| | |
|---|---|
| **Subject Code** | **15BCA201** |
| **Subject Name** | **DATA STRUCTURES** |
| **Short Name** | **DS** |
| **Total Lectures** | **88** |
| **Total Credits** | **4** |

**Prerequisites:**

- Basic knowledge of C programming must be known.

**Objectives:**

- To extend programming ability using an object oriented language.
- To analyze the algorithms to determine time and space complexity.
- To build and manipulate linear and non-linear data structure, including Stack, Array, Linked list, Queues, Tree and Graphs.
- To be able to Sort, Search and merge data.
- To be able to choose the appropriate data structure to use in solving typical computer science problem.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **Introduction**: Data structure & their types, primitive Operations, Algorithms & Algorithms Notation, Time-Space Complexity. **Arrays :** Linear array and its Representation in memory, Primitive Operation on Linear Array, traversing linear arrays, inserting & deleting operations, Bubble sort, Linear search and Binary search algorithms. | 18 |
| II | **Linked List:** Linked lists and their representation in memory, Primitive Operation on Linked list, traversing a linked list, searching a linked list. Memory allocation & garbage collection. Insertion deletion operations on linked lists. Header linked lists, Two-way linked lists & its memory representation. | 18 |
| III | **Stack:** Definition, sequential and Linked representation in Memory. Primitive Operation on Stack, Arithmetic expressions, Polish notation: Infix, Postfix & Prefix operations using stack.<br>**Recursion:** Recursion definitions & Their type, recursion for Tower of Hanoi. | 18 |
| IV | **Queues:** Definition, Primitive Operation on Queues, Array Representation of Queues, linked lists representation of a queue. De-queue. Circular Queue, priority queue.<br>**Trees:** Definition, Tree terminology, Binary Trees & their memory representation using Arrays & Linked list, Traversing Binary Trees. | 17 |
| V | **Graph:** Definition, Graph terminology, sequential and Linked representation of Graph.<br>**Sorting:** Selection sort, Insertion sorts. Merging &Merge sort, Radix sorts, Quick Sort, Hashing & Type of Hashing Function. | 17 |
| | **Text Books :**<br>1. Seymour Lipschutz, Data Structures, Tata McGraw Hill Education Private Limited, NEW DELHI.<br>2. S. B. Kishor, Data Structures, Das Ganu Publications, Nagpur, 2nd Edition (2007)<br>3. G. S. Baluja, Data Structures through C (A Practical Approach), GAGAN KAPUR FOR Dhanpat Rai & Co. (P) Ltd. New Delhi, 4th Edition. | |
| | **References :**<br>1. Langsam, Augenstein And Tenenbaum, Data Structures using C & C ++, PHI.<br>2. Tremblay and Sorenson, An Introduction to Data Structures With Applications.<br>3. Horowoitz & Sahani, Fundamentals of Data Structure, 2nd Edition. | |

**Course Outcomes :**

| | |
|---|---|
| **Subject Code** | **15BCA202** |
| **Subject Name** | **Object Oriented Programming using C++** |
| **Short Name** | **OOP using C++** |
| **Total Lectures** | **88** |
| **Total Credits** | **4** |

**Prerequisites :**

- The student should have the basic knowledge of C Programming
- The student should be able to do computations.
- The students should posses the logical thinking ability.

**Objectives:**

- To build the basic skills of programming.
- To learn and implement the OOPs features.
- To acquire the importance of C++ programming using various methodologies.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **OOP:** Features of OOP, basic Concepts of OOP, advantages and applications of OOP, Introduction to C++, structure of C++ program, tokens, keywords, identifiers, basic data types & user defined data types, Constants, variables, declaration of variables and initialization. | 17 |
| II | **Operators:** Scope resolution operator, member dereferencing operator, Type conversion, implicit & explicit conversions.<br>**Control structures:** if, switch, do..while, while, for statements.<br>**Functions:** Function prototype, Function calling and returning, their types, inline functions, default arguments, constant arguments, function overloading. | 17 |
| III | **Classes and Objects:** class specification, creating objects, accessing class members, defining member functions, Nesting of member function, friend functions, passing objects as arguments, Returning objects from functions.<br>**Constructors:** Defining constructor, parameterized constructor, multiple constructors in a class, constructor with default argument, copy constructor, destructor. | 18 |
| IV | **Arrays and pointers:** Arrays as class member data, Arrays of objects, Pointers to objects, this pointer, memory management using 'new" and "delete'. **Operator overloading:** Overloading unary and binary operator, rules for overloading operators.<br>**Inheritance:** Derived and base class, Types of Inheritance, visibility mode. | 18 |
| V | **Virtual Functions and Polymorphism:** Introductions, pointers to derived class, definition of virtual functions, pure virtual functions, Rules for Virtual functions,<br>**Files and streams:** Hierarchy of file stream classes, opening and closing of files, files modes, file I/O with stream class. | 18 |
| | **Text Books:**<br>1. E. Balagurusamy , Object oriented programming with C++, 4th edition, Tata Mc Graw- Hill , New Delhi, India, (2008).<br>2. K. R. Venugopal, B. Rajkumar and T. Ravishankar, Mastering C++, Tata McGraw Hill, New Delhi, (2006).<br>3. Yashwant Kanetkar, Let Us C++, 1st edition, BPB Publications, New Delhi, (1999) | |
| | **References :**<br>1. Robert Lafore, Object Oriented Programming with C++, 4th edition, Pearson Education, (2008).<br>2. D. Ravichandran ,Programming with C++, 2nd edition, Tata Mc Graw- Hill, New Delhi, India, (2002).<br>3. Al Stevens, Teach Yourself C++, 4th edition, BPB Publications, New Delhi, (2006).<br>4. B.M. Harwani, C++ for beginners, SPD Publications. | |

**Course Outcomes :**

1. Able to implement the OOP concepts like class, objects, Inheritance, Polymorphism, Constructor, Destructor, Polymorphism, Virtual Function, etc.
2. Programming logic is developed which will help them to create efficient programs & applications providing the students better opportunity in software industry.
3. Ability to follow professional programming, practices to align with Industry Expectations.

