CBCS Format Structured Curriculum

Bachelor of Computer Application (B.Sc Computer Science)

Raiganj University,

WestBengal,

India

Detailed Syllabus

B.Sc(Computer Science)

2019-20

CBCS Format

Raiganj University, Raiganj,
Uttar Dinajpur, West Bengal, India www.raiganjuniversity.ac.in

SEMESTER –I

Course Code	Course Title	Course Type	(L-T-P)	Credit
BSCCSH-1	Programming I	Core	4-0-4	6
BSCCSH-2	Digital Electronic	Core	4-0-4	6
BSCCSGE-1	Mathematics-I	Generic Elective	5 - 1 - 0	6
ACCE-1	Environmental	AECC (Elective	4-0-0	4
Semester Total Credit				**22**

SEMESTER –II

Course Code	Course Title	Course Type	(L-T-P)	Credit
BSCCSH-3	Data Structure Using C	Core	4-0-2	6
BSCCSH-4	Computer Architecture And Organization	Core	4-0-2	6
BSCCSGE-2	Mathematics-II	Generic Electiv	5-1-0	6
AECC-2	Microprocessor	AECC (Elective	4-0-0	2
Semester Total Credit				**20**

SEMESTER –III

Course Code	Course Title	Course Type	(L-T-P)	Credit
BSCCSH-5	Programming in JAVA	Core	5-1-0	6
BSCCSH-6	Theory of Computation	Core	4-0-4	6
BSCCSH-7	Computer Network	Core	4-0-4	6
BSCCSGE-3	Mathematics-III	Generic Electi	5-1-0	6
BSCCSHSEC-1	Programming in Phython Or R programming	SEC	1-1-0	2
Semester Total Credit				**26**

SEMESTER –IV

Course Code	Course Title	Course Type	(L-T-P)	Credit
BSCCSH-8	Design and Analysis of Algorithm	Core	4-0-4	6
BSCCSH-9	Software Engineeri	Core	4-0-4	6
BSCCSH-10	Database Manageme	Core	5-1-0	6
BSCCSGE-4	Mathematics	Generic Elective	5 - 1 - 0	6
BSCCSHSEC-2	PHP Programming Or LINUX Programming	SEC	1-1-0	2
Semester Total Credit				**26**

SEMESTER –V

Course Code	Course Title	Course Type	(L-T-P)	Credit
BSCCSH-11	Internet Technologies	Core	5-1-0	6
BSCCSH-12	Operating System	Core	5-1-0	6
BSCCSHDSE-1	Compiler Cons O r Digital Image Processing	D S E	5 - 1 - 0	6
BSCCSHDSE-2	Multimedia Applica O r System Programming	D S E	5 - 1 - 0	6
Semester Total Credit				**24**

SEMESTER –VI

Course Code	Course Title	Course Type	(L-T-P)	Credit
BSCCSHDSE-13	Artificial Intelligence	Core	4-0-2	6
BSCCSHDSE-14	Computer Graphic	Core	5-1-0	6
BSCCSHDSE-3	Cloud Computing Or Cryptography and Stenography	D S E	5-1-0	6
BSCCSDSEPRO	Project/ Dissertatio	DSE	4-0-2	6
Semester Total Credit				**24**

SC=SubjectCode,C=CoreCourse,AECC=AbilityEnhancementCompulsoryCourse,SEC=SkillEnhancementCourse,GE=GenericElective,DSE=DisciplineSpecific

Introduction to Programming Language using C (6 Credit)

Code: BSCCHS-1 (6Credit)

UNIT I

C basics: C character set, Identifiers and keywords, Data types, constants, variables and arrays, declarations, expressions statements, symbolic constants, compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, conditional operators, bit operators.

C constructs: If statement, if….else statement, if…..else if….else statement, while statement, do….while statement, for statement, switch statement, nested control statement, break operator, continue operator, comma operator, goto statement. .[T1,T2,T3]

UNIT – II

C Functions: Functions: declaration, definition & scope, recursion, call by value, call by reference.

Storage Classes: automatic, external (global), static & registers.

Arrays: Arrays, pointers, array & pointer relationship, pointer arithmetic, dynamic memory allocation, pointer to arrays, array of pointers, pointers to functions, array of pointers to functions, Preprocessor directives: #include, #define, macro's with arguments, the operators # and ##, conditional compilations. [T1,T2,T3]

UNIT – III

Structures: Structures, unions, passing structure to functions, bit fields, file handling [text (ASCII), binary] [T1,T2,T3]

UNIT – IV

String manipulation functions and other standard library functions from stdio.h, stdlib.h, conio.h,ctype.h,math.h,string.h,process.h.Usageofcommandlinearguments.[T1,T2,T3]

TEXTBOOKS:

[T1]Ashok N. Kamthane, "Computer Basics and C Programming", Pearson Education.

[T2]E. BalaGuruswamy, "Programming in ANSI C", 2008.

[T3]V Rajaraman, “Computer Basics and C Programming”, PHI.

REFERENCES:

[R1]Herbert Schildt, “C The Complete Reference” Fourth Edition, 2000. [R2]Yashwant Kanetkar, “Let us C” eighth edition, 2002.

[R3]Kernighan and d. Ritchie, “The ANSI C Programming Language”, 2000.

[R4]Stephenn Prata**, “**C Primer Plus” Fourth Edition, 2001.

[R5]Schaum’s Outline Series, “Programming with C”, 2nd Edition, 1996.

Digital Electronics (6 Credit)

Code: BSCCHS-2

UNIT-I

Computer Software: System software, assemblers, compilers, interpreters, linkers Elementary Operating System concepts, different types of operating systems, Application Software: Introduction to MS Office (MS-Word, MS Powerpoint, MS-Excel) Computer Programming and Languages: Algorithms, flow chart, decision tables, pseudo code, Low level languages and introduction to high level languages.[T1][T2][R3].
Review of various number systems (Binary, Octal, Hexadecimal), Definition of BCD , Gray codes and Excess – 3 codes and their application (without design of code convertors) Parity generation and Checking.

UNIT-II

Logic gates NOT, AND, OR, Universal gates- NAND, NOR. EX-OR and EX-NOR gates. Diode and Transistor as a switch Logic Families-RTL, DTL, TTL, ECL, CMOS – (Main features only - without details of circuit connections and working)Boolean Algebra: Basics Laws of Boolean Algebra, Logic Gates, Simplifications of Boolean equations using K-maps.[T1,T2,T3]

Arithmetic Circuits

Adder, Subtractor, Parallel binary adder/Subtractor, binary multiplier and divider. Combinational Circuits, Multiplexers, De-Multiplexers, decoders,encoders,.[T1,T2,R3]

UNIT-III

Flip-flops, S-R, D, J-K, T, Clocked Flip-flop, Race around condition, Master slave Flip-Flop, Realization of one flip-flop using other flip-flop, Shift Registers

Serial-in-serial-out, serial-in-parallel-out, parallel-in-serial-out and parallel-in-parallel-out, Bi- directional shift register. [T1, T2,R3]

UNIT-IV

Counters: Ripple counter, Synchronous Counter, Modulo Counters, Ring Counter, Twisted Ring Counter. Memory Devices - RAM, ROM, PAL & PLA[T1,T2,T3,R3]

TEXT BOOKS

[T1]. Moris Mano, "Digital Logic and Computer Design", PHI Publications,2002.

[T2]. Raj Kamal, "Digital Systems " , Principles and Design, Pearson ,2011.

[T3]. R. P. Jain, "Modern Digital Electronics", TMH, 3rd Edition, 2003.

REFERENCES:

[R1]. R.L.Tokheim, "Digital Electronics, Principles and Applications", Tata McGraw Hill, 1999.

[R2]. W.Gothman, "Digital electronics", PHI.

[R3]. S. Salivahanan & S. Arivyhgan. "Digital circuits and design", Vikas Publication, 2001.

[R4]. Malvino Leach, "Digital Principles and Application", TMH, 19

Semester II Core Courses:

Paper Title: Data Structures Using C
Course Code: BSCCHS-3
Credit: 6
Theory Portion 4 Credit

UNIT-I

Introduction to Data Structures: Basic Terminology, Elementary Data Organizations, Classification of data structures and its operations.

Arrays: Representation of single and multidimensional arrays (up to three dimensions) ; sparse arrays - lower and upper triangular matrices and Tri-diagonal matrices; addition and subtraction of two sparse arrays. (Multidimensional, and, sparse arrays, to be given elementary treatment.)

