**SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS**
**FEROZEPUR**

Ref. No.: SBS/FZR/ODA/708 Dated: 15/10/2016

## NOTIFICATION

**Teaching scheme and syllabus for the discipline of B.Tech, B. Arch, MBA, MCA and BCA (3rd Sem Onwards) for the students admitted in the year 2015 stands approved in the 6th Academic Council of the institute wide agenda item no. 6.16. The approved teaching scheme and syllabus are available on the institute website**

Director 19/10/16

Endst. No. Dated:

A copy of the above is forwarded to the following for information and necessary action.

1. Mr. Amardeep Chopra to upload the teaching scheme and syllabus attached herewith on the institute website.
2. Registrar
3. Dr Tejeet Singh, Member Secretary Academic Council
4. PA to Director

# Shaheed Bhagat Singh State Technical Campus

Moga Road, Ferozepur-152004 (Punjab)

**Study Scheme for B.Tech.in CSE (Batch 2015)**

**Semester – 3**

| **Third Semester** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sr. No.** | **Course Code** | **Course Name** | **Schedule of Teaching** | | | | **Evaluation Scheme** | | | **Credits** |
| | | | **CBCS*** | **L** | **T** | **P** | **Mid Semester Assessment** | **End Semester Assessment** | **Total Marks** | |
| 1. | BTCS-301A | ComputerArchitecture and Organization | C | 3 | - | - | 40 | 60 | 100 | 3 |
| 2. | BTAM-302A | Engineering Mathematics –III | C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 3. | BTCS-303A | DigitalCircuits &Logic Design | C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 4. | BTCS-304A | Data Structures | C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 5. | BTCS-305A | ObjectOrientedProgrammingusingC++ | C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 6. | BTCS-306A | Data Structures Laboratory | C | - | - | 3 | 30 | 20 | 50 | 1 |
| 7. | BTCS-307A | Training-I | T | - | - | - | 60 | 40 | 100 | 2 |
| 8. | BTCS-308A | DigitalCircuits &Logic DesignLaboratory | C | - | - | 2 | 30 | 20 | 50 | 1 |
| 9. | BTCS-309A | ObjectOrientedProgrammingusingC++ Laboratory | C | - | - | 3 | 30 | 20 | 50 | 1 |
| 10. | BTHU-301 | Professional Skills-I | PS | - | - | 2 | 30 | 20 | 50 | 1 |
| 11. | | Essentials of IT (Value Added) | | 2 | - | - | | | | |
| **Total** | | | | **15** | **4** | **10** | **380** | **420** | **800** | **-** |
| **Total Contact Hours** | | | | **29** | | | **Total Credits** | | | **25** |

# Shaheed Bhagat Singh State Technical Campus

Moga Road, Ferozepur-152004 (Punjab)

**Study Scheme for B.Tech.in CSE (Batch 2015)**

**Semester – 4**

| **Fourth Semester** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sr. No. | Course Code | Course Name | Schedule of Teaching | | | | Evaluation Scheme | | | Credits |
| | | | CBCS* | L | T | P | Mid Semester Assessment | End Semester Assessment | Total Marks | |
| 1. | BTCS-401A | Operating System | C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 2. | BTCS-402A | Discrete Structures | C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 3. | BTCS-403A | ComputerNetworks-I | C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 4. | BTCS-404A | Microprocessor&AssemblyLanguage Programming | C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 5. | BTCS-405A | SystemProgramming | C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| 6. | BTCS-406A | OperatingSystem Laboratory | C | - | - | 2 | 30 | 20 | 50 | 1 |
| 7. | BTCS--407A | ComputerNetworks-ILaboratory | C | - | - | 2 | 30 | 20 | 50 | 1 |
| 8. | BTCS-408A | Microprocessor&AssemblyLanguage Laboratory | C | - | - | 2 | 30 | 20 | 50 | 1 |
| 9. | BTCS-409A | SystemProgrammingLaboratory | C | - | - | 2 | 30 | 20 | 50 | 1 |
| 10. | BTHU-401 | Professional Skills- II | OE | - | - | 2 | 30 | 20 | 50 | 1 |
| **Total** | | | | **15** | **5** | **10** | **350** | **400** | **750** | **-** |
| **Total Contact Hours** | | | | **30** | | | **Total Credits** | | | **25** |

# Syllabus of 3rd Semester CSE (Scheme 2015)

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-301A Computer Architecture & Organization

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 0 | 0 | 3 |

**Course 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.

**Course Outcomes:**

After undergoing this course students will be able

I. To understand how computer hardware has evolved to meet the needs of multi-processing systems.
II. To understand the design of control unit.
III. To study the major components of a computer including CPU, memory, I/O and storage.
IV. To understand design principles in instruction set design including RISC architectures
V. To understand parallelism both in terms of a single processor and multiple processors.