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|---|---|
| **Subject Code** | **15BCA203** |
| **Subject Name** | **WEB Technology** |
| **Short Name** | **WT** |
| **Total Lectures** | **88** |
| **Total Credits** | **4** |

**Prerequisites :**

- Basic knowledge in HTML tags & skill of creating web pages should be known.
- Knowledge of basic Computer hardware & software is also necessary.

**Objectives:**

- To have an understanding of the introductory Internet and World Wide Web concepts.
- To be able to configure text, color, and page layout with Cascading Style Sheets.
- To have an understanding of configuring images & multimedia on web pages.
- To have an understanding of some advanced technologies of web.
- To develop the skill & knowledge of Web page design using HTML5.

| Units | Contents | Total Lectures |
|---|---|---|
| I | Web basics, Multitier Application Architecture, Client-Side Scripting versus Server-Side Scripting, World Wide Web Consortium (W3C)<br>**HTML5**: Features, Editing, First HTML5 Example, Headings, Linking, Images, Special Characters and Horizontal Rules, Lists, Tables, Forms, meta Elements. | 18 |
| II | **HTML5 Elements**: **Form input type element**: Colors, date, time, e-mail addresses, numbers, range, search, telephone numbers, URLs, **Datalist Elements**. **Page-Structure Elements**: header, nav, figure, figcaption, article, summary, details, section, aside, meter, footer. **Audio and Video elements. Canvas element:** rectangle. | 18 |
| III | **Introduction to scripting**: Java Script basics, operators, data types, popup boxes. Control structures: if, If-else, Switch. Looping structures: for, do-while, while. **Java Script functions**: built in functions, Defining and invoking parameter functions. **JavaScript objects**: Math, String, Date, Number, Boolean | 18 |
| IV | **XML**: Introduction, Features, Syntax, Tags, Elements, Attributes, Tree Structure and namespaces. **DTD**: Internal, External. **XML Schemas**: Definition types.<br>**CSS**: Introduction, basic properties, **Selectors**: universal, type, id, class. Inline Styles Embedded Style Sheets, External Style Sheets. Element Positioning and Dimensions. | 17 |
| V | **jQuery**: Introduction , importance, jQuery Installation, jQuery Syntax, jQuery Selectors, jQuery Event Methods, jQuery Effects<br>**AngularJS**: OVERVIEW, Features, advantages, disadvantages, simple application, Directives, Expressions: numbers, String, Object, and Array. | 17 |
| | **Text Books :**<br>7. Paul Deitel, Harvey Deitel and Abbey Deitel, "Internet & World Wide Web: How to program", Fifth Edition Pearson ISBN 978-0-13-215100-9<br>8. Thomas A. Powell, "HTML & CSS: The Complete Reference", Fifth Edition, McGraw-Hill, ISBN: 978-0-07-174170-5<br>9. Kogent Learning Solutions Inc, HTML5 Black Book: Covers CSS3, Javascript, XML, XHTML, Ajax, PHP and jQuery, Dreamtech Press, New Delhi, 2011<br>10. Jeffery C. Jackson, "Web Technologies", A Computer Science Perspective, Pearson Education | |
| | **References :**<br>1. Kogent Learning Solutions Inc, Web Technologies Black Book, Dreamtech Press, New Delhi, 2009<br>2. Bankim Patel, Lal Bihari Barik, Introduction to Web Technology & Internet, Acme Learning Private Limited, New Delhi, 2009<br>3. Jonathan Chaffer, Karl Swedberg, "Learning jQuery"<br>4. Phil Ballard, Michael Moncur, Sams Teach Yourself Ajax, JavaScript and PHP, Pearson Education, New Delhi, 2009 | |

**Course Outcomes :**

1. Ability to develop a dynamic website by the use of JavaScript, HTML5 & Cascading Styles sheets.
2. Students will be able to write a well formed / valid XML document and Schema.
3. Able to use scripting languages and web services to transfer data and add interactive components to web pages.

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|---|---|
| **Subject Code** | **15BCA204** |
| **Subject Name** | **SOFTWARE ENGINEERING AND TESTING** |
| **Short Name** | **SET** |
| **Total Lectures** | **88** |
| **Total Credits** | **4** |

**Prerequisites :**

- Basic knowledge in System development life cycle should be known.
- Knowledge of basic Computer software and related terms are also necessary.
- Programming constructs along with object oriented concepts must be known.

