1. Date C.J. "An Introduction to Database System". Addision Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
3. Elmasri, Navathe, "Fundamentals of Database Systems" Addision Wesley
4. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Pub.

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	SET/CSE/BCS/C403	Software Engineering	4	1	-	10	20	30	70	100	5

Software Engineering

Introduction: Introduction to software engineering, Importance of software, evolving role of software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software engineering problems, Software Development Life Cycle, Software Process.

Software Requirement Specification: Analysis, Principles, Water Fall Model, The Incremental Model, Prototyping, Spiral Model, Role of management in software development, Role of matrices and Measurement, Problem Analysis, Requirement specification, Monitoring and Control.

Software-Design: Design principles, problem partitioning, abstraction, top down and bottom up-design, Structured approach functional versus object oriented approach, design specifications and verification, Monitoring and control, Cohesiveness, coupling, Forth generation techniques, Functional independence, Software Architecture, Transaction and Transaction and Transform Mapping, Component level Design, Forth Generation Techniques.

Coding: Top-Down and Bottom-Up programming, structured programming, information hiding, programming style and internal documentation.

Testing principles, Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, software testing strategies, Verification and validation, Unit testing, Integration Testing, Alpha & Beta testing, system testing and debugging.

Software Project Management: The Management spectrum (The people, the product, the process, the project) Cost estimation, project scheduling, staffing, software configuration management, Structured Vs. Unstructured maintenance, quality assurance, project monitoring, risk management.

Software Reliability & Quality Assurance: Reliability issues, Reliability metrics, Reliability growth modeling, Software quality, ISO 9000 Certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM.

CASE (Computer Aided Software Engineering): CASE and its scope, CASE support in software life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

References:

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach Ed.Boston: McGraw Hill, 2001

2. Jalote, Pankaj, "Software Engineering Ed.2"New Delhi: Narosa 2002

3. Schaum's Series, "Software Engineering" TMH

4. Ghezzi Carlo and Others "Fundamentals of Software Engineering" PHI

5. Alexis, Leon and Mathews Leon, "Fundamental of Software Engg.

6. Sommerville, Ian, "Software Engineering" AWL

7. Fairly, "Software Engineering" New Delhi" TMH

8. Pfleerger, S. "Software Engineering" Macmillan, 1987

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
4.	SET/CSE/BCS/SEC2	SEC2A	2	-	-	10	20	30	70	100	2

2A.1: Modeling and Simulation

Systems and environment: Concept of model and model building, model classification and representation, Use of simulation as a tool, steps in simulation study.

Continuous-time and Discrete-time systems: Laplace transform, transfer functions, state space models, order of systems, z-transform, feedback systems, stability, observability, controllability. Statistical Models in Simulation: Common discrete and continuous distributions, Poisson process, empirical distributions.

Random Numbers: Properties of random numbers, generation of pseudo random numbers, techniques of random number generation, tests for randomness, random variate generation using inverse transformation, direct transformation, convolution method, acceptance-rejection.

References:

1. Narsingh Deo, *System Simulation with Digital Computer*, Prentice Hall of India, 1999.
2. Averill Law, *Simulation Modeling and Analysis,* 3rd Ed., Tata McGraw-Hill, 2007.
3. G. Gordan, *System Simulation*, 2nd Ed., Pearson Education, 2007.
4. A.F. Seila, V. Ceric and P. Tadikamalla, *Applied Simulation Modeling* (International Student Edition), Thomson Learning, 2004.
5. Jerry Banks, *Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice*, Wiley Inter Science, 1998.
6. J. Banks, J.S. Carson, B.L. Nelson, *Discrete Event System Simulation,* 4th Ed., Prentice Hall of India, 2004.

SEC 2A.2: Graph Theory

Definition, examples and basic properties of graphs, pseudo graphs, complete graphs, bi-partite graphs, isomorphism of graphs, paths and circuits, Eulerian circuits, Hamiltonian cycles, the adjacency matrix, weighted graph, travelling salesman's problem, shortest path, Dijkstra's algorithm, Floyd-Warshall algorithm..

References:

1. Edgar G. Goodaire and Michael M. Parmenter, *Discrete Mathematics with Graph Theory,* 2nd Ed., Pearson Education (Singapore) P. Ltd., Indian Reprint 2003.
2. Rudolf Lidl and Günter Pilz, *Applied Abstract Algebra,* 2nd Ed., Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.