**Unit I: Register Transfer and Micro operations**

Register transfer languageoperations, arithmetic micro operations, logic micro operations, shift micro operations, arithmetic logic shift unit. Design of a complete basic computer and it's working.

**Unit II: Basic Computer Organization and Design**

Instructioncodes,Computerregisters, ComputerInstructions,Timingandcontrol,InstructionCycle,Memoryreferenceinstructions,Input/OutputandInterrupt,Designofbasic Computer,Designof Accumulator Logic.

**Unit III: Design of Control Unit**

Control memory, design of control unit–micro programmed, hardwired, and theircomparative study.

**Unit IV: Central Processing Unit**

General Register Organization, Stack Organization, Instruction formats, Addressing Modes, Data transfer and manipulations, Program control, RISC and CISC architecture.

**Unit V: Input-Output Organization**

Peripheraldevices,I/OInterface, asynchronousdatatransfer,modesoftransfer,priorityinterrupt,DMA,I/O processor,serialcommunication.

**Unit VI: Memory Organization**

Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memorymanagementhardware.

**Unit VII: Advanced concepts of Computer Architecture**

Concept of pipeline, Arithmetic pipeline, Instruction, vector processors and array processors. Introduction to parallel processing, Inter processor communication & synchronization.

**Recommended Text and Reference 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.

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTAM-302A — Mathematics-III

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 1 | 0 | 4 |

**Course Objectives:**

To teach computer based Engineering Mathematics to students. After this course the student will be able to solve complex computer oriented problems.

**Course Outcomes:**

After undergoing this course students will be able

I. Calculate the coefficients of both the complex and the real Fourier series for a variety functions, and to use Laplace transform to solve ordinary differential equations.

II. Understand formation of Partial Differential Equations, linear Partial Differential Equations, and Homogeneous Partial Differential Equations with constant coefficients and Apply standard techniques of linear algebra, complex analysis and calculus.

III. Solve the Laplace, heat and wave equations for a variety of boundary conditions in domains of simple geometry and with simple boundary conditions; the techniques available will include, separation of variables, Laplace and Fourier Transform methods.

IV. Understand Gauss – elimination method, gauss- Jordan method, Gauss- Seidel iteration method, Rayleigh's Power method for Eigen values and Eigenvectors and Solutions of Initial values problems using Eulers, modified Eulers method and Runge- kutta (upto fourth order) methods.

V. Apply various probability distributions to solve practical problems and construct confidence intervals using sampling analysis and testing of hypothesis.

**Unit I: Fourier series**

Periodic Functions, Euler's Formula. Even and oddFunctions, Half range expansions, Fourierseriesofdifferentwaveforms.

**Unit II: Linear Systems and Eigen-Values**

Gauss-elimination method, Gauss-Jordan method, Jacobi's Method, Gauss-Seidel iteration method, Rayleigh's Power method for Eigen values and Eigen vectors

**Unit III: Differential Equations**

Solutions of Initial values problems using Euler's, modified Euler's method and Runge-kutta (up to fourth order) methods.

**Unit IV: Probability**

Mean, median, mode and standard deviation, Random variables. Uniform, normal, exponential, Poisson and binomial distributions, Conditional probability and Bayes theorem.

**Unit V: 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.

**Recommended Text and Reference Books**


1. E. Kreyszig, Advanced Engineering Mathematics, 5th Edition, Wiley Enstern 1985.
2. 2. P. E. Danko, A. G. Popov, T. Y. A. Kaznevnikova, Higher Mathematics in Problems and Exercise, Part 2, Mir Publishers, 1983.
3. Bali, N. P., A Text Book on Engineering Mathematics, Luxmi Pub., New Delhi.
4. S.C Gupta, V. Kapoor, "Fundamentals of Mathematical Statistics: A Modern Approach", S Chand & Sons educational Publishers, 10th Ed.
5. Grewal B.S, "Higher Engineering Mathematics 43rd Edition.

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-303A Digital Circuits & Logic Design

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 1 | 0 | 4 |

**Course Objectives:**

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.

**Course Outcomes:**

After undergoing this course students will be able to

I. Understand the significance and use of different number systems, weighted & non-weighted codes along with their conversions. Learn Boolean algebra& its laws.