Stacks and Queues: Introduction and primitive operations on stack; Stack application: Polish Notations; Evaluation of postfix expression; Conversion from infix to postfix; Introduction and primitive operations on queues; D-queues and priority queues.[T1,T2,T3]

UNIT-II

Lists: Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion, searching, Two way lists and Use ofheaders

Trees: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion and deletion; [T1, T2,T3]

UNIT-III

Introduction to and creation of AVL trees and m-way search trees - (elementary treatment to be given); Multilevel indexing and B-Trees: Introduction; Indexing with binary search trees; Multilevel indexing, a better approach to tree indexes; Example for creating a B-tree. [T1, T2, T3]

UNIT-IV

Sorting Techniques: Insertion sort, selection sort and merge sort.

Searching Techniques: linear search, binary search and hashing. (Complexities NOT to be discussed for sorting and searching) [T1, T2, T3]

TEXTBOOKS:

[T1] Ashok N. Kamthane, “Introduction to Data Structures in C”, PearsonEdu.

[T2] Y. Langsam, Tananbaum, et. al., “Data Structures using C and C++”, PHI,

1999. [T3] Schaum's outline series, "Data Structure", TMH,2002

REFERENCES:

[R1] Yashwant Kanetkar, "Data Structures Through C",BPB Publications,

2008 [R2] A.K. Sharma, " Data Structure Using C",Pearson

[R3] P. S. Deshpande and O.G. Kakde, "C & Data Structure", Wiley Dreamtech, 1st Edition, 2003.

[R4] Richard F. Gilberg & Behrouz A. Forouzan, " Data Structures – A Pseudocode Approach with C", second edition, COURSE TECHNOLOGY, CENGAGELearning

[R5] E. Horowitz and S. Sahani, "Fundamentals of Data Structures", Galgotia Booksource Pvt. Ltd,2003

Computer Architecture and Organization

Code:BSCHCS-4 **Credit-4**

1. **Introduction**
   Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units.

2. **Data Representation and BasicComputerArithmetic**
   Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison, multiplication and division algorithms forintegers

3. **Basic Computer OrganizationandDesign**
   Computer registers, bus system, instruction set, timing and control, instruction cycle, memoryreference,input-outputandinterrupt,Interconnection Structures, Bus Interconnection design of basic computer.

4. **CentralProcessingUnit**
   Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming, RISC, CISC architectures, pipelining and parallel architecture.

5. **MemoryOrganization**
   Cache memory, Associative memory, mapping.

6. **Input-OutputOrganization**
   Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

Microprocessors

Credit: 2

Subject Code: AECC-2

All concepts should be studied in the context of the Intel 8085 Microprocessor.

Microprocessor architecture: Internal architecture, system bus architecture, memory and I/O interfaces.

Microprocessor programming: Register Organization, instruction formats, assembly language programming.

Interfacing: Memory address decoding, cache memory and cache controllers, I/O interface, keyboard, display, timer, interrupt controller, DMA controller, video controllers, communication interfaces.

Programming in Java

Subject Code: BSCCSH-5 **Credit-6**

1. Introductionto Java
Java Architecture and Features, Understanding the semantic and syntax differences between C++ and Java, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators (Arithmetic, Logical and Bitwise) and Expressions, Comments, Doing Basic Program Output, Decision Making Constructs (conditional statements and loops) and Nesting, Java Methods (Defining, Scope, Passing and Returning Arguments, Type Conversion and Type and Checking, Built-in Java Class Methods),

2. Arrays, StringsandI/O

Creating & Using Arrays (One Dimension and Multi-dimensional), Referencing Arrays Dynamically, Java Strings: The Java String class, Creating & Using String Objects, Manipulating Strings, String Immutability & Equality, Passing Strings To & From Methods,
String Buffer Classes. Simple I/O using System.out and the Scanner class, Byte and Character streams, Reading/Writing from console and files.

3. Object-OrientedProgrammingOverview Principles of Object-Oriented Programming, Defining & Using Classes, Controlling Access to Class Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects asparameters, final classes, Object class, GarbageCollection.

4. Inheritance, Interfaces, Packages, Enumerations, AutoboxingandMetadata
Inheritance: (Single Level and Multilevel, Method Overriding, Dynamic Method Dispatch, Abstract Classes), Interfaces and Packages, Extending interfaces and packages, Package and Class Visibility, Using Standard Java Packages (util, lang, io, net), Wrapper Classes, Autoboxing/Unboxing, Enumerations andMetadata.

5. Exception Handling, Threading, Networking andDatabaseConnectivity Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions; Multi- threading: The Thread class and Runnable interface, creating single and multiple threads, Thread prioritization, synchronization and communication, suspending/resumingthreads.

6. Applets andEventHandling
Java Applets:Introduction to Applets, Writing Java Applets, Working with Graphics, Incorporating Images & Sounds. Event Handling Mechanisms,Listener Interfaces, Adapter and Inner Classes. The design and Implementation of GUIs using the AWT controls.

Theory of Computation

Subject Code: BSCCSH-5 **Credit-6**

1. Languages
Alphabets, string, language, Basic Operations on language, Concatenation, KleeneStar

2. Finite Automata andRegularLanguages
Regular Expressions, Transition Graphs, Deterministics and non-deterministic finite automata, NFA to DFA Conversion, Regular languages and their relationship with finite automata, Pumping lemma and closure properties of regular languages, Moore & MealyMachines.

3. Contextfreelanguages (17 L)
Context free grammars, parse trees, ambiguities in grammars and languages, Pushdown automata (Deterministic and Non-deterministic), Pumping Lemma, Properties of context free languages, normal forms.

4. Turing Macines and ModelsofComputations (15 L)
RAM, Turing Machine as a model of computation, Universal Turing Machine, Language acceptability, decidability, halting problem, Recursively enumerable and recursive languages, unsolvabilityproblems.

Title: Computer Networks Course Code: BSCCSH-7**Credit: 6**

Unit - I

Basic Concepts: Components of data communication, distributed processing, Line configuration, topology, transmission mode, and categories of networks. OSI and TCP/IP Models: Layers and their functions, comparison of models. Digital Transmission: Interfaces and Modems: DTE-DCE Interface, modems, cable modems. Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon Capacity.T[1], T[2]

Unit – II

Telephony: Multiplexing, error detection and correction: Many to one, one to many, WDM,

TDM, FDM, circuit switching, packet switching and message switching. Data Link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols overview. ISDN: Services, historical outline, subscriber's access, ISDN, Layers, and broadband ISDN. T[1], T[2]

Unit-III

Devices: Repeaters, bridges, gateways, routers, The Network Layer, Design Issues, Network Layer Addressing and Routing concepts (Forwarding Function, FilteringFunction);Routing

Methods (Static and dynamic routing, Distributed routing, Hierarchical Routing);Distance Vector Protocol, Link State protocol. T[1],T[2]

Unit – IV

Transport and upper layers in OSI Model: Transport layer functions, connection management, Functions of session layers, Presentation layer, and Application layer. T[1], T[2]

Text Books

T[1]. A. S. Tenanbaum, "Computer Networks"; Pearson Education Asia, 4th Ed., 2003.

T[2]. Behrouz A. Forouzan, "Data Communication and Networking", 2nd edition, Tata

Mc GrawHill.

.

Reference Books

R[1]. D. E. Comer, "Internetworking with TCP/IP", Pearson Education Asia, 2001.

R[2]. William Stallings, "Data and computer communications", Pearson education Asia,

7th Ed., 2002.

Paper Title: Database Management System Course Code
BSCCSH-10Credit: 6

UNIT-I

Introduction to Data Structures : Basic Terminology, Elementary Data Organizations, Classification of data structures and its operations.

Arrays: Representation of single and multidimensional arrays (up to three dimensions) ; sparse arrays - lower and upper triangular matrices and Tri- diagonal matrices; addition and subtraction of two sparse arrays. (Multidimensional, and, sparse arrays, to be given elementary treatment.)

Stacks and Queues: Introduction and primitive operations on stack; Stack application: Polish Notations; Evaluation of postfix expression; Conversion from infix to postfix; Introduction and primitive operations on queues; D- queues and priorityqueues.[T1,T2,T3]

UNIT-II

Lists: Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion, searching, Two way lists and Use of headers

Trees: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion and deletion; [T1, T2,T3]

UNIT-III

Introduction to and creation of AVL trees and m-way search trees - (elementary treatment to be given); Multilevel indexing and B-Trees: Introduction; Indexing with binary search trees; Multilevel indexing, a better approachtotreeindexes;ExampleforcreatingaB-tree.[T1,T2,T3]

UNIT-IV

Sorting Techniques: Insertion sort, selection sort and merge sort.

Searching Techniques:linear search, binary search and hashing. (ComplexitiesNOTtobediscussedforsortingandsearching)[T1,T2,T3]

TEXTBOOKS:

[T1] Ashok N. Kamthane, "Introduction to Data Structures in C", Pearson Edu.

[T2] Y. Langsam, Tananbaum, et. al., "Data Structures using C and C++", PHI,1999.