**Objectives:**

- To provide an insight into the process of software development.
- To understand and practice the various fields such as analysis, design, development, testing of software engineering.
- To develop skill to construct software of high quality with high reliability.
- To apply metrics and testing technique to evaluate the software.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **Software**: Definition, characteristic, myths. **Software engineering**: Definition, layer, management, and phases in software engineering software process, project, product, process component and frame work. **Software life cycle model**: Waterfall, prototyping, spiral incremental, RAD, V model. | 18 |
| II | **Software requirement**: Introduction, Types, requirement analysis: Structured, object oriented modeling, other approaches. **SRS**: Characteristic. **Basic of cost estimation**: Estimation of resources, software product cost factor COCOMO model of cost estimation. | 18 |
| III | **Software design**: Basic, data design architectural design, component level design, user interface design, object oriented design, software design notation: flowchart, DFD, structure chart. **Software coding**: Feature, programming practices: top down, bottom up, structured, information hiding. | 18 |
| IV | **Testing fundamentals**: Error, fault and failure, test cases and test criteria, **Software testing**: basic, strategies, v mode. **Level of software testing**: unit, integration, system acceptance. **Testing Technique**: white box, black box and gray box testing and their comparison. | 17 |
| V | **Software quality**: Concept, SQA group. **Quality management**: process and product quality, quality assurance and standard, quality planning & quality control. **Software Maintenance**: Basic, type, software maintenance life cycle. | 17 |
| | **Text Books :**<br>1. Rohit khurana," Software Engineering Principles and practice", Second edition , Vikas publishing house Pvt. Ltd, 2010<br>2. Sommerville Pearson, "Software Engineering", Eight Edition, Pearson Education, 2007<br>3. Pankaj Jalote, "An integrated approach to Software Engineering", Third Edition, Narosa Publishing House, 2005 | |
| | **References :**<br>5. Roger S. Pressman ,"Software Engineering : A Practitioner Approach", Seventh edition, McGrawHill, 2010<br>6. Richard Fairley ,"Software Engineering Concept", Tata McGrawHill Edition 2008<br>7. Hans van Vliet, "Software Engineering: Principles and Practice", 3rd edition, John Wiley & Sons, 2008. | |

**Course Outcomes :**

1. Achieve basic knowledge of software engineering principles, including models and their

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|---|---|
| **Subject Code** | **15BCA205** |
| **Subject Name** | **Operating System** |
| **Short Name** | **OS** |
| **Total Lectures** | **88** |
| **Total Credits** | **4** |

**Prerequisites :**

- Basic knowledge about computer system, its components and functions.

**Objectives:**

- To acquire the basic knowledge about operating system.
- To learn the basic knowledge about various components of operating system, capabilities and services of operating system.
- To understand various types of operating system & their management and techniques.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **Operating system:** Introduction, Components, Characteristics and Services. **Process concept**: Definition, process state, process state transition, operation on process, inter-process communication, process scheduling. | 18 |
| II | **CPU scheduling**: Concepts, scheduling criteria and algorithm. **Process synchronization:** Concept, Critical section problem, semaphores, monitors, preemptive vs non preemptive scheduling. **Deadlocks:** Definition and characterization, deadlocks prevention, avoidance, detection and recovery from deadlocks. | 18 |
| III | **Memory management:** Background, functions, Allocation methods, memory management system, partitions, paging, segmentation, swapping. **Virtual memory management:** Demand paging, process creation, page replacement, allocation of frames, thrashing. | 18 |
| IV | **Device Management:** I/O Hardware, application I/O interface, kernel I/O sub system, Disk scheduling & management, swap-space management. | 17 |
| V | **Study of Unix Operating system:** Features, History, Architecture, process management, scheduling, memory management, file systems, security. | 17 |
| | **Text Books :**<br>1. H. M. Dietel, Operating System, 3rd edition, Pearson Education, (2008).<br>2. A. Silberschatz, P.B. Galvin, Operating System Concepts, 7th Edition, Addision Education.<br>3. Achyut S. Godbole, Operating system, Tata McGraw-Hill Education, (2005).<br>4. Maurice J. Bach, The Design of UNIX operating system, Pearson Publication, First impression, (2015).<br>5. Sumitabh Das, Unix concepts and Application, Fourth Edition, Tata McGraw-Hill Education, (2010). | |
| | **References :**<br>1. William Stalling, Operating Systems: Internals and Design Principles, Prentice Hall.<br>2. Crowley, Operating Systems, Tata McGraw-Hill Education, (2001).<br>3. Peterson, Operating System concepts, 2nd edition, Addison-Wesley Longman Publishing Co., (1985).<br>4. M. Milankovic, Operating systems, McGraw-Hill.<br>5. A. S. Tananbum, Operating systems, Pearson Education. | |

**Course Outcomes:**

1. Ability to use various OS and its file systems with ease.
2. Ability to understand CPU scheduling algorithms used in OS.
3. Able to understand the management of deadlock, memory, virtual memory and device.
4. Ability to install UNIX/LINUX, etc. operating systems.

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|---|---|
| **Subject Code** | **15BCA206** |
| **Subject Name** | **Environmental Science** |
| **Short Name** | **EVS** |
| **Total Lectures** | **40** |
| **Total Credits** | **2** |