II. Minimize Boolean expressions using different techniques: Algebraic method, K- Map Technique and QM Methods, develop basic understanding of Logic gates and universal behaviour of NAND/NOR gates.

III. Obtain knowledge of combinational circuits and design procedure of various combinational logic circuits like Adder, Sub tractor, Comparator, MUX/DEMUX, Parity checker etc. Classification of memory devices and to develop understanding about their Organization.

IV. Know about different sequential circuits like Flip-flops, Counters & their types. To design counters and know about working of shift registers.

V. Know need of signal conversion, Study different types of signal convertors: ADC and DAC along with their working.

**Unit I: Number Systems**

Binary,Octal, Decimal, And Hexadecimal. Numberbaseconversions,1's,2's,nth'scomplements, signedBinarynumbers.BinaryArithmetic,Binarycodes:WeightedBCD,Greycode,Excess3code, ASCII–conversion from onecodeto another.

**Unit II: Boolean Algebra**

Booleanpostulatesand laws– De-Morgan's Theorem, Principle of Duality,Booleanexpression–Booleanfunction,MinimizationofBooleanexpressions–
SumofProducts(SOP),ProductofSums(POS),Minterm,Maxterm,Canonicalforms,Conversionbetweencanonicalforms, Karnaughmap Minimization,Quine-McCluskeymethod-Don'tcareconditions.

**Unit III: Logic GATES**

AND,OR,NOT,NAND,NOR,Exclusive-ORand Exclusive-NOR, Implementations ofLogicFunctionsusinggates,NAND-NOR implementations, StudyoflogicfamilieslikeRTL,DTL,DCTL,TTL,MOS,CMOS,ECLandtheir characteristics.

**Unit IV: Combinational Circuits**

Designprocedure–
Adders,Subtractors,Serialadder/Subtractor,Paralleladder/SubtractorCarrylookaheadadder,BCDadder,MagnitudeComparator,Multiplexer/Demultiplexer,encoder/decoder,paritychecker,code converters. Implementation of combinational logic using MUX.

**Unit V: SequentialCircuits**

FlipflopsSR,JK,T,DandMasterslave,Excitationtable,Edgetriggering,LevelTriggering,Realizationofoneflipflopusingotherflipflops.Asynchronous/Ripplecounters,Synchronouscounters,Modulo-ncounter,RingCounters.Classificationofsequentialcircuits-MooreandMealy,DesignofSynchronouscounters:statediagram,Circuit implementation,Shiftregisters

**Unit VI: MemoryDevices:**

Classificationofmemories,RAMorganization,Writeoperation,Readoperation,Memorycycle, StaticRAMCell-Bipolar,RAMcell,MOSFETRAMcell,DynamicRAM cell, ROMorganization,PROM,EPROM,EEPROM,FieldProgrammable Gate Arrays(FPGA).

**Unit VII: SignalConversions:**

Analog& Digital signals, A/DandD/Aconversiontechniques(Weightedtype,R-2RLaddertype,Counter Type,DualSlopetype,SuccessiveApproximationtype).

## Recommended Text and Reference Books


1. Morris Mano, 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
3. Limited, New Delhi, 2003.
4. R.P.Jain, Modern Digital Electronics, 3 ed., Tata McGraw–Hill publishing company limited, New Delhi, 2003.
5. Thomas L. Floyd, Digital Fundamentals, Pearson Education, Inc, New Delhi, 2003
6. Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss, Digital System -Principles and Applications, Pearson Education.
7. Ghosal ,Digital Electronics, Cengage Learning.

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-304A — Data Structures

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 1 | 0 | 4 |

**Course 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.

**Course Outcomes:**

After undergoing this course students will be able to

I. Understand how various data structures are represented in memory and are used by algorithms.
II. Understand the concept of time and space complexity and analyze them for different algorithms and also the ability to estimate programming time using Big O notation.
III. Assess how the choice of data structures impact the performance of program.
IV. Design and employ appropriate data structures for solving computing problems;
V. Implement searching and sorting algorithms in solving larger problems.

**Unit I: 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.

**Unit II: Introduction to Data Types**

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.

**Unit III: Arrays**

Linear and multi-dimensional arrays and their representation, operations on arrays, sparse matrices and their storage.

**Unit IV: Linked List**

Linear linked list, operations on linear linked list, doubly linked list, operations on doubly linked list, application of linked lists.

**Unit V: Stacks**

Sequential and linked representations, operations on stacks, application of stacks such as parenthesis checker, evaluation of post fix expressions, conversion from in fix to post fix representation, implementing recursive functions.