[T3] Schaum's outline series, "Data Structure", TMH,2002

REFERENCES:

[R1] Yashwant Kanetkar, "Data Structures Through C",BPB Publications, 2008

[R2] A.K.Sharma,"DataStructureUsingC",Pearson

[R3] P. S. Deshpande and O.G. Kakde, "C & Data Structure", Wiley Dreamtech, 1st Edition,2003.

[R4] Richard F. Gilberg & Behrouz A. Forouzan, " Data Structures – A Pseudocode Approach with C", second edition, COURSE TECHNOLOGY, CENGAGELearning

[R5] E. Horowitz and S. Sahani, "Fundamentals of Data Structures", Galgotia Booksource Pvt. Ltd,2003.

Generic Elective Courses (Any One)

Paper Title: Advanced Mathematics Course Code:
BCAGE-201 (A) Credit:6

UNIT I

SETS: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

RELATIONS AND FUNCTIONS: Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Hashing functions, Recursive function.[T1][T2]

UNIT – II

PARTIAL ORDER RELATIONS AND LATTICES: Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices & Algebric Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattices.[T1][T2]

UNIT-III

Graphs: types and operations(bipartite graph. Subgraph, distance of a graph, cut-edges & cut vertices, isomorphic and homomorphic graphs), degree of graphs, adjacent and incidence matrices, path circuit(Floyd's and Warshall algorithms), hamiltonian graph, graph colouring. [T1][T2]

UNIT – IV

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers. [T1[T2]

TEXT BOOKS:

[T1]Rosen, K.H., Discrete Mathematics and its Applications, McGraw Hill, (2006) 6th ed.

[T2]Kolman, Busby and Ross, "Discrete Mathematical Structure", PHI, 1996.

[T3]Babu Ram, "Discrete Mathematics", Pearson Education

REFERENCE BOOKS:

[T1]S.K. Sarkar, "Discrete Maths"; S. Chand & Co., 2000.

[T2]Tremblay, J.P. and Manohar, R., Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, (2007).

Paper Title: Principle of Management Course Code:
BCAGE-201(B)
Credit: 6

UNIT – I
Management: Meaning & concept, Management principles (Fayol & Taylor), Management process (in brief), Managerial levels, Roles & skills of a manager, Management Theories (Classical, Neo classical, Behavioral, Systems & Contingency) [Elementary][T1,R1]

UNIT – II :

Planning: Meaning, Purpose & process, Decision making: Concept & process,

Organizing: Process, Departmentation, Authority & Responsibility relationships, Decentralization. Staffing: Nature & Importance,[T1,R1]

UNIT-III
Staffing: Concept, nature & importance of staffing.

Directing: Motivation: concept & theories (Maslow's, Herzberg Two factor, McGregor's theory X & Y) , Leadership: Concepts &styles.

Controlling: Nature, Importance, significance & Process of control.[T1,R1]

UNIT – IV

Managing People - Meaning, Need of understanding human behavior in organization, Models of OB, **Major concepts in OB (elementary)**- Personality, Learning, Perception & Attitude Building. [T1,R2,R3]

TEXT BOOKS

[T1] Dr. C.B Gupta "Management concepts & practices" S.Chand & Sons,2009.

REFERENCE BOOKS

[R1] Stoner,Freeman & Gilbert, "Management" 6th Edition, Pearson International. [R2] Ankur Chhabra, "Organisational Behaviour", Sun India Publications, 2009 [R3] Robbins, Stephen P, "Organisational Behaviour". PHI,2010

Ability Enhancement Courses

Paper Title: Communicative English Course Code: ACCE-201
Credit: 2

Semester III

Core Courses

Paper Title: Computer Architecture Course Code: BCAC-301
Credit: 6

UNIT-I

Register Transfer and Micro-operations:Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Microoperations, Arithmetic logic shiftunit

Basic Computer Organizations and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Register reference instructions, Input - Output Instructions, Design of Accumulator Logic **[T1]**

UNIT-II

Design of Microprogrammed Control Unit

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes. Difference between RISC and CISC .

Pipeline and Vector Processing: Arithmetic and Instruction pipeline, Vector operations, Matrix Multiplication, memoryinterleaving**.[T1,R2]**

UNIT-III

Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, for fixed point-members.[T1,R2]

Input-Output Organization: Peripheral Devices, Input-Output Interfaces, Asynchronous

Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA)**[T1]**

UNIT-IV

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware**[T1]**

TEXT BOOKS :

[T1]. Morris Mano, Computer System Architecture, 3rd Edition, Prentice-Hall of India Private Limited, 1999.

REFERENCE BOOKS:

[R1]. WIliam Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hall of India Private Limited, 2001

[R2]. Subrata Ghosal," Computer Architecture and Organization" , Pearson 2011

[R3]. Malvino, "Digital Computer Electronics: An Introduction to Microcomputers", McGraw Hill,

Paper Title: Front End Design Tool VB.Net Course Code: BCAC-302
Credit: 6
Theory Portion: 4 Credits

UNIT I

Introduction: Introduction to .Net, Two tier and Three tier client server model, .Net Architecture, Features of .Net, Advantages of .Net, .Net Framework, CLR, CTS, CLS, Assemblies, Memory management issues – Garbage Collector and collection process, Exception Handling, Code Access Security.[T1,R2]

UNIT – II

Introduction to Visual Basic.Net IDE: Creating a project, Types of project in .Net, Exploring and coding a project, Solution explorer, toolbox, properties window, Output window, Object Browser. [T1, T2]

VB.Net Programming Language: Similarities and Differences with Visual Basic, Variables, Comments, Data Types, Working with Data Structures – Arrays, Array Lists, Enumerations, Constants, Structures; Introduction to procedures, calling procedures, argument passing mechanisms, scope of variable.

Control Flow Statements – conditional statement, Loops, Nesting of Loops, MsgBox and Input Box.[T1,R2]

UNIT-III

GUI Programming: Introduction to Window Applications, Using Form – Common Controls, Properties, Methods and Events. Interacting with controls - Textbox, Label, Button, Listbox, Combobox, Checkbox, Picture Box, Radio Button, Panel, scroll bar, Timer, ListView, TreeView, toolbar, Status Bar. Dialog Controls, Creating and Using MDI applications, Toolbar, Status Bar, Creating custom controls, Creating Menus. [T1, T2,R1]

Object Oriented Features: Classes and Objects, Access Specifiers: Private, Public and Protected, Building Classes, Reusability, Constructors, Inheritance, Overloading, Overriding, Creating and Using Namespaces. [T2, R1]

UNIT – IV

Introduction to ADO: ADO vs ADO.Net, ADO.Net data namespaces, ADO.Net Object Model, Accessing data from Server Explorer, Creating Connection, Command, Data Adapter, Data Reader and Data Set with OLEDB and SQLDB, Data Binding. [T1, R1,R2]

Crystal Report : Connection to Database, Table, Queries, Building Report, Modifying Report, Formatting Fields, Publishing and exporting reports.. [T2]

TEXT BOOKS

[T1]Visual Basic 2010 programming Black Book, by Kogent Learning Solutions, Wiley India [T2]Visual Basic 2010 Step By Step, Michael Halvorson, PHI

REFERENCE BOOKS

[R1] Mastering Microsoft Visual Basic 2010, Evangelos Petroutsos, Wiley Publications [R2] Beginning Visual Basic 2010 (Wrox)

Practical Portion: 2 Credits

1. Develop an Image ViewerApplication
2. Simulate a MathCalculator
3. Develop a Notepad Editor using DialogControl
4. Simulate a Paint BrushApplication
5. To Move an object using TimerControl
6. Develop a Simple Student Information System UsingFiles

7. Develop a College Admission Form UsingMDI
8. Validate a Bio – Data ApplicationForm
9. Develop an Inventory Control System UsingADO.NET
10. Develop a mark sheet preparation system Using Grid Control. Other than these, possible lab exercises related to syllabus can also beincluded.

Paper Title: Object Oriented Programming using C++ Course Code: BCAC-303
Credit: 6
Theory Portion: 4 Credits

UNIT – I

Introduction: Introducing Object-Oriented Approach, Relating to other paradigms (functional, data decomposition). Features of Procedure oriented programming, Basic Concepts of Object Oriented Programming, Benefits of OOP, Applications of OOP, Difference between C and C++, cin, cout, new, deleteoperators.

