II B.Tech I Semester

S.No	Course Type	Course Code	Course Title	Periods Per Week			Credits
				L	T	P	
1	ESC	EC301ES	Analog and Digital Electronics	3	0	0	3
2	PCC	CS302PC	Data Structures	3	1	0	4
3	BSC	MA303BS	Computer Oriented Statistical Methods	3	1	0	4
4	ESC	IT304ES	Computer Organization and Microprocessor	3	0	0	3
5	PCC	CS305PC	Object Oriented Programming using C++	2	0	0	2
6	ESC	EC306ES	Analog and Digital Electronics Lab	0	0	2	1
7	PCC	CS307PC	Data Structures Lab	0	0	3	1.5
8	ESC	IT308ES	IT Workshop and Microprocessor Lab	0	0	3	1.5
9	PCC	CS309PC	C++ Programming Lab	0	0	2	1
10	**MC**	***MC310**	**Gender Sensitization Lab**	**0**	**0**	**2**	**0**
			Total Credits	**14**	**2**	**12**	**21**

II B.Tech II Semester

S.No	Course Type	Course Code	Course Title	Periods Per Week			Credits
				L	T	P	
1	PCC	CS401PC	Discrete Mathematics	3	0	0	3
2	HSMC	SM402MS	Business Economics & Financial Analysis	3	0	0	3
3	PCC	CS403PC	Operating Systems	3	0	0	3
4	PCC	CS404PC	Database Management Systems	3	1	0	4
5	PCC	CS405PC	Java Programming	3	1	0	4
6	PCC	CS406PC	Operating Systems Lab	0	0	3	1.5
7	PCC	CS407PC	Database Management Systems Lab	0	0	3	1.5
8	PCC	CS408PC	Java Programming Lab	0	0	2	1
9	**MC**	***MC410**	**Constitution of India**	**3**	**0**	**0**	**0**
10	**MC**	***MC411IT**	**Python Programming -II**	**1**	**0**	**2**	**0**
			Total Credits	**19**	**2**	**10**	**21**

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EC301ES: ANALOG AND DIGITAL ELECTRONICS

B.Tech II year I semester

Course Code	Category	Hours/Week			Credits	Max Marks		
		L	T	P	C	CIA	SEE	Total
EC301ES	ESC	3	0	0	3	30	70	100
Contact Classes : 45	Tutorial Classes : 0	Practical Classes : Nil				Total Classes : 45		

Prerequisite : Nil

Course Objectives :

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To give understanding of various types of amplifier circuits.
- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand the concepts of combinational logic circuits and sequential circuits.

Course Outcomes : Upon successful completion of the course, students will be able to:

- Know the characteristics of various components..
- Understand the utilization of components.
- Design and analyze small signal amplifier circuits.
- Learn Postulates of Boolean algebra and to minimize combinational functions.
- Design and analyze combinational and sequential circuits
- Know about the logic families and realization of logic gates.

Unit- I	Diodes and Applications	No. of classes :9

Junction diode characteristics: Open circuited p-n junction, p-n junction as a rectifier, V-I characteristics, effect of temperature, diode resistance, diffusion capacitance, diode switching times, breakdown diodes, Tunnel diodes, photo diode, LED. Diode Applications - clipping circuits, comparators, Half wave rectifier, Full wave rectifier, rectifier with capacitor filter.

Unit- II	BJTs	No. of classes :10

Transistor characteristics: The junction transistor, transistor as an amplifier, CB, CE, CC configurations, comparison of transistor configurations, the operating point, self-bias or Emitter bias, bias compensation, thermal runaway and stability, transistor at low frequencies, CE amplifier response, gain bandwidth product, Emitter follower, RC coupled amplifier, two cascaded CE and multi stage CE amplifiers.

Unit- III	FETs and Digital Circuits	No. of classes :10

FETs: JFET, V-I characteristics, MOSFET, low frequency CS and CD amplifiers, CS and CD amplifiers.

Digital Circuits: Digital (binary) operations of a system, OR gate, AND gate, NOT, EXCLUSIVE OR gate, De Morgan Laws, NAND and NOR DTL gates, modified DTL gates, HTL and TTL gates, output stages, RTL and DCTL, CMOS, Comparison of logic families.