**Unit VI: 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.

**Unit VII: Trees**

Basic terminology, sequential and linked representations of trees, traversing a binarytree using recursive and

non-recursive procedures, inserting a node, deleting a node, brief introduction to threaded binary trees, AVL trees and B-trees.

**Unit VIII: Heaps**
Representing a heap in memory, operations on heaps, and application of heap in implementing priority queue and heap sort algorithm.

**Unit IX: 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.

**Unit X: Hashing & Hash Tables**
Comparing direct address tables with hash tables, hash functions, concept of collision and its resolution using opened dressing and separate chaining, double hashing, rehashing.

**Unit XI: 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.

## Recommended Text and Reference Books


1. SartajSahni, 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. Michael T. Goodrich, Roberto Tamassia, & David Mount, Data Structures and Algorithms in C++ (Wiley India)

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-305A Object Oriented Programming Using C++

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 1 | 0 | 4 |

**Course Objectives:**

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

**Course Outcomes:**

After undergoing this course students will be able to

I. Gain the basic knowledge on Object Oriented concepts and to demonstrate the differences between traditional imperative design and object-oriented design.

II. Apply the concepts of class and object, data encapsulation, inheritance, operator overloading, Type Conversion and polymorphism to large-scale software

III. Understand the basics of exception handling, Template concepts, Function templates, class templates, File streams, hierarchy of file stream classes, error handling during file operations

IV. Declare and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using new and delete operators

V. Design and develop object-oriented computer programs. Ability to implement features of object oriented programming to solve real world problems

**Unit I: 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,datahiding,inheritance,overloading,polymorphism,messaging.

**Unit II: Standard Input/ Output**

Concept of streams, hierarchy of console stream classes, input /output using overloaded operators >> and << and member functions of i/o stream classes, formatting output, formatting using ios class functions and flags, formatting using manipulators.

**Unit III: ClassesandObjects:**

Specifyingaclass,creatingclassobjects,accessing classmembers,accessspecifiers,staticmembers,useof*const*keyword,friendsofaclass,emptyclasses,nestedclasses,localclasses,abstractclasses,container classes, bit fields and classes**.**

**Unit IV: Pointers and Dynamic Memory Management**

Declaringandinitializingpointers,accessingdatathroughpointers,pointerarithmetic,memoryallocation(staticanddynamic),dynamicmemorymanagementusingnewanddeleteoperators,pointertoanobject,thispointer,pointerrelatedproblems-dangling/wildpointers,nullpointer assignment, memory leak and allocation failures.

**Unit V: Constructors and Destructors**

Need for constructors and destructors, copy constructor, dynamic constructors, explicit constructors, destructors, constructors and destructors with static members, initialize lists.

**Unit VI: 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.

**Unit VII: Inheritance**
Introduction,definingderivedclasses,formsofinheritance,ambiguityinmultipleandmultipathinheritance,virtual baseclass,objectslicing,overridingmemberfunctions,objectcompositionanddelegation,order ofexecution of constructorsanddestructors

**Unit VIII: Virtual functions & Polymorphism**
Conceptofbinding-earlybindingandlatebinding,virtualfunctions,purevirtualfunctions, abstract classes, virtual destructors.

**Unit IX: Exception Handling**
Reviewoftraditionalerrorhandling,basicsofexceptionhandling,exceptionhandlingmechanism, throwingmechanism, catchingmechanism, rethrowingan exception, specifyingexceptions.

**Unit X: TemplatesandGenericProgramming**
Templateconcepts,Functiontemplates,classtemplates,illustrativeexamples.

**Unit XI: Files**
Filestreams,hierarchyoffilestreamclasses,errorhandlingduringfileoperations,reading/writingoffiles,accessin grecordsrandomly, updatingfiles

## Recommended Text and Reference 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 Publishing House.
4. BjarneStroustrup, The C++ Programming Language, Addison Wesley.
5. Herbert Schildt, The Complete Reference to C++ Language, McGraw Hill-Osborne.
6. Lippman F. B, C++ Primer, Addison Wesley.
7. Farrell- Object Oriented using C++, Cengage Learning.

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS306A — Data Structures Lab

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 30 | 20 | 50 | - | - | 3 | 1 |

**Course Objectives:**

The objective of this course is to teach students various data structures and to explain them algorithms for performing various operations on these data structures.

**Course Outcomes:**

After undergoing this course students will be able to

I. Implement basic data structures such as arrays and linked list.
II. Programs to demonstrate fundamental algorithmic problems including tree traversals, graph traversals and shortest path.
III. Implement various searching and sorting algorithms.
IV. Programs to demonstrate the implementation of various operations on stack and queue.