SEC 2A.3: Boolean Algebra

Definition, examples and basic properties of ordered sets, maps between ordered sets, duality principle, maximal and minimal elements, lattices as ordered sets, complete lattices, lattices as algebraic structures, sublattices, products and homomorphisms. Definition, examples and properties of modular and distributive lattices, Boolean algebras, Boolean polynomials, minimal forms of Boolean polynomials, Quinn- McCluskey method, Karnaugh diagrams, switching circuits and applications of switching circuits.

References:

1. B A. Davey and H.A. Priestley, *Introduction to Lattices and Order,* Cambridge University Press, Cambridge, 1990.
2. Rudolf Lidl and Günter Pilz, *Applied Abstract Algebra,* 2nd Ed., Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/DSE1	DSE1A	4	-	-	10	20	30	70	100	4

DSE 1A.1 Visual Programming (VB, VC++)

Visual C++: Introduction to Visual C++, getting started with Visual C++, reading Keystrokes from keyboard, handling mouse in VC++, creating menus, Toolbars buttons, status bar prompts, Dialog Boxes: Using Buttons and Text Boxes, creating check box and radio Buttons, List Boxes, Combo boxes and Sliders, File handling, Multiple Documents and Multiple Views, creating Internet Programs- including a Web Browser, creating Active X controls.

COM: Introduction, Building and using COM Servers in VC++, Building and Using Active X controls in VC++, Building Internet COM components with VC++, COM Security, New COM features, Features in Windows 2000, Debugging and profiling COM components, Deploying COM Applications.

Visual Basic: Introduction, Analyzing, controls and properties, coding, loops, dialog boxes, additional controls-option buttons, frames, check boxes, scroll bars, timer control, procedures and functions, using debugging windows, database programming, crystals reports, simple Active X controls.

References:

1. Murray, et.al "The Visual C++ Handbook", 2nd edition. Osborne MCGraw Hill, New York, 1996.
2. COM/DCOM Primer Plus by Waite Group (Techmedia)
3. Using Visual Basic 6 by Reselman and other (PHI)
4. VC++ 6 Programming Bible, Wiley dreamtech India Pvt. Ltd.
5. VB 6 Black Book, Steven Holzer, Wiley dreamtech India

DSE 1A.2 Internet Technologies

Introduction to Web Design: Introduction to hypertext markup language (html) document type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images, frames.

Customized Features: Cascading style sheets, (css) for text formatting and other manipulations.

JavaScript: Data types, operators, functions, control structures, events and event handling.

Java: Use of Objects, Array and Array List class, Designing classes, Inheritance, Input/Output, Exception Handling.

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface,Working with statements, Creating and Executing SQL Statements, Working with Result Set Objects.

JSP: Introduction to JavaServer Pages, HTTP and Servlet Basics, The Problem with Servlets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, Implicit JSP Objects, Conditional Processing, Displaying Values

Using an expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Database Access.

References:

1. Web Enabled Commercial Application Development Using Html, Dhtml, javascript, Perl Cgi By Ivan Bayross, BPB Publications, 2009.
2. BIG Java Cay Horstmann, Wiley Publication , 3rd Edition., 2009
3. Java 7 ,The Complete Reference, Herbert Schildt, 8th Edition, 2009.
4. The Complete Reference J2EE, TMH, Jim Keogh, 2002.
5. Java Server Pages, Hans Bergsten, Third Edition, O'Reilly Media December 2003.

DSE 1A.3 Programming in JAVA

Java Programming: Introduction, Operator, Data types, Variables, Methods and Classes, Multi threaded programming, I/O Java applet.

Java Library: String handling, I/O exploring JAVA, Networking, Applet Classes, Event Handling, Introduction to AWT, Working with windows, Graphics, AWT Controls, Layout manager and menu, Images, Additional Packages.

Software Development Using Java: Java Bean, Java Swing, Java Servlets, Migrating from C++ to Java, Application of JAVA, Dynamic Billboard Applet.

Image Menu: An image based menu, Lavatron Applets, Scrabblets JDBC, Brief functioning of Upper Layer E-mail and their applications.