Unit- IV	Combinational Logic Circuits	No. of classes :8

Basic Theorems and Properties of Boolean Algebra, Canonical and Standard Forms, Digital Logic Gates, The Map Method, Product-of-Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Exclusive-OR Function, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

Unit- V	Sequential Logic Circuits	No. of classes :8

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Sequential Circuits, Storage Elements: Latches and flip flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Shift Registers, Ripple Counters, Synchronous Counters, Random-Access Memory, Read-Only Memory.

Text Books :

1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, Jaccob Millman, Christos Halkias and Chethan D. Parikh, *Tata McGraw-Hill Education*, India, 2010.
2. Digital Design, 5/e, Morris Mano and Michael D. Cilette, *Pearson,* 2011.

Reference Books :

1. Electronic Devices and Circuits, Jimmy J Cathey, *Schaum's outline series*, 1988.
2. Digital Principles, 3/e, Roger L. Tokheim, *Schaum's outline series*, 1994.

Web References :

1. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/
2. https://silo.tips/download/analog-digital-electronics

E-text Books :

1. https://www.google.com/url?sa=t&source=web&rct=j&url=http://csma31.csm.jmu.edu/physics/g iovanetti/EE/digi.pdf&ved=2ahUKEwjxv5P17rDqAhX37nMBHTuPAI0QFjAAegQIAxAB&usg=AOvVaw2Jmvz2ThBCt02an4j0aaA6&cshid=1593772004644
2. https://drive.google.com/file/d/0B9LJy8vattSMTTJNVmFrMXc4cFk/view

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CS302PC: DATA STRUCTURES

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS302PC	**PCC**	3	1	-	4	30	70	100
Contact Classes: 45	**Tutorial Classes: 15**	**Practical Classes: Nil**				**Total Classes: 60**		

Prerequisite: A course on "Programming for Problem Solving".

Course Objectives:

- Exploring basic data structures such as stacks andqueues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps,graphs.
- Introduces sorting and pattern matchingalgorithms

Course Outcomes:

- Ability to select the data structures that efficiently model the information in aproblem.
- Ability to assess efficiency trade-offs among different data structure implementationsor combinations.
- Implement and know the application of algorithms for sorting and patternmatching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, andAVL-trees.

Unit- I	INTRODUCTION TO DATA STRUCTURES	No.of Classes: 09

abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

Unit- II	DICTIONARIES	No.of Classes: 09

linear list representation, skip list representation, operations - insertion, deletion and searching.

Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing- linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

Unit- III	SEARCH TREES	No.of Classes: 09

Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion,AVLTrees,Definition,HeightofanAVLTree,Operations– Insertion,DeletionandSearching, Red –Black, SplayTrees.

Unit- IV	GRAPHS	No.of Classes: 09

Graph Implementation Methods. Graph Traversal Methods.
Sorting: Heap Sort, External Sorting- Model for external sorting, Merge Sort.

Unit- V	PATTERN MATCHING AND TRIES	No.of Classes: 09

Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

Text Books:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, *UniversitiesPress*.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, *PHI/Pearson Education*.

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Reference Books:

1.Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.

Web References:

1. http://masterraghu.com/subjects/Datastructures/ebooks/rema%20thareja.pdf
2. https://www.pdfdrive.com/data-structure-books.html

E-Text Books:

1. https://books.google.co.in/books?id=2lvbJjTITuMC&lpg=PP1&dq=data%20structures&pg=RA8-PT2#v=onepage&q=data%20structures&f=false
2. http://www.freepdfbook.com/fundamentals-of-data-structures-in-c-horowitz-pdf/

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MA303BS: COMPUTER ORIENTED STATISTICAL METHODS

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
MA303BS	BSC	3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

Prerequisite: Mathematics courses of first year of study.

Course Objectives: To learn

- The theory of Probability, and probability distributions of single and multiple random variables
- The sampling theory and testing of hypothesis and making inferences
- Stochastic process and Markov chains.

Course Outcomes: After learning the contents of this paper the student must be able to

- Apply the concepts of probability and distributions to some case studies
- Correlate the material of one unit to the material in other units
- Resolve the potential misconceptions and hazards in each topic of study.

Unit- I	Probability, Random Variables and Probability Distributions	No.of Classes: 09(L), 03(T)

Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule.
Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence.

Unit- II	Mathematical Expectation, Discrete Probability Distributions	No.of Classes: 09(L), 03(T)

Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.
Discrete Probability Distributions: Introduction and Motivation, Binomial, Distribution, Geometric Distributions and Poisson distribution.

