For Batches 2015 & Onwards

Academic Autonomous Institute (No. F22-1/2014 (AC)

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	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	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

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

Beant College of Engineering & Technology, Gurdaspur

Third Semester

BTIT- 301 Operating Systems

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", 5th Edition, 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.

Beant College of Engineering & Technology, Gurdaspur

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.