**Prerequisites:**

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**Objectives:**

- To create awareness about environmental problems among the students.
- To impart basic knowledge about the environment and its applied problems.
- To develop an attitude of concern for the environment.
- Motivating students to participate in environment protection and environment improvement.
- Acquiring skills to help the concerned individuals in identifying and solving environmental problems.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **The multidisciplinary nature of environmental studies:** Definition, Scope and importance, Need for public awareness.<br>**Human population and the environment:** Population Explosion, Human Rights, Value Education, Environment and Human Health, Women and Child Welfare Programme. | 09 |
| II | **Social Issues and The Environment:** From unsustainable development to sustainable development, Water conservation- Rain water harvesting, Watershed management, Global Warming, Acid-rain, Environment Protection Act, Air (Prevention and Control of pollution), Act, Wildlife protection Act. | 09 |
| III | **Natural Resources:** Renewable and non-renewable resources, Forest resources, Water resources, Mineral resources, Food resources, Land resources, Role of an individual in conservation of natural resources. | 06 |
| IV | **Ecosystem, Biodiversity and its conservation:** Ecosystem- Concept of ecosystem, Structure and functions of ecosystem, Food-chain, Ecological pyramids, Structure and functions of ecosystem- Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystem,<br>**Biodiversity:** Introduction- Definition, Genetic, Species and Ecosystem diversity, Values of biodiversity, Hot-spots of biodiversity, threats to biodiversity, Conservation of biodiversity: In-situ and Ex-situ conservation. | 10 |
| V | **Environmental Pollution:** Causes, effects and control measures of- Air pollution, Soil pollution, Water pollution, Noise pollution, Thermal pollution, Solid waste management. | 06 |
| | **Text Books**<br>1. Prof. K. Gawai, Environmental studies, Sanskar publications.<br>2. R. Rajgopalan, Environmental studies, Oxford uni. press, New Delhi, 2005. | |
| | **References :**<br>1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.<br>2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)<br>3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)<br>4. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p<br>5. De A.K., Environmental Chemistry, Wiley Eastern Ltd | |

**Course Outcomes:**

1. Students will gain knowledge of Ecosystem, Biodiversity and Environmental Pollution.
2. Ability to understand Causes, effects and control measures of Pollution.
3. Achieve awareness about Water conservation- Rain water harvesting, Watershed management, Global Warming, Acid-rain, Environment Protection Act, Wildlife protection Act.

| Subject Code | 15BCA207 |
|---|---|
| Subject Name | Lab-I: DS & OOP using C++ |
| Short Name | Lab-I |
| Total Lectures | 130 |
| Total Credits | 4 |

| Sr. No. | Contents | Total Lectures |
|---|---|---|
| | **Data Structures Practical List:** | |
| 1 | WAP to Insert element in an array at the given location. | 3 |
| 2 | WAP to Delete an element from array at the given location. | 3 |
| 3 | WAP to Sort the element of an array using bubble sort technique. | 3 |
| 4 | WAP to Search an element using linear search technique. | 3 |
| 5 | WAP to Search element from an array by using binary search technique. | 3 |
| 6 | WAP to Traverse an element from link list. | 3 |
| 7 | WAP to Insert node at beginning of link list. | 3 |
| 8 | WAP to Delete node at beginning of link list. | 3 |
| 9 | WAP to Insert node at specific location of link list. | 3 |
| 10 | WAP to Calculate factorial of given number by using iteration method. | 3 |
| 11 | WAP to Calculate factorial of given number by using recursion method. | 3 |
| 12 | WAP to Calculate Fibonacci series of given number by using recursion method. | 3 |
| 13 | WAP to perform basic operation (PUSH, POP) of stack using array. | 3 |
| 14 | WAP to Calculate factorial of given number by using recursion method. | 3<br>3 |
| 15 | WAP to Obtain tower of Hanoi problem. | |
| 16 | WAP to Perform the insertion operation of queue by using array. | 4 |
| 17 | WAP to Perform the deletion operation of queue sort by using array. | 4 |
| 18 | WAP to Sort element of an element of an array by using insertion sort technique. | 4 |
| 19 | WAP to Sort element of an element of an array by using selection sort technique. | 4 |
| 20 | WAP to Merge element of two arrays into a single array by using merging technique. | 4 |
| | **OOP using C++ Practical list:** | |
| 1 | Practical based on structure of C++ Program. | 2 |
| 2 | Practical based on use of operators. | 3 |
| 3 | Practical based on use of Type conversion. | 3 |
| 4 | Practical based on use of class and objects. | 3 |
| 5 | Practical based on use of control structures- if-else. | 3 |
| 6 | Practical based on use of control structures nested if. | 3 |
| 7 | Practical based on use of control structures- switch statement. | 3 |
| 8 | Practical based on use of looping structures- for loop. | 6 |
| 9 | Practical based on use of looping structures do-while. | 3 |
| 10 | Practical based on use of looping structures while. | 3 |
| 11 | Practical based on use of function. | 6 |
| 12 | Practical based on use of inline function. | 3 |
| 13 | Practical based on inheritance. | 3 |
| 14 | Practical based on function overloading. | 3 |
| 15 | Practical based on operator overloading | 3 |
| 16 | Practical based on constructor | 3 |
| 17 | Practical based on parameterized constructor. | 3 |
| 18 | Practical based on copy constructor | 3 |
| 19 | Practical based on virtual function. | 3 |
| 20 | Practical based on file handling | 3 |

| Subject Code | 15BCA208 |
|---|---|
| Subject Name | Lab-II : (Web Technology) |
| Short Name | Lab-II |
| Total Lectures | 90 |
| Total Credits | 3 |

| Sr. No. | Contents | Total Lectures |
|---|---|---|
| 1 | Create a webpage in HTML5 using <img> tag with its attributes. | 3 |
| 2 | Create a webpage in HTML5 for strength of BCA using <table> tag | 3 |
| 3 | Create a webpage in HTML5 using <form> tag with new input type. | 3 |
| 4 | Create a webpage in HTML5 for strength of BCA using <a> tag | 3 |
| 5 | Create a webpage in HTML5 with audio and video Elements | 3 |
| 6 | Write a program for inline CSS | 3 |
| 7 | Write a program for internal style sheet | 3 |
| 8 | Write a program for external style sheet | 3 |
| 9 | WAP for simple Javascript using if-else conditional statements. | 3 |
| 10 | WAP for simple Javascript using for looping statements. | 3 |
| 11 | WAP in Javascript to check whether the given number is even or odd. | 3 |
| 12 | Write a program in XML for showing student information. | 3 |
| 13 | Write a program in simple AJAX | 3 |
| 14 | Write a program to use of jQuery | 3 |
| 15 | Write a program to demonstrate AngularJS. | 3 |

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|---|---|
| **Subject Code** | **15BCA209** |
| **Subject Name** | **VISUAL BASIC. NET** |
| **Short Name** | **VB.NET** |
| **Total Lectures** | **88** |
| **Total Credits** | **4** |

**Prerequisites:**

- Basic knowledge of programming logic must be known.