Unit- III	Continuous Probability Distributions, Fundamental Sampling Distributions	No.of Classes: 09(L), 03(T)

Continuous Probability Distributions : Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions.
Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S2, t –Distribution, F-Distribution.

Unit- IV	Estimation & Tests of Hypotheses, Statistical Hypotheses	No.of Classes: 09(L), 03(T)

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Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation. Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean , Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Tests Concerning a Single Mean, Tests on Two Means, Test on a Single Proportion, Two Samples: Tests on Two Proportions.

Unit: V	Stochastic Processes and Markov Chains	No.of Classes: 09(L), 03(T)

Stochastic Processes and Markov Chains: Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, nstep transition probabilities, Markov chain, Steady state condition, Markov analysis.

Text Books:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

Reference Books:

1. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & Sons Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.
3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

Web References:

1) **SWAYAM Online Courses** https://storage.googleapis.com/uniquecourses/online.html
2) **Directory of Open Access Journals** https://doaj.org/
3) **Springer Open Journals** https://www.springeropen.com/journals
4) **UG/PG MOOCs** http://ugcmoocs.inflibnet.ac.in/ugcmoocs/moocs_courses.php

E-Text Books:

1) **National Digital Library:** https://ndl.iitkgp.ac.in/
2) **NCERT Text Books** http://ncert.nic.in/textbook/textbook.htm
3) **Directory of Open Access Books** https://www.doabooks.org/

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IT304ES: COMPUTER ORGANIZATION AND MICROPROCESSOR

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
IT304ES	ESC	3	-	-	3	30	70	100
Contact Classes: 60	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 60		

Prerequisite: Nil

Course Objectives:

- To understand basic components of computers.
- To understand the architecture of 8086 processor.
- To understand the instruction sets, instruction formats and various addressing modes of 8086.
- To understand the representation of data at the machine level and how computations are performed at machine level.
- To understand the memory organization and I/O organization.
- To understand the parallelism both in terms of single and multiple processors.

Course Outcomes: Upon completing this course, the student will be

- Able to understand the basic components and the design of CPU, ALU and Control Unit.
- Ability to understand memory hierarchy and its impact on computer cost/performance.
- Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.
- Ability to understand the instruction set, instruction formats and addressing modes of 8086.
- Ability to write assembly language programs to solve problems.

Unit- I		No.of Classes: 13

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of ComputerOrganization, Computer Design and Computer Architecture.

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computerinstructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input –Output andInterrupt, complete Computer Description.

Micro Programmed Control: Control memory, Address sequencing, micro program example, designof control unit.

Unit- II		No.of Classes: 15

Central Processing Unit: The 8086 Processor Architecture, Register organization, Physical memory organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum and Maximum mode system and timings.

8086 Instruction Set and Assembler Directives-Machine language instruction formats, Addressingmodes, Instruction set of 8086, Assembler directives and operators.

Unit- III		No.of Classes: 12

Assembly Language Programming with 8086- Machine level programs, Machine coding theprograms, Programming with an assembler, Assembly Language example programs. Stack structureof 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Interrupt programming,Passing parameters to procedures, Macros, Timings and Delays.

Unit- IV		No.of Classes: 10

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Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, DivisionAlgorithms, Floating - point Arithmetic operations.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP),Intel 8089IOP.

Unit- V		No.of Classes: 10

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory,Cache Memory.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, InstructionPipeline, RISC Pipeline, Vector Processing, Array Processors.

Text Books:

1. Computer System Architecture, M. Moris Mano, Third Edition, Pearson. **(UNIST-I , IV , V)**

2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A.K Ray ,3rd edition, McGrawHill India Education Private Ltd. **(UNITS - II, III).**

Reference Books:

1. Microprocessors and Interfacing, D V Hall, SSSP Rao, 3rd edition, McGraw Hill IndiaEducation Private Ltd.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, TataMcGraw Hill, 2002
3. Computer Organization and Architecture, William Stallings, 9th Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware/ Software Interface ARM Edition, 4th Edition, Elsevier, 2009.

