Syllabus for Bachelor of Computer Application (BCA) Programme
(Effective for Students Admitted in Academic Session 2018-2019)

Detailed Syllabus
Semester III

Paper: Operating Systems
Code : BCAN-301
Contacts Hours / Week : 4L+1CE
Credits : 4

1. Module I: Introduction (3L) Importance of OS, Basic concepts and terminology, Types of OS, Different views, Journey of a command execution, Design and implementation of OS
2. Module II: Process (10L) Concept and views, OS view of processes, OS services for process management, Scheduling algorithms, Performance evaluation; Inter-process communication and synchronisation, Mutual exclusion, Semaphores, Hardware support for mutual exclusion, Queuing implementation of semaphores, Classical problem of concurrent programming, Critical region and conditional critical region, Monitors, Messages, Deadlocks
3. Module III: Resource Manager (8L) Memory management, File management, Processor management, Device management
4. Module IV: Security and related Issues (5L) Security and protection, Authentication, Protection and access control, Formal models of protection, Worms and viruses
5. Module V: Multiprocessor System (6L) Multiprocessor system, Classification and types, OS functions and requirements, Introduction to parallel computing, Multiprocessor interconnection synchronization
6. Module VI: Distributed OS (4L) Introduction to distributed processing
7. Module VII: Introduction to UNIX OS / DOS (4L) Case studies

Suggested Readings:

1. **Operating Systems, Galvin, John Wiley**
2. **Operating Systems , Milankovic, TMH**
3. **An Introduction to Operating System, Bhatt,PHI**
4. **Modern Operating System, Tannenbaum,PHI**
5. **Guide to Operating Systems, Palmer, VIKAS**
6. **Operating Systems, Prasad, Scitech**

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Paper: Object Oriented Programming with C++
Code : BCAN-E302A
Contacts Hours / Week : 4L+1CE
Credits : 4

1. Module I: Concepts of OOP (3L) Introduction OOP, Procedural vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP
2. Module II: C++ Basics (3L) Overview, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures
3. Module III: C++ Functions (5L) Simple functions, Call and return by reference, Inline functions, Macro Vs. Inline functions, Overloading of functions, default arguments, friend functions
4. Module IV: Objects and Classes (8L) Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading, type conversion
5. Module V: Inheritance (8L) Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class
6. Module VI: Polymorphism (6L) Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism
7. Module VII: I/O and File Management (5L) Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators, File stream, C++ File stream classes, File management functions, File modes, Binary and random Files
8. Module VIII: Templates, Exceptions and STL (2L) About template, Function templates and class templates, Introduction to exception, try-catch-throw, Overview and use of Standard Template Library

Suggested Readings:

1. **Object Oriented Programming With C++, E Balagurusamy, TMH**
2. **Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia**
3. **The Compete Reference C++, Herbert Schlitz, TMH**

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Paper: GUI Programming with .NET
Code : BCAN-E302B
Contacts Hours / Week : 4L+1CE
Credits : 4

1. Module I: Visual Basic .NET and the .NET Framework (8L) Introduction to .net framework -Features, Common Language Runtime (CLR), Framework Class Library (FCL), Visual Studio.Net – IDE, Languages Supported, Components, Visual Programming, VB.net- Features, IDE- Menu System, Toolbars, Code Designer, Solution Explorer, Object Browser, Toolbox, Class View Window, Properties Window, Server Explorer, Task List, Output Window, Command Window
2. Module II: Elements of Visual Basic .net (8L) Properties, Events and Methods of Form, Label, Text Box, List Box, Combo Box, Radio Button, Button, Check Box, Progress Bar, Date Time Picker, Calendar, Picture Box, Scroll bar, Group Box, ToolTip Timer
3. Module III: Programming in Visual basic .net (8L) Data Types, Keywords, Declaring Variables and Constants, Operators, Understanding Scope and accessibility of variables, Conditional Statements- If- Then, If-Then-Else, Nested If, Select Case, Looping Statement- Do loop, For Loop, For Each-Next Loop, While Loop, Arrays- Static and Dynami
4. Module IV: Functions, Built-In Dialog Boxes, Menus and Toolbar (8L) Menus and toolbars- Menu Strip, Tool Strip, Status Strip, Built-In Dialog Boxes – Open File Dialogs, Save File Dialogs, Font Dialogs, Color Dialogs, Print Dialogs, Input Box, Message Box, Interfacing With End user- Creating MDI Parent and Child, Functions and Procedures- Built-In Functions- Mathematical and String Functions, User Defined Functions and Procedures
5. Module V: Object Oriented Programming (8L) Object Oriented Programming- Creating Classes , Objects, Fields, Properties, Methods, Events , Constructors and destructors, Exception Handling- Models, Statements, File Handling- Using File Stream Class, File Mode, File Share, File Access Enumerations, Opening or Creating Files with File Stream Class, Reading and Writing Text using StreamReader and StreamWriter Classes, Data Access with ADO.Net – What are Databases?, Data Access with Server Explorer, Data Adapter and Data Sets, ADO.NET Objects and Basic SQL. Connection with Sql Server