C++ Environment: Program development environment, the language and the C++ language standards. C++ standard libraries.
Introduction to various C++ compilers, C++ standard libraries, Testing the C++ program in Turbo C++/Borland C++/MicroSoft VC++/GNU C++ compiler. [T1][T2][T3]

UNIT – II
Classes and Objects: Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, references, this pointer, Function Overloading, Constructors and destructors, instantiation of objects, Default parameter value, C++ garbage collection, dynamic memory allocation, Meta class/abstract classes.[T1][T2]

UNIT – III

Inheritance and Polymorphism: Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition v/s classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric polymorphism, Virtual Function, Early v/s Late Binding.[T1][R2] **[No. of Hrs:10]**

UNIT – IV
Generic Programming – Introduction, templates, template functions, Overloading of template functions, Overriding inheritance methods.

Files and Exception Handling: Persistant objects, Streams and files, Namespaces, The basic stream classes: C++ predefined streams, Error handling during file operations, Command Line Arguments. Types of Exception, Catching and Handling Exceptions.[T1][T3]

TEXT BOOKS

[T1]AshokN.Kamthane,"Object-OrientedProgrammingWithAnsiAndTurboC++", PearsonEducation.

[T2] A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997.

[T3] E. Balguruswamy, **"C++ "**, TMH Publication ISBN 0-07-462038-x .

REFERENCE BOOKS

[R1] Mahesh Bhave, "Object Oriented Programming with C++", Pearson Education.

[R2] D . Parasons, "Object Oriented Programming with C++", BPB Publication.

[R3]Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication.

[R4] Schildt Herbert, "C++: The Complete Reference", 4th Ed., Tata McGraw Hill, 1999.

[R5] R. Lafore, "Object Oriented Programming using C++", Galgotia Publications, 2004.

Practical Portion: 2 Credits

1. Write a C++ program to implement the concept of classes andobject
 a. Create a class 'staff ', to create different objects and to test the functioning of member functions, constructors andDestructors.
 2. write a C++ program to implement the concept Arrays of Objects a. Create Class 'student', create an array of students, find out the student who got the firstrank
 3. Write a C++ program to implement operator overloading to perform complexarithmetic
4. Write a C++ program to implement the concept of Inheritance a. Create a class 'College', create another class 'department' by using 'college' as a base class, and verify the functions in the derived and base classes. Also to verify by keeping the two functions with same name (one in the base class and another in derivedclass)
 5. Write a C++ program to handle the error using ExceptionHandling.
6. Write a C++ program to implement stack using array.
 7. Write a C++ program to implement Queue usingarray.
8. Write a C++ program to convert the infix to postfixexpression.
9. Write a C++ program for inorder, preorder and post order treetraversals.
10. Write a C++ program for sorting the given set of elements using selection and bubblesort.

Generic Elective Courses (Any One)

Paper Title: Optimization Technique Course Code: BCAGE-301(A)
Credit: 6

UNIT – I

Measures of Central Tendency & Dispersion

Definition, Importance & Limitation. Collection of data and formation of frequency distribution. Graphic presentation of frequency distribution – graphics, Bars, Histogram, Diagrammatic. Measures of central tendency – mean, median and mode, partition values – quartiles, deciles and percentiles. Measures of variation – range, IQR, quartile, deciles and percentiles.

UNIT – II

Correlation/Regression

Correlation Coefficient; Assumptions of correlation analysis; coefficients of determination and correlation; measurement of correlation- Karl Person's Methods; Spearman's rank correlation; concurrent deviation the correlation coefficient; Pitfalls and limitations associated with regression and correlation analysis; real world application using IT tools.

UNIT – III

Linear Programming & Queuing

Concept a assumptions usage in business decision making linear programming problem: formulation, methods of solving: graphical and simplex, problems with mixed constraints: duality; concept, significance, usage & application in business decision making.

Queuing Models: Basic structure of queuing models, Birth-Death queuing models and its steadystatesolution,M/M/1andM/M/Cmodelswithinfinite/finitewaitingspace,PERT,CPM

UNIT – IV

Transportation & Assignment Problem

General structure of transportation problem, solution procedure for transportation problem, methods for finding initial solution, test for optimality. Maximization of transportation problem, transportation problem. Assignment problem approach of the assignment model, solution methods of assignment problem, maximization in an assignment, unbalanced assignment problem, restriction onassignment.

TEXT BOOKS

[T1] Sharma, J.K.; Operations Research: problems & solutions; Macmillan India

[T2] Gupta, S.P. and Gupta, P.K.; Quantitative Techniques and Operations Research,

Sultan Chand & Sons

[T3] Vohra, N.D.; Quantitative Techniques in Management 2003.

[T4] Gupta, S.P. Statistical Methods, Sultan Chand &Sons.2004

[T5] A. M. Natarajan, P Balasubramani A. Tamilarasi, Operations Research, Pearson 2005

REFERENCE BOOKS

[R1] R.L.Rardin, Optimization in Operations Research, Prentice Hall.

[R2] A.Racindran, D.T.Phillips, J.S.Solberg, Second edition,

JohnWiley.

Paper Title: E-Commerce Course Code:
BCAGE-301 (B) Credit: 6

UNIT-I

An Overview of E-Commerce: Trade Process & Trade Cycles their linkages with information exchange; Definitions of E-commerce & E-business & their difference; Problems with Manual Systems, Aims of E-commerce, Functions of E-commerce, Applications of E-commerce in business functions, Tools & Technologies for E-commerce,Types of E-commerce,Operational & Strategic benefits of E-commerce, Issues & Challenges in E-commerce.

Electronic Data Interchange (EDI): Definition, Concept & Evolution of EDI, Traditional versus EDI enabled system for document exchange, EDI Layered Architecture, Process of EDI Message Exchange, Components of EDI, UNEDIFACT Standards & Message Structure, EDI in India, EDI enabled procurement process, EDI Implementation, UN

‘**Model Interchange Agreement**’ for international commercial use ofEDI**.**

Web based E-Commerce: Need for web based business, Choosing the right format of website: Characteristics of PR site, Marketing site, Sales site/web-store and vertical & horizontal portals; Steps in setting up business on Internet: Selection & registration of domain name, Website development-client & server side tools, web authoring tools, catalogue & web store tools, Website hosting considerations-own versus rented server; Website Maintenance Online Promotion tools & techniques: Getting links to your site, banner advertisements & measuring advertisement effectiveness, Web Traffic Analysis: Various measures, structure of log file data at server side & its analysis for promotion and tools for analysis, Search Engine optimization techniques, Payment Gateways for online payment, Security of transactions on Web:SellingthroughSecureServers,useofdigitalcertificatesandinternationalstandards.

[No. of Hrs: 12]

UNIT – II

Intranet, Extranet and VPN: Architecture of Intranet, Intranet Software, Applications of Intranets, Intranet Application Case Studies, Considerations in Intranet Deployment; The architecture of Extranets, Extranet Products & Services, Applications of Extranets, Business Models of Extranet Applications; Virtual Private Network (VPN): Architecture of VPN - service provider dependent & service provider independent configurations, VPN Security-User authentication & DataSecurity.

Electronic Payment Systems: E-cash: Purchasing & using of e-cash; Electronic Purses their loading with cash and use; E-cheque payment system; Online Third Party Verified Payment System through Credit & Debit Cards & encryption mechanism; ATM based cash disbursement system; Electronic Bill Payment System; 6. Inter bank clearingsystem.

Security E-Commerce Transactions: Security issues: confidentiality, integrity, authentication, non-repudiation & access control their objectives & techniques; Types of security attacks; Cryptography & Digital Signatures: Symmetric & asymmetric cryptography, Public-Private Key Cryptography, Digital signatures & their use, Public Key Infrastructure (Digital Certificate, Certification Authority, Registration Authority, Key Repository), SSL and SET, Legal issuesincryptography **[No. of Hrs: 12]**

UNIT –

III

Business Strategy in an Electronic Age: Impact of Internet on Competition - Porter's Five Forces Model & Business Strategies in Digital Economy; Impact of IT Enabled Systems on Value Chain - Porter's Value Chain Model; Supply Chain & Supply Chain Management:

Definition & flows in a supply chain, Evolution of supply chain-JIT & Quick Response Retailing, Push, Pull and Built-to-order model of supply chains, E-commerce enabled supply chain management using Internet, Intranet & Extranet.

Business Process Management: Concepts of Business Process Management & Business Process Reengineering; Call Centre operations: Purpose & functions, mode of operations, Components (Telephony, Web, Application servers & middle ware, Desktop applications); Customer RelationshipManagement(CRM). **[No. of Hrs:10]**

UNIT – IV

Technology & Legal Issues in E-Commerce: Technological Issues: Availability of telecom infrastructure, interoperability, bandwidth issues, technical standards & spectrum management, Expansion of Internet: 128 bit IP addressing issue; Legal Issues: Uniform Commercial code for E-commerce (**'Model Law on Electronic Commerce'** by United Nations Commission on International Trade Law, IT Act 2000 by Govt of India), Intellectual Property Protection (Copyrights, Patents, Trademarks & Domain Names), Privacy, Security (storage of electronic messages & their evidence value), Customs & Taxation laws, Role of governments & regulatory bodies, Jurisdictionissues.