Web References:

1. https://nptel.ac.in/courses/108/107/108107029/
2. https://nptel.ac.in/courses/106/105/106105163/
3. https://nptel.ac.in/courses/106/103/106103180/

E-Text Books:

1. http://index-of.es/Computer/Fundamentals%20of%20Computer%20Organization%20and%20Architecture.pdf
2. http://home.ustc.edu.cn/~leedsong/reference_books_tools/Computer%20Organization%20and%20Architecture%2010th%20-%20William%20Stallings.pdf

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CS305PC: OBJECT ORIENTED PROGRAMMING USING C++

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS305PC	**PCC**	2	0	0	2	30	70	100
Contact Classes: 45	**Tutorial Classes: 15**	**Practical Classes: Nil**				**Total Classes: 60**		

Prerequisite: A course on "Programming for Problem Solving using C".

Course Objectives:

- Introduces Object Oriented Programming concepts using the C++language.
- Introduces the principles of data abstraction, inheritance and polymorphism;
- Introduces the principles of virtual functions and polymorphism
- Introduces handling formatted I/O and unformatted I/O
- Introduces exceptionhandling

Course Outcomes:

- Able to develop programs with reusability
- Develop programs for file handling
- Handle exceptions in programming
- Develop applications for a range of problems using object-oriented programmingtechniques

Unit- I	OBJECT-ORIENTED THINKING	No.of Classes: 09

Different paradigms for problem solving, need for OOP paradigm, differences between OOP and Procedure oriented programming, Overview of OOP concepts- Abstraction, Encapsulation, Inheritance and Polymorphism.
C++Basics:Structureof aC++program,Datatypes,Declarationofvariables,Expressions,Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings, Structures, References. Flow control statement- if, switch, while, for, do, break, continue, goto statements. Functions - Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions. Dynamic memory allocation and de- allocation operators-new and delete, Preprocessordirectives.

Unit- II	C++CLASSES AND DATA ABSTRACTION	No.of Classes: 09

Classdefinition,Classstructure,Classobjects,Classscope,this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors,Dynamiccreationanddestructionofobjects,Dataabstraction,ADTandinformationhiding.

Unit- III	INHERITANCE	No.of Classes: 09

Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction, Destructors, Virtual base class.
VirtualFunctionsandPolymorphism:StaticandDynamicbinding,virtualfunctions,Dynamicbinding through virtual functions, Virtual function call mechanism, Pure virtual functions, Abstract classes, Implications of polymorphic use of classes, Virtualdestructors.

Unit- IV	C++I/O	No.of Classes: 09

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	I/OusingCfunctions,Stream classeshierarchy,StreamI/O,FilestreamsandStringstreams, Overloading operators, Error handling during file operations, FormattedI/O.	
Unit- V	**EXCEPTION HANDLING**	**No.of Classes: 09**
	Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding, Re throwing an exception, Catching all exceptions.	

Text Books:

1. The Complete Reference C++, 4th Edition, Herbert Schildt, Tata McGrawHill.
2. Problem solving with C++: The Object of Programming, 4th Edition, Walter Savitch, Pearson Education.

Reference Books:

1. The C++ Programming Language, 3rd Edition, B. Stroutstrup, PearsonEducation.
2. OOP in C++, 3rd Edition, T. Gaddis, J. Walters and G. Muganda, Wiley DreamTechPress.
3. Object Oriented Programming in C++, 3rd Edition, R. Lafore, Galigotia Publications PvtLtd.

Web References:

1. https://fac.ksu.edu.sa/sites/default/files/ObjectOrientedProgramminginC4thEdition.pdf
2. https://www.pdfdrive.com/object-oriented-programming-in-c-ksu-e18716558.html

E-Text Books:

1. **https://books.google.co.in/books?id=7D6-7Pp0cTMC&lpg=PP1&dq=object%20oriented%20programming%20c%2B%2B&pg=PP1#v=onepage&q=object%20oriented%20programming%20c++&f=false**
2. http://www.freebookcentre.net/ComputerScience-Books-Download/Object-Oriented-Programming-Using-C++.html

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EC306ES: ANALOG AND DIGITAL ELECTRONICS LAB

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
EC306ES	ESC	-	-	2	1	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32			Total Classes: 32			

Prerequisite: Nil

Course Objectives:

The course should enable the students to:

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To give understanding of various types of amplifier circuits.
- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand the concepts of combinational logic circuits and sequential circuits.

