# BEANT COLLEGE OF ENGINEERING & TECHNOLOGY, GURDASPUR

**Scheme& Syllabus of**
**B. Tech.**
**Information Technology**
**Batch 2015 onwards**

**By**
**Department of Academics**
**BEANT COLLEGE OF ENGINEERING & TECHNOLOGY**
**GURDASPUR**

| Third Semester | | | | | | Contact Hrs=28 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **MCode** | **Subject Code** | **Course Name** | **L** | **T** | **P** | **Internal Marks** | **External Marks** | **Total** | **Credits** |
| 74258 | BTIT-301 | Operating System | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74273 | BTAM-302 | Mathematics-III | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74259 | BTIT-303 | Digital Circuit & Logic Design | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74260 | BTIT-304 | Data Structures | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74261 | BTIT-305 | Object Oriented Programming Using C++ | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74262 | BTIT-306 | Programming Lab-I | - | - | 4 | 30 | 20 | 50 | 2 |
| 74263 | BTIT-307 | Digital Circuit & Logic Design Lab | - | - | 2 | 30 | 20 | 50 | 1 |
| 74264 | BTIT-308 | Operating System Lab | - | - | 2 | 30 | 20 | 50 | 1 |
| 74265 | BTIT-309 | Institutional Practical Training* | - | - | - | 60 | 40 | 100 | 1 |
| **Total** | | | **15** | **5** | **8** | **350** | **400** | **750** | **25** |

**\* The marks will be awarded on the basis of 4 weeks institutional training conducted after second semester.**

| Fourth Semester | | | | | | Contact Hrs=28 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **MCode** | **Subject Code** | **Course Name** | **L** | **T** | **P** | **Internal Marks** | **External Marks** | **Total** | **Credits** |
| 74266 | BTIT-401 | Computer Networks-I | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74288 | BTAM-402 | Discrete Structure | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74267 | BTIT-403 | Computer Architecture | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74268 | BTIT-404 | Microprocessor & Assembly Language Programming | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74269 | BTIT-405 | System Programming | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74270 | BTIT-406 | Computer Networks-I Lab | - | - | 2 | 30 | 20 | 50 | 1 |
| 74271 | BTIT-407 | Microprocessor & Assembly Language Programming Lab | - | - | 2 | 30 | 20 | 50 | 1 |
| 74272 | BTIT-408 | System Programming Lab | - | - | 4 | 30 | 20 | 50 | 2 |
| 74079 | BTGF-400 | General Fitness | | | | 100 | | 100 | 1 |
| **Total** | | | **15** | **5** | **8** | **390** | **360** | **750** | **25** |

| **Fifth Semester** | | | | | | | | | **Contact Hrs=27** |
|---|---|---|---|---|---|---|---|---|---|
| **MCode** | **Subject Code** | **Course Name** | **L** | **T** | **P** | **Internal Marks** | **External Marks** | **Total** | **Credits** |
| | BTXX | Open Elective-I | 3 | - | - | 40 | 60 | 100 | 3 |
| 74274 | BTIT-501 | Computer Networks-II | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74275 | BTIT-502 | Programming in Java | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74276 | BTIT-503 | Database Management System | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74277 | BTIT-504 | Design and Analysis of Algorithms | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74278 | BTIT-505 | Database Management System Lab | - | - | 2 | 30 | 20 | 50 | 1 |
| 74279 | BTIT-506 | Programming in Java Lab | - | - | 4 | 30 | 20 | 50 | 2 |
| 74280 | BTIT-507 | Computer Networks-II Lab | - | - | 2 | 30 | 20 | 50 | 1 |
| 74281 | BTIT-508 | Industrial/Institutional Training* | - | - | - | 60 | 40 | 100 | 1 |
| **Total** | | | **15** | **4** | **8** | **350** | **400** | **750** | **24** |

**\* The marks will be awarded on the basis of 6 weeks industrial training conducted after fourth semester.**

| **Sixth Semester** | | | | | | | | | **Contact Hrs=27** |
|---|---|---|---|---|---|---|---|---|---|
| **MCode** | **Subject Code** | **Course Name** | **L** | **T** | **P** | **Internal Marks** | **External Marks** | **Total** | **Credits** |
| 74282 | BTIT-601 | Network Programming | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74283 | BTIT-602 | Web Technologies | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74284 | BTIT-603 | Software Engineering | 3 | 1 | - | 40 | 60 | 100 | 4 |
| | BTXXXX | Elective-I | 3 | 1 | - | 40 | 60 | 100 | 4 |
| | BT*** | Open Elective-II | 3 | - | - | 40 | 60 | 100 | 3 |
| 74285 | BTIT-604 | Network Programming Lab | - | - | 2 | 30 | 20 | 50 | 1 |
| 74286 | BTIT-605 | Web Technologies Lab | - | - | 4 | 30 | 20 | 50 | 2 |
| 74287 | BTIT-606 | Minor Project | - | - | 2 | 60 | 40 | 100 | 1 |
| 74092 | BTGF-600 | General Fitness | | | | 100 | - | 100 | 1 |
| **Total** | | | **15** | **4** | **8** | **420** | **380** | **800** | **24** |

| Seventh/Eighth Semester | | | | | | | | Contact Hrs=32 |
|---|---|---|---|---|---|---|---|---|
| **MCode** | **Subject Code** | **Course Name** | **L** | **T** | **P** | **Internal Marks** | **External Marks** | **Total** | **Credits** |
| 74289 | BTIT-701 | Cloud Computing | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74290 | BTIT-702 | Wireless Communication | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74291 | BTIT-703 | Network Security and Cryptography | 3 | 1 | - | 40 | 60 | 100 | 4 |
| | BTYYY | Elective-II | 3 | 1 | - | 40 | 60 | 100 | 4 |
| | BTZZZ | Elective-III | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 74292 | BTIT-704 | Cloud Computing Lab | - | - | 2 | 30 | 20 | 50 | 1 |
| 74293 | BTIT-705 | Major Project | - | - | 8 | 150 | 150 | 300 | 4 |
| 74112 | BTGF-800 | General Fitness | | | | 100 | - | 100 | 1 |
| **Total** | | | **15** | **5** | **12** | **480** | **470** | **950** | **26** |

| Seventh/Eighth Semester | | | | | | Industrial Training (One Semester) | | | |
|---|---|---|---|---|---|---|---|---|---|
| **MCode** | **Subject Code** | **Course Name** | **L** | **T** | **P** | **Internal Marks** | **External Marks** | **Total** | **Credits** |
| 72161 | BTIT-801 | Industrial Training | | | | 450 | 300 | 750 | 24 |
| **Total** | | | | | | **450** | **300** | **750** | **24** |

Total Marks= 4750 (Excluding First Year Marks)

Total Credits= 197   (Including First Year Credits)

**Elective-I**

| MCODE | Subject Code | Course Name | Remarks |
|---|---|---|---|
| 74295 | BTIT-911 | Computer Graphics | |
| 74296 | BTIT-912 | Multimedia Database | |
| 74297 | BTIT-913 | Mobile Computing | |
| 74298 | BTIT-914 | Cyber law and IPR | |
| | BTIT-915 | Internet of Things | |

**Elective-II**

| MCODE | Subject Code | Course Name | Remarks |
|---|---|---|---|
| 74299 | BTIT-931 | Theory of Computation | |
| 74300 | BTIT-932 | Software Project Management | |
| 74301 | BTIT-933 | Image Processing | |
| 74302 | BTIT-934 | Enterprise Resource Planning | |

**Elective-III**

| MCODE | Subject Code | Course Name | Remarks |
|---|---|---|---|
| 74303 | BTIT-935 | Modelling & Simulation | |
| 74304 | BTIT-936 | Advance Java | |
| 74305 | BTIT-937 | Mobile Application Programming | |
| 74306 | BTIT-938 | Multimedia and Applications | |

| Open Elective-I | | | |
|---|---|---|---|
| MCODE | Subject Code | Course Name | Remarks |
| 74307 | BTIT-951 | Concept of Computer and Networking | |
| 74308 | BTIT-952 | Operating System | |
| Open Elective-II | | | |
| 74309 | BTIT-961 | Programming in Java | |
| 74310 | BTIT-962 | Software Engineering | |

Beant College of Engineering & Technology, Gurdaspur

# *Third Semester*

# BTIT- 301 Operating System

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks:   100**

**Objectives:** This course should provide the students with good understanding of Operating System including its architecture and all its components. Good conceptions on all the subjects like processes, inter-process communication, semaphore, message passing, classical IPC problems, scheduling, memory management, file systems, security and protection mechanism, I/O hardware and software, deadlocks, etc. should be provided

1. **Introduction** to Operating system, Role of Operating System as resource manager, function of kernel and shell, operating system structures, views of an operating system.                     **(7)**

2. **Process management:** CPU scheduling, Scheduling Algorithms, PCB, Process synchronization, Deadlocks, Prevention, Detection and Recovery.                     **(8)**

3. **Memory Management:** Overlays, Memory management policies, Fragmentation and its types, Partitioned memory managements, Paging, Segmentation, Need of Virtual memories, Page replacement Algorithms, Concept of Thrashing.                     **(8)**

4. **Device Management:** I/O system and secondary storage structure, Device management policies, Role of I/O traffic controller, scheduler                     **(7)**

5. **File Management:** File System Architecture, Layered Architecture, Physical and Logical File Systems, Protection and Security.                     **(7)**

6. Brief study to multiprocessor and distributed operating systems.                     **(4)**

**Case Studies:** LINUX / UNIX Operating System and Windows based operating systems.

**Suggested Readings/ Books:**
**1.** A Silberschatz and Peter B. Galvin, **"Operating System Concepts''**Addison Wesley Publishing Company
**2.** Dhamdhere —**Systems Programming & Operating Systems"** Tata McGraw Hill
**3.** Gary Nutt **"Operating Systems Concepts",** Pearson Education Ltd. 3rd Edition
**4. Operating System** by Madnick Donovan
**5. Operating System** by Stallings

# BTAM-302 Mathematics-III

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks:   100**

**Objective/s and Expected Outcome:**
To teach computer based Engineering Mathematics to students.After this course the student will be able to solve complex computer oriented problems.

**Fourier series:**
Periodic Functions, Euler's Formula. Even and odd Functions, Half range expansions,Fourier series of different waveforms.                                                            (5)

**Laplace transformations:**
Laplace transforms of various standard functions, properties of Laplace transform.        (5)

**Partial Differential Equations:**
Formation of Partial Differential Equations, linear Partial Differential Equations, Homogeneous Partial Differential Equations with constant coefficients.                                      (5)

**Functions of complex variables:**
Limits, continuity and derivatives of the function of complex variables, Analytic function, Cauchy-Riemann equations, conjugate functions.                                                    (5)

**Linear Systems and Eigen- Values:**
Gauss–elimination method, gauss- Jordan method, Gauss- Seidel iteration method, Rayleigh's Power method for Eigen values and Eigenvectors.                                            (5)

**Differential Equations:**
Solutions of Initial values problems using Eulers, modified Eulers method and Runge- kutta (upto fourth order) methods.                                                                 (5)

**Probability distribution:**
Binomial, Poisson and Normal distribution.                                                (5)

**Sampling Distribution & testing of Hypothesis:**
Sampling, Distribution of means and variance, Chi-Square distribution, t- distribution, F- distribution. General concepts of hypothesis, Testing a statistical Hypothesis, One and two tailed tests, critical region, Confidence interval estimation.Single and two sample tests on proportion, mean and variance.
                                                                                          (5)

**Suggested Readings/ Books:**

a. E. Kreyszig,"Advanced Engineering Mathematics", 5thEdition, Wiley Enstern 1985.
b. P. E. Danko, A. G. Popov, T. Y. A. Kaznevnikova, "Higher Mathematics in Problemsand Exercise", Part 2, Mir Publishers, 1983.

c. Bali, N. P., "A Text Book on Engineering Mathematics", Luxmi Pub., New Delhi.
d. Peter V.O'Neil," Advanced Engineering Mathematics", Cengage Learning

## BTIT-303 Digital Circuits & Logic Design

**L T P**
**3 1 0**

**Internal Marks:  40**
**External Marks: 60**
**Total Marks:    100**

**Objective/s and Expected outcome:** Demonstrate the operation of simple digital gates, identify the symbols, develop the truth table for those gates; combine simple gates into more complex circuits; change binary, hexadecimal, octal numbers to their decimal equivalent an vice versa, demonstrate the operation of a flip-flop. Design counters and clear the concept of shift resisters. Study different types of memories and their applications. Convert digital into analog and vice versa.