Suggested Readings:

1. **Fred Barwell, " Professional VB.NET" ,2nd edition, WROX Publication**
2. **Jesse Liberty," Learning Visual Basic. NET",O'RELLY**
3. **Paul Vick," The Visual Basic .Net Programming Language"**

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB

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Paper: Computer Graphics
Code : BCAN-303
Contacts Hours / Week : 4L+1CE
Credits : 3

1. Module I: Introduction to Computer Graphics(4L) Introduction to Computer Graphics & Graphics systems, Graphics Display Devices, Raster and Random Scan Display
2. Module II: Line Drawing (5L) Points & Lines, Line Drawing Algorithms (DDA Algorithm, Bresenham's Line Drawing Algorithm)
3. Module III: Circle Drawing Algorithm (5L) Circle Generation algorithm (Midpoint Circle Algorithm, Bresenham's Algorithm)
4. Module IV: 2D Transformations (12L) Translation, Rotation, Scaling, Reflection, Shear etc. Homogenous Coordinates, Composite Transformation
5. Module V: Projection (2-dimension) (5L) Line of Sight, Plane of Projection, Projection methods (Perspective and Parallel)
6. Module VI: Viewing and Clipping (5L) Window to Viewport co-ordinate transformation, Point Clipping, Line Clipping (Cohen-Sutherland Line Clippings, Midpoint Sub-division Algorithm)
7. Module VII: Curves and Surfaces (4L) Bezier Curves, B-splines, Hidden line/surface removal methods (Depth Buffer(Z-Buffer) Method

Suggested Readings:

1. **Introduction to Computer Graphics, A. Mukherjee, VIKAS**
2. **Computer Graphics, Rajiv Chopra, S. Chand**
3. **Procedural & Mathematical Elements in Computer Graphics, Rogers, TMH**
4. **Computer Graphics, Hearn & Baker, PHI**

Syllabus for Bachelor of Computer Application (BCA) Programme
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Paper: Mathematics for Computing
Code : BMN-301
Contacts Hours / Week : 4L+1CE
Credits : 3

1. Module I: Propositional Logic (8L) Construction of truth table, Tautology, Contradiction, Contigency, Logical equivalence, Generating functions, Recurrence relations
2. Module II: Graph Theory (16L) Graphs, Digraphs, Weighted graph, Connected and disconnected graphs, Bipartite graph, Degree of a graph, Theorems on graph, Complement of a graph, Regular graph, Complete graph, Sub-graph, Walks, Paths, Circuits, Hamiltonian and Euler Graph, Cut sets and cut vertices, Adjacency and incidence matrices of a graph, Graph isomorphism, Dijkstra's Algorithm for shortest path problem, Definition and properties of tree, Binary tree, Spanning tree of a graph, Minimal spanning tree, Algorithms: DFS, BFS, Kruskal's and Prim's algorithms
3. Module III: Probability Theory (10L) Basics of Probability Theory: Axiomatic definition of probability. Conditional probability, Independent events and related problems, Bay's theorem (Statement only) & its application, One dimensional random variable, Probability distributions-discrete and continuous, Expectation, Binomial, Poisson, Uniform, Exponential, Normal distributions
4. Module IV: Frequency Distribution (6L) Collection of data, Charts and diagram, Measure of central tendency, Measure of dispersion

Suggested Readings:

1. **Discrete Structure & Graph Theory, Rathore, EPH.**
2. **Discrete Mathematical Structure, G.S. Rao, New Age International**
3. **Fundamental of Statistics, Goon, Gupta and Dasgupta**
4. **Mathematical Probability, Banerjee, Dey and Sen, U N Dhar Pvt. Ltd.**
5. **Engineering Mathematics, Vol. 1 & 2, Sastry, PHI**