**Objectives:**

- Extend programming ability using VB.Net
- Ability to learn and developed GUI based and Event Driven programming.
- Build and manipulate Database programming using VB.net
- Learn basic controls of Visual Studio IDE.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **Introduction to .NET**, 4.0.NET Framework features & architecture. Introduction to Visual Studio2010, Event Driven Programming, VB.NET Development Environment, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser. The VB.NET Language - data types, variables, variables declarations, Scope of a variable, type casting, constants, operators and expressions. | 18 |
| II | Conditional statements, loop statements. Arrays, types of array, Exception Handling, Sub procedure, Functions, Passing arguments, Optional Argument, Returning value from function. Msgbox & Inputbox, String manipulation, mathematical function, Date function | 18 |
| III | **Object Oriented Programming:** Concepts of classes & objects, field, Properties, methods and events, Creating a class, Constructors and Destructors, Inheritance, Access modifiers, Overloading & Overriding, Polymorphism. | 18 |
| IV | **Working with Forms:** Loading, showing and hiding forms, controlling one form within another. GUI Programming with Windows Form: Method, properties, events and working of basic controls-Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, Image Control, RadioButton, Panel, Timer. Menu, Built-in Dialog Boxes. | 17 |
| V | **Data Access with ADO.NET:** What are Databases, Accessing Data with the Server Explorer, Architecture of Ado.net, Data provider Ado.net objects: Connection, Command, DataReader. Data Controls: Grid View, DetailView, Repeater, DataList | 17 |
| | **Text Books :**<br>1. Steven Holzner, Visual Basic.NET Programming Black Book PARAGLYPH PRESS Dreamtech Publications.<br>2. Visual Basic 2010 Programming Black Book, PLATINUM Edition, Dreamtech Press, KOGENT Learning Solution Inc.<br>3. Shirish Chavan, Visual Basic.NET PEARSON Education.<br>4. Michal Halvorsons, MICROSOFT VISUAL BASIC.NET STEP BY STEP, Prentice-Hall of India Private Limited, New Delhi | |
| | **References :**<br>1. Alisstair McMonnies, Object Oriented Programming in Visual Basic.NET, Pearson Education<br>2. Hamilton J.P., OOP with Visual Basic.NET, O'Reilly Media Inc.<br>3. Francesco Balena, Programming Microsoft Visual Basic.NET, Microsoft Press. | |

**Course Outcomes :**

1. Able to build application using event driven programming skills and GUI tools of .net framework.
2. Able to use object-oriented features with console applications.
3. Able to create dynamic application using ADO.NET.

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|---|---|
| **Subject Code** | **15BCA210** |
| **Subject Name** | **Network Security** |
| **Short Name** | **NS** |
| **Total Teaching Hrs.** | **88** |
| **Total credits** | **4** |

**Prerequisites :**

- Students should be familiar with networking.
- Basic concepts related to security are required.

**Objectives:**

- To be able to explain and implement basic security techniques.
- To use methods in cyber crime and networking purposes.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **Introduction**: Security Trends, Security Services, Security attacks, Security mechanisms, A Module for Network security. **Classical Encryption techniques**: Symmetric cipher model, substitution techniques and Transposition techniques**.** | 17 |
| II | **Block Ciphers and Data encryption standard**: Block cipher principles, Data Encryption standard, AES Evaluation criteria of AES, The AES cipher. | 18 |
| III | **Finite Fields:** Groups, Rings and Fields, Modular Arithmetic, Euclidean Algorithm**.** **Introduction to Number theory:** Prime numbers, Formats and Euler's theorem, Testing for primarily. | 17 |
| IV | **Public key cryptography and RSA:** Principles of Public key crypto systems, RSA algorithm Message authentication and Hash functions- Authentication requirements, authentication, Functions, Message authentication codecs, Hash function, Digital Signatures. | 18 |
| V | **Security**: Email Security – Pretty good privacy, S/MIME, IP Security And Web Security- IP security over view, IP Security Architecture, Web Security, Considerations, Secure Socket Layer and Transport layer Security, System Security – Intruders , Viruses and related Threats, Firewalls. | 18 |
| | **Text Books**:<br>1. William Stallings, Cryptography and Networking Security Principles & Practice , fourth edition<br>2. John F. Chavwan, The Fundamentals of New Security, Artch. House.<br>3. Juaniata, The Internet Security Guide Book. | |
| | **References:**<br>1. Atul kahate, Cryptography and Network Security, Tata McGraw-Hill Education, 2003<br>2. Behrouz A. Forouzan, Cryptography & Network security, (TMH )<br>3. Charlie Kaufman, Radia Perlman and Mike Speciner, Network security private Communication in a public world, 2nd Edition, (LPE) | |

**Course Outcomes :**

1. Able to identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks.
2. Able to understand encryption and analyze the various encryption algorithms.
3. Able to apply modern algebra and number theory.
4. Capability to understand cryptographic algorithms and its vulnerabilities.
5. Ability to understand the techniques and algorithms used for message authentication like MAC, Digital Signatures and Hash functions.
6. Students are familiarized with network security designs using available secure solutions.

| | |
|---|---|
| **Subject Code** | **15BCA211** |
| **Subject Name** | **Numerical Methods** |
| **Short Name** | **NM** |
| **Total Lectures** | **88** |
| **Total Credits** | **4** |

**Prerequisites:**

- Basic knowledge of mathematics.