**1. Number Systems:** Binary, Octal, Decimal, Hexadecimal. Number base conversions, 1's, 2's, rth's complements, signed Binary numbers. Binary Arithmetic, Binary codes: Weighted BCD, Gray code, Excess 3 code, ASCII – conversion from one code to another. **(6)**

**2. Boolean Algebra:** Boolean postulates and laws – De-Morgan's Theorem, Principle of Duality, Boolean expression – Boolean function, Minimization of Boolean expressions – Sum of Products (SOP), Product of Sums (POS), Minterm, Maxterm, Canonical forms, Conversion between canonical forms, Karnaugh map Minimization, Quine-McCluskey method - Don't care conditions **(6)**

**3. Logic GATES:** AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR. Implementations of Logic Functions using gates, NAND-NOR implementations. Study of logic families like RTL, DTL, DCTL, TTL, MOS, CMOS, ECL and their characteristics. **(6)**

**4. Combinational Circuits:** Design procedure – Adders, Subtractors, Serial adder/Subtractor, Parallel adder/ Subtractor Carry look ahead adder, BCD adder, Magnitude Comparator, Multiplexer/Demultiplexer, encoder/decoder, parity checker, code converters. Implementation of combinational logic using MUX. **(6)**

**5. Sequential Circuits:** Flip flops SR, JK, T, D and Master slave, Excitation table, Edge triggering, Level Triggering, Realization of one flip flop using other flip flops. Asynchronous/Ripple counters, Synchronous counters, Modulo-n counter, Ring Counters. Classification of sequential circuits- Moore and Mealy, Design of Synchronous counters: state diagram, Circuit implementation. Shift registers. **(6)**

**6. Memory Devices:** Classification of memories, RAM organization, Write operation, Read operation, Memory cycle. Static RAM Cell-Bipolar, RAM cell, MOSFET RAM cell, Dynamic RAM cell. ROM organization, PROM, EPROM, EEPROM, Field Programmable Gate Arrays (FPGA). **(5)**

**7. Signal Conversions:** Analog & Digital signals. A/D and D/A conversion techniques (Weighted type, R-2R Ladder type, Counter Type, Dual Slope type, Successive Approximation type).          **(6)**

**Suggested Readings/ Books:**

**1.** MorrisMano, **Digital Design**, Prentice Hall of India Pvt. Ltd
**2.** Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 5 ed., Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
3. R.P.Jain,Modern Digital Electronics, 3 ed., Tata McGraw–Hill publishing company limited, New Delhi, 2003.
4. Thomas L. Floyd, Digital Fundamentals, Pearson Education, Inc, New Delhi, 2003
5. Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss, Digital System-Principles and Applications, Pearson Education.
6. Ghosal , Digital Electronics, Cengage Learning.

# BTIT-304 Data Structures

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks:   100**

**Objectives:** This course should provide the students with a fairly good concept of the fundamentals of different types of data structures and also the ways to implement them. Algorithm for solving problems like sorting, searching, insertion & deletion of data etc. related to data structures should also be discussed. After completion of this subject student should be able to choose an appropriate data structure for a particular problem.

1.    **Dynamic Memory Management:** Understanding pointers, usage of pointers, arithmetic on pointers, memory allocation, memory management functions and operators, debugging pointers – dangling pointers, memory leaks, etc.                                                                            **(3)**

2.    **Introduction:** Concept of data type, definition and brief description of various data structures, data structures versus data types, operations on data structures, algorithm complexity, Big O notation.                                                                                                        **(3)**

3.    **Arrays:** Linear and multi-dimensional arrays and their representation, operations on arrays, sparse matrices and their storage.                                                                              **(3)**

4.    **Linked List:** Linear linked list, operations on linear linked list, doubly linked list, operations on doubly linked list, application of linked lists.                                                      **(4)**

5.    **Stacks:** Sequential and linked representations, operations on stacks, application of stacks such as parenthesis checker, evaluation of postfix expressions, conversion from infix to postfix representation, implementing recursive functions.                                                         **(4)**

6.    **Queues:** Sequential representation of queue, linear queue, circular queue, operations on linear and circular queue, linked representation of a queue and operations on it, Deque, priority queue, applications of queues.                                                                                **(4)**

7.    **Trees:** Basic terminology, sequential and linked representations of trees, traversing a binary tree using recursive and non-recursive procedures, inserting a node, deleting a node, brief introduction to threaded binary trees, AVL trees and B-trees.                                            **(4)**

8.    **Heaps:** Representing a heap in memory, operations on heaps, application of heap in implementing priority queue and heap sort algorithm.                                                             **(3)**

9.      **Graphs:** Basic terminology, representation of graphs (adjacency matrix, adjacency list), traversal of a graph (breadth-first search and depth-first search), and applications of graphs.      **(4)**

10.     **Hashing & Hash Tables:** Comparing direct address tables with hash tables, hash functions, concept of collision and its resolution using open addressing and separate chaining, double hashing, rehashing.                                                                                       **(3)**

11.     **Searching & Sorting:** Searching an element using linear search and binary search techniques, sorting arrays using bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, shell sort and radix sort, complexities of searching & sorting algorithms.      **(5)**

**Suggested Readings/ Books:**

1. Sartaj Sahni, Data Structures, Algorithms and Applications in C++, Tata McGraw Hill.
2. Tenenbaum, Augenstein, & Langsam, Data Structures using C and C++, Prentice Hall of India.
3. R. S. Salaria, Data Structures & Algorithms Using C++, Khanna Book Publishing Co. (P) Ltd.
4. Seymour Lipschutz, Data Structures, Schaum's Outline Series, Tata McGraw Hill
5. Kruse, Data Structures & Program Design, Prentice Hall of India.
6. R. S. Salaria, Test Your Skills in Data Structures.
7. Malik , Data Structures using C++, Cengage Learning.

**BTIT- 305 Objects Oriented Programming Using C++**

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

**Objectives:** To understand the basic concepts of object oriented programming languages and to learn the techniques of software development in C++.

**1. Object-Oriented Programming Concepts:** Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object oriented programming — concepts of an object and a class, interface and implementation of a class, operations on objects, relationship among objects, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging. **(4)**

**2. Standard Input/output:** Concept of streams, hierarchy of console stream classes, input/output using overloaded operators >> and << and member v functions of i/o stream classes, formatting output, formatting using ios class functions and flags, formatting using manipulators. **(4)**

**3. Classes and Objects:** Specifying a class, creating class objects, accessing class members, access specifiers, static members, use of *const* keyword, friends of a class, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes**. (4)**

**4. Pointers and Dynamic Memory Management:** Declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using *new* and *delete* operators, pointer to an object, *this* pointer, pointer related problems- dangling/wild pointers, null pointer assignment, memory leak and allocation failures**. (6)**

**5. Constructors and Destructors:** Need for constructors and destructors, copy constructor, dynamic constructors, explicit constructors, destructors, constructors and destructors with static members, initializer lists. **(4)**

**6. Operator Overloading and Type Conversion:** Overloading operators, rules for overloading operators, overloading of various operators, type conversion - basic type to class type, class type to basic type, class type to another class type. **(4)**

**7. Inheritance:** Introduction, defining derived classes, forms of inheritance, ambiguity in multiple and multipath inheritance, virtual base class, object slicing, overriding member functions, object composition and delegation, order of execution of constructors and destructors. **(5)**

**8. Virtual functions & Polymorphism:** Concept of binding - early binding and late binding, virtual functions, pure virtual functions, abstract clasess, virtual destructors. **(3)**

**9. Exception Handling:** Review of traditional error handling, basics of exception handling,

exception handling mechanism, throwing mechanism, catching mechanism, rethrowing an exception, specifying exceptions. **(3)**

**10. Templates and Generic Programming:** Template concepts, Function templates, class templates, illustrative examples. (**3**)

**11. Files:** File streams, hierarchy of file stream classes, error handling during file operations, Reading/writing of files, accessing records randomly, updating files. (**3**)

**Suggested Readings/ Books:**
1. Lafore R., Object Oriented Programming in C++, Waite Group.
2. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill.
3. R. S. Salaria,Mastering Object-Oriented Programming with C++, Salaria PublishingHouse.
4. Bjarne Stroustrup, The C++ Programming Language, AddisonWesley.
5. Herbert Schildt, The Complete Reference to C++ Language,McGraw Hill-Osborne.
6. Lippman F. B, C++ Primer, AddisonWesley.

**BTIT-306 Programming Lab-I**

**L T P**
**0 0 4**

**Internal Marks: 30**
**External Marks: 20**
**Total Marks: 50**

**List of practical exercises, to be implemented using object-oriented approach in C++ Language.**

1. Write programs to understand the basic of object oriented programming.
2. Write program to demonstrate the use constructors and destructors
3. Write a program to demonstrate the overloading of increment anddecrement operators.
4. Write a program to demonstrate the typecasting of class type to class type & basic type.
5. Write a program to demonstrate the multilevel inheritance.
6. Write a program to demonstrate the multiple inheritances.
7. Write a program to demonstrate the runtime polymorphism.
8. Write a program to demonstrate the exception handling.
9. Write a program to demonstrate the reading and writing of mixed type of data.
10. Write a program to demonstrate the reading and writing of objects.
11. Write a menu driven program that implement following operations (using separate functions) on alinear array:
    * Insert a new element at end as well as at a given position
    * Delete an element from a given whose value is given or whose position is given
    * To find the location of a given element
    * To display the elements of the linear array
12. Write a menu driven program that maintains a linear linked list whose elements are stored in on ascending order and implements the following operations (using separate functions):
13. Insert a new element
    * Delete an existing element
    * Search an element
    * Display all the elements
14. Write a program to demonstrate the use of stack (implemented using linear array) in converting arithmetic expression from infix notation to postfix notation.
15. Program to demonstrate the use of stack (implemented using linear linked lists) in evaluating arithmetic expression in postfix notation.
16. Program to demonstration the implementation of various operations on a linear queue represented using a linear array.
17. Program to demonstration the implementation of various operations on a circular queue representedusing a linear array.
17. Program to demonstration the implementation of various operations on a queue represented using a linear linked list (linked queue).
18. Program to illustrate the implementation of different operations on a binary search tree.

19. Program to illustrate the traversal of graph using breadth-first search.
20. Program to illustrate the traversal of graph using depth-first search.
21. Program to demonstrate the use of various searching & Sorting Technique.

## BTIT-307 Digital Circuits & Logic Design Lab

**L T P**
**0 0 2**

**Internal Marks:  30**
**External Marks: 20**
**Total Marks:     50**

**Implementation all experiments with help of Bread- Board.**

1.  Study of Logic Gates: Truth-table verification of OR, AND, NOT, XOR, NAND and NOR gates; Realization of OR, AND, NOT and XOR functions using universal gates.
2.  Half Adder / Full Adder: Realization using basic and XOR gates.
3.  Half Subtractor / Full Subtractor: Realization using NAND gates.
4.  4-Bit Binary-to-Gray & Gray-to-Binary Code Converter: Realization using XOR gates.
5.  4-Bit and 8-Bit Comparator: Implementation using IC7485 magnitude comparator chips.
6.  Multiplexer: Truth-table verification and realization of Half adder and Full adder using IC74153 chip.
7.  Demultiplexer: Truth-table verification and realization of Half subtractor and Full subtractor using IC74139 chip.
8.  Flip Flops: Truth-table verification of JK Master Slave FF, T-type and D-type FF using IC7476 chip.
9.  Asynchronous Counter: Realization of 4-bit up counter and Mod-N counter using IC7490 & IC7493 chip.
10. Synchronous Counter: Realization of 4-bit up/down counter and Mod-N counter using IC74192 & IC74193 chip.
11. Shift Register: Study of shift right, SIPO, SISO, PIPO, PISO & Shift left operations using IC7495 chip.
12. DAC Operation: Study of 8-bit DAC (IC 08/0800 chip), obtain staircase waveform using IC7493 chip.
13. ADC Operations: Study of 8-bit ADC.

**BTIT-308 Operating System Lab**

**L T P**
**0 0 2**

**Internal Marks:  30**
**External Marks: 20**
**Total Marks:    50**

1.  Installation Process of various operating systems

2. Virtualization, Installation of Virtual Machine Software and installation of Operating System on Virtual Machine

3.  Commands for files & directories: cd, ls, cp, md, rm, mkdir, rmdir. Creating and viewing files using cat. File comparisons. Disk related commands: checking disk free spaces. Processes in Linux, Connecting processes with pipes, Background processing, managing multiple processes. Manual help. Background process: changing process priority, scheduling of processes at command, batch commands, kil, ps, who, sleep. Printing commands, grep, fgrep, find, sort, cal, banner, touch, file. File related commands ws, sat, cut, grep.

4. Shell Programming: Basic of shell programming, various types of shell, Shell Programming in bash, conditional & loping statement, case statements, parameter passing and arguments, shell variables, shell keywords, creating shell programs for automate system tasks, report printing.