Course Outcomes : Upon successful completion of the course, students will be able to:

- Know the characteristics of various components.
- Understand the utilization of components.
- Design and analyze small signal amplifier circuits.
- Postulates of Boolean algebra and to minimize combinational functions.
- Design and analyze combinational and sequential circuits.
- Known about the logic families and realization of logic gates.

List of Experiments:

1. Full Wave Rectifier with & without filters
2. Common Emitter Amplifier Characteristics
3. Common Base Amplifier Characteristics
4. Common Source amplifier Characteristics
5. Measurement of h-parameters of transistor in CB, CE, CC configurations
6. Input and Output characteristics of FET in CS configuration
7. Realization of Boolean Expressions using Gates
8. Design and realization logic gates using universal gates
9. generation of clock using NAND / NOR gates
10. Design a 4 – bit Adder / Subtractor
11. Design and realization a Synchronous and Asynchronous counter using flip-flops
12. Realization of logic gates using DTL, TTL, ECL, etc.

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CS307PC: DATA STRUCTURES LAB

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS307PC	PCC	-	-	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

Prerequisite: A Course on "Programming for problem solving".

Course Objectives:

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes:

- Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

List of Experiments:

1. Write a program that uses functions to perform the following operations on singly linked list.:
   i) Creation ii)Insertion iii)Deletion iv)Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.:
   i) Creation ii)Insertion iii)Deletion iv)Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.:
   i) Creation ii)Insertion iii)Deletion iv)Traversal
4. Write a program that implement stack (its operations)using
   i) Arrays ii)Pointers
5. Write a program that implement Queue (its operations)using
   i) Arrays ii)Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Bubble sortii)Selection sort iii) Insertion sort
7. Write a program that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
   i) Linear search ii) Binary search
8. Write a program to implement the tree traversal methods.
9. Write a program to implement the graph traversal methods.

List of Equipment/Software (with Specifications or Range) Required:
A Computer System with Ubuntu operating system and GCC Compiler

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IT308ES: IT WORKSHOP AND MICROPROCESSOR LAB

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
IT308ES	ESC	-	-	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

Prerequisite: A Course on "Programming for problem solving".

Course Objectives:

The IT Workshop for engineers is a training lab course spread over 60 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

List of Experiments:

PC Hardware

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Task1: **Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally studentsshould demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task2:WebBrowsers,SurfingtheWeb:StudentscustomizetheirwebbrowserswiththeLANproxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should beconfigured.

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Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD Task1–

WordOrientation:ThementorneedstogiveanoverviewofLaTeXandMicrosoft(MS)office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task2:UsingLaTeXandWordtocreateprojectcertificate.Featurestobecovered:-FormattingFonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX andWord.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Imagesfromfilesandclipart,DrawingtoolbarandWordArt,FormattingImages,Textboxes,Paragraphs and Mail Merge in word.

Excel

Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task1:CreatingaScheduler-Featurestobecovered:Gridlines,FormatCells,Summation,autofill, FormattingText

Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel– average, std.deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task 3: Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes: - PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in

bothLaTeXandPowerPoint.Studentswillbegivenmodelpower pointpresentationwhichneedstobe replicated (exactly how it'sasked).

Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

MICROPROCESSOR LAB

Write assembly language programs for the following using MASAM.

1. Write assembly language programs to evaluate theexpressions:

i) a = b + c –d *e

ii) z = x * y + w – v +u /k

a. Considering 8-bit, 16 bit and 32-bit binary numbers as b, c, d,e.

b. Considering 2-digit, 4 digit and 8-digit BCDnumbers.

Take the input in consecutive memory locations and results also Display the results by using "int xx" of 8086. Validate program for the boundary conditions.

2. Write an ALP of 8086 to take N numbers as input. And do the following operations onthem.

a. Arrange in ascending and descendingorder.

3. Find max andminimum

a. Findaverage

Considering 8-bit, 16-bit binary numbers and 2-digit, 4 digit and 8-digit BCD numbers. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.

4. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations on it.

a. Find thelength

b. Find it is Palindrome orn

5. Find whether given string substring ornot.

a. Reverse astring

b. Concatenate by taking another sting Display the results by using "int xx" of8086.

6. Write the ALP to implement the above operations as procedures and call from the main procedure.

7. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display theresult.

List of Equipment/Software (with Specifications or Range) Required:

- Assembled Systems
- System with Latex
- System with Internet
- System with MSOFFICE

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CS309PC: C++ PROGRAMMING LAB

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS309PC	PCC	-	-	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

Prerequisite: A course on "Programming for Problem Solving".