**Objectives:**

- To teach the concept of Numerical analysis.
- To teach the various applications of numerical methods on computer.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **Introduction:** A simple mathematical model, algorithm design. Approximation and round-off errors, truncation errors, Numerical error, Modeling error, Inherent error, Blunders , Absolute and relative error. | 17 |
| II | **Root of equations**: Introduction of methods used to find roots of Non-linear equations, Polynomial equation, transcendental equation, Bisection method, False Position method, Newton-Raphson method, Secant method. | 18 |
| III | **Interpolation**: Concept and definition of interpolation, Construction of Forward and Backward difference table, Newton- Gregory formula of Forward and Backward interpolation, Lagrange interpolation, inverse interpolation. | 18 |
| IV | **Curve Fitting**: Introduction of Regression, definition, Least – square regression: Linear regression. **Solutions to ODE (Ordinary Differential Equations):** Introduction to ODE, various methods to solve ODE: Euler's method, Runge-kutta method. | 17 |
| V | **Linear Algebraic Equation**: a) **Gauss elimination**: Solving small number of equations Naïve gauss elimination, pitfalls of elimination method. **Numerical Integration:** Introduction to numerical integration, General Quadrature formula for Equidistant ordinates, various numerical methods for solving numerical integration: Trapezoidal rule, Simpson's 1/3rd rule and Simpson's 3/8rd rule. | 18 |
| | **Text Books :**<br>1. S.R. Patil, M.D. Bhagat, A.D. Mankar, "Numerical Methods", Nirali Prakashan, Sep.-2007.<br>2. S.C. Chapra, R.P. Canale, "Numerical Methods for Engineers", Tata Mc-Graw Hill Pvt. Ltd., New Delhi, 5th Edition,2006, ISBN-13: 978-0-07-063416-9 .<br>3. S.S. Shastri, "Introductory methods of Numerical Analysis", Prentice Hall of India Pvt. Ltd., New Delhi, 2nd Edition, Jan.1997, ISBN:81-203-0611-2. | |
| | **Reference Books :**<br>1. E. Balguruswamy, "Numerical Methods", Tata Mc-Graw Hill Pvt. Ltd., New Delhi, 1999, ISBN-13: 978-0-07-463311-3.<br>2. V. Rajaram, "Computer oriented numerical methods", Prentice Hall of India Pvt. Ltd., New Delhi, 3rd Edition, 1997,ISBN:81-203-0786-0.<br>3. M.K. Jain, S.R.K. Iyengar, R. K. Jain, "Numerical Methods for Scientific & Engineering computations", Wiley Eastern Ltd., New Age International Publications Ltd., 3rd Edition, ISBN : 81-224-0540-1. | |

**Course Outcomes:**

1. Ability to implement a numerical method in any modern computer language.
2. Capable of performing error analysis for a given numerical method.
3. Able to solve linear system of equation using appropriate numerical method.
4. Ability to solve algebraic and transcendental equation using appropriate numerical method.

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|---|---|
| **Subject Code** | **15BCA212** |
| **Subject Name** | **JAVA PROGRAMMING** |
| **Short Name** | **JP** |
| **Total Teaching Hrs.** | **88** |
| **Total credits** | **4** |

**Prerequisites :**
Students should be familiar with Object Oriented Programming.
Basic concepts related to programming are required.

**Objectives:**
To be able to explain and implement basic Programming techniques.
To use methods & concepts for programming purposes.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **Introduction to JAVA:** Introduction, Features, Java Virtual Machine(JVM), Java Development Kit(JDK),Data Types, Keywords, Operators & Expressions, Control Structures(if, if-else,switch statement),Looping Structures(for,while, do-while,continue,break statement). | 18 |
| II | **Class & Inheritance:** Introduction to class & objects, defining a class, Creating an Objects, Method Overloading, Constructor, Constructor Overloading, Static variables & methods, new, delete & this keyword. Introduction to Inheritance, types of Inheritance, Super & Extended Class, Final variables, methods & classes, Abstract methods & class, Overriding methods. | 18 |
| III | **Interface & Packages:** Introduction to Interface, Defining & Implementing Interface, Defining Packages, Importing Packages, API Packages. **Access Specifiers:** public, private & protected. | 17 |
| IV | **Exception Handling & Multithreaded Programming:** Concept of Exception & Exception Handling, Types of Exception, use of try-throw-catch mechanism, Multiple catch blocks, use of finally block, Catch all & Uncaught Exception. Thread basics, Thread Life Cycle, Concept of Multithreading, Creating & Running Threads. | 17 |
| V | **Applet, AWT & Event Handling:** Introduction to Applet, Applet Life Cycle, Difference between Application & Applet, Applet tag, Different Applet methods, Introduction to AWT, Working with Text, Windows, Graphics & Colors, Drawing lines, Circles, Polygon, Rectangles, Ellipses, Circles, Arcs, working with Colors, Handling Mouse & Keyboard events through Applet. | 18 |
| | **Text Books :**<br>1. E. Balagurusamy - Programming with Java (4/e) (Tata-McGraw Hill)<br>2. Herbert Schildt- The Complete Reference Java 2 (5/e) (Tata-McGraw Hill)<br>3. Dietel & Dietel - Java How to Program (Pearson Education) | |
| | **References :**<br>1. Y. Daniel Liang – Introduction to Java Programming (2/e) (PHI).<br>2. Horstmann & Cornell - Core Java 2 (Vol-1) (Sun Microsystems)<br>3. S. Chavan - Programming in Java Shroff Publication. | |