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# *Fourth Semester*

## BTIT-401 Computer Networks–I

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks:    100**

**Objective/s and Expected Outcome:** This course provides knowledge about computer network related hardware and software using a layered architecture.

**1. Introduction to Computer Networks:**
Data Communication System and its components, Data Flow, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Wireless and wired networks, broadcast and point to point networks, Network topologies, Network software: concept of layers, protocols, interfaces and services, ISO OSI reference model, TCP/IP reference model.          **(6)**

**2. Physical Layer:**
Concept of Analog & Digital Signal, Bandwidth, Transmission Impairments: Attenuation, Distortion, Noise, Data rate limits : Nyquist formula, Shannon Formula, Multiplexing : Frequency Division, Time Division, Wavelength Division, Introduction to Transmission Media : Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (radio, microwave, infrared), Switching: Circuit Switching, Message Switching, Packet Switching & their comparisons.          **(8)**

**3. Data Link Layer:**
Design issues, Framing, Error detection and correction codes: checksum, CRC, hamming code, Data link protocols for noisy and noiseless channels, Sliding Window Protocols: Stop & Wait ARQ, Go-back-NARQ, Selective repeat ARQ, Data link protocols: HDLC and PPP.          **(7)**

**4. Medium Access Sub-Layer:**
Static and dynamic channel allocation, Random Access: ALOHA, CSMA protocols, Controlled Access: Polling, Token Passing, IEEE 802.3 frame format, Ethernet cabling, Manchester encoding, collision detection in 802.3, Binary exponential back off algorithm.          **(6)**

**5. Network Layer**:
Design issues, IPv4 classful and classless addressing, subnetting, Routing algorithms: distance vector and link state routing, Congestion control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket and token bucket algorithms          **(7)**

**6. Transport Layer**:
Elements of transport protocols: addressing, connection establishment and release, flow control and buffering, multiplexing and de-multiplexing, crash recovery, introduction to TCP/UDP protocols and their comparison.          **(5)**

**7. Application Layer**:
World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP), Introduction to Network security          **(4)**

**Suggested Readings/ Books:**
1. Computer Networks, 4th Edition, Pearson Education by Andrew S. Tanenbaum
2. Data Communication & Networking, 4th Edition, Tata McGraw Hill. By Behrouz A. Forouzan.
3. Computer Networking, 3rd Edition, Pearson Education by James F. Kurose and Keith W. Ross
4. Internetworking with TCP/IP, Volume-I, Prentice Hall, India by Douglas E. Comer.

5. Guide to Networking Essentials, 5th Edition, Cengage Learning by Greg Tomsho,
6. Handbook of Networking, Cengage Learning by Michael W. Graves.

## BTAM-402 Discrete Structures

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks:   100**

**Objective:** The objective of this course is to provide the necessary back ground of discrete structures with particular reference to the relationships between discrete structures and their data structure counterparts including algorithm development.

**Sets, relations and functions:**
Introduction, Combination of Sets, ordered pairs, proofs of general identities  of  sets,  relations, operations on relations, properties of relations and functions, Hashing Functions, equivalence relations, compatibility relations, partial order relations.                                        (8)

**Rings and Boolean algebra:**
Rings, Subrings, morphism of rings ideals and quotient rings.Euclidean domains Integral domains and fields Boolean Algebra direct product morphisms Boolean sub-algebra Boolean Rings Application of Boolean algebra (Logic Implications, Logic Gates, map)                         (8)

**Combinatorial  Mathematics:**
Basic   counting   principles   Permutations   and combinations. Inclusion and Exclusion Principle Recurrence relations, Generating Function, Application.                                        (8)

**Monoids  and  Groups:**
Groups Semigroups and monoids Cyclic semigraphs  and Subgroups and Cosets. Congruence relations on semigroups.Morphisms.Normal groups.                                        (8)

**Graph Theory:**
Graph- Directed and undirected, Eulerian chains and cycles, Hamiltonian chains andcycles Trees, Chromatic number Connectivity, Graph coloring, Plane and connected graphs, Isomorphism and Homomorphism. Applications.                                        (8)

**Suggested Readings/ Books:**

1. Discrete Mathematics (Schaum series) by Lipschutz (McGraw Hill).
2. Applied Discrete Structures for Computer Science by Alan Doerr and Kenneth Levarseur.
3. Discrete Mathematics by N Ch SN Iyengar, VM Chandrasekaran.
4. Discrete Mathematics and Graph Theory(Cengage Learning) by Sartha
5. Discrete Mathematics and its Applications. Kenneth H Rosen.(McGraw Hill)
6. Elements of discrete mathematics. C L Liu (McGraw Hill)

**COURSE OUTCOMES (CO):** The student is expected to

1. Be familiar with constructing proofs.
2. Be familiar with elementary formal logic.
3. Be familiar with set algebra.
4. Be familiar with combinatorial analysis.
5. Be familiar with recurrence relations.
6.  Be familiar with graphs and trees, relations and functions, and finite automata.
7.  Be eposed to the strategies for compare relative efficiency of algorithms.

## BTIT-403 Computer Architecture

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

**Objectives:** This course offers a good understanding of the various functional units of a computer system and prepares the student to be in a position to design a basic computer system.

1. **Register Transfer and Microoperations:** Register transfer language & operations, arithmetic microoperations, logic microoperations, shift microoperations, arithmetic logic shift unit. Design of a complete basic computer and its working. **(6)**

2. **Basic Computer Organisation and Design:** Instruction codes, Computer registers, Computer Instructions, Timing and control, Instruction Cycle, Memory reference instructions, Input/ Output and Interrupt, Design of basic Computer, Design of Accumulator Logic. **(6)**

3. **Design of Control Unit:** Control memory, design of control unit – microprogrammed & hardwired, and their comparative study. **(5)**

4. **Central Processing Unit:** General Register Organisation, Stack Organisation, Instruction formats, Addressing Modes, Data transfer and manipulations, Program control, RISC and CISC architecture. **(6)**

5. **Input-Output Organisation:** Peripheral devices, I/O Interface, asynchronous data transfer, modes of transfer, priority interrupt, DMA, I/O processor, serial communication. **(6)**

6. **Memory Organisation:** Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware. **(6)**

7. **Advanced concepts of Computer Architecture:** Concept of pipeline, Arithmetic pipeline, Instruction, vector processors and array processors, Introduction to parallel processing, Interprocessor communication & synchronization. **(6)**

**Suggested Readings/ Books:**
**1.** M. Moris Mano, Computer System Architecture, Pearson Education.
2. William Stallings, Computer Organisation and Architecture, Pearson Education.
3. David A Patterson, Computer Architecture, Pearson Education.
4. P. Pal Choudhri, Computer Organisation and Design, PHI.
5. J. P. Hayes, Computer System Architecture, Pearson Education.
6. Kai Hawang, Advanced Computer Architecture, Tata McGraw Hill.
7. Riess. Assembly Language and Computer Architecture and using C++ and JAVA, Cengage Learning.

## BTIT-404 Microprocessors and Assembly Language Programming

**L T P**
**3 1 0**

**Internal Marks:  40**
**External Marks:  60**
**Total Marks:    100**

**Objective/s:** The course is intended to give students good understanding of internal architectural details and functioning of microprocessors.

1.  **Introduction:** Introduction to Microprocessors, history, classification, recent microprocessors.                                                    **(7)**

2.  **Microprocessor Architecture:** 8085 microprocessor Architecture. Bus structure, I/O Memory & Instruction execution sequence & Data Flow Instruction cycle. System buses, concept of address Bus, Data Bus & Control Bus, Synchronous & Asynchronous buses.  **(8)**

3.  **I/O memory interface:** Data transfer modes: Programmable, interrupt initiated and DMA, Serial & parallel interface, Detail study of 8251 I/O Processor & 8255 programmable Peripheral interfaces.                                                **(6)**

4.  **Instruction set & Assembly Languages Programming:** Introduction, instruction & data formats, addressing modes, status flags, 8085 instructions, Data transfer operations, Arithmetic operations, Logical operations, Branch operations.             **(7)**

5.  **Case structure & Microprocessor application:** Interfacing of keyboards and seven segment LED display, Microprocessor controlled temperature system (MCTS), Study of traffic light system, stepper motor controller, Microprocessor based micro computers.  **(8)**

6.  **Basic architecture of higher order microprocessors:** Basic introduction to 8086 family, Motorola 68000, Pentium processors.                             **(5)**

**Suggested Readings/ Books:**

1. Ramesh Gaonkar, "8085Microprocessor ",PHI Publications.
2. Daniel Tabak, "AdvancedMicroprocessors‖,McGraw- Hill, Inc., Second Edition 1995.
3. Douglas V. Hall, "Microprocessors and Interfacing: Programming and Hardware",
Tata McGraw Hill Edition,1986.
4. CharlesM.Gilmore,"Microprocessors: Principles and Applications",McGraw Hill.
5. Ayala Kenneth, "The 8086 Microprocessor Programming and Interfacing", Cengage   Learning

## BTIT- 405 System Programming

**L T P**
**3 1 0**

**Internal Marks:  40**
**External Marks: 60**
**Total Marks:    100**

**Objective/s and Expected Outcome:** This course provides knowledge to design various system programs.

1. **Introduction:** Introduction to system programming and different types of system programs –editors, assemblers, macro-processors, compilers, linkers, loader, debuggers.                    **(5)**

2. **Assemblers:** Description of single pass and two pass assemblers, use of data structures like OPTAB and SYMTAB, etc.                                                                              (8)

3. **Macroprocessors:** Description of macros, macro expansion, conditional and recursive macro expansion.                                                                                            **(6)**

4. **Compilers:** Various phases of compiler – lexical, syntax and semantic analysis, intermediate code generation, code optimization techniques, code generation, Case study: LEX and YACC.                                                                                          **(9)**

5. **Linkers and Loaders:** Concept of linking, different linking schemes, concept of loading and various loading schemes.                                                                           **(6)**

6. **Editors:** Line editor, full screen editor and multi window editor, Case study MS-Word, DOS Editor and vi editor.                                                                               **(4)**

7. **Debuggers:** Description of various debugging techniques.                                        **(3)**


**Suggested Readings/ Books:**

**1.** Donovan J.J., **"Systems Programming"**, New York, Mc-Graw Hill, 1972.

**2.** Dhamdhere, D.M., **"Introduction to Systems Software"**, TataMc-Graw Hill, 1996.

**3.** Aho A.V. and J.D. Ullman ,**"Principles of compiler Design"** AddisonWesley/ Narosa 1985.

**4.** Kenneth C. Louden,‖ Compiler Construction‖, Cengage Learning.

**BTIT- 406 Computer Networks-I Lab**

**L T P**
**0 0 2**

**Internal Marks:  30**
**External Marks: 20**
**Total Marks:    50**

**1.** To study various topologies for establishing computer networks.

**2.** To learn the usage of various basic tools (crimping, krone etc.) used in establishing a LAN.

**3.** To familiarize with switch and hub used in networks

**4.** To learn the usage of connecters and cables (cabling standards) used in networks

**5.** To make certain copper and fiber patch cords using different standards.

**6.** To familiarize with routers & bridges

**7.** Use commands like ping, ipconfig for trouble shooting network related problems.

**8.** Develop a program to compute the Hamming Distance between any two code words.

**9.** Develop a program to compute checksum for an 'm' bit frame using a generator   polynomial.

**BTIT-407 Microprocessor and Assembly Language Programming Lab**

**L T P**
**0  0  4**

**Internal Marks:  30**
**External Marks: 20**
**Total Marks:    50**

**1.** Introduction to 8085 kit.

**2.** Addition of two 8 bit numbers, sum 8 bit.

**3.** Subtraction of two 8 bit numbers.

**4.** Find 1's complement of 8 bit number.

**5.** Find 2's complement of 8 bit number.

**6.** Shift an 8 bit no. by one bit.

**7.** Find Largest of two 8 bit numbers.

**8.** Find Largest among an array of ten numbers (8 bit).

**9.** Sum of series of 8 bit numbers.

**10.** Introduction to 8086 kit.

**11.** Addition of two 16 bit numbers, sum 16 bit.

**12.** Subtraction of two 16 bit numbers.

**13.** Find 1's complement of 16 bit number.

**14.** Find 2's complement of 16 bit number.

**BTIT-408 System Programming Lab**

**L T P**
**0 0 4**

**Internal Marks:  30**
**External Marks: 20**
**Total Marks:    50**

**1.** Create a menu driven interface for

    **a)** Displaying contents of a file page wise

    **b)** Counting vowels, characters, and lines in a file.

    **c)** Copying a file

**2.** Write a program to check balance parenthesis of a given program. Also generate the error report.

**3.** Write a program to create symbol table for a given assembly language program.

**4.** Write a program to create symbol table for a given high-level language program.

**5.** Implementation of single pass assembler on a limited set of instructions.

**6.** Exploring various features of debug command.

**7.** Use of LAX and YACC tools.

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# 5th *Semester*

## BTIT-951 Concept of Computer and Networking (Open Elective-I)

**L T P**
**3 0 0**

**Internal Marks:   40**
**External Marks:   60**
**Total Marks:  100**

**Course Objective/s and Expected Outcome/s:** This course will provide the knowledge of computer networks and computer organization to the students. After this course students will be able to understand the functions of protocols and algorithms of different layers of computer network and also understand the concept of memory management and parallel processing.