References:

1. Naughton, Schidt, "The Complete Reference JAVA2", TMH
2. Balagurusamy E, "Programming in JAVA, TMH
3. Dustin R. Calway, "Inside Serviets" Addison Wesley
4. Mark Wutica, "Java Enterprise Edition" QUE
5. Steven Hoizner, "Java2 Black book" Dreamtech

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	SET/CSE/BCS/DSE2	DSE2A	4	1	-	10	20	30	70	100	5

DSE 2A.1 Computer Graphics

Graphics Primitives: Display Devices: Refresh Cathode Ray Tube, Raster Scan Display, Plasma display, Liquid Crystal display Plotters, Printers. Input Devices: Keyboard, Trackball, Joystick, Mouse, Light Pen, Tablet, and Digitizing Camera.

Input Techniques: Positioning techniques, Potentiometers, Constraints, Scales & Guidelines, Rubber-Band techniques, Dragging Dimensioning techniques and Graphical Potentiometers, Pointing and Selection: the use of selection points defining a boundary rectangle, multiple selections, Menu selection.

Mathematics for Computer Graphics: Point representation, Vector representation, Matrices and operations related to matrices, Vector addition and vector multiplication, Scalar product of two vectors, Vector product of two vectors.

Line Drawing Algorithms: DDA Algorithms, Bresenham's Line algorithm.

Segment & Display files: Segments, Functions for segmenting the display file, Posting and posting a segment, segment naming schemes, Default error conditions, Appending to segments, Refresh concurrent with reconstruction, Free storage allocation, Display file structure.

Graphics Operations: Clipping, Point Clipping, Line Clipping, Polygon Clipping. Filling: Inside Tests, Flood fill algorithm, Boundary-Fill Algorithm and scan-line polygon fill algorithm.

Conics, Curves and Surfaces: Quadric surfaces: Sphere, Ellipsoid, and Torus. Superquadrics: Superellipse, superellipsoid, Spline & Bezier Representations: Interpolation and approximation splines, parametric continuity conditions, Geometric Continuity Conditions, Spline specifications. Bezier curves and surfaces.

Transformation: 2D transformation, Basic Transformations, Composite transformations: Reflection, Shearing, Transformation between coordinate systems. 3D Graphics: 3D Display Methods, 3D transformations, Parallel projection, Perspective projection, Visible lines and surfaces identification, Hidden surface removal.

References:

1. Donald Hearn and M Pauline Baker, "Computer Graphics" PHI
2. Steven Harrington, "Computer Graphics: A Programming Approach" TMH
3. Prajapati A.K. "Computer Graphics" PPM Ed2
4. Foley James D, "Computer Graphics" AW Ed2
5. Newman and Sprould, "Principle of to Interactive Computer Graphics" McGraw Hill
6. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill
7. Rogers and Adams, "Mathematical Elements of Computer Graphics" McGraw Hill

DSE 2A.2   C#

Language Basics: Datatypes & Variables Declaration , Implicit and Explicit Casting , Checked and Unchecked Blocks – Overflow Checks , Casting between other datatypes, Boxing and Unboxing , Enum and Constant , Operators , Control Statements , Working with Arrays, Working with Methods , Pass by value and by reference and out parameters

Features of Object Oriented programming

Exception Handling: What is Exception , Rules for Handling Exception , Exception classes and its important properties, Understanding & using try, catch keywords , Throwing exceptions, Importance of finally block , "using" Statement , Writing Custom Exception Classes.

Working With Collections and Generics: Importance of IList and IDictionary., Using ArrayList and Hashtable. , Understanding IEnumerable and IEnumerator. Sorting Items in the collection using IComparable. Typesafety issue with ArrayList and Hashtable classes. Writing custom generic classes. Working with Generic Collection Classes. Operator Overloading, Partial Class, Attributes, Reflection, Configuration

WinForms: Introduction, Controls, Menus and Context Menus, MenuStrip, ToolbarStrip. Graphics and GDI , SDI and MDI Applications , Dialogbox (Modal and Modeless)

Form Inheritance, Developing Custom, Composite and Extended Controls Other Misc topics., Working with Resource Files , Working with Settings

DSE 2A.3   .NET Technology

Introduction to .NET: Writing Window Applications, Windows Graphical User Interface, Programming Languages – Procedural, Event Driven, and Object Oriented, The Object Model, Microsoft's Visual Studio.NET, Writing Visual Basic Projects, Three-Step Process, Visual Basic Application Files.