**Course Outcome :**

1. Students programming logic is developed which will help them to create programs & applications.
3. Able to implement class, objects, Interface, Packages, Exception Handling, Multithreaded Programming, Applet, Event Handling, etc.
4. Students get better opportunity in software industry.
5. Better understanding & the ability to follow professional programming, practices to align with Industry Expectations.

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| **Subject Code** | **15BCA213** |
| **Subject Name** | **BUSINESS SYSTEM AND APPLICATION** |
| **Short Name** | **BSA** |
| **Total Lectures** | **88** |
| **Total Credits** | **4** |

**Prerequisites:**

- Basic knowledge of Business and Management.

**Objectives:**

- To learn the concept of Business System.
- To acquire the knowledge of Principles of Management.
- To understand the financial and marketing functions.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **Introduction:** Nature of business, Characteristics of business, objectives, components of business, Industry, Commerce, environment of business system, business system and its sub-systems, Business and economical systems, **Forms of legal ownership**: Sole proprietorship business, Partnership organization, Social responsibilities of business. | 18 |
| II | **Company Management:** Structure of company management, shareholders, board of directors, chief executives, managing directors, patterns and problems of company management, company meetings & resolutions, company office - its organization and management, basic functions of the Office. | 17 |
| III | **Principles of Management:** Nature and Importance of Management, Administration and Management, Functions of Management, Decision Making, Coordination, need of coordination, Planning, process of planning, elements of planning, Organization, organization structure, types of organization. | 18 |
| IV | **Personnel functions:** Personnel management, definition, role of personnel manager, job evaluation, merit rating. Industrial relations, Trade Unionism, employee remunerations, systems of wage payments, incentives & wage policies. | 17 |
| V | **Financial functions:** Financial planning, need of finance, financial planning, sources of finance, methods for raising finance, shares, debentures, **Marketing functions:** Marketing & its function, selling or distributions of goods, advertising and promotion. | 18 |
| | **Text Books:**<br>1. M. C. Shukla, Business Organization & Management, S. Chand & Company.<br>2. Neeru Vasishth, Taxman's Business Organization and Management.<br>3. Johan Strydom, Oxford's Principles of Business Management, 2nd Edition | |
| | **References:**<br>1. P. Gopalkrishnan, Materials Management, PHI.<br>2. Reddy & Gulshan, Business Organization & Management, S. Chand & Company.<br>3. R. C. Appleby, Modern Business Administration, 6/e, Macmillan. | |

**Course Outcomes:**

1. Achieve an understanding of Management Information Systems.
2. Ability to analyze and synthesize business information needs of the organization.
3. Ability to support the decision-making by providing the strategic information.
4. Compare and evaluate alternative business application environments that enable business systems.

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| **Subject Code** | **15BCA214** |
| **Subject Name** | **DISASTER MANAGEMENT** |
| **Short Name** | **DMng** |
| **Total Lectures** | **40** |
| **Total Credits** | **2** |

**Prerequisites :**

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**Objectives:**

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction.
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR).
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity.

| Units | Contents | Total Lectures |
|---|---|---|
| I | **Introduction to Disasters:** Concepts, and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks) | 04 |
| II | **Disasters:** Classification, Causes, Impacts (including social, economic, political, environmental, health, psychosocial, etc.) Differential impacts- in terms of caste, class, gender, age, location, disability Global trends in disasters, urban disasters, pandemics, complex emergencies, Climate change. | 06 |
| III | **Approaches to Disaster Risk reduction:** Disaster cycle - its analysis, Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, Centre, and other stake-holders. | 10 |
| IV | **Inter-relationship between Disasters and Development:** Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources | 10 |
| V | **Disaster Risk Management in India Hazard and Vulnerability profile of India Components of Disaster Relief:** Water, Food, Sanitation, Shelter, Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programs and legislation). | 10 |
| | **Text Books:**<br>1. Gupta Anil K, Sreeja S. Nair. 2011 Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi.<br>2. KapurAnu 2010: Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi. | |
| | **References:**<br>1. Alexander David, Introduction in 'Confronting Catastrophe', Oxford University Press, 2000<br>2. Andharia J. Vulnerability in Disaster Discourse, JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008<br>3. Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples' Vulnerability and Disasters, Routledge.<br>4. Coppola P Damon, 2007. Introduction to International Disaster Management,<br>5. Carter, Nick 1991. Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.<br>6. Cuny, F. 1983. Development and Disasters, Oxford University Press.<br>7. Document on World Summit on Sustainable Development 2002.<br>8. Govt. of India: Disaster Management Act 2005, Government of India, New Delhi. | |

**Course Outcomes:**

1. Acuire an understanding of vulnerabilities and to work on reducing disaster risks and to build a culture of safety.
2. Ability to understand Causes, effects and control measures of Disaster Management.