Applications of E-Commerce & Case Studies: 1. Case studies & applications of e-commerce in Retailing, Banking, Manufacturing, Airlines & Railway reservation & e-governance; 2. CyberCrimes. **[No. of Hrs:10]**

TEXT BOOKS:

[T1] e-commerce: Strategy, Technologies and Applications, David Whiteley, Tata McGraw Hill

[T2] E-Commerce: The Cutting Edge of Business, KK Bajaj & Debjani Nag, McGraw Hill.

REFERENCES:

[R1] The Complete Reference: Internet, Margaret Levine Young, Tata McGraw Hill.

[R2] e-Commerce: Concepts, Models, Strategies, CSV Murthy, Himalayas Publishing House.

[R3] Frontiers of Electronic Commerce, Ravi Kalakota & Andrew B. Wilson, Addison-Wesley (An Imprint of Pearson Education)

[R4] Network Security Essentials: Applications & Standards, William Stallings, Pearson Education.

Skill Enhanced Courses (Any 1)

Paper Title: Artificial Intelligence Course Code: BCASEC-301 (A) Credit: 2

UNIT -I

Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.

Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem.

Heuristic search techniques: Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction.

UNIT -II

Knowledge representation: Definition and importance of knowledge, Knowledge representation, various approaches used in knowledge representation, Issues in knowledge representation.

Using Predicate Logic: Represent ting Simple Facts in logic, Representing instances and is-a relationship, Computable function and predicate.

UNIT -III

Natural language processing: Introduction syntactic processing, Semantic processing, Discourse and pragmaticprocessing.

Learning: Introduction learning, Rote learning, Learning by taking advice, learning in problem solving, Learning from example-induction, Explanation based learning.

UNIT - IV

Expert System: Introduction, Representing using domain specific knowledge, Expert system shells. LISP and other AI Programming Language

TEXTBOOKS:

[T1] E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1999.

REFERENCE:

[R1] D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999

[R2] Nils J Nilsson,"Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt AsiaLtd.

TEXTBOOKS:

[T1] W. Stallings, Networks Security Essentials: Application & Standards, Pearson Education, 2000

[T2] TCP/IP Protocol Suite , Behrouz A. Forouzan, “Data Communication and Networking”, Tata Mc Graw Hill,

REFERENCE BOOKS:

[R1] W.Stallings, Cryptography and Network Security, Principles and Practice, Pearson Education, 2000.

Paper Title: Personality Development & Motivation Course Code: BCASEC-301 (B) Credit: 2

Unit 1:

Personality, Personality Crisis, Personality Development: Concepts and characteristics, Evolutionary Perspectives, Lifespan Perspective, InfluencingFactor,

Unit 2:

Personality Right, Personality Style, Motivation, Laws related to motivation, Types of theories and models, Adaptive performance, Addition, Happiness at work, human behavior

Unit 3:

Organizational Behavior, work engagement, positive education, positive psychology, ways in motivation

Unit 4:

Carrier and motivation, education and motivation, body language and relationship

Semester IV Core
Courses

Paper Title: Web Technologies Course Code:
BCAC-401 Credit: 6
Theory Portion: 4 Credits

UNIT – I

History of the Internet and World Wide Web, Search Engines, News-group, E-mail and its Protocols, Web Portal, Browsers and their versions, Its functions, URLs, web sites, Domain names,Portals.

Static Web Development: HTML - Introduction to HTML, HTML Document structure tags, HTML comments, Text formatting, inserting special characters, anchor tag, adding images and Sound, lists types of lists, tables, frames and floating frames, Developing Forms, Image maps.

UNIT – II

Introduction to Java Script: Data Types, Control Statements, operators, Built in and User Defined Functions, Objects in Java Script, Handling Events.

Cascading Style Sheet: Types of Style Sheets – Internal, inline and External style sheets, creating styles, link tag.

UNIT – III

DHTML : Introduction to DHTML, JavaScript & DHTML, Document Object Model, Filters and Transitions, DHTML Events, Dynamically change style to HTML Documents.

UNIT – IV

Introduction to WYSIWYG Design tools, Introduction to Dreamweaver, Website Creation and maintenance, Web Hosting and Publishing Concepts, XML: Introduction to XML-Mark up languages, Features of Mark up languages, XML Naming rules, Building block of XML Document, Difference between HTML & XML, Components of XML, XML Parser, DTD's Using XML with HTML andCSS

TEXT BOOKS

[T1] The complete reference HTML, by Thomas A powell, TMH publication.
[T2]MasteringHTML4.0byDeborahS.RayandErichJ.Ray.BPBPublication.

[T3] Internet and World Wide Web Deitel HM, Deitel ,Goldberg , Third Edition

Practical Portion: 2 Credits

1. Writing different HTML pages using HTMLcommands
2. Creating Web pages
3. Writing HTML documents for Basic styles, creating lists, Adding links, adding images to a
4. Web page.
5. Program using image map fornavigation
6. Program for creating frames, creating HTMLforms.
7. Programs for creating tables ofdata.
8. Creating dynamic webpages
9. Solution of different common problems usingJAVA
10. Solution of different problems usingarrays.
11. Writing programs for inheritance, polymorphism, operatoroverloading
12. Writing program for multithreadinghanding.
13. Applet programming and tagging of applet in HTMLdocument.

Paper Title: Java Programming Course Code:
BCAC-402 Credit:6

Theory Portion: 4 Credit

UNIT-I

Java Programming: Introduction, Data types, acces specifiers, operators, control statements, arrays.

Classes: Fundamentals, objects, methods,constructors.

Inheritance: Super class,sub class,this and super operator, method overriding, use of final, packages, abstractclass, interface.

Polymorphism: Method overloading, constructor overloading. [T1,R1]

UNIT – II

Exception Handling: Exception Class, built in checked and unchecked exceptions, user defined exceptions, use of try, catch, throw, throws, finally.

Multi threaded programming: Overview, comparison with multiprocessing ,Thread class and runnable interface, life cycle, creation of single and multiple threads, thread priorities, overview of Synchronization.

Java Library: String handling (only main functions), String Buffer class.

Elementary concepts of Input/Output :byte and character streams, System.in and Sysem.out, print and println, reading from a file and writing in a file. [T1, R1]

UNIT – III

Software Development using Java:

Applets :Introduction, Life cycle, creation and implementation,

AWT controls: Button, Label,TextField, TextArea, Choice lists, list, scrollbars, check boxes, Layout managers,

Elementary concepts of Event Handling :Delegation Event Model, Event classes and listeners, Adapter classes, Inner classes.

Swings: Introduction and comparison with AWT controls. [T1, R1]

UNIT – IV

Networking Basics: Socket (datagram and TCP/IP based client and server socket), factory methods, InetAddress

JDBC: JDBC Architecture, JDBC Drivers, Connecting to the Database

Introduction to Java Servlets: Life cycle,Interfaces and classes in javax.servletpackage(onlydescription)Creatingasimpleservlet[T1,T2,R1,R2]

TEXT BOOKS:

[T1] Patrick Naughton and Herbert Schildt, “Java-2 The Complete Reference”, TMH.

[T2] Y. Daniel Liang, “Introduction to Java Programming, Comprehensive Version, 7/e” Pearson.

REFERENCE BOOKS: -

[R1] Krishnamoorthy R, Prabhu S ,"Internet and Java Programming", New Age Intl.

[R2] David Flanagan, Jim Farley, William Crawford and Kris Magnusson, "Java Enterprise in a Nutshell",O'Reilly.

Practical Portion: 2 Credits

1. Program to illustrate the use of classes andobjects
2. Program to illustrate the use of StringClass
3. Program to illustrate the use of final and statickeyword
4. Program to illustrate the use ofinheritance
5. Program to illustrate the use ofinterfaces
6. Program to illustrate the use ofpackages
7. Program to illustrate the use ofmultithreading
8. Program to illustrate the use of Exceptionhandling
9. Program to illustrate the use of Utilityclasses
10. Program to create and readfile.
11. Program to create applet and pass parameter toit
12. Program to illustrate handling of mouse event Other than these, possible lab exercises related to syllabus can also beincluded.

Paper Title: Software Engineering Course Code: BCAC-403
Credit: 6
UNIT – I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and SpiralModels

Software Requirements analysis & specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD, Requirements analysis using DFD(with case studies), Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS.[T1][T2][T3]

UNIT – II

Software Project Management Concepts: The Management spectrum, The People, The Problem, The Process, TheProject.