Course Objectives:

- Introduces object-oriented programming concepts using the C++language.
- Introduces the principles of data abstraction, inheritance and polymorphism;
- Introduces the principles of virtual functions and polymorphism
- Introduces handling formatted I/O and unformatted I/O
- Introduces exception handling

Course Outcomes

- Ability to develop applications for a range of problems using object-oriented programming techniques

List of Experiments:

1. WriteaC++ProgramtodisplayNames,RollNo.,andgradesof3studentswhohaveappeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array.
2. Write a C++ program to declare Struct. Initialize and display contents ofmember variables.
3. Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.
4. Given that an EMPLOYEE class contains following members: data members: Employee number, Employee name, Basic, DA, IT, Net Salary and print datamembers.
5. WriteaC++programtoreadthedataofNemployeeandcomputeNetsalaryofeachemployee (DA=52% of Basic and Income Tax (IT) =30% of the gross salary).
6. Write a C++ to illustrate the concepts of console I/O operations.
7. Write a C++ program to use scope resolution operator. Display the various values of the same variables declared at different scopelevels.
8. Write a C++ program to allocate memory using new operator.
9. Write a C++ program to create multilevel inheritance. (Hint: Classes A1, A2, A3)
10. Write a C++ program to create an array of pointers. Invoke functions usingarrayobjects.
11. Write a C++ program to use pointer for both base and derived classes and call the member function. Use Virtualkeyword.

List of Equipment/Software (with Specifications or Range) Required:

A Computer System with Ubuntu operating system and GCC Compiler

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MC409: GENDER SENSITIZATION LAB

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
MC409	**MC**	2	-	-	0	30	70	100
Contact Classes: 30	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 30**		

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Course Objectives:

1. To develop students" sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

Course Outcomes:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.

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3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Unit - 1	UNDERSTANDING GENDER	No.of Classes: 06

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit - 2	GENDER ROLES AND RELATIONS	No.of Classes: 06

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences- Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

Unit - 3	GENDER AND LABOUR	No.of Classes: 06

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn"t Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights- Gender and Mainstreaming

Unit - 4	GENDER - BASED VIOLENCE	No.of Classes: 06

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*

Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

Unit - 5	GENDER AND CULTURE	No.of Classes: 06

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular

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Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks- The Brave Heart.

Note: **Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.**

- ***Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".***

ESSENTIAL READING: The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender" written* by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi, Telangana Government in 2015.**

ASSESSMENT AND GRADING:

1. Discussion & Classroom Participation: 20%
2. Project/Assignment: 30%
3. End Term Exam: 50%

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CS401PC: DISCRETE MATHEMATICS

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS401PC	PCC	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: 0				Total Classes: 60		

Prerequisite: An understanding of Mathematics in general is sufficient

Course Objectives:

- Introduces the elementary discrete mathematics for computer science andengineering.
- Topics include formal logic notation, methods of proof, induction, sets, relations, graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

Course Outcomes:

- Ability to understand and construct precise mathematical proofs
- Ability to use logic and set theory to formulate precise statements
- Ability to analyze and solve counting problems on finite and discrete structures
- Ability to describe and manipulate sequences
- Ability to apply graph theory in solving computing problems

Unit - 1	The Foundations: Logic and Proofs	No. of Classes:9

The Foundations: Logic and Proofs: Propositional Logic, Applications of Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

Unit - 2	Basic Structures	No. of Classes:9

Basic Structures, Sets, Functions, Sequences, Sums, Matrices and Relations Sets, Functions, Sequences & Summations, Cardinality of Sets and Matrices Relations, Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

Unit - 3	Algorithms, Induction and Recursion	No. of Classes:8

Algorithms, The Growth of Functions, Complexity of Algorithms

Induction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness

Unit - 4	Discrete Probability and Advanced Counting Techniques	No.of Classes:10

Discrete Probability and Advanced Counting Techniques : An Introduction to Discrete Probability, Probability Theory, Bayes' Theorem, Expected Value and Variance

Advanced Counting Techniques: Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, **Algebraic Structures, Semi-group and Monoids, Group Theory, Residue Arithmetic.**

Unit - 5	Graphs	No. of Classes:9

Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.

Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees

Text Books:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory- Kenneth H Rosen, 7thEdition, TMH.