**List of Experiments**

1. Write a menu driven program that implements following operations (using separate functions) on a linear 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.
2. 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):
   Insert a new element
   Delete an existing element
   Search an element
   Display all the elements
3. Write a program to demonstrate the use of stack (implemented using linear array) in converting arithmetic expression from infix notation to postfix notation.
4. Program to demonstrate the use of stack (implemented using linear linked lists) in evaluating arithmetic expression in postfix notation.
5. Program to demonstration the implementation of various operations on a linear queue represented using a linear array.
6. Program to demonstration the implementation of various operations on a circular queue represented using a linear array.
7. Program to demonstration the implementation of various operations on a queue represented using a linear linked list (linked queue).
8. Program to illustrate the implementation of different operations on a binary search tree.

9. Program to illustrate the traversal of graph using breadth-first search.
10. Program to illustrate the traversal of graph using depth-first search.
11. Program to sort an array of integers in ascending order using bubble sort.
12. Program to sort an array of integers in ascending order using selection sort.
13. Program to sort an array of integers in ascending order using insertion sort.
14. Program to sort an array of integers in ascending order using radix sort.
15. Program to sort an array of integers in ascending order using merge sort.
16. Program to sort an array of integers in ascending order using quick sort.
17. Program to sort an array of integers in ascending order using heap sort.
18. Program to sort an array of integers in ascending order using shell sort.
19. Program to demonstrate the use of linear search to search a given element in an array.
20. Program to demonstrate the use of binary search to search a given element in a sorted array in ascending order.

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-308A Digital Circuits & Logic Design Lab

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 30 | 20 | 50 | - | - | 2 | 1 |

**Course Objectives:**

The objectives of this course is to Introduce the concept of digital and binary systems and to be able to design and analyze combinational logic circuits and be able to design and analyze sequential logic circuits.

**Course Outcomes:**

After undergoing this course students will be able to

I. Develop basic understanding of Logic gates and universal behaviour of NAND/NOR gates.
II. Obtain knowledge of combinational circuits and design procedure of various combinational logic circuits
III. Obtain knowledge of different Flip-flops, their working and Truth Table Verification.
IV. Obtain knowledge of Synchronous and Asynchronous Counters and their heir working.
V. Study different types of ADC and DAC along with their working.

**List of Experiments**

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. DE multiplexer: Truth-table verification and realization of halfsubtractor 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.

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-309A Object Oriented Programming Using C++ Lab

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 30 | 20 | 50 | - | - | 3 | 1 |

**Course Objectives:**

The objectives of this course is to familiarize the students with language environment and to implement various concepts related to language.

**Course Outcomes:**

After undergoing this course students will be able to

I. Able to apply an object oriented approach to programming and identify potential benefits of object-oriented programming over other approaches
II. Able to reuse the code(Inheritance) and write the classes which work like built-in types(Integer, Float, Character)
III. Able to design applications which are easier to debug, maintain and extend.
IV. Able to apply object-oriented concepts (inheritance, data abstraction, encapsulation, operator overloading and polymorphism etc) in real world applications.
V. Able to design small level project using object oriented programming concepts(Class template, file stream, error handling)

**List of Experiments**

1. [Classes and Objects] Write a program that uses a class where the member functions are defined inside a class.
2. [Classes and Objects] Write a program that uses a class where the member functions are defined outside a class.
3. [Classes and Objects] Write a program to demonstrate the use of static data members.
4. [Classes and Objects] Write a program to demonstrate the use of const data members.
5. [Constructors and Destructors] Write a program to demonstrate the use of zero argument and parameterized constructors.
6. [Constructors and Destructors] Write a program to demonstrate the use of dynamic constructor.
7. [Constructors and Destructors] Write a program to demonstrate the use of explicit constructor.
8. [Initializer Lists] Write a program to demonstrate the use of initializer list.
9. [Operator Overloading] Write a program to demonstrate the overloading of increment and decrement operators.
10. [Operator Overloading] Write a program to demonstrate the overloading of binary arithmetic operators.
11. [Operator Overloading] Write a program to demonstrate the overloading of memory management operators.
12. [Typecasting] Write a program to demonstrate the typecasting of basic type to class type.
13. [Typecasting] Write a program to demonstrate the typecasting of class type to basic type.