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.[T1][T2][T3]

UNIT - III

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Layered arrangement of modules, Function Oriented Design, Object Oriented Design[T1][T2]

Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics.[T1][T2]

UNIT - IV

Software Testing: Code Review, Testing Process, Types of Testing, Functional Testing, Structural Testing, Test Activities, Unit Testing, Integration Testing and System Testing(Performance Testing and Error Seeding), Debugging Activities.[T1][T2][R1]

Software Maintenance: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering, Configuration Management,Documentation.[T1][T3]

TEXT Books:

[T1] K. K. Aggarwal & Yogesh Singh, “Software Engineering”, 2nd Ed., New Age International,2005.

[T2] Rajib Mall, “Fundamental of Software Engineering”, 3rd Edition, PHI Learning

Private Limited

[T3] I. Sommerville, “Software Engineering”, 9th Edition, PearsonEdu.

REFERENCE:

[R1] Jibitesh Mishra and Ashok Mohanty, “Software Engineering”,Pearson

[R2] R. S. Pressman, “Software Engineering – A practitioner’s approach”, 5th Ed., McGraw Hill Int. Ed.,2001.

[R3] James Peter, W. Pedrycz, “Software Engineering: An Engineering Approach”, John Wiley &Sons.

Generic Elective Courses (Any 1)

Paper Title: Data Ware Housing & Data Mining Course Code: BCA GE-401 (A)
Credit: 6

UNIT – I

Data mining: Introduction, Data mining – on what kind of data, data mining functionalities – what kind of patterns to be mined, Classification of data mining systems, data mining task primitives, integration of a data mining systems with a database or data warehouse systems, major issues in data mining.

Data preprocessing: Descriptive data summarization, data cleaning, data integration and transformation, data reduction, data descretization and concept hierarchy generation.

UNIT – II

Data warehouse and OLAP technology: What is data warehouse, A multidimensional datamodel, data warehouse architecture, data warehouse implementation, data warehouse usage, OLAP, OLAM

Mining frequent patterns, association and correlation, efficient and scalable frequent itemset mining methods, From association mining to correlation analysis.

UNIT – III

Classification and prediction: Introduction, issues, classification by decision tree induction, rule based classification, classification by back propagation, lazy learners, other classification methods, Prediction: accuracy and error measures, evaluating the accuracy of a classifier or predictor.

Cluster Analysis: Types of data in cluster analysis,a categorization of major clustering methods, partitioningmethods.

UNIT – IV

Mining complex types of data: Multidimensional analysis and descriptive mining of complex data objects, mining spatial database, multimedia database, mining world wide web.

Applications and trends in data mining: Data mining applications, data mining system products and research prototypes, social impact of data mining, trends in data mining.

TEXT BOOKS:

[T1] Kamber and Han, "Data Mining Concepts and Techniques", Hartcourt India P. Ltd.,2001. [T2] Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons,2000

REFERENCE BOOKS:

[R1] Margaret Dunham, " Data Mining: Introductory and Advanced Topics, 1/e", Pearson [R2] G. K. Gupta, "Introduction to Data Mining with Case Studies", PHI, 2006.

[R3] W. H. Inmon, "Building the OperationalDataStore",2nd Ed., John Wiley,1999

[R4] B. M. Shawkat Ali, Saleh A. Wasimi, "Data Mining Methods and Techniques", Cengage Learning, 2009

Paper Title: Mobile Computing Course Code: BCA GE-401 (B) Credit: 6

UNIT – I

Introduction to wireless communications: Applications, Short History of Wireless Communications, Market of Mobile Communications.[T1]

Elementary Knowledge on Wireless Transmission: Frequency of Radio Transmission, Signals, Antennas, Signal Propagation: Path Loss of Radio Signals, Additional Signal Propagation Effects, Multipath Propagation, Multiplexing: Space Division Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing, Modulation: Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying, Advanced Frequency Shift Keying, Advanced Phase Shift Keying, Multicarrier Modulation, Spread Spectrum: Direct Sequence Spread Spectrum, Frequency Hopping Spread Spectrum, Cellular Systems.[T1]

UNIT – II

Elementary Knowledge on Medium Access Control: Motivation for a specialized MAC, Hidden and exposed terminals, Near and far terminals, Introduction to SDMA, FDMA, TDMA:FixedTDM,ClassicalAloha,SlottedAloha,Carriersensemultipleaccess,Demand

assigned multiple access, PRMA packet reservation multiple access, Reservation TDMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access, CDMA, Spread Aloha multiple access, Mobile communications, Comparison ofS/T/F/CDMA. [T1]
Elementary Knowledge on Telecommunications Systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, New data services, DECT: System architecture, Protocolarchitecture.[T1]

Elementary Knowledge on Satellite systems: History, Applications, Basics: GEO, LEO, MEO, Routing, Localization, Handover. [T1]

UNIT – III

Mobile Internet: Introducing the Mobile Internet, Services for the mobile Internet, Business opportunities.[T2]

Implementing WAP Services: WML: WML Variables and Contexts: Variable Substitution, Setting Variables, Browser Contexts, WML Tasks and Events, WML User Interaction: ProblemswithWebInteraction,InteractioninWAP,Elements:<input>,<select>,<option>, <optgroup>, <do> , <anchor> , <a> , The tabindex Attribute, WML Timers, WML Decks, Templates, and Cards: Elements: <wml>, <head>, <access>, <meta> , <card> , <template>, WML Text and Text Formatting, Elements <p>,
, Character Formatting, Tables, WML Images: <img> Element, The WBMP Image Format. [T2, T3]

UNIT – IV

WAP: the Mobile Internet Standard, Making the Internet Mobile: Challenges and Pitfalls, Overview of the Wireless Application Protocol [T2]

Implementing WAP Services: WML Script: Datatypes, Variables, and Conversions, Operators and Expressions: Operand Conversions, Assignment Operators, Arithmetic Operators, Bitwise Operators, Shift Operators, Logical Operators, Increment and Decrement Operators, Comparison Operators, Type Operators, The Conditional Operator, The Comma Operator, Precedence and Associativity, WMLScript Statements: Expressions as Statements, Blocks of Statements, Conditions, Loops, Returning from a Function, Other Statements, WMLScript **Functions:** Function Declarations, Function Calls, Calls to Other Script Units, Calling WMLScript from WML, Standard Libraries, WMLScript Pragmas: The access Pragma, The meta Pragma, Elementry Knowledge on Libraries: Lang , Float , String ,URL , WMLBrowser , Dialogs [T2,T3]

TEXTBOOKS

[T1] Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2003.

[T2] Sandeep Singhal, “The Wireless Application Protocol, Writing Applications for Mobile Internet”, Pearson Education, 2000
[T3] Learning WML, and WMLScript, Programming the Wireless Web, Martin Frost, Publisher: O'Reilly 2000

REFERENCE BOOKS

[R1] William Stallings, “Wireless Communications and Networks”, PHI/Pearson Education, 2002
[R2] Theodore S Rappaport, “Wireless Communication Principles and Practice”, 2nd Ed, Pearson Education. 2002
[R3] C. Y. Lee and William, “Mobile Cellular Telecommunications”, 2nd Ed, McGraw Hill. 2001

Skill Enhanced Courses (Any 1) Paper Title:

CyberSecurity & Laws
Course Code: BCASEC-401 (A) Credit: 2

Unit-I
Information Security, Cyber Security, Information Assurance, Cyber Crime- Meaning, Types, Need, Function

Unit-II
Information Policy- Meaning, Types, Need, Function, Case Studies, Need, Convergence, Information Divide, Digital Divide, Information Literacy, Network Literacy, Digital Humanities & Sociology, Information and IT Policy as a Discipline and Degreesworldwide

Unit-III
Information Technology Act, Information Security Protocols, Non-repudiation services, related protocols, Fairness in Information Exchanges Protocols

Unit-IV
Trusted Third Party, its use as Adjudicator, message authenticator, Information Security standards, Information SecurityInfrastructure.

Unit-V

International Information Act & IT Act, Right to Information Act-2005 with Process, Features and Functions, IT Act 2000-Role, Features, Summary, Changes, Data Privacy Rules, Real life Example of IT Act uses, Emerging Cyber Act inIndia

Text/References:

1. Kahin, B., & Nesson, C. (1996). *Borders in cyberspace: Information policy and the global information infrastructure*. MITPress.
2. Kamisar, Y. (1980). *Police interrogation and confessions: Essays in law and policy* (p. 1). Ann Arbor, MI: University of MichiganPress.
3. Holtshouse, D. K. (2013). *Information technology for knowledge management*. U. M. Borghoff, & R. Pareschi (Eds.). Springer Science & BusinessMedia.