Reference Books:

1. Discrete Mathematical Structures with Applications to Computer Science-J.P. Tremblayand R. Manohar, TMH,
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe L. Mott, Abraham Kandel, Teodore P. Baker, 2nded, PearsonEducation.
3. Discrete Mathematics- Richard Johnsonbaugh, 7thEdn., PearsonEducation.
4. Discrete Mathematics with Graph Theory- Edgar G. Goodaire, Michael M.Parmenter.
5. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, 5thedition, PearsonEducation.

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SM402MS: BUSINESS ECONOMICS & FINANCIAL ANALYSIS

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
SM402MS	HSMC	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

Prerequisite: Nil

Course Objectives:

- To learn the basic Business types, impact of the Economy on Business and Firms specifically.
- To analyze the Business from the Financial Perspective.

Course Outcomes:

- The students will understand the various Forms of Business and the impact of economic variables on the Business.
- The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
- The Students can study the firm's financial position by analysing the Financial Statements of a Company.

Unit- I	INTRODUCTION TO BUSINESS AND ECONOMICS	No. of Classes: 10

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

Unit-II	DEMAND AND SUPPLY ANALYSIS	No. of Classes: 08

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

Unit-III	PRODUCTION, COST, MARKET STRUCTURES & PRICING	No. of Classes: 10

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

Cost analysis: Types of Costs, Short run and Long run Cost Functions.

Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition.

Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

Unit- IV	FINANCIAL ACCOUNTING	No. of Classes: 10

Accounting concepts and Conventions, Accounting Equation, Double-Entry systemofAccounting,RulesformaintainingBooksofAccounts,Journal,PostingtoLedger,Preparation of Trial Balance, Elements of Financial Statements, Preparation of FinalAccounts.

Unit- V	FINANCIAL ANALYSIS THROUGH RATIOS	No. of Classes: 07

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Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios,
Solvency, Leverage Ratios (simple problems). Introduction to Fund Flow and Cash Flow Analysis (simple problems).

Text Books:

1. D.D. Chaturvedi, S.L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd.2013.
2. GeethikaGhosh,PiyaliGosh,PurbaRoyChoudhury,ManagerialEconomics,2e,TataMcGraw Hill Education Pvt. Ltd.2012.

Reference Books:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press,2015.
2. S.N.Maheshwari,SunilKMaheshwari,SharadKMaheshwari,FinancialAccounting,5e,Vikas Publications,2013.

Web References:

1. https:// www.slideshare.net/glory1988/managerial-economics-and- financial analysis
2. https:// thenthata.web4kurd.net/mypdf/managerial-economics-and- financial analysis
3. https:// bookshallcold.link/pdfread/managerial-economics-and-financial analysis
4. https:// www.gvpce.ac.in/syllabi/Managerial Economics and financial analysis

E-Text Books:

1. https:// books.google.co.in/books/about/Managerial economics and financial analysis
2. http://www. ebooktake.in/pdf/title/managerial-economics-and-financial analysis
3. http://all4ryou.blogspot.in/2012/06/mefa-managerial-economics and financial analysis
4. http://books.google.com/books/about/Managerial economics and financial analysis

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CS403PC: OPERATING SYSTEMS

B.Tech. II Year II Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS403PC	**PCC**	3	0	0	3	30	70	100
Contact Classes: 45	**Tutorial Classes: 15**	**Practical Classes: Nil**				**Total Classes: 60**		

Prerequisite:

- A course on "Computer Programming and DataStructures".
- A course on "Computer Organization andArchitecture".

Course Objectives:

- Provide an introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems andprotection)
- Introduce the issues to be considered in the design and development of operatingsystem
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O inUnix

Course Outcomes:

- Will be able to control access to a computer and the files that may beshared
- Demonstrate the knowledge of the components of computer and their respective roles in computing.
- Ability to recognize and resolve user problems with standard operatingenvironments.
- Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

Unit- I	OPERATING SYSTEM	No.of Classes: 09

Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls

Unit-II	PROCESS AND CPU SCHEDULING	No.of Classes: 09

Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling.