**1 Introduction**
Basic architecture of Computer System, System performance parameters, I/O interfaces, communication devices, Internet connectivity and its types, Applications of Computers, Current trends in computing.
                    (9)

**2. I/O and Memory Management**
Memory Hierarchy, Main Memory, Auxillary memory, Associative memory, Cache memory, Virtual Memory, modes of I/O, Asynchronous and synchronous data transfer, DMA.
            (9)

**3 Computer Networks**
Types of computer networks: LAN, MAN, WAN, Wireless and wired networks, broadcast and point to point networks, Network topologies, concept of layers, protocols, interfaces and services, ISO OSI reference model, TCP/IP reference model, Transmission Media, Switching.

(8)

**4. Network and Data Link Protocol**
Internet Protocol: IPv4, IPv6 and their comparison. Distance vector and link state routing protocol, Error detection and correction, Sliding window protocol, Cryptography.

(8)

**Suggested Books:**
1. M. Moris Mano, Computer System Architecture, Pearson Education
2. Data Communication & Networking, 4th Edition, Tata McGraw Hill. By Behrouz A. Forouzan.

**BTIT-952 Operating Systems (Open Elective-I)**

**L T P**
**3 0 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

**Course Objective/s and Expected Outcome/s:** This course provide the students with understanding of Operating System including its architecture and all its components. At the end of the course, students will be able to understand the concepts of processes, inter-process communication, semaphore, message passing, classical IPC problems, scheduling, memory management, file systems, security and protection mechanism, I/O hardware and software, deadlocks etc.

1. **Introduction**
   Operating system, Role of Operating System as resource manager, function of kernel and shell, operating system structures, views of an operating system.

   (7)

2. **Process Management**
   CPU scheduling, Scheduling Algorithms, PCB, Process synchronization, Deadlocks, Prevention, Detection and Recovery.

   (8)

3. **Memory Management**
   Overlays, Memory management policies, Fragmentation and its types, Partitioned memory managements, Paging, Segmentation, Need of Virtual memories, Page replacement Algorithms, Concept of Thrashing

   (8)

4. **Device Management**
   I/O system and secondary storage structure, Device management policies, Role of I/O traffic controller, scheduler

   **(7)**

5. **File Management**
   File System Architecture, Layered Architecture, Physical and Logical File Systems, Protection and Security.

   (7)

6. **Brief study**
   Multiprocessor and distributed operating systems.

   (4)

**Case Studies:** LINUX / UNIX Operating System, Real Time Operating System, Mobile Operating System and Windows based operating systems.
**Suggested Books:**
1. A Silberschatz and Peter B. Galvin, **"Operating System Concepts"** Addison Wesley Publishing Company, 9th Edition.

2. Andrew S. Tanenbaum and Herbert Boss, **"Modern Operating System",** Prentice Hall, 4th Edition.
3. D.M. Dhamdhere, **"Operating Systems: A Concept-based Approach"** Tata McGraw Hill, 3rd Edition.
4. Gary Nutt **"Operating Systems Concepts",** Pearson Education Ltd. 3rd Edition
5. William Stallings, **"Operating Systems: Internals and Design Principles",** Prentice Hall, 8th Edition.

## BTIT-501 Computer Networks-II

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

**Course Objective/s and Expected Outcome/s:** This course will provide a precise view of the generation of the recent trends in the field of communication technology. After studying this course the students can understand the basic building blocks of modern communication system and network security.

### 1. Internet Protocols

IPv4, IPv6, IPsec: overview of IPsec, Authentication header (AH), Encapsulating Security Payload (ESP).

(6)

### 2. Network Security

Introduction, symmetric-key cryptography, Asymmetric-key cryptography, security services, message confidentiality, message integrity, message authentication and digital signature.

(6)

### 3. Ad hoc networks

Features, advantages and applications, Ad hoc versus Cellular networks, Network architecture, Protocols: MAC protocols, Routing protocols, Technologies.

(6)

### 4. Wireless Communication Systems

Evolution, examples of wireless communication systems, 2G Cellular networks, Evolution for 2.5G TDMA Standards, IS-95B for 2.5G CDMA.

(6)

### 5. 3G wireless networks

Wireless local loop (WLL), Local Multipoint Distribution System (LMDS), Wireless local Area Networks (WLANs), Bluetooth and Personal Area Network

(6)

### 6. Wireless System Design

Introduction, Frequency reuse, channel assignment strategies, handoff strategies, interference and system capacity, improving coverage and capacity in cellular systems. (6)

**Suggested Books:**

1. Theodore S. Rappaport, Wireless Communication: Principles and Practices (2$^{nd}$Edition), Pearson Education.
2. Charlie Kaufman, Radio Perlman, Mike Speciner, Neywork security, 2$^{nd}$ ed., PHI.
3. Sunilkumar S. Manvi, Mahabaleshwar S. Kakkasageri, Wireless and mobile networks: concepts and protocols, Wiley India.
4. Michael A. Gallo & William M. Hancock, "Computer Communications and Networking Technologies", Cengage Learning / Thomson Brooks / Cole
5. S. Keshav, "An Engineering Approach to Computer Networking", Pearson Education.

## BTIT-502 Programming in Java

**L T P**
**3 1 0**

**Internal Marks:** 40
**External Marks:** 60
**Total Marks:** 100

**Course Objective/s and Expected Outcome/s:** This course will provide the knowledge of Java and prepare students to be in a position to write Object Oriented programs in Java. During this course students will be able to understand the concept of object oriented programming, different constructs of language, classes and objects, Inheritance, Exception handling, Multithread programming, Graphics, Event Handling and Network programming.

**1. Introduction to Java:** Features of Java, Object oriented programming, Date types, Variables, Casting, automatic type promotion in expressions, Arrays.                                                 (3)

**2. Operators and Control Statements:** Arithmetic operators, bit-wise operators, relational operators, Boolean logical operators, operator precedence, Java's selection statements, iteration statements, jump statements.                                                 (3)

**3. Introduction to Classes:** Class fundamentals, declaring object reference variable, Introducing methods, constructors, this keyword, garbage collection, the finalize() method, Overloading methods, using objects as parameters, recursion.
        (4)

**4. Inheritance:** Inheritance basics, using super, method overriding, dynamic method dispatch, using abstract Classes, Using final with inheritance, Package and Interfaces, Package access protection, importing packages.
                (4)

**5. Exception Handling:** Exception handling fundamentals, Exception types, Uncaught Exceptions Using try and catch, multiple catch clauses, nested try statements, throw, finally Java's built-in exceptions, creating your own exception sub classes, using exceptions.
        (3)

**6. Multithreaded Programming:** The Java thread model, the main thread, creating thread, creating multiple threads, using is alive () and join (), Thread priorities, synchronization, Inter thread communications, suspending resuming and stopping threads.
        (5)

**7. I/O, Applets and Graphics:** I/O Basics, Reading Console Input, Writing Console Output, Reading and Writing Files, Applet Fundamentals, Applet Architecture, Applet initialization and termination, Frame Windows, Drawing Lines, Rectangles, Circles, Ellipses.                         (5)

**8. Event Handling and AWT**:  Abstract Window Toolkit, working with button, text field, check box, radio button, canvas, Event Handling, Delegation event Model, Event classes and event listener interfaces, key events, mouse events, Adapter classes, Introduction to Swings. (4)

**9. Networking:** Networking basics, Java and the Internet, TCP/IP Client Sockets URL, URL Connection, TCP/IP Server Sockets, Database connectivity with JDBC.

(3)

**Suggested Books:**

1. Herbert Schildt, The Complete Reference Java, Seventh Edition, McGraw-Hill.
2. M.P. Bhave, S.A. Patekar, Programming with java, Pearson Education.
3. Joyce Farrell, Java for Beginners, Cengage Learning.
4. Deitel and Deitel, Java: How to Program, 6th Edition, Pearson Education.
5. James Edward Keogh, Jim Keogh, J2EE: The complete Reference, McGraw-Hill
6. Khalid A. Mughal, Torill Hamre, Rolf W. Rasmussen, Java Actually, Cengage Learning.

**BTIT-503 Database Management System**

**L T P**
**3 1 0**

**Internal Marks:    40**
**External Marks:    60**
**     Total Marks:  100**

**Course Objective/s and Expected Outcome/s:** The course is designed to expose the students to the fundamentals of Database Management Systems and make them understand the relational model. To familiarize the students with ER diagrams and SQL. To make the students to understand the fundamentals of Transaction Processing and Query Processing. To make the students understand the Security Issues in Databases

**1. Introduction to DBMS**
File Systems Organization - Sequential, Pointer, Indexed, Direct - Purpose of Database System-Database System Terminologies-Database characteristics- Data models – Types of data models – Components of DBMS- Relational Algebra.  LOGICAL DATABASE DESIGN: Relational DBMS - Codd's Rule - Entity-Relationship model - Extended ER Normalization – Functional Dependencies, Anomaly- 1NF to 5NF- Domain Key Normal Form – Denormalization.

(10)

**2. SQL & Query Optimization**
SQL Standards - Data types - Database Objects- DDL-DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL - QUERY OPTIMIZATION: Query Processing and Optimization - Heuristics and Cost Estimates in Query Optimization.

(8)

**3. Transaction Processing and Concurrency Control**
Introduction-Properties of Transaction- Serializability- Concurrency Control – Locking Mechanisms- Two Phase Commit Protocol-Dead lock.

(6)

**4. Trends in Database Technology**
 Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing - Introduction to Distributed Databases- Client server technology-- Spatial and multimedia databases- Mobile and web databases- Data Warehouse-Mining- Data marts.

(10)

**5. Advanced Topics**
 Database Security: Data Classification-Threats and risks – Database access Control – Types of Privileges –Cryptography- Statistical Databases. - Distributed Databases-Architecture-Transaction Processing, Object Oriented Databases-XML Databases.

(8)

**Suggested Books:**

1. Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education, 2008.
2. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2011.
3. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
4. Atul Kahate, "Introduction to Database Management Systems", Pearson Education, New Delhi, 2006.
5. Alexis Leon and Mathews Leon, "Database Management Systems", Vikas Publishing House Private Limited, New Delhi, 2003.

## BTIT-504 Design and Analysis of Algorithms

**L T P**
**3 1 0**

**Internal Marks:** 40
**External Marks:** 60
**Total Marks:** 100

**Objectives:** This subject will give an insight into the techniques used for designing the algorithms for solving any kind of problem. It also provides a way to analyze the performance of the algorithms.

### 1. Introduction
An Overview of data Structures: Stacks, Queues, Trees and Graphs. Concept of Algorithm, Performance Analysis (Time and space complexity), Asymptotic Notations. Substitution Method, Master theorem,

(4)

### 2. Divide and conquer approach
General Method, Binary Search, Merge Sort, Quick Sort, Strassen's Matrix Multiplication.

(4)

### 3. Greedy Method
General Method, Knapsack Problem, Finding Minimum Cost Spanning Trees (Prim's Algorithm, Kruskal's Algorithm), Single–Source Shortest Path algorithm.          `

(5)

### 4. Dynamic Programming
General Method, Multistage Graphs, All Pairs Shortest Paths, Single Source Shortest Paths, 0/1 Knapsack and Travelling Salesman Problem.

(5)

### 5. Backtracking approach
General Method, 4–Queen's and 8-Queen's Problem, Graph Coloring, Hamiltonian Cycles.

(5)

### 6. Matching Algorithms
Boyer-Moore String matching algorithm, Knuth-Mooris-Pratt pattern matching algorithm

(3)

### 7. Complexity Classes
Basic Concepts, Nondeterministic Algorithms, Classes NP–Hard and NP– Complete, NP–Hard Graph Problems.

(4)

### 8. Approximation Algorithms
Introduction, Absolute Approximation (Planner Graph Coloring), ε–Approximations (Scheduling Independent Tasks and Bin Packing).