Paper Title: SEO
Course Code: BCASEC-401 (B) Credit: 2

Unit-1

Search Engine Optimization and its meaning, features, function and need. Search Engine Optimization and Google, Indexing Methods, Search Engines its features, history, emerging search engines, searchstrategies

Unit-2

Ranking Concept, Long tail-concept and theory, why content is a king?, SEO Copywriting, Content Development and its features with style, Content Designing, Content Management, Content Management Systems, Content Engineering, Role of Search Engine Optimization in Digital Marketing

Unit-3

On Page SEO-Concept of Content, URL Structure, Pictures in On Page Optimization, Title Tag & Meta Tag in On Page Optimization, Headline Tag, InternalLinking

Unit-4

Off Page Optimization, Linking Approaches, Use Of Social Media, Use of Email on Off Page Optimization promotion, identifying a keywords, long-tail keywords, checking web analytics, keyword research tools, search for keywords

Unit-5

Tariff and SEO, Leads/ROI, Indexed Pages, Inbound Links, Keywords, Ranking, Creating list of Keywords, building keyword focused webpage, setup a blog, creating a link building plan, PPC Advertisement, Webmaster edge, site maps, use of color and psychology

Text/References:

1. Ledford, J. L. (2015). Search Engine Optimization Bible (Vol. 584). John Wiley &Sons.
2. Kent, P. (2012). Search engine optimization for dummies. John Wiley &Sons.
3. Amerland, D. (2013). Google Semantic Search: Search Engine Optimization (SEO) Techniques That Get Your Company More Traffic, Increase Brand Impact, and Amplify Your Online Presence. Que Publishing.

Semester V

Core Courses Paper

Title: Computer Networks Course Code: BCAC-501

Credit: 6

Unit - I

Basic Concepts: Components of data communication, distributed processing, Line configuration, topology, transmission mode, and categories of networks. OSI and TCP/IP Models: Layers and their functions, comparison of models. Digital Transmission: Interfaces and Modems: DTE-DCE Interface, modems, cable modems. Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon Capacity.T[1], T[2]

Unit – II

Telephony: Multiplexing, error detection and correction: Many to one, one to many, WDM,

TDM, FDM, circuit switching, packet switching and message switching. Data Link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols overview. ISDN: Services, historical outline, subscriber's access, ISDN, Layers, and broadband ISDN. T[1], T[2]

Unit-III

Devices: Repeaters, bridges, gateways, routers, The Network Layer, Design Issues, Network Layer Addressing and Routing concepts (Forwarding Function, FilteringFunction);Routing

Methods (Static and dynamic routing, Distributed routing, Hierarchical Routing);Distance Vector Protocol, Link State protocol. T[1],T[2]

Unit – IV
Transport and upper layers in OSI Model: Transport layer functions, connection management, Functions of session layers, Presentation layer, and Application layer. T[1], T[2]

Text Books
T[1]. A. S. Tenanbaum, "Computer Networks"; Pearson Education Asia, 4th Ed., 2003.

T[2]. Behrouz A. Forouzan, "Data Communication and Networking", 2nd edition, Tata

Mc GrawHill.

.

Reference Books
R[1]. D. E. Comer, "Internetworking with TCP/IP", Pearson Education Asia, 2001.

R[2]. William Stallings, "Data and computer communications", Pearson education Asia,

7th Ed., 2002.

Paper Title: Operating System Course Code:
BCAC-502 Credit: 6

UNIT – I

Introduction: What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems

Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, OtherConsiderations

UNIT – II

Processes: Process Concept, Process Scheduling, Operation on Processes

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling,

Process Synchronization: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems ofSynchronization

UNIT – III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary-Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability

UNIT – IV

Information Management: Introduction, A Simple File System, General Model of a File System, Types of File System File-System Interface: File Concept, Access Methods, Directory Structure, Protection: Goals of protection, Domain of protection, Access rights, Consistency Semantics Security: Authentication, Program threats, System threats,Encryption.

TEXT:

[T1] Silbersachatz and Galvin, "Operating System Concepts", John Wiley & Sons, 7th Ed.

2005 [T2] Haldar/Aravind, "Operating System", Pearson Edu.

REFERENCES:

[R1] Madnick E., Donovan J., "Operating Systems", Tata McGraw Hill,

2001 [R2] Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000
[R3] An Introduction to Operating Systems: Concepts & Practice, Bhatt, PHI

Discipline Specific Courses (DSE) –Any 1

Paper Title: Information Systems & Management Course Code: BCADSE-501(A)
Credit: 6

Unit-1
Information Systems as a Field, Information Systems Function, Information Systems Professionals, IS Development, IS for Development, Carrier opportunities as Information Systems, Management Science with its principles, Management in InformationSystems

Unit-2
Introduction to Information Systems, shift in Information system thinking, latest trends in Information Technology, Use of computers for managerial applications, Technology issues and data and information processing in organizations

Unit-3
Computer Based Information Systems- office automation systems, decision making and MIS, transaction processing systems, decision support system, Group Decision Support, Executive Information systems, DSS generator, Artificial Intelligence based systems, end user computing, distributed data processing

Unit-4
Knowledge Management, Business system, deciding on IS architecture, IT leadership & IS strategic planning, IS strategy and effects of IT on competition**,** ERP, re-engineering work processes for IT applications, Business Process Redesign

Unit-5
Information Systems beyond MIS, Information Systems and Domain based Nature, Geo Information Systems, Bio Information Systems, Health Information Systems, Environmental Information Systems, Educational Information Systems

Text/References:
1.Management Information System, O'Brien,TMH
2. Management Information System: A Concise Study,Kelkar,PHI 3.Decision support Systems, Janaki Raman,PHI
4 Business Information Systems, Munish Kumar, VIKAS 5.Business Application of Computers, M.M. Oka, EPH

Paper Title: Multimedia and its Application Course Code: BCADSE-502(B)

Credit: 6

UNIT-I

Introductory Concepts: Multimedia - Definitions, Basic properties and medium types.(Temporal and non temporal) . Multimedia applications Uses of Multimedia, Introduction to making multimedia - The Stages of project, the requirements to make good multimedia, Multimedia skills and training.

Multimedia-Hardware and Software: Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Media software - Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards.[T1,T2,R1]

UNIT-II

Multimedia building blocks Creating & Editing Media elements: Text, image, Sound, animation Analog/ digital video Data Compression: Introduction, Need, Difference of lossless/lossy compression techniques. Brief overview to different compression algorithms concern to text, audio, video and images etc .[T1,T2,R3]

UNIT-III

Multimedia and the Internet: History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW - Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, Designing for the WWW -Working on the Web, Multimedia Applications - Media Communication, Media Consumption, Media Entertainment, Mediagames.[T2.R2]

Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Virtual Reality, Digital Camera. Assembling and delivering a Multimedia project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM: The CD family, production process, CD-i – Overview – Media TypesTechnology.[T2,R2]

TEXTBOOKS:

[T1] Tay Vaughan, “Multimedia: Making it work”, TMH, 1999.
[T2] Ralf Steinmetz and Klara Naharstedt, “Multimedia: Computing, Communications Applications”,Pearson,2001.

REFERENCES:

[R1] Keyes, “Multimedia Handbook”, TMH, 2000.
[R2] Steve Heath, “Multimedia & Communication Systems”, Focal Press, UK, 1999. [R3] K.

Andleigh and K. Thakkar, "Multimedia System Design", PHI, PTR, 2000. [R4] Steve Rimmer, "Advanced Multimedia Programming", MHI,2 0 0 0

Paper Title: IT Project Management with Ethics Course Code: BCADSE-502(A)
Credit: 6

Unit-I
Project Management, Approaches of Project Management, Processes and Topics of Project Management, Software and Network Project Management, IT Projects and its dealing, Qualities needed for IT Project Management

Unit-II
Engineering and Computing/Informatics profession: Ethical issues in Informatics practice. Conflicts between business demands and professional ideals, Social and ethical Responsibilities ofTechnologists.

Unit-III
Codes of professional ethics, Whistle blowing and beyond, Case studies, Profession and Human Values Value Crisis in contemporary society. Nature of values: Value Spectrum of a 'good' life

Unit-IV
Information and Computing Professions with its emerging nature, Chief Technology Officer, Information Scientist, Computer Scientist, IT Officer, Web Analyst, SEO Engineer, Web Administrator, Database Administrator, Chief Information Officer, Chief Digital Officer, Network and System Administrator, Information Manager, Knowledge Broker, System Engineer, Software Engineer—their basics with roles and comparisons, JobOpportunities

Text/References:
1.Blending the best of the East & West, Dr. Subir Chowdhury, EXCEL
2.Ethics & Mgmt. & Indian Ethos, Ghosh, VIKAS
3.Business Ethics,Pherwani,EPH
4.Ethics,Indian Ethos & Mgmt., Balachandran,Raja,Nair, Shroff
Publishers 5.Business Ethics: concept and cases, Velasquez,Pearson

Paper Title: Advance Network Technologies Course Code: BCADSE-502(B)

Credit: 6

UNIT-I

Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

UNIT-II

Sockets : Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

UNIT-III

TCP client server : Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

UNIT-IV

I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socketoption.