Visual Studio Environment: IDE Start Page, New Project Dialog, IDE Main Window, Toolbars, Document Window, Form Designer, Solution Explorer Window, Properties Window, Toolbox, Design Time, Run Time, and Break Time.

Writing Visual Basic Project: Workspace Setup, Plan the Project, Define the User Interface, Set Properties, Coding, Testing, Maintenance, Printing.

Finding and Fixing Errors: Syntax Errors, Run-Time Errors, Logic Errors, Project Debugging, Naming Rules and Conventions for Objects.

Variables, constants and calculations: data: variables and constants, formatting data, handling exceptions, displaying messages in message boxes, counting and accumulating sums, decisions and conditions, menus, sub procedures, and functions, lists, loops, and printing, graphics, animation, and additional topics in visual basic.

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	SET/CSE/BCS/DSE3	DSE3A	4	1	-	10	20	30	70	100	5

DSE 3A.1   Network Security

Introduction To security: Attacks, Services & Mechanisms, Security, Attacks, Security Services, Conventional Encryption: Classical Techniques, Conventional Encryption Model, and steganography, Classical Encryption Techniques. Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operations.

Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128, CR2 Placement & Encryption Function, Key Distribution, Random Number Generation, Placement of Encryption Function.

Hash Functions: Message Authentication & Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Function Birthday Attacks, Security of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Digital Signature, Authentication Protocol, Digital Signature Standard (DDS) Proof of Digital Signature Algorithm.

Network & System Security: Authentication Applications: Kerberos X-509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP),S/Mine Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management.

References:

1. William Stallings, "Cryptography and Network Security: Principles and   Practice"' Prentice hall, New Jersey
2. Johannes A. Buchmann, "Introduction to Cryptography" Springer-Verlag
3. Atul Kahate, "Cryptography and Network Security" TMH

DSE 3A.2   Data Mining

Overview: The process of knowledge discovery in databases, predictive and descriptive data mining techniques, supervised and unsupervised learning techniques. Techniques of Data Mining: Link analysis, predictive modeling, database segmentation, score functions for data mining algorithms, Bayesian techniques in data mining. Issues in Data Mining: Scalability and data management issues in data mining algorithms, parallel and distributed data mining, privacy, social, ethical issues in KDD and data mining, pitfalls of KDD and data mining.

References:

1. Margaret H. Dunham, *Data Mining: Introductory and Advanced Topics*, Pearson, 2002.

2. Jiawei Han and Micheline Kamber, *Data Mining: Concepts and Techniques,* 2nd Ed., Morgan Kaufmann, 2006.

3. Arun Pujari, *Data Mining Techniques*, University Press, 2001.

4. D. Hand, H. Mannila and P. Smyth, *Principles of Data Mining*, Prentice-Hall of India, 2006.

5. G.K. Gupta, *Introduction to Data Mining with Case Studies*, Prentice-Hall of India, 2006.

DSE 3A.3   E-commerce

Introduction: Electronic Commerce - Technology and Prospects, Definition of E-Commerce, Economic potential of electronic commerce, Incentives for engaging in electronic commerce, forces behind E-Commerce, Advantages and Disadvantages, Architectural framework, Impact of E-Commerce on business.

Network Infrastructure of E-Commerce: Internet and Intranet based E-Commerce Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY).

Mobile Commerce: Introduction, Wireless Application Protocol, WAP Technology, Mobile Information device, Mobile Computing Applications.

Web Security: Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging client server, Security Threats, Network Security, Factors to consider in Firewall design, Limitation of Firewalls.

Encryption: Encryption techniques, Symmetric Encryption-Keys and data encryption standard, Triple encryption. Asymmetric encryption-Secret key encryption, public and private pair key encryption, Digital Signature, Virtual Private Network.

Electronic Payments: Overview, The SET protocol, payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking EDI Application in business, E-Commerce Law, Forms of Agreement, Govt. policies and Agenda.