(5)

**Suggested Books:**

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran *"Fundamentals of Computer Algorithms"*, Second Edition, Universities Press, 2011.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clliford Stein, *"Introduction to Algortihms",* Second Edition, PHI, 2009.
3. Aho, Hopcroft and Ullman *"The Design and Analysis of Computer Algorithms",* 2003.
4. Purdom, Jr. and C. A. Brown, *"The Analysis of Algorithms"*, Holt Rinechart and Winston, 1985.
5. Donald E. Kunth, *"The Art of Computer Programming"*, Addison-Wesley, 1968.

## BTIT-505 Database Management System Lab

**L T P**
**0 0 2**

**Internal Marks:  30**
**External Marks:  20**
**Total Marks:  50**

1. Introduction to SQL and installation of a database product

2. Data Types, Creating Tables, Retrieval of Rows using Select Statement, Conditional Retrieval of Rows, Alter and Drop Statements.

3. Working with Null Values, Matching a Pattern from a Table, Ordering the Result of a Query, Aggregate Functions, Grouping the Result of a Query, Update and Delete Statements.

4. Set Operators, Nested Queries, Joins, Sequences.

5. Views, Indexes, Database Security and Privileges: Grant and Revoke Commands, Commit and Rollback Commands.

6. PL/SQL Architecture, Assignments and Expressions, Writing PL/SQL Code, Referencing Non-SQL parameters.

7. Stored Procedures and Exception Handling.

8. Triggers and Cursor Management in PL/SQL.

9. Working with XML databases

10. Introduction to a data mining tool

## BTIT-506 Programming in Java Lab

**L T P**
**0 0 4**

**Internal Marks: 30**
**External Marks: 20**
  **Total Marks: 50**

1. Implementation of classes.

2. Implementation of inheritance.

3. Implementation of packages and interfaces.

4. Implementation of threads.

5. Using exception handling mechanisms.

6. Implementation of Applets.

7. Implementation of Frame Window and Graphics

8. Implementation of mouse events, and keyboard events.

9. Implementing basic file reading and writing methods.

10. Using basic networking features.

11. Connecting to Database using JDBC.

## BTIT-507 Computer Networks-II Lab

**L T P**

**0 0 2**

**Internal Marks:  30**
**External Marks:  20**
**Total Marks: 50**

**1.** To configure the IP address for a computer connected to LAN and to configure network parameters of a web browser for the same computer.

**2.** To plan IPv6 address scheme for a local area network comprising of 'n' terminals.

**3.** To develop programs networks for implementing / simulating routing algorithms for Adhoc

**4.** To install any one open source packet capture software like wire shark etc**.**

**5.** To configure Wireless Local Loop.

**6.** To plan Personal Area Network.

**7.** To configure WLAN.

**8.** To configure Ad hoc networks.

**9.** To install and configure wireless access points

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# 6th *Semester*

**BTIT-601 Network Programming**

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

**Course Objective/s and Expected Outcome/s:** To familiarize students with advanced concepts of networks, network programming in UNIX environment.

**1. Network Models and UNIX Architecture**

OSI model, client server model, TCP/IP protocols, Introduction to UNIX; Process, groups, job control and non-job control shells, reliable and unreliable signals, shell Programming.

(8)

**2. Inter process communication**

Inter process communication in Unix, pipes, half duplex and full duplex pipes, FIFOs, properties of pipes and FIFOs, POSIX message queues, system V message queues, semaphores, shared memory, mmap( ) function and its use, RPC, authentication, timeout and retransmission, call semantics, XDR.

(8)

**3. Communication Protocol**

Introduction, TCP, IP, XNS, SNA, NetBIOS, OSI protocols, comparisons.

(6)

**4. Socket Programming**

Introduction to Berkeley sockets, socket addressing, TCP and UDP socket functions, sockets and UNIX signals, socket implementation, client and server examples for TCP and UDP and their behavior under abnormal conditions.

(10)

**5. Socket options and I/O Models**

IPv4, IPv6, TCP, I/O multiplexing, Unix I/O models, select and poll functions

(5)

**6. System V Transport Layer and Interface**

Introduction Transport End Point address, TLI

(5)

**Suggested Books:**

1. W. R. Stevens, B. Fenner & A. M. Rudoff, UNIX Network Programming, Vol. I, 3rd Ed., Pearson Education
2. W. R. Stevens , Unix Network Programming, Vol. II, 2nd Ed., Pearson Education
3. Comer and Stevens, Internetworking with TCP/IP, Vol. I, II and III, PHI
4. Christian Benvenuti, Understanding Linux Network Internals, O'Reilly
5. W. R. Stevens , Advanced Programming in Unix Environment, Pearson Education

## BTIT-602 Web Technologies

**Internal Marks:  40**                                    **L T P**
**External Marks:  60**                                    **3 1 0**
**Total Marks:  100**

**Course Objective/s and Expected Outcome/s:** The course is designed to understand the basic concepts of Web Technologies, Internet and WWW, HTML5, Java Script, AJAX, PHP, ASP and JSP. After this course, students will be in a position to develop any type of website by using all technologies.

**1. Internet and World Wide Web**
Introduction, Internet Addressing, ISP, types of Internet Connections, Introduction to WWW, WEB Browsers, WEB Servers, URLs, HTTP, WEB Applications, Tools for web site creation.

(3)

**2. HTML-5**
Introduction to HTML5, Lists, adding graphics to HTML5 page, creating tables, linking documents, forms, frames, Cascading Style sheets.

(6)

**3. Java Script**
Introduction, programming constructs: variables, operators and expressions, conditional checking, functions and dialog boxes, JavaScript DOM, creating forms, Introduction to Cookies, Jquery.

(6)

**4. AJAX**
Introduction, HTTP Request, XMLHttpRequest, AJAX Server Script.

(4)

**5. PHP**
Introduction, Syntax, Statements, Operators, PHP and MySQL, PHP and AJAX.

(6)

**6. Server Side Technologies**
Introduction to ASP.net, J2EE, POJO, Java servlets and JSP.

(6)

**Suggested Books:**
 1. Deitel, Deitel, Nieto, Lin and Sadhu, XML How to Program, Pearson Education.
 2. Ivan Bayross, Web Enabled Commercial Application Development using HTML, DHTML, JavaScript, Perl CGI, BPB.
 3. Steven M. Schafer, HTML, CSS, JavaScript, Perl, Python and PHP, Wiley India
 4. Paul S. Wang, G. Keller, S. Katila, An Introduction to Web Design + Programming, Cengage Learning.
 5. Jeffery C. Jackson, Web Technologies: A Computer Science Perspective, Pearson Education.
 6. Stephen Walhter, Kevin Hoffman, Nate Dudek, ASP.NET 4 Unleashed, Pearson Education.
 7. James Keogh, ASP.NET 2.0 Demystified, McGraw-Hill.
 8. Scott Mitchell, Sams Teach Yourself ASP.NET 4 in 24 Hours, SAMS, Pearson Education.
 9. Robin Nixon, Learning PHP, MySQL, and JavaScript, Shroff/O'Reilly.

## BTIT-603 Software Engineering

**L T P**
**3 1 0**

**Internal Marks:   40**
**External Marks:   60**
**Total Marks:  100**

### 1. A Generic view of process
Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

(4)

### 2. Process models
The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

(3)

### 3. Software Requirements
Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

(4)

### 4. Requirements engineering process
Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

(4)

### 5. Design Engineering
Design process and Design quality, Design concepts, the design model.

(3)

### 6. Creating an architectural design
Software architecture, Data design, Architectural styles and patterns,

(2)

### 7. Testing Strategies
A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

(3)

### 8. Product metrics
Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

(4)

### 9. Metrics for Process and Products
Software Measurement, Metrics for software quality.

(2)

### 10. Risk management

Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

(3)

## 11. Quality Management

Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

(3)

## 12. Software maintenance

Software reuse, Software Reengineering Component-based software development.

(2)

## 13. CASE Tools

Types of CASE tools, advantages and components of CASE tools, Unified Modelling Language (UML)

(2)

**Suggested Books:**

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
3. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
4. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition. McGrawHill International Edition.
5. Software Engineering- Sommerville, 7th edition, Pearson education.

## BTIT-911 Computer Graphics (Elective-I)

**L T P**
**3 1 0**

**Internal Marks:   40**
**External Marks:   60**
 **Total Marks:  100**

**Course Objective/s and Expected Outcome/s:** The course is designed to understand the fundamental concepts of computer graphics and its applications. Students will be able to learn various algorithms for performing graphics operations such as drawing of graphics elements, transformations, clipping and 3D object representations. After the study of this course, a student is expected to develop applications using a programming language incorporating the elements of computer graphics.

### 1. Fundamentals of Computer Graphics
Basics, Applications of computer Graphics in various fields, importance of computer graphics in different areas, Evolution of computer Graphics.

(3)

### 2. Graphics Systems
Video Display Devices, Random scan displays, raster scan displays, DVST, Flat Panel displays, Virtual reality systems, I/O Devices

(4)

### 3. Graphics Primitives
Algorithms for drawing Line, circle, ellipse, Boundary Fill & Flood Fill algorithm, Line attributes, Character attributes,

(5)

### 4. Transformations
2D scaling, Translation, rotation, shearing & reflection, Composite transformation, matrix representations, reflection and shearing transformations,

(4)

### 5. Clipping
Window to viewpoint coordinate transformation, Cohen Sutherland, Liang Barsky line clipping algorithms, Sutherland Hodgeman algorithm, Weiler Atherton Polygon clipping algorithm. Text clipping operation

(5)

### 6. Three Dimensional Object Representations
Modeling transformations, Interactive Picture construction techniques, Parallel & Perspective projection, Curved lines & Surfaces, Spline representations, Spline specifications, Bezier Curves & surfaces, B-spline curves & surfaces, Displaying Spline curves & surfaces

(6)

**7. Visibility**

Algorithms for visible line determination, z-buffer algorithm, list priority algorithm, scan-line algorithm

(3)

**8. Color Models and Rendering**

Properties of light, Color Concepts, Color models and their conversions, Introduction to rendering, raytracing, antialiasing, fractals, gouraud and phong shading

(5)

**Suggested Books:**

1. D. Hearn and M.P. Baker, Computer Graphics: C version.
2. Foley, Van Dam, Feiner, Hughes, Computer Graphics, Pearson Education Asia.
3. D.F. Rogers, Mathematical Elements for Graphics.
4. Roy A. Plastock, Gordon Kalley, Computer Graphics, Schaum's Outline Series.

## BTIT-912 Multimedia Database (Elective-I)

**L T P**
**3 1 0**

**Internal Marks:   40**
**External Marks:   60**
**Total Marks:  100**

### 1. Introduction
An introduction to Object-oriented Databases; Multidimensional Data Structures: k-d Trees, Point Quadtrees, The MX-Quadtree, R-Trees, comparison of Different Data Structures

(4)

### 2. Image Databases
Raw Images, Compressed Image Representations, Image Processing: Segmentation, Similarity-Based Retrieval, Alternative Image DB Paradigms, Representing Image DBs with Relations, Representing Image DBs with R-Trees, Retrieving Images By Spatial Layout, Implementations

(6)

### 3. Text/Document Databases
Precision and Recall, Stop Lists, Word Stems, and Frequency Tables, Latent Semantic Indexing, TV-

Trees, Other Retrieval Techniques

(4)

### 4. Video Databases
Organizing Content of a Single Video, Querying Content of Video Libraries, Video Segmentation, video Standards

(3)

### 5. Audio Databases
A General Model of Audio Data, Capturing Audio Content through Discrete Transformation, Indexing Audio Data. Multimedia Databases : Design and Architecture of a Multimedia Database, Organizing Multimedia Data Based on The Principle of Uniformity, Media Abstractions, Query Languages for Retrieving Multimedia Data, Indexing SMDSs with Enhanced

Inverted Indices, Query Relaxation/Expansion

(8)

### 6. Creating Distributed Multimedia Presentations
Objects in Multimedia Presentations, Specifying Multimedia Documents with Temporal Constraints, Efficient Solution of Temporal Presentation Constraints, Spatial Constraints.

(4)

### 7. Spatial Concepts and Data Models
Models of spatial information, Design extending the ER model with spatial concepts, extending the ER model pictograms, Object oriented data model with UML.

(4)

**8. Spatial Query Languages**

Extending the SQL for spatial data, Examples of queries that emphasis spatial data, Object relational schema examples queries.

(4)

**Suggested Books:**

1. Principles of Multimedia Database Systems, V.S. Subrahmanian, Elseveir(Morgan Kauffman).
2. Spatial Databases, Shashi Shekhar, Sanjiv Chawla, Pearson Education.
3. Multimedia Databases: An object relational approach, Lynne Dunckley, Pearson Education.
4. Multimedia Database Systems, Prabhakaram, Springer

**BTIT-913 Mobile Computing**

**L T P**
**3 1 0**

**Internal Marks:    40**
**External Marks:    60**
  **Total Marks:   100**

**1. Introduction to Mobile Computing**
Introduction, Added Dimensions of Mobile Computing, Condition of the Mobile User, Architecture of Mobile Software Applications

(5)

**2. Mobile Development Frameworks and Tools**
Introduction to Mobile Development Frameworks and Tools, Workflow for Mobile Application Development, Techniques for Composing Applications. Java, Brew, Windows CE, Symbian, WAP, Android.
(6)

**3. Mobility and Location Based Services**
Introduction, Data Acquisition of Location Information, GIS, Location Information Modeling, Utilizing Location Based Services with Mobile Applications, Localization and Internationalization, latest development in Location based efforts.