14. [Typecasting] Write a program to demonstrate the typecasting of class type to class type.
15. [Inheritance] Write a program to demonstrate the multilevel inheritance.
16. [Inheritance] Write a program to demonstrate the multiple inheritance.
17. [Inheritance] Write a program to demonstrate the virtual derivation of a class.
18. [Polymorphism] Write a program to demonstrate the runtime polymorphism.
19. [Exception Handling] Write a program to demonstrate the exception handling.
20. [Templates and Generic Programming] Write a program to demonstrate the use of function template.
21. [Templates and Generic Programming] Write a program to demonstrate the use of class template.
22. [File Handling] Write a program to copy the contents of a file to another file byte by byte. The name of the source file and destination file should be taken as command-line arguments
23. [File Handling] Write a program to demonstrate the reading and writing of mixed type of data.
24. [File Handling] Write a program to demonstrate the reading and writing of objects.

# Syllabus of 4th Semester CSE (Scheme 2015)

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-401A Operating System

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 1 | 0 | 4 |

**Course 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.

**Course Outcomes:**

After undergoing this course students will be able to

I. Identify the role of Operating System.To understand the design of control unit.
II. Understanding CPU Scheduling, Synchronization, Deadlock Handling and Comparing CPU Scheduling Algorithms. Solve Deadlock Detection Problems
III. Describe the role of paging, segmentation and virtual memory in operating systems. Generation of logical and physical addresses for problems related to memory management.
IV. Defining I/O systems,Device Management Policies and Secondary Storage Structure and Evaluation of various Disk Scheduling Algorithms.
V. Description of protection and security and also the Comparison of UNIX and Windows based OS.

**Unit I: Introduction**

IntroductiontoOperatingsystem,RoleofOperatingSystemasresourcemanager,functionofkernelandshell,operatingsystemstructures,viewsofan operatingsystem.

**Unit II: Process management**

CPU scheduling, Scheduling Algorithms, PCB, Process synchronization, Deadlocks, Prevention, Detection and Recovery

**Unit III: 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.

**Unit IV: Device Management**

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

**Unit V: File Management**

File System Architecture, Layered Architecture, Physical and Logical File Systems, Protection and Security:

**Unit VI:**Brief study to multiprocessor and distributed operating systems.

**Unit VII: Case Studies**
LINUX / UNIX Operating System and Windows based operating systems. Recent trends in operating system.

## Recommended Text and Reference 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. 3 rd Edition
4. Operating System by Madnick Donovan
5. Operating System by Stallings
6. Ida M.Flynn Understanding Operating Systems -, Cengage Learning

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-402A — Discrete Structures

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 1 | 0 | 4 |

**Course Objectives:**

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.

**Course Outcomes:**

After undergoing this course students will be able to

I. Understand the necessary back ground of discrete structures with particular reference to the relationships between discrete structures and their data structure counterparts including algorithm development and use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, Hashing functions and integers.

II. Model, analyse and apply computational processes using analytic and combinatorial methods such as permutations and combinations and understand Recurrence relations, generating functions and applications.

III. Understand elementary properties of modular arithmetic and explain their applications in Computer Science and apply graph theory models of data structures, trees to solve computer science problems.

IV. Remember elementary mathematical arguments, logic and identify fallacious reasoning and understand concepts of Boolean algebra.

V. Understand and apply principles of abstract algebra viz., group, ring and field.

**Unit I: 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, and partial order relations.

**Unit II: 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, Karnaugh- map).

**Unit III: Combinatorial Mathematics**

Basic counting principles Permutations and combinations Inclusion and Exclusion Principle Recurrence relations, Generating Function, Application.

**Unit IV: Monoids and Groups**

Groups Semigroups and monoids Cyclic semigraphs and submonoids, Subgroups and Cosets. Congruence relations on semigroups. Morphisms. Normal subgroups. Dihedral groups.

**Unit V: Graph Theory**

Graph- Directed and undirected, Eulerian chains and cycles, Hamiltonian chains and cycles Trees, Chromatic number Connectivity, Graph coloring, Plane and connected graphs, Isomorphism and

Homomorphism. Applications.

## Recommended Text and Reference 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)

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-403A Computer Network-I

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 1 | 0 | 4 |

**Course Objectives:**

This course provides knowledge about computer network related hardware and software using a layered architecture.

**Course Outcomes:**

After undergoing this course students will be able

I. To study, analyze and understand the terminologies involved in networking by exploring insight to layers, interface, protocol, service, type of networks, hardware technologies used, signals and Models: OSI and TCP/IP.

II. To explain and analyze the preparation and transmission of Data, understand the protocols and procedures of flow control, error and access control.