References:

1.   Ravi Kalakota, Andrew Winston, :Frontiers of Electronic Commerce" Addison Wesley.

2.   Bajaj and Nag. "E-Commerce the cutting edge of Business". TMH.

3.   P. Loshin, John Vacca, "Electronic Commerce" Firewall Media, N.Delhi.

4.   E Business & Commerce: Brahm Cazner, Wiley dreamtech.

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
4.	SET/CSE/BCS/SEC3	SEC3A	2	-	-	10	20	30	70	100	2

SEC3A.1 System Administration and Maintenance

Part I (Linux/Unix) (8L)

✓ Basics of operating system, services,

✓ Installation and configuration, maintenance

✓ What is linux/unix Operating systems, Kernel, API, cli, gui,

✓ Difference between linux/unix and other operating systems

✓ Features and Architecture

✓ Linux features, advantages, disadvantages

Part II(Windows) (8L)

✓ Windows as operating system, history, versions.

✓ PC hardware, BIOS, Devices and drivers,

✓ Kernal Configuration and building

✓ Application installation, configuration and maintenance

✓ Server services and Client services

✓ Difference between WindowsXP/windows7 and windows server 2003/2008

SEC3A.2 Software Testing

Introduction

Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model

Functional Testing\ Black-box Testing

Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

Structural Testing\ White-box Testing

Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices, Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage

References:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Seventh Edition, Mc Graw Hill Education.2009.

2. Yogesh Singh, Software Testing, Cambridge University Press,2011.

SEC3A.3 Multimedia Applications

Multimedia: Introduction to multimedia, Components, Uses of multimedia.

Making Multimedia: Stages of a multimedia project, Requirements to make good multimedia, Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Multimedia software and Authoring tools.

Text: Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia &Hypertext.

Images: Still Images – Bitmaps, Vector Drawing, 3D Drawing & rendering, Natural Light &

Colors, Computerized Colors, Color Palletes, Image File Formats.

Sound: Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats.

Video: How Video Works, Analog Video, Digital Video, Video File Formats, Video Shooting and Editing.

Animation: Principle of Animations. Animation Techniques, Animation File Formats.

References:

1. Tay Vaughan, "Multimedia: Making it work", TMH, Eighth edition. 2006

2. Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications Applications", Pearson,1995.

3. Keyes, "Multimedia Handbook", TMH. 2000.

4. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI,2000

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCS/DSE4	DSE4A	4	1	-	10	20	30	70	100	5

DSE 4A.1   Multimedia Technology

Multimedia Input Devices: Scanner, Digital Camera, Microphone, Video Camera.

Multimedia Output Devices: Sound/Speaker, colour Monitors, Printers

Storage Devices: CD-ROM's, DVD – Digital Versatile Disk, Coding & Compression Formats for Image, Audio, Video

Nonlinear form of Presentation: Hypertext, Hypermedia, Human/Computer Interaction

Cognitive Aspects of Information Transfer: Various Models of Structuring of Content

Methodology for developing Multimedia CDROM Titles.

Use of Multimedia tools: PhotoShop, Sound Editor, Video Editor, Animator, Authorizing tool – Director Multimedia Databases, Multimedia Application in Education, Libraries, Publishing, Art & Culture, Medicine and Industry.

DSE 4A.2   Software Engineering

Introduction: Introduction to software engineering, Importance of software, evolving role of software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software engineering problems, Software Development Life Cycle, Software Process.

Software Requirement Specification: Analysis, Principles, Water Fall Model, The Incremental Model, Prototyping, Spiral Model, Role of management in software development, Role of matrices and Measurement, Problem Analysis, Requirement specification, Monitoring and Control.

Software-Design: Design principles, problem partitioning, abstraction, top down and bottom up-design, Structured approach functional versus object oriented approach, design specifications and verification, Monitoring and control, Cohesiveness, coupling, Forth generation techniques, Functional independence, Software Architecture, Transaction and Transaction and Transform Mapping, Component level Design, Forth Generation Techniques.

Coding: Top-Down and Bottom-Up programming, structured programming, information hiding, programming style and internal documentation.

Testing principles, Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, software testing strategies, Verification and validation, Unit testing, Integration Testing, Alpha & Beta testing, system testing and debugging.

Software Project Management: The Management spectrum (The people, the product, the process, the project) Cost estimation, project scheduling, staffing, software configuration management, Structured Vs. Unstructured maintenance, quality assurance, project monitoring, risk management.

Software Reliability & Quality Assurance: Reliability issues, Reliability metrics, Reliability growth modeling, Software quality, ISO 9000 Certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM.