(7)

**4. Overview of Mobile Internet Protocol:**
MIP Mobile Internet Protocol version 6:MIPv6 Wireless Application Protocols: WAP – Architecture and Protocol Suite Bluetooth – Architecture, Network, Protocols

(7)

**5. Wireless LAN Protocols**
Overview of Wireless LAN Protocols: WiFi, WiMAX – 802.16

(6)

**Suggested Books:**

1. Reza B'Far, Mobile Computing Principles: Designing and Developing Mobile Applications with
   UML and XML, Cambridge University, 2004
2. Reto Meie, Professional Android Application Development (Wrox Programmer to Programmer),
   Wrox, 2008
3. Axel Küpper, Location-Based Services: Fundamentals and Operation, Wiley, 2005.
4. Marcus Taylor , Understanding WAP : Wireless Applications, Devices, and Services, Artech House Publishers, 2000

## BTIT-914 Cyber Laws and IPR

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

### 1. Basics of Computer & Internet Technology

Internet, ISP & domain name; Network Security; Encryption Techniques and Algorithms; Digital Signatures.

(6)

### 2. Introduction to Cyber World

Introduction to Cyberspace and Cyber Law; Different Components of cyber Laws; Cyber Law and Netizens.

(5)

### 3. Types and Categories of Cyber Crime

Categories of Cyber Crime: Personal, Business, Financial, Office Security, Cyber Crime – Complete transparency, hacking/cracking, denial of service, IP piracy, phrasing, hetaerism etc. Cyber Attack – cyber attackers.

(5)

### 4. E-Commerce

Introduction to E-Commerce; Different E-Commerce Models; E-Commerce Trends and Prospects; E-Commerce and Taxation; Legal Aspects of E-Commerce.

(5)

### 5. Intellectual Property Rights

IPR Regime in the Digital Society; Copyright and Patents; International Treaties and Conventions; Business Software Patents; Domain Name Disputes and Resolution.

(6)

### 6. I.T ACT 2000

Aims and Objectives; Overview of the Act; Jurisdiction; Role of Certifying Authority; Regulators under IT Act; Cyber Crimes-Offences and Contraventions; Grey Areas of IT Act.

(5)

**Suggested Books:**

1. Nandan Kamath, A Guide to Cyber Laws & IT Act 2000 with Rules & Notification
2. Keith Merill & Deepti Chopra (IK Inter.), Cyber Cops, Cyber Criminals & Internet
3. Diane Row Land, Information Technology Law
4. Vakul Sharma (Mc Millian), Handbook of Cyber Laws

**BTIT-915 Internet of Things (Elective-I)**

**L T P**
**3 1 0**

**Internal Marks:** 40
**External Marks:** 60
**Total Marks:** 100

1. IoT & Web Technology:

The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Security, Privacy & Trust.

(5)

**2. M2M to IoT – A Basic Perspective & Architecture:**

Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies, Building Architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

(10)

**3. IoT -State of the Art:**

Introduction, State of the art, Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

(10)

**4. Security and Governance:**

Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities.
(5)

**5. IoT Applications for Value Creations:**

Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, IoT for Retailing Industry, IoT For Oil and Gas Industry.

(5)

**Suggested Books:**

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.

2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
3. Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011.

## BTIT-961 Programming in Java (Open Elective-II)

**L T P**
**3 0 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

**Course Objective/s and Expected Outcome/s:** This course will provide the knowledge of Java and prepare students to be in a position to write Object Oriented programs in Java. During this course students will be able to understand the concept of object oriented programming, different constructs of language, classes and objects, Inheritance, Exception handling, Multithread programming, Graphics and Event Handling.

### 1. Introduction to Java

Features of Java, Object oriented programming, Date types, Variables, Casting, automatic type promotion in expressions, Arrays. (3)

### 2. Operators and Control Statements

Arithmetic operators bit-wise operators, relational operators, Boolean logical operators, operator precedence, Java's selection statements, iteration statements, jump statements.

(3)

### 3. Introduction to Classes

Class fundamentals, declaring object reference variable, Introducing methods, constructors, this keyword, garbage collection, the finalize() method, Overloading methods, using objects as parameters, recursion.

(5)

### 4. Inheritance

Inheritance basics, using super, method overriding, dynamic method dispatch, using abstract Classes, Using final with inheritance, Package and Interfaces, Package access protection, importing packages.

(5)

### 5. Exception Handling

Exception handling fundamentals, Exception types, Uncaught Exceptions Using try and catch, multiple catch clauses, nested try statements, throw, finally Java's built-in exceptions, creating your own exception sub classes, using exceptions.

(3)

### 6. Multithreaded Programming

The Java thread model, the main thread, creating thread, creating multiple threads, using is alive () and join (), Thread priorities, synchronization, Inter thread communications, suspending resuming and stopping threads.

(5)

## 7. I/O, Applets and Graphics

I/O Basics, Reading Console Input, Writing Console Output, Reading and Writing Files, Applet Fundamentals, Applet Architecture, Applet initialization and termination, Frame Windows, Drawing Lines, Rectangles, Circles, Ellipses.

(5)

## 8. Event Handling and AWT

Abstract Window Toolkit, working with button, text field, check box, radio button, canvas, Event Handling, Delegation event Model, Event classes and event listener interfaces, key events, mouse events, Adapter classes, Introduction to Swings. (5)

**Suggested Books:**

1. Herbert Schildt, The Complete Reference Java, Seventh Edition, McGraw-Hill.
2. M.P. Bhave, S.A. Patekar, Programming with java, Pearson Education.
3. Joyce Farrell, Java for Beginners, Cengage Learning.
4. Deitel and Deitel, Java: How to Program, 6th Edition, Pearson Education.
5. James Edward Keogh, Jim Keogh, J2EE: The complete Reference, McGraw-Hill
6. Khalid A. Mughal, Torill Hamre, Rolf W. Rasmussen, Java Actually, Cengage Learning.

## BTIT-962 Software Engineering (Open Elective-II)

**L T P**
**3 0 0**

**Internal Marks:   40**
**External Marks:   60**
**  Total Marks:  100**

### 1. Fundamentals of Software Engineering

Evolution and impact of Software engineering, software life cycle models: Waterfall, prototyping, Evolutionary, and Spiral models. Feasibility study, Functional and Non-functional requirements, Requirements gathering, Requirements analysis and specification.                          (6)

### 2. Software Design

Basic issues in software design, modularity, cohesion, coupling and layering, function-oriented software design: DFD and Structure chart, object modeling using UML, Object-oriented software development, user interface design. Coding standards and Code review techniques.
(10)

### 3. Software Testing and Reliability

Fundamentals of testing, White-box, and black-box testing, Test coverage analysis and test case design techniques, mutation testing, Static and dynamic analysis, Software reliability metrics, reliability growth modeling.                                                   (5)

### 4. Software Project Management

Software project management, Project planning and control, cost estimation, project scheduling using PERT and GANTT charts, cost-time relations: Rayleigh-Norden results, quality management, ISO and SEI CMMI, PSP and Six Sigma. Computer aided software engineering, software maintenance, software reuse, Component-based software development.
(10)

**Suggested Readings/ Books:**

1. Roger Pressman, "Software Engineering: A Practitioners Approach,(6th Edition), McGraw Hill, 1997.
2. Sommerville,"Software Engineering, 7th edition", Adison Wesley, 1996.
3. Watts Humphrey," Managing software process", Pearson education, 2003.
4. James F. Peters and Witold Pedrycz, "Software Engineering – An Engineering Approach", Wiley.
5. Mouratidis and Giorgini. "Integrating Security and Software Engineering–Advances and Future", IGP. ISBN – 1-59904-148-0.
6. Pankaj Jalote, "An integrated approach to Software Engineering", Springer/Narosa.

## BTIT-604 Network Programming Lab

**L T P**
**0 0 2**

**Internal Marks:   30**
**External Marks:   20**
**   Total Marks:   50**

1.  To study and implement various network commands like telnet, ftp, etc.

2.  To study various system calls.

3.  Programs related to Interprocess communication

4.  Programs related to message queues

5.  Programs related to pipes

6.  Programs related to file handling

7.  Programs related to process control

8.  Programs using Socket Programming

## BTIT-605 Web Technologies Lab

**L T P**
**0 0 4**

**Internal Marks:   30**
**External Marks:   20**
**   Total Marks:   50**

1.  Creation of Web pages using HTML, DHTML.

2.  Creation of Web pages using JavaScript.

3.  Creation of Web pages using AJAX.

4.  Creating web pages using PHP.

5.  Creating Web pages using ASP.

6.  Creating Web pages using JSP

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# 7th *Semester*

## BTIT-701 Cloud Computing

**L T P**
**3 1 0**

**Internal Marks:** 40
**External Marks:** 60
**Total Marks:** 100

### 1. Overview of cloud computing:

What is a cloud, Definition of cloud , Definition of cloud ,characteristics of cloud ,Why use clouds, How clouds are changing , How clouds are changing , Driving factors towards cloud, Comparing grid with cloud and other computing systems, workload patterns for the cloud, "Big Data", IT as a service.

### 2. Cloud computing concepts:

Concepts of cloud computing, Cloud computing leverages the Internet, Positioning cloud to a grid infrastructure, Elasticity and scalability, Virtualization, Characteristics of virtualization, Benefits of virtualization, Virtualization in cloud computing, Hypervisors, Multitenancy, Types of tenancy, Application programming interfaces (API), Billing and metering of services , Economies of scale, Management, tooling, and automation in cloud computing, Management: Desktops in the Cloud, Security.

### 3. Cloud service delivery:

Cloud service , Cloud service model architectures, Infrastructure as a service (IaaS) architecture, Infrastructure as a service (IaaS) details, Platform as a service (PaaS) architecture, Platform as a service (PaaS) details, Platform as a service (PaaS) , Examples of PaaS software, Software as a service (SaaS) architecture, Software as a service (SaaS) details, Examples of SaaS applications, Trade-off in cost to install versus , Common cloud management platform reference architecture: Architecture overview diagram, Common cloud management platform.

### 4. Cloud deployment scenarios:

Cloud deployment models, Public clouds, Hybrid clouds, Community, Virtual private clouds, Vertical and special purpose, Migration paths for cloud, Selection criteria for cloud deployment.

### 5. Security in cloud computing:

Cloud security reference model, How security gets integrated,  Cloud security , Understanding security risks, Principal security dangers to cloud computing, Virtualization and multitenancy, Internal security breaches, Data corruption or loss, User account and service hijacking, Steps to reduce cloud security breaches, Steps to reduce cloud security breaches, Reducing cloud security, Identity management: Detection and forensics, Identity management: Detection and Identity management, Benefits of identity, Encryption techniques, Encryption & Encrypting data , Symmetric key encryption, Asymmetric key encryption, Digital signature, What is SSL? IBM Smart Cloud, Amazon Web Services, Google Cloud platform, Windows Azure platform, A comparison of Cloud Computing Platforms, Common building Blocks.

**Suggested Books:**

1. Raj Kumar Buyya, James Broberg, Andrezei M.Goscinski, Cloud Computing: Principles and paradigms.
2. Michael Miller, Cloud Computing.
3. Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, Cloud Computing for dummies.
4. Anthony T. Velte, Toby J. Velte and Robert Elsenpeter, Cloud Computing: A practical Approach, McGraw Hill.
5. Barrie Sosinsky, Cloud Computing Bible, Wiley.
6. Borko Furht, Armando Escalante (Editors), Handbook of Cloud Computing, Springer.

## BTIT-702 Wireless Communication

**L T P**
**3 1 0**

**Internal Marks:  40**
**External Marks:  60**
**Total Marks:  100**

### 1. Introduction

Network basics, Wireless Networking, types of wireless networks (PAN, LAN, MAN, WAN), Cellular Systems, difference between wireless and fixed telephone networks, PSTN, Advantages, limitations and evolution of wireless networks. Performance fundamentals of Wireless Networks, Bandwidth, Channel Capacity, Modulation, Shannon Theory.