III. To interpret the concept of IPv4 addressing and subnetting, subsequently applying the same for subnet design as per requirement of an enterprise.

IV. To study routing, congestion, connection establishment, connection termination and crash recovery protocols.

V. To identify and study the protocols that are involved in web access, file sharing, name.

**Unit I: 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.

**Unit II: 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.

**Unit III: 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-N ARQ, Selective repeat ARQ, Data link protocols: HDLC and PPP.

**Unit IV: 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.

**Unit V: 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

**Unit VI: 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.

**Unit VII: ApplicationLayer**

World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP), Introduction to Network security

## Recommended Text and Reference Books


1. Computer Networks, 4 th Edition, Pearson Education by Andrew S. Tanenbaum
2. Data Communication & Networking, 4th Edition, Tata McGraw Hill. By Behrouz A. Forouzan.
3. Computer Networking, 3 rd 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, 5 th Edition, Cengage Learning by Greg Tomsho,
6. Handbook of Networking, Cengage Learning by Michael W. Graves.

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-404A — Microprocessor and Assembly Language Programming

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 1 | 0 | 4 |

**Course Objectives:**

The course is intended to give students good understanding of internal architectural details and functioning of microprocessors.

**Course Outcomes:**

After undergoing this course students will be able to

I. Draw a block diagram and pin diagram of 8085 microprocessors, 8086 microprocessors. Discuss instruction cycle (i.e., fetch/decode/execute) and relate the instruction cycle to what actions occur for various instruction types using a block diagram of a microprocessor.

II. Explain basic binary operations, buses, registers, ALU, Timing controls, flags, addressing modes and interrupt control that interconnect with each other.

III. Perform the programs using the various addressing modes and data transfer instructions of the 8085 microprocessor and run their program on the training boards

IV. Design timing diagrams, analyse the different data transfer modes, 8251 I/O processor and peripheral interfacing of 8255.

V. Evaluate the real-world control problems such as traffic light signal, stepper motor controller, temperature control, Motorola 68000 and all Pentium and keyboard 7 segment display.

**Unit I: Introduction**

Introduction to Microprocessors, history, classification, recent microprocessors.

**Unit II: 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.

**Unit III: 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.

**Unit IV: Instruction set &Assembly Languages Programming**

Introduction, instruction & data formats, addressing modes, status flags, 8085 instructions, Data transfer operations, Arithmetic operations, Logical operations, Branch operations.

**Unit V: 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 microcomputers.

**Unit VI: Basic architecture of higher order microprocessors**

Basic introduction to 8086 family, Motorola 68000, Pentium processors.

**Recommended Text and Reference Books**


1. Ramesh Gaonkar, "8085 Microprocessor ",PHI Publications.
2. Daniel Tabak, "Advanced Microprocessors", McGraw- Hill, Inc., Second Edition 1995.
3. Douglas V. Hall, "Microprocessors and Interfacing: Programming and Hardware", Tata McGraw Hill Edition,1986.
4. Charles M.Gilmore," Microprocessors: Principles and Applications", McGraw Hill.
5. Ayala Kenneth, "The 8086 Microprocessor Programming and Interfacing", Cengage Learning
6. Handbook of Networking, Cengage Learning by Michael W. Graves.

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-405A System Programming

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 40 | 60 | 100 | 3 | 1 | 0 | 4 |

**Course Objectives:**

This course provides knowledge to design various system programs. Although not the primary focus of this course, instruction shall be done within the context of C/C++ and Linux/Unix.

**Course Outcomes:**

After undergoing this course students will be able to

I. To identify the role of different types of software in system programming.
II. To understand and compare single pass and two pass assembler. Show the use of SYMTAB and OPTAB.
III. To understand the design of macroprocessor. USE LEX and YACC tools.
IV. To identify the compiler phases. Construct small/part of compiler.
V. To understand and compare various types of editors, linkers and loaders.

**Unit I: Introduction**

Introduction to system programming and different types of system programs –editors, assemblers, macro-processors, compilers, linkers, loader, debuggers.

**Unit II: Assemblers**

Description of single pass and two pass assemblers, use of data structures like OPTAB and SYMTAB, etc.

**Unit III: Microprocessors**

Description of macros, macro expansion, conditional and recursive macro expansion.

**Unit IV: Compilers**

Various phases of compiler – lexical, syntax and semantic analysis, intermediate code generation, code optimization techniques, code generation, Case study : LEX and YACC

**Unit V: Loaders**

Concept of linking, different linking schemes, concept of loading and various loading schemes.