**Note:** There will be a Project Work (Field Work, Case Studies) for this subject. The project/fieldwork is meant for students to understand vulnerabilities and to work on reducing disaster risks and to build a culture of safety. Project must be conceived creatively based on the geographic location and hazard profile of the region where the college is located.

| Subject Code | 15BCA215 |
|---|---|
| Subject Name | Lab-III (VB.NET) |
| Short Name | Lab-III |
| Total Lectures | 130 |
| Total Credits | 4 |

| Sr. No. | Contents | Total Lectures |
|---|---|---|
| 1 | Write a VB.NET program to determine whether an input number is an even number. | 3 |
| 2 | Write VB.Net to Find Greatest of Three Number | 3 |
| 3 | Write VB.Net for Conditional if else. | 3 |
| 4 | Write VB.Net for Select Case | 3 |
| 5 | Write VB.Net for Print Factorial | 3 |
| 6 | Write VB.Net for Print Prime Number | 3 |
| 7 | Write VB.Net to Generate Fibonacci Series | 3 |
| 8 | Write VB.Net to Swap Two Numbers using 2 Variables. | 3 |
| 9 | Write VB.Net to Print * like<br>*<br>* *<br>* * *<br>* * * *<br>* * * * * | 3 |
| 10 | Write VB.Net code to print the following pattern:<br>1<br>12<br>123<br>1234<br>12345 | 3 |
| 11 | Write VB.Net code to print the following pattern:<br>I<br>I N<br>I N D<br>I N D I<br>I N D I A | 3 |
| 12 | Write VB.Net code to print the following pattern:<br>1<br>23<br>456<br>78910 | 3 |
| 13 | Write VB.Net program to demonstrate constructor. | 4 |
| 14 | Write VB.Net program to demonstrate constructor overloading. | 4 |

| | | |
|---|---|---|
| 15 | Write VB.Net program to demonstrate passing argument by val. | 4 |
| 16 | Write VB.Net program to demonstrate passing argument by ref. | 4 |
| 17 | Write VB.Net program to demonstrate arrays. | 4 |
| 18 | Write VB.Net program to demonstrate built in dialog boxes. | 4 |
| 19 | Write VB.Net program to demonstrate timer control. | 5 |
| 20 | Write VB.Net program to demonstrate check box. | 5 |
| 21 | Write VB.Net program to demonstrate radio button. | 6 |
| 22 | Write VB.Net program to demonstrate repeater data controls. | 6 |
| 23 | Write VB.Net program to demonstrate data grid control | 6 |
| 24 | Write VB.Net program to demonstrate panels. | 6 |
| 25 | Write VB.Net program to demonstrate string manipulation functions. | 6 |
| 26 | Write VB.Net to demonstrate classes and objects. | 6 |
| 27 | Write VB.Net to demonstrate method overloading | 6 |
| 28 | Write VB.Net to create menu editor | 6 |
| 29 | Write VB.Net for Ado.Net connection objects. | 6 |
| 30 | Write VB.Net for Ado.Net command objects. | 6 |

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| **Subject Code** | **15BCA216** |
| **Subject Name** | **Lab-IV (JAVA)** |
| **Short Name** | **Lab-IV** |
| **Total Lectures** | **90** |
| **Total Credits** | **3** |

| Sr. No. | Contents | Total Lectures |
|---|---|---|
| | **Perform any 8 from JAVA Practical list:** | |
| 1 | WAP in java for demonstrating switch statement. | 4 |
| 2 | WAP in java for demonstrating while loop. | 4 |
| 3 | WAP in java for demonstrating for loop. | 4 |
| 4 | WAP in java for demonstrating do while loop. | 4 |
| 5 | WAP in java to demonstrate the use of Casting Operation. | 4 |
| 6 | WAP in java to demonstrate the use of Multiple inheritance using interfaces. | 4 |
| 7 | WAP in java to demonstrate the use of method overriding. | 4 |
| 8 | WAP in java for sorting given list of strings using String class methods. | 4 |
| 9 | WAP in java to demonstrate the use of Packages. | 4 |
| 10 | WAP in java to demonstrate the use of simple try – catch. | 4 |
| 11 | WAP for demonstrating multithreading concept. | 5 |
| 12 | Create an applet for drawing symbol of Olympics. | 5 |
| 13 | Create an applet for drawing a human face. | 4 |
| 14 | Create an applet for drawing Polygons | 4 |
| 15 | Create an applet for displaying numerical values | 4 |
| 16 | Create an applet for drawing Lines and Rectangle | 4 |
| | **Perform any 8 from Numerical Methods Practical list:** | |
| 1 | Write a c - program for Bisection method. | 3 |
| 2 | Write a c - program for False Position method. | 3 |
| 3 | Write a c - program for Newton–Raphson method. | 3 |
| 4 | Write a c - program for Secant method. | 3 |
| 5 | Write a c - program for Newton- Gregory Forward Interpolation. | 3 |
| 6 | Write a c - program for Newton- Gregory Backward Interpolation. | 3 |
| 7 | Write a c - program for Lagrange's Interpolation. | 3 |
| 8 | Write a c - program for Inverse Interpolation. | 3 |
| 9 | Write a c - program for Linear Regression. | 3 |
| 10 | Write a c - program for Gauss Elimination method. | 3 |
| 11 | Write a c - program for Numerical Integration using Trapezoidal rule. | 3 |
| 12 | Write a c - program for Numerical Integration using Simpson's $1/3^{rd}$ rule. | 3 |
| 13 | Write a c - program for Numerical Integration using Simpson's $3/8^{th}$ rule. | 3 |
| 14 | Write a c - program to solve ODE using Euler's method. | 3 |
| 15 | Write a c - program to solve ODE using Runge-Kutta method. | 3 |