(7)

### 2. Global system for mobile communication

Global system for mobile communication, GSM architecture, GSM entities, call routing in GSM,PLMN interface, GSM addresses and identifiers, network aspects in GSM,GSM frequency allocation, authentication and security

(7)

### 3. General packet radio service (GPRS)

GPRS and packet data network, GPRS network architecture, GPRS network operation, data services in GPRS, Applications of GPRS, Billing and charging in GPRS.

(6)

### 4. Spread   Spectrum

The  Concept  of  Spread  Spectrum, Frequency Hopping  Spread  Spectrum, Direct  Sequence Spread   Spectrum, Code Division Multiple Access

(6)

### 5. Wireless   System   Operations

Cordless Systems, Wireless Local Loop, WiMAX and IEEE 802.16 Broadband Wireless Access Standards   Mobile IP and Wireless Application Protocol.

(6)

### 6. Wireless Standards

Wi-Fi and the IEEE 802.11 Wireless LAN Standard – IEEE 802 architecture,  IEEE  802.11 architecture  and  services,  IEEE  802.11 Medium access control, IEEE 802.11 physical layer, Wi-Fi  protected access.

(5)

### 7. Bluetooth

Radio specification, baseband specification, link manager specification,logical link control and adaption protocol.

(3)

### 8. Security in Wireless Networks

Threats, attacks and their counter measures.

(3)

**Suggested Books:**

1. Wireless Communications & Networks, Second Edition,William Stallings by Pearson
2. Mobile ComputingTechnology,Applications and service creation, Asoke K Telukder, Roopa R Yavagal by TMH
3. Android Application Development Black Book, Pradeep Kothari, dreamtech press.
4. Wireless and mobile networks, Dr. Sunilkumar S. Manvi, Dr. Mahabaleshwar S.Kakkasageri by WILEY
5. Wireless networks, P. Nicopolitidis,M.S. Obaidat,G.I.Papadimitriou,A.S.Pomportsis by WILEY
6. Mobile Computing, Raj Kamal by Oxford
7. Mobile Computing Theory and Practice-Kumkum Garg-Pearson
8. Lauren Darcey and Shane Conder, Android Wireless Application Development,Pearson Education

## BTIT-703 Network Security and Cryptography

**L T P**
**3 1 0**

**Internal Marks:  40**
**External Marks:  60**
**Total Marks:  100**

**Objectives:** Upon completion of this course, students will have gained knowledge and understanding the principles and approaches of Network Security and Cryptography.

### 1. Network Security

Overview: Services, Mechanisms and Attacks, The OSI Security Architecture, Network security at various layers. A Model of Network Security. System Security- Intruders, Malicious Software, Viruses and Related Threats, Counter Measures, Firewalls and its Design Principles.

(6)

### 2. Authentication

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulation Security Payload. Web Security: Web Security Requirements, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction, Authentication Applications: Kerberos, X.509 Directory Authentication Service. Electronic Mail Security: Pretty Good Privacy.

(7)

### 3. Symmetric Cryptography

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. Block Cipher and the Data Encryption Standard: Simplified DES, Block Cipher Principles, The DES, The Strength of DES, Differential and Linear Cryptanalysis. Symmetric Ciphers: Triple DES, Blowfish. Confidentiality using Conventional Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation.

(8)

### 4. Asymmetric Cryptography

Public Key Encryption, Digital Signatures - Number Theory, Prime Numbers Format s and Euler s Theorems, Testing for Primality. Public Key Cryptography and RSA: Principles of Public Key Cryptosystems, The RSA Algorithms, Key Management, Diffie Hellman Key Exchange.

(7)

### 5. Authentication Protocols

Message Authentication: Authentication Requirements, Authentication Functions, Message Authentication Codes, MD5 Message Digest Algorithms, Digital Signatures and Authentication Protocols: Digital Signatures, Authentication Protocols, Digital Signature Standards, digital certificates.

(8)

**Suggested Books:**

1. William Stallings, Network Security Essentials, Applications and Standards Pearson Education.

2. William Stallings, Cryptography and Network Security Principles and practice. 2/e,Pearson Education.

3. Bishop, Matt, Introduction to Computer Security. Addison-Wesley, Pearson Education, Inc.

4. Michael. E. Whitman and Herbert J. Mattord Principles of Information Security,

5. Cengage Learning Atul Kahate Cryptography & Network Security, TMH,

6. Charlie Kaufman, Radia Perlman, Mike Speciner, Network Security: Private Communication in Public World, Pearson Education.

## BTIT-931 Theory of Computation (Elective-II)

**L T P**
**3 1 0**

**Internal Marks:** 40
**External Marks:** 60
**Total Marks:** 100

**Objectives:** To give the students knowledge of number of areas in theoretical computer science and their interconnections.

**1. Introduction:**
Basics of Strings and Alphabets

**2. Finite Automata:**
DFA, transition graphs, regular languages, non-deterministic FA, equivalence of DFA and NDFA

**3. Regular Grammars:**
Regular expressions, equivalence between regular languages, properties of regular languages, pumping lemma.

**4. Context Free Languages:**
Leftmost and rightmost derivation, parsing and ambiguity, ambiguity in grammar and languages, normal forms

**5. Pushdown Automata:**
NDPDA, DPDA, context free languages and PDA, comparison of deterministic and non-deterministic versions, closure properties, pumping lemma for CFL

**6. Turing Machines:**
 Introduction variations, halting problem, PCP

**7. Chomsky Hierarchy:**
 LR (k) Grammars, properties of LR (k) grammars, Decidability and Recursively Enumerable Languages

**Suggested Books:**

1.  K.L.P. Mishra and N. Chandrasekaran, "Theory of Computer Science, Third Edition", PHI Learning Private Limited
2.  John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, "Introduction to Automata Theory", Languages and Computation, Pearson Education
3.  M. Sipser, "Introduction to the Theory of Computation", Second Edition, Cengage Learning
4.  K. V. N. Sunitha , N. Kalyani, "Formal Languages and Automata Theory", McGraw-Hill
5.  Stephen Wolfram, "Theory and Applications of Cellular Automata", World Scientific

6.  G.E. Revesz, "Introduction to Formal Languages", Dover Publications
7.  M. A. Harrison, "Introduction to Formal Language Theory", Addison-Wesley
8.  R.K. Shukla," Theory of Computation", Cengage Learning

## BTIT-932 Software Project Management (Elective-II)

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

**Objective-** Software development is a complex process involving such activities as domain analysis, requirements specification, communication with the customers and end-users, designing and producing different artifacts, adopting new paradigms and technologies, evaluating and testing software products, installing and maintaining the application at the end-user's site, providing customer support, organizing enduser's training, envisioning potential upgrades and negotiating about them with the customers, and many more. The proposed subject will take students through the various processes involved in project management.

### 1. Project Evaluation and Planning:
Activities in Software Project Management, Overview of Project Planning, Stepwise planning, contract management, Software processes and process models. Cost Benefit Analysis, Cash Flow Forecasting, Cost-Benefit Evaluation Techniques, Risk Evaluation. Project costing, COCOMO 2, Staffing pattern, Effect of schedule compression, Putnam's equation, Capers Jones estimating rules of thumb, Project Sequencing and Scheduling Activities, Scheduling resources, Critical path analysis, Network Planning, Risk Management, Nature and Types of Risks, Managing Risks, Hazard Identification, Hazard Analysis, Risk Planning and Control, PERT and Monte Carlo Simulation techniques.

### 2. Monitoring and Control:
Collecting Data, Visualizing Progress, Cost Monitoring, review techniques, project termination review, Earned Value analysis, Change Control, Software Configuration
Management (SCM), Managing Contracts, Types of Contracts, Stages in Contract Placement, Typical Terms of a Contract, Contract Management and Acceptance.

### 3. Quality Management and People Management:
Introduction, Understanding Behaviour, Organizational Behaviour, Selecting The Right Person For The Job, Motivation, The Oldman – Hackman Job Characteristics Model , Working in Groups, Organization and team structures, Decision Making, Leadership, Organizational Structures, Stress, Health And Safety. ISO and CMMI models, Testing, and Software reliability, test automation, Overview of project management tools.

**Suggested Books:**
1. Bob Hughes, Mike Cotterell, "Software Project Management", Tata McGraw Hill.
2. Royce, "Software Project Management", Pearson Education.
3. Robert K. Wysocki, "Effective Software Project Management", Wiley.
4. Ian Sommerville, Software Engineering, Seventh Edition, Pearson Education.
5. R.S. Pressman, Software Engineering: A Practitioner's Approach, Sixth Edition, Tata McGraw-Hill.
6. Kassem, Software Engineering, Cengage Learning.

## BTIT-933 Image Processing (Elective-II)

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

### 1. Introduction to Image Processing:
Digital Image representation, Sampling & Quantization, Steps in image Processing, Image acquisition, Color image representation

(8)

### 2. Image Transformation & Filtering:
Intensity transform functions, histogram processing, Spatial filtering, Fourier transforms and its properties, frequency domain filters, color models, Pseudo coloring, color transforms, Basics of Wavelet Transforms

(12)

### 3. Image Restoration:
Image degradation and restoration process, Noise Models, Noise Filters, degradation function, Inverse Filtering, Homomorphic Filtering

(5)

### 4. Image Compression:
Coding redundancy, Interpixel redundancy, Psychovisual redundancy, Huffman Coding, Arithmetic coding, Lossy compression techniques, JPEG Compression.

(8)

### 5. Image Segmentation & Representation:
Point, Line and Edge Detection, Thresholding, Edge and Boundary linking, Hough transforms, Region Based Segmentation, Boundary representation, Boundary Descriptors, Regional

(12)

**Suggested Books:**

1. Gonzalez and Woods: Digital Image Processing ISDN 0-201-600- 781, Addison Wesley.
2. Boyle and Thomas: Computer Vision - A First Gurse 2nd Edition, ISBN 0-632-028-67X, Blackwell Science.
3. Pakhera Malay K: Digital Image Processing and Pattern Recoginarion, PHI.
4. Trucco & Verri: Introductory Techniques for 3-D Computer Vision, Prentice Hall, Latest Edition
5. Low: Introductory Computer Vision and Image Processing, McGraw-Hill.
6. Jain, Kasturi and Schunk: Machine Vision, McGraw-HiII.
7. Sonka, Hlavac, Boyle: Digital Image –Processing and Computer Vision First ed. ISBN 978813150557, Cengage Learning

**BTIT-934 Enterprise Resource Planning (Elective-II)**

**L T P**
**3 1 0**

**Internal Marks:** 40
**External Marks:** 60
**Total Marks:** 100

**1. ERP and Technology:**
Introduction – Related Technologies – Business Intelligence – E-Commerce and EBusiness – Business Process Reengineering – Data Warehousing – Data Mining – OLAP – Product life Cycle management – SCM – CRM.

(10)

**2. ERP Implementation:**
Implementation Challenges – Strategies – Life Cycle – Pre-implementation Tasks – Requirements Definition – Methodologies – Package selection – Project Teams –Process Definitions – Vendors and Consultants – Data Migration – Project management – Post Implementation Activities.

(10)

**3. ERP in Action & Business Modules:**
Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Manufacturing – Human Resources – Plant maintenance – Materials Management – Quality management – Marketing – Sales, Distribution and service.

(8)

**4. ERP Market:**
Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards – QAD Inc – SSA Global – Lawson Software – Epicor – Intuitive.

(9)

**5. ERP Application:**
Enterprise Application Integration – ERP and E-Business – ERP II – Total quality management – Future Directions – Trends in ERP.

(6)

**Suggested Books:**

1. Alexis Leon, "ERP DEMYSTIFIED", Tata McGraw Hill.
2. Mary Sumner, "Enterprise Resource Planning", Pearson Education.
3. Jim Mazzullo,"SAP R/3 for Everyone", Pearson.
4. Jose Antonio Fernandz, "The SAP R /3 Handbook", Tata McGraw Hill.
5. Biao Fu, "SAP BW: A Step-by-Step Guide", First Edition, Pearson Education.

## BTIT-935 Modeling and Simulation (Elective-III)

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

**Objectives:** This course should provide the students with good understanding of various techniques of Simulation.

### 1. Introduction:
When simulation is appropriate and when not, advantages and disadvantages of simulation, application areas in communication, computer and software design, systems and systems environment, components of a system, discrete and continuous systems, model of a system, types of models, discrete-event simulation, steps in a simulation study. Simulation Examples- Simulation of queueing systems, on-demand and inventory systems, simulation for reliability analysis etc

### 2. General Principles:
Concepts in discrete event simulation: event scheduling/time advance algorithms, world views. List Processing: properties and operations, data structures and dynamic allocation, techniques;

### 3. Simulation Software:
Integrated environments. Examples and review of some existing software popular and useful in the industry, e.g., Arena, AutoMod, Extend, Flexsim, Micro Saint, ProModel, Quest, SIMUL8, WITNESS etc. Simulation using languages and environments like C++/Java/GPSS/SSF etc. Experimentation and Statistical-Analysis Tools: common features and relevant current products.