**Unit VI: Editors**

Line editor, full screen editor and multi window editor, Case study MS-Word, DOS Editor and vi editor.

**Unit VII: Debuggers**

Description of various debugging techniques

### Recommended Text and Reference Books


1. Donovan J.J., "Systems Programming", New York, Mc-Graw Hill, 1972.
2. Dhamdhere, D.M., "Introduction to Systems Software", Tata Mc-Graw Hill, 1996.
3. Aho A.V. and J.D. Ullman ,"Principles of compiler Design" Addison Wesley/ Narosa 1985.
4. Kenneth C. Louden," Compiler Construction", Cengage Learning.

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-406A Operating System Lab

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 30 | 20 | 50 | - | - | 2 | 1 |

**Course Objectives:**

To make students able to implement CPU scheduling algorithms and Bankers algorithm used for deadlock avoidance and prevention. Students will also be able to implement page replacement and memory management algorithms.

**Course Outcomes:**

After undergoing this course students will be able to

I. Perform Installation process of various operating systems.
II. Demonstrate virtualization, installation of virtual machine software and installation of operating systems on virtual machines.
III. Ability to create, view file directories and process related commands in linux.
IV. Understand the basics of shell programming.

**List of Experiments**

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, kill, 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 & looping statement, case statements, parameter passing and arguments, shell variables, shell keywords, creating shell programs for automate system tasks, report printing management policies, Role of I/O traffic controller, scheduler

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-407A — Computer Network-I Lab

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 30 | 20 | 50 | - | - | 2 | 1 |

**Course Objectives:**

To make students aware about various types of cables used in guided media like coaxial cable, optical fiber cable, twisted pair cables and its categories. To understand the working of LAN Card, Hub, TELNET and to understand the working difference between straight cable and cross over cable. To be able to analyze different protocols used for packet communication like ALOHA Protocol.

**Course Outcomes:**

After undergoing this course students will be able to

I. To understand components of desktop, laptop and write latest specifications of desktop and laptop.
II. To familiarize with various transmission media and prepare straight and cross cables using crimping tool and connectors.
III. To have an exposure of network components devices and implement various topologies such as Ring, Bus, Star etc. physically using trainer kit.
IV. To configure TCP/IP protocol in Windows, Linux and implement resource sharing.
V. To perform subnet planning as per requirements of an enterprise and implement the same with proper testing.

**List Of Experiments:**

1. Write specifications of latest desktops and laptops.
2. Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, Routers etc.
3. Familiarization with Transmission media and Tools: Co-axial cable, UTP Cable, Crimping Tool, Connectors etc.
4. Preparing straight and cross cables.
5. Study of various LAN topologies and their creation using network devices, cables and computers.
6. Configuration of TCP/IP Protocols in Windows and Linux.
7. Implementation of file and printer sharing.
8. Designing and implementing Class A, B, C Networks
9. Subnet planning and its implementation
10. Installation of ftp server and client

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

| BTCS-408A | Microprocessor and Assembly Language Programming Lab |
|---|---|

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 30 | 20 | 50 | - | - | 2 | 1 |

**Course Objectives:**

This course provide practical hands-on experience with microprocessor applications and interfacing techniques. Understand 8085 microprocessor kit, knowledge of 8085 instruction set and ability to utilize it in assembly language programming. Understand real mode Memory addressing and ability to interface various devices to the microprocessor.

**Course Outcomes:**

After undergoing this course students will be able to

I. Identify the basic element and functions of microprocessor.
II. Describe the architecture of microprocessor and its peripheral devices.
III. Demonstrate fundamental understanding on the operation between the microprocessor.
IV. Demonstrate fundamental understanding on the operation interfacing devices.
V. Complete the experiments in laboratory and present the technical report.

**List Of Experiments:**

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

# Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Computer Science & Engineering

[Batch 2015 onwards]

## BTCS-409A System Programming Lab

| Mid-Sem | End-Sem | MM | L | T | P | C |
|---|---|---|---|---|---|---|
| 30 | 20 | 50 | - | - | 2 | 1 |

**Course Objectives:**

The purpose of this course is to provide the students with an introduction to system-level programming. Although not the primary focus of this course, instruction shall be done within the context of C/C++ and Linux/Unix.

**Course Outcomes:**

After undergoing this course students will be able to

I. Create a menu driven interface for displaying contents of a file.
II. To create symbol table for high level language.
III. Implementation of single pass assembler on a limited set of instructions.
IV. Exploring various features of debug command.
v. Understand the use of LEX and YACC tools.

**List Of Experiments:**

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.