CASE (Computer Aided Software Engineering): CASE and its scope, CASE support in software life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

References:

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach Ed. Boston: McGraw Hill, 2001

2. Jalote, Pankaj, "Software Engineering Ed.2"New Delhi: Narosa 2002

3. Schaum's Series, "Software Engineering" TMH

4. Ghezzi Carlo and Others "Fundamentals of Software Engineering" PHI

5. Alexis, Leon and Mathews Leon, "Fundamental of Software Engg.

DSE 4A.3   Unix & Shell Programming

Basic Unix Commands: The Unix editors and vi; Redirection, Piping, Tees and filters; The Unix Utilities grep, sed, etc.

Overview of Unix Architecture: The kernel and the Shell; Processes and Time Sharing files and Directories; Peripheral Device as files.

Introduction the Shell Scripts: The Bourne and C-shells; Shell variables, scripts meta-characters and environment; the if and case statements; for, while and until loops.

System calls and the 'C' library: Discussion of the Unix system calls and 'C' library functions, the standard I/O Package; file handling; math library; command line parameters etc. The Unix 'C' interface; 'C' files and Graphics.

Introduction of systems Administration under Unix: The system Manger OLE and functions.

Different Tools: Debugging language development, System development different print formatting UNIX Tools.

Bourne Shell: Shell meta characteristics, shell variable, scripts, facilities, commands and environments, shell archive, idea about restricted shell, ROLC program.

Korn Shell: Shell variables and scripts, built in EDITOR, built in integer arithmetic, string manipulation capabilities, Command Aliasing, Array Job control.

C-Shell: Shell variables and scripts, shell facilities, history Integer Arithmetic Decision making and job control.

References:

1.   Stephan Prata   :   Advanced Unix – A Programmers Guide – BPB PUB.

2.   Kernighlan & Pike :   The Unix Programming Environment – PHI.

3.   The Unix System Manuals.

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	SET/CSE/BCS/DSE5	DSE5A	4	1	-	10	20	30	70	100	5

DSE 5A.1   Artificial Intelligence

Introduction: Definition and meaning of artificial intelligence, A.I. techniques, pattern recognition, Level of, speech recognition representation in A.I. properties of internal representation.

Production System: Different types of tracing, strategies, graph search strategies, Heuristic graph, search procedure, AND/OR graph, relationship between decomposional and compatible systems, searching Gate Tree, min-max search game playing, actual game playing.

Introduction to Predicate Calculus: Predicates and Arguments, connectives, Simplifications of strategies, extracting answers from Resolution Refutation. Control strategies.

Rule Based Deduction Systems: Forward and backward deduction system, resoling with AND/OR graph, computation, deduction and program synthesis, central knowledge for rules based deduct systems.

Managing Plans of Action: Plan interpreter, planning decisions, execution monitoring and re-planning domain of application robot motion planning and game playing.

Structural Object Representation: Semantic networks semantic market matching deductive operations on structured objects.

Architectural for A.I. Systems: Knowledge, acquisitions representation IMAGES PROCESSING, Natural language processing.

References:

1.   Introduction to artificial Intelligence Eugene Charnik Drew MC mott

2.   Artificial Intelligence Elaine Rice.

3.   Principal of Artificial Intelligence, Nelson, Springer-Verlag.

4.   Artificial Intelligence Application Programming: Tim Jones, Wiley dreamtech

DSE 5A.2   Wireless and Mobile Computing

Existing Wireless Systems: Introduction, Global System for Mobile Communications (GSM), Personal Communications Services (PCS), International Mobile Telecommunications 2000 (IMT-2000). Wireless local area networks. Wireless local loops.

Wireless & Mobile Computing: Overview of the history, evolution, and compatibility of wireless standards; the special problems of wireless and mobile computing.

Mobile Communication Systems: Introduction, mobile Internet protocol; mobile aware adaptation; extending the client-server model to accommodate mobility; mobile data access; the software packages to support mobile and wireless computing; Mobile/Cellular System Infrastructure, Registration, Handoff Parameters and Underlying Support. Roaming Support Using System Backbone. The role of middleware and support tools. performance issues; Multicasting, Security and Privacy.

Satellite Systems: Introduction, Types of Satellite Systems, Characteristics of Satellite Systems, Satellite System Infrastructures, Call Setup, Global Positioning System.