UNIT-V

Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. Elementary name and Address conversions: DNS, gethost by Name function, Resolver option.

Semester VI Core
Courses

PaperTitle:WebProgramming(PHP) Course
Code:BCAC-601
Credit: 6
Theory Portion: 4 Credit

UNIT – I

Introduction to web applications, HTML, Client Side Scripting Vs Server Side Scripting, Web Servers : Local Servers and Remote Servers, Installing Web servers, Internet Information Server (IIS) and Personal Web Server (PWS). Static website vs Dynamic websitedevelopment.

UNIT – II

Introduction to PHP, Start and End Tags of PHP, Data types in PHP, Variables, Constants, operators and Expressions, printing data on PHP page, Control statements – if, switch case, for, while, do while.

Arrays: Initialization of an array, Iterating through an array, Sorting arrays, Array Functions, Functions: Defining and Calling Functions, Passing by Value and passing By references, Inbuilt Functions.

UNIT – III

Working with Forms: Get and Post Methods, Querystrings, HTML form controls and PHP, Maintaining User State: Cookies, Sessions, Application State.

Working With Files: Opening and Closing Files, Reading and Writing to Files, Getting Information onFiles

UNIT – IV

PHP Database Connectivity: Introduction to MYSQL, Creating database and other operations on database, connecting to a database, Use a particular database, Sending query to database, Parsing of the query results, Checking dataerrors.

TEXT BOOKS:

[T1] Programming PHP. Rasmus Lerdorf, Kevin Tatroe. (O'Reilly, ISBN 1565926102).

[T2] PHP, MySQL, and JavaScript: A Step-By-Step Guide to Creating Dynamic Websites by Robin Nixon O'Reilly Media; 1 edition

REFERNCE BOOKS:

[R1] Core PHP Programming. Leon Atkinson (Prentice Hall, ISBN 0130463469).

[R2] Beginning PHP5 and MySQL: From Novice to Professional, W. Jason Gilmore, 2004, Apress, ISBN: 1-893115-51-8

Practical Portion: 2 Credits

1. Introduction to XML :Introduction to XML and its need-XML Revolution – Data Revolution - XML Revolution – Architectural and Software revolution-The XML Technology family-Structure and data typing-The XML Technology family-Presentation Technologies The XML Technology family- Manipulation Technologies.

2. XML Presentation, Manipulation Technologies: XML Document rule-XML structuring rule and Related Data type-XML presentation – CSS – XSL- XSLT (operations) –XPath, Xlink and XQuery-Introduction to XSL-FO-XML – Forms-Uses of Voice XML with a blockdiagram.

3. Asynchronous Javascript and XML – AJAX :Introduction and Need for AJAX-AJAX Basics - AJAX Architecture-Ajax Web Application Model-Ajax Patterns - Ajax control Toolkit - Ajaxcontrols

4. SOAP Protocol &Web Services: Purpose of SOAP - SOAP Protocol-Approaches to SOAP-SOAP Architecture-XML-RPCStructure of HTTP Request-Introduction to SOAP faults-Concepts of SOAP Attachments-Introduction to Web Services-UDDI Model & Security onXML.

5. Semantic Web :Introduction to Semantic Web: Needs, Evolution. Types of Data etc.,-Levels of Semantics-The layered Architecture: URI, UNICODE, XML NS, RDF-The layered Architecture: Ontology, logic, proof, trust and Digital signature-Un-Resource Description Framework (RDF)-Web Ontology Language(OWL).

Paper Title: System Analysis and Designing Course Code: BCAC-602
Credit: 6

Unit-I
Information Systems, Types and Overview, Information Analysis, Systems Analysis, Software Analysis, IT Management Analysis, Professionals and Tools associated with Information SAD, Data Analysis with Analytics

Unit-II
Overview of System analysis and design: Development life cycle (Waterfall, Spiral, incremental models), feasibility studies, Requirements determination, Logical design, Physical design, Program design, Risk and feasibility analysis,prototyping

Unit-III
Information requirement analysis: Process modelling with physical and logical data flow diagrams, Data modelling with entity relationship diagrams, Normalization upto3NF

Unit-IV
System design: Process descriptions, Input/output controls, object modelling, Database design, User Interface design, Documentation, Data Dictionary

Unit-V
Development methodologies: Top down, bottom up, structured chart, decision table, decision tree, CASE productivitytools.
Testing – Unit, integration, system, Acceptance, regression, Test Case generation

Text/References:
1.System Analysis & Design, Parthasarathi,EPH
2. Analysis & Design of Information
Systems,Rajaraman,PHI 3.Analysis & Design of
Information Systems, Senn ,MH
4.Information Systems: Analysis and Design,Ram Bansal 'Vigyacharya',New Age International. 5.System Analysis, Design & MIS, EXCEL BOOKS
6.Analysis, Design & Implementation of Information System, Sharma,
VIKAS 7.System Analysis & Design, V.K. Jain, WileyDreamtech

Discipline Specific Courses (DSE) - Any1

Paper Title: E-Learning Technologies Course Code:
BCADSE-601 (A) Credit:6
Theory Portion: 4 Credits

Unit 1

E-learning theory, Meaning, Definition, Types, Characteristics, E-Learning History, Advantages of ELearning

Unit 2

Trends in E Learning, Technologies involved with E-Learning, Database & E-learning, Multimedia & E-learning, Web Technology & E-learning, Network Technologies &E-learning

Unit 3

Similar and Allied Technologies: Online Education, Education Technology, Virtual Learning, LMS-Meaning and Features, Synchronous and Asynchronous methods

Unit 4

Tools for creation of E Learning, Micro Learning and Advantages, E Learning Principles, Cloud Computing for E Learning

Unit 5

An Account of E Learning Software, Media for E Learning, Inside into the MOOC, E Learning Projects in International Context and India

Practicals

- Live utilization of NPTEL, Virtual Labs, Talk to Teachers, SpokenTutorial,
- Live utilization of E Yantra,INFLIBNET,
- Live utilization of Quantum and Nano Computing, ERPMission,
- Live utilization of Virtual LearningEnvironment,
- Live utilization of Aakash Educational Portal, OSS, SOSTools,
- Live utilization of Scopus, Google Scholar, INSPEC,IDEAS,
- Live utilization of YouTube as an EducationalMedium

Discipline Specific Courses (DSE)

Paper Title: Emerging Trends in IT & Computing Course Code: BCADSE-601(B)
Credit: 6

Unit-I

Parallel Computing: Concept, Features and Emerging Trends-*Mobile Computing*: Mobile connectivity- Cells, Framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile, computing applications. Mobile databases - protocols, scope, tools and technology. M-business.

Unit-II

Electronic Commerce: Framework, Media Convergence of Applications, Consumer Applications, Organisation Applications. Electronic Payment Systems: Digital Token, Smart Cards, Credit Cards, Risks in Electronic Payment System, Designing Electronic Payment Systems. Electronic Data Interchange (EDI): Concepts, Applications, (Legal, Security and Privacy) issues, EDI and Electronic Commerce, Standardization and EDI, EDI Software Implementation. EDI Envelope for Message Transport, Internet-BasedEDI.

Unit-III

Software Agents: Characteristics and Properties of Agents, Technology behind Software Agents (Applets, Browsers and Software Agents), Broadband Telecommunications: Concepts, Frame Relay, Cell Relay, Switched Multimegabit Data Service

Unit-IV

Asynchronous Transfer Mode. Main concepts in Geographical Information Systems (GIS), E- cash, E-Business, ERP packages.

Text/References:

1. Laudon, Kenneth C., and Jane Price Laudon. Management information systems. Vol. 8. New Jersey: Prentice Hall,2011.
2. Lucey, T. (2005). Management information systems. Cengage LearningEMEA.
3. Leeuwen, J. V., Hartmanis, J., & Goos, G. (1995). Computer science today: recent trends and developments. Springer-Verlag New York,Inc..
4. Ten Teije, A., Miksch, S., & Lucas, P. (Eds.). (2008). Computer-based medical guidelines and protocols: a primer and current trends (Vol. 139). IosPress.

5. Davis, C. H., Shaw, D., Katz, J. M., Tejedor, F. J., Allard, C. K., Allard, K., & Martín, A. G. (2011). Introduction to information science and technology (No. 004 004). e-libro,Corp..
6. Pour, M.K. (2015), Encyclopedia of information science and technology, 3rd Edition, IGI Global,USA

Paper Title: Project/ Dissertation Course Code: BCADSEPRO Credit:6

रायगञ्ज यूनिभार्सिटि
तमसो मा ज्योतिर्गमय
Estd. 2015

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