### 4. Statistical Models in Simulation:
Terms and concepts. Statistical Models. Review of discrete and continuous distributions. Review of Poisson (stationary and non-stationary) processes. Empirical Distributions; Elementary Queueing Theory- Basic Structure of Queueing Models. Input Source (Calling Population). Queue, Queue Discipline, Service Mechanisms. Notations and relationships between *L, W, Lq,* And *Wq.* Little's Formula. Role of Exponential Distribution and Properties. Birth and Death Processes. M/M/s queues. Finite queue variation in M/M/s/K models with different s values. Finite Calling Population cases. Queueing Models involving Non-Exponential Distributions: M/G/1, M/D/s, M/Ek/s (involving Erlang distribution), Models without a Poisson Input, Models involving hyperexponential distributions, Priority Discipline Queueing Models: Preemptive and Non- Preemptive with results, properties and server number variations, Queueing Networks:Equivalence Property. Infinite Queues in Series and Product Form Solutions. Jackson Networks,

### 5. Application of Queueing Models:
Review of Characteristics (calling population system capacity, arrival processes, behavior and disciplines, service times and mechanisms etc) and notations, Application of Long-Run Measures of Performance: Time average in system, average time spent per customer, Little's Formula and server utilization and costs. Steady State behaviour of Infinite (M/G/1, M/M/c/infinity, M/M/c/N/infinity) and finite (M/M/c/K/K) Calling Population Models, Use of Network of Queues.

### 6. Random Number Generation:

Properties. Generation of Pseudo-Random Numbers, Techniques for Generation of Pseudo-Random Numbers: Linear Congruential, Combined Linear Congruential, Random Number Streams. Tests for Random Numbers: Frequency Tests and Tests for Autocorrelation. Random Variate Generation- Inverse Transform Techniques for Exponential, Uniform, Weibull, Triangular and for Empirical Continuous Distributions. Acceptance-Rejection Techniques for Poisson (Stationary and Non- Stationary) Distribution and Gamma Distribution. Special Properties like the Direct Transformation for the Normal and Lognormal Distributions, Convolution Method and others.

## 7. Input Modelling:

Data collection, identifying the Distribution with Data: Histograms, Selection of the Appropriate Family of Distributions, Quantile-Quantile Plots.100 Parameter Estimation: Sample Mean and Sample Variance and various biased and unbiased Estimators. Goodness of Fit Tests applied to Simulation inputs: Chi-Square and Chi-Square with Equal Probabilities, Kolmogorov-Smirnov Tests, p- Values and Best Fits.Verification and Validation of Simulation Models- Verification and Validation of Simulation Models. Calibration and Validation: Face Validity, Validation of Assumptions, Input-Out Transformation Validation.

## 8. Comparison and Evaluation of Alternative System Designs:

Comparison of Two System Designs. Sampling with Equal and Unequal Variances. Common Random Numbers. Confidence Intervals with Specified Precision. Comparison of Several System Designs: Bonferroni Approaches to Multiple Comparisons and to Screening and to Selection of the Best. MetamodelingL Sample Linear Regression, Testing for Significance, Multiple Linear Regression. Random Number Assignment for Regression. Optimization via Simulation: Robust Heuristics.

**Simulation Languages:** Basic Introduction to Special Simulation Languages:-GPSS/ MATLAB/ Network Simulators.

**Suggested Books:**

1. Jerry Banks, John S. Carson II, Barry L. Nelson and David M. Nicol, Discrete-Event System and Simulation, Prentice Hall of India, New Delhi.
2. Averill M. Law, Simulation modeling and analysis (SIE), Tata McGraw Hill India.
3. David Cloud, Larry Rainey, Applied Modeling and Simulation, Tata McGraw Hill, India.
4. Gabriel A. Wainer, Discrete-event modeling and simulation: a practitioner's approach, CRC Press.
5. Bernard P. Zeigler, Herbert Praehofer, Tag Gon Kim, Theory of modeling and simulation: integrating discrete event and continuous complex dynamic systems, Academic Press.
6. Walter J. Karplus, George A. Bekey, Boris Yakob Kogan, Modeling and simulation: theory and practice, Springer.
7. Stanislaw Raczynski, Modeling and simulation: the computer science of illusion, Wiley.
8. Mohammad Salameh Obaidat, Georgios I. Papadimitriou, Applied system simulation: methodologies and application, Springer.
9. van Dijk, Nico M.; Boucherie, Richard J. (Eds.) 2011. Queueing Networks: A Fundemental Approach, Springer.
10. Bhat, U. Narayan, An Introduction to Queueing Theory: Modeling and Analysis in Applications, Springer 2008 (Birkhäuser Boston).
11. James J. Nutaro, Building software for simulation: theory and algorithms, with applications in C++. Wiley.

## BTIT-936 Advance Java (Elective-III)

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

### 1. Introduction to Multithreading and Concurrency in Java:

Creating and managing threads in Java, Priority management, Thread synchronization, Inter thread communication, Thread groups and Daemon threads. Concepts of concurrency, task scheduling, Callable and Futures, Synchronizes, Semaphores, Concurrent Collections, Atomic variables and Locks

### 2. Understanding Input Output Streams:

Basic concepts of Stream data, Input Stream hierarchy, Output Stream hierarchy, Understanding of various API's and methods used or streaming of data. Serialization and security in Serialization.

### 3. Introduction to Java Data Base Connectivity:

Basic concept on Database Connectivity Drivers. Database interaction using Statement Interface, Result set Interface. Prepared Statements and Callable statements. Transaction management.

### 4. Java Beans and Generics:

Reflection API, Introduction to Java Bean, Java Bens in User Interface, Naming Convention, Importance of Bean Serialization. Introduction to generics, Importance of generics, Implementation of various types in Generics and Concept of Erasure.

### 5. Annotations:

Introduction to Annotations, Build in Annotations, Annotation Inheritance, Creation of user defined Annotations and Advantages of Annotations

**Suggested Books:**

1. Herbert Schildt, the Complete Reference Java2, McGraw-Hill.
2. Joyce Farrell, Java for Beginners, Cengage Learning.
3. Deitel and Deitel, Java: How to Program, 6th Edition, Pearson Education.
4. James Edward Keogh, Jim Keogh, J2EE: The complete Reference, McGraw- Hill
5. Khalid A. Mughal, Torill Hamre, Rolf W. Rasmussen, Java Actually, Cengage Learning.

## BTIT-937 Mobile Application Programming (Elective-III)

**L T P**
**3 1 0**

**Internal Marks: 40**
**External Marks: 60**
**Total Marks: 100**

**1. Introduction:** Mobile operating system, Operating system structure, Constraints and Restrictions, Hardware configuration with mobile operating system, Features: Multitasking Scheduling, Memory Allocation, File System Interface, Keypad Interface, I/O Interface, Protection and Security, Multimedia features.

**2. Introduction to Mobile development IDE's:**
Introduction to Worklight basics, Optimization, pages and fragments, writing a basic program- in Worklight Studio, Client technologies, Client side debugging, Creating adapters, Invoking adapters from Worklight Client application, Common Controls, Using Java in adapters, Programming exercise with Skins, Understanding Apache Cordova, Offline access, Encrypted cache deprecated, Using JSONStore

**3. Understanding Apple iOS Development:**
Android development, Shell Development, Creating Java ME application, exploring the Worklight Server, Working with UI frameworks, Authentication, Push notification, SMS Notifications, Globalization, WebView overlay, Creating Authentication application: development for Apple iOS by using a login module, Device Analytics, Worklight Server Administration

**4. Windows Phone:**
Introduction to Windows Phone, Architecture, memory management, communication protocols, application development methods, deployment. Case Study: Design and development of Application using mobile application development platforms e.g. WorkLight, Kendo, Appcon, Xcode, Xpages

**5. Android:**
Introduction to Android, Architecture, memory management, communication protocols, application development methods, deployment. Case Study: Design and development of Application using mobile application development platforms e.g. WorkLight, Kendo, Appcon, Xcode, Xpages

**6. iOS:**
Introduction to iOS, Architecture, memory management, communication protocols, application development methods, deployment. Case Study: Design and development of Application using mobile application development platforms e.g. WorkLight, Kendo, Appcon, Xcode, Xpages

**Suggested Books:**

1. Anubhav Pradhan, Anil V Deshpande, " Mobile Apps Development" Edition: I
2. Jeff McWherter, Scott Gowell "Professional Mobile Application Development", John Wiley & Sons.

3. Barry Burd, "Android Application Development All in one for Dummies", Edition: I

4. Teach Yourself Android Application Development In 24 Hours, Edition: I, Publication: SAMS

5. Neal Goldstein, Tony Bove, "iPhone Application Development All-In-One For Dummies", John Wiley & Sons

6. Henry Lee, Eugene Chuvyrov, "Beginning Windows Phone App Development", Apress.

7. Jochen Schiller,"Mobile Communications", Addison-Wesley.

8. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley.

**9.** Worklight resources

## BTIT-938 Multimedia and Application (Elective-III)

**L T P**
**3 1 0**

**Internal Marks:** 40
**External Marks:** 60
**Total Marks:** 100

**Objectives:** This Course introduces the multimedia systems and their applications to students. This course covers the different compression standards used in multimedia, some current technology and related issues.

**1. Introduction:**

Multimedia and its types, Introduction to Hypermedia, Hyper Text, Multimedia Systems and their Characteristics, Challenges, Desirable Features, Components and Applications, Trends in Multimedia.

(4)

**2. Multimedia Technology:**

Multimedia Systems Technology , Multimedia Hardware devices, Multimedia software development tools, Multimedia Authoring Tools, Multimedia Standards for Document Architecture, SGML, ODA, Multimedia Standards for Document interchange, MHEG, Multimedia Software for different media.

(6)

**3. Storage Media:**

Magnetic and Optical Media, RAID and its levels, Compact Disc and its standards, DVD and its standards, Multimedia Servers.

(4)

**4. Audio:**

Basics of Digital Audio, Application of Digital Audio, Digitization of Sound, Sample Rates and Bit Size, Nyquist's Sampling Theorem Typical Audio Formats Delivering Audio over a Network , Introduction to MIDI (Musical Instrument Digital Interface), Components of a MIDI System Hardware Aspects of MIDI, MIDI Messages. Audio Compression, Simple Audio Compression Methods, Psychoacoustics, MPEG Audio Compression.

(8)

**5. Basics of Compression:**

Classifying Compression Algorithms, Lossless Compression Algorithms, Entropy Encoding, Run-length Encoding, Pattern Substitution, Basics of Information theory, Huffman Coding, Adaptive Huffman Coding, Arithmetic Coding, Lempel-Ziv-Welch (LZW) Algorithm, and Source Coding Techniques: Transform Coding, Frequency Domain Methods, and Differential Encoding.

(6)

**6. Image and Graphics Compression:**

Colour in Images, Types of Colour Models, Graphic/Image File Formats: TIFF, RIFF, BMP, PNG, PDF, Graphic/Image Data, and JPEG Compression, GIF Compression.

(6)

**7. Video Compression:**
Basics of Video , Video Signals, Analog Video, Digital Video, TV standards, H. 261 Compression, Intra Frame Coding, Inter-frame (P-frame) Coding, MPEG Compression, MPEG Video, The MPEG Video Bitstream , Decoding MPEG Video in Software.

(6)

**8. Multimedia Communication:**
Building Communication network, Application Subsystem, Transport Subsystem, QOS, Resource Management, Distributed Multimedia Systems.

(5)

**Suggested Books:**

1. Ralf Steinmetz amd Klara Nahrstedt," Multimedia Computing Communications and Applications" Pearson Educations.
2. Parag Havaldar, Gerard Medioni,"Multimedia Systems Design", PHI, Latest Edition

**BTIT-704 Cloud Computing Lab**

**L T P**
**0 0 2**

**Internal Marks:  30**
**External Marks:  20**
**   Total Marks:  50**

1. Software Study- Hadoop Mapreduce and HDFS
2. Service deployment and usage over cloud.
3. Managing cloud computing Resources
4. Using existing cloud characterstics and Service models
5. Performance evaluation of services over cloud
6. Case Study:- Google App Engine , Microsoft Azure
7. Case Study:-Hadoop, Amazon, Aneka

# 8th *Semester*

| Seventh/Eighth Semester | | | | | | Industrial Training | (One Semester) | | |
|---|---|---|---|---|---|---|---|---|---|
| MCode | Subject Code | Course Name | L | T | P | Internal Marks | External Marks | Total | Credits |
| 72161 | BTIT-801 | Industrial Training | | | | 450 | 300 | 750 | 24 |
| | | Total | | | | **450** | **300** | **750** | **24** |

BCET