Recent Advances: Introduction, Ultra-Wideband Technology, Multimedia Services Requirements. Mobility Management for Integrated Systems; Multicast in Wireless Networks; MANET Route Maintenance/Repair; Design Issues in Sensor Networks; Bluetooth Networks; Threats and Security Issues.

References:

1.   Introduction to Wireless and Mobile Systems , Dharma P. Agrawal.

2.   Internetworking with TCP/IP Vol.1: Principles, Protocols, and Architecture, 4/e, Comer, Douglas E., Prentice Hall.

DSE 5A.2   Unified Modeling Language

Introduction: The Evolution of Technology, Structured Analysis and Design, Object-Oriented Technologies, Comparison between the main technologies.

The Unified Process and Features: Unified Process, Static Structure: Process Representation, Dynamic Structure: iterative development, an architecture-centric process, A use-case-driven process, Use case models, Notations and Terminology.

Process Components (Workflows): Business Modeling Workflow, Requirement Workflow, Analysis and Design Workflow, Deployment workflow.

Understanding Object –Oriented Technologies, Current status of Object Technologies, The static object model- Class, Collaborations and Object Diagrams, Generalization, Composition, Aggregation, Multiplicity & Association with concept and examples.

Use Case Analysis: Discussion on use cases, terminology, notations and analysis, what they are and aren't, Use case- an example, Use case- formal Scenario template.

Static chart Diagram: Composite states, nested states, Events, Simple transitions.

UML Activity and sequence diagrams: Usage and Syntax, Guarded Transitions, Synchronization Bars, Swim lanes Purpose, Proper Usage of Activity diagram. Transition time sequence diagram: Objective and Modeling guidelines, Objective Interaction, Sequence diagram- UML notation, Object and Stereotypes.

References:

1. UML distilled by Martin Fouler- Pearson Education.

2. Object –Oriented Modeling by James Raumbaugh, PHI.

3. UML a nutshell by Dan Pillone, O'Reilly Publication.

4. The elements of UML by Scott Amber, Cambridge University Press.

5. Designing Object-Oriented Software by Rebecca Wirf Brock, PHI.

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	SET/CSE/BCS/SEC4	SEC4A	2	-	-	10	20	30	70	100	2

SEC 4A.1 Android Programming

Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.

Overview of object oriented programming using Java: OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project

– Hello Word, run on emulator, Deploy it on USB-connected Android device.

User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes.

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners(Combo boxes),Images, Menu, Dialog.

Database: Understanding of SQLite database, connecting with the database.

References:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

SEC 4A.2 XML Programming

Introduction: Understanding Mark-up Languages, Introduction to XML and its Goals.

XML Basics: XML Structure and Syntax, Document classes and Rules.

Other XML Concepts: Scripting XML, XML as Data, Linking with XML.

XML with Style: XSL –Style Sheet Basics, XSL basics, XSL style sheets.

References:

1. William J. Pardi , XML in action web technology, Microsoft Press, 1999
2. Michael J. Young ,Step by Step XML , Microsoft Press, 2002

SEC 4A.3 PHP Programming

Introduction to PHP: PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.), PHP with other technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP , Expressions, scopes of a variable (local, global), PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator. PHP operator Precedence and associatively

Handling HTML form with PHP: Capturing Form Data, GET and POST form methods, Dealing with multi value fields, Redirecting a form after submission.

PHP conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else), Switch case, while ,For and Do While Loop, Goto , Break ,Continue and exit

PHP Functions: Function, Need of Function , declaration and calling of a function, PHP Function with arguments, Default Arguments in Function, Function argument with call by value, call by reference, Scope of Function Global and Local

String Manipulation and Regular Expression: Creating and accessing String , Searching & Replacing String, Formatting, joining and splitting String , String Related Library functions, Use and advantage of regular expression over inbuilt function, Use of preg_match(), preg_replace(), preg_split() functions in regular expression

Array: Anatomy of an Array ,Creating index based and Associative array ,Accessing array, Looping with Index based array, with associative array using each() and foreach(), Some useful Library function

References:

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.

2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.

3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.

4. Luke Welling, Laura Thompson, PHP and MySQL Web Development", 4th Edition, Addition Paperback, Addison-Wesley Professsional,2008.

5. David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.