System call interface for process management-fork, exit, wait, waitpid, exec

Unit- III	DEADLOCKS	No.of Classes: 09

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

Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors **Interprocess Communication Mechanisms**: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

Unit-IV	MEMORY MANAGEMENT AND VIRTUAL MEMORY	No.of Classes: 09

Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

Unit- V	FILESYSTEMINTERFACEANDOPERATIONS	No.of Classes: 09

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Accessmethods,DirectoryStructure,Protection,FileSystem Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl systemcalls

Text Books:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, JohnWiley
2. Advanced programming in the UNIX environment, W.R. Stevens, Pearsoneducation.

Reference Books:

1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI
2. Operating System A Design Approach- Crowley,TMH.
3. Modern Operating Systems, Andrew S. Tanenbaum 2nd edition,Pearson/PHI
4. UNIX programming environment, Kernighan and Pike, PHI/ PearsonEducation
5. UNIX Internals -The New Frontiers, U. Vahalia, PearsonEducation.

Web References:

1. http://www.freebookcentre.net/ComputerScience-Books-Download/Operating-System-Guru-Jambheshwar-University-of-Science-and-Technology.html
2. https://www.pdfdrive.com/operating-systems-e18726938.html
3. https://www.topfreebooks.org/free-operating-systems-books/

E-Text Books:

1. https://books.google.co.in/books?id=WjvX0HmVTlMC&printsec=frontcover&source=gbs_vpt_buy#v=onepage&q&f=false
2. https://easyengineering.net/operating-systems-by-deitel/

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CS404PC: DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year II Semester								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS404PC	PCC	3	1	0	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

Prerequisite: A course on "Data Structures".

Course Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes:

- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

Unit- I	DATABASE SYSTEM APPLICATIONS	No.of Classes: 09

A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS

Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

Unit- II	INTRODUCTION TO THE RELATIONAL MODEL	No.of Classes: 09

Integrity constraint over relations, enforcing integrity constraints,queryingrelationaldata,logicaldatabasedesign,introductiontoviews,destroying/altering tables andviews.

Relational Algebra, Tuple relational Calculus, Domain relational calculus.

Unit- III	SQL	No.of Classes: 09

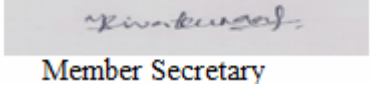
QUERIES, CONSTRAINTS, TRIGGERS form of basic SQL query, UNION, INTERSECT, and

EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.

Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

Unit- IV	TRANSACTION CONCEPT	No.of Classes: 09

Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.



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Unit- V	DATA ON EXTERNAL STORAGE	No.of Classes: 09

File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

Text Books:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, *Tata Mc GrawHill* 3rd Edition
2. Database System Concepts, Silberschatz, Korth, *Mc Graw hill*, Vedition.

Reference Books:

1. DatabaseSystemsdesign,Implementation,andManagement,PeterRob&CarlosCoronel7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, *PearsonEducation*
3. Introduction to Database Systems, C. J. Date, *PearsonEducation*
4. Oracle for Professionals, The X Team, S.Shah and V. Shah,*SPD*.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,*PHI*.
6. Fundamentals of Database Management Systems, M. L. Gillenson, *Wiley Student*Edition.

Web References:

1. https://www.pdfdrive.com/database-management-system-dbms-tutorial-tutorials-point-e10969892.html
2. http://www.lincoste.com/ebooks/english/pdf/computers/database_management_systems.pdf
3. http://www.freebookcentre.net/database-books-download/Database-Management-Systems-by-Rich-Maclin.html

E-Text Books:

1. **https://books.google.co.in/books?id=dkg8BAAAQBAJ&lpg=PP1&dq=database%20management%20system%20by%20raghuramakrishnan&pg=PP1#v=onepage&q&f=false**

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CS405PC: JAVA PROGRAMMING

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS405PC	PCC	3	1	0	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

Prerequisite:

Course Objectives:

- To introduce the object oriented programmingconcepts.
- To understand object oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstractclasses
- To introduce the implementation of packages andinterfaces
- To introduce the concepts of exception handling andmultithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

- Able to solve real world problems using OOPtechniques.
- Able to understand the use of abstractclasses.
- Able to solve problems using java collection framework and I/O classes.
- Able to develop multithreaded applications withsynchronization.
- Able to develop applets for webapplications.
- Able to design GUI basedapplications

Unit - 1	Object-Oriented Thinking	No. of Classes:12

Object-Oriented Thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

Inheritance– Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

Unit - 2	Packages	No. of Classes:12

Packages- Defining a Package, CLASSPATH, Access protection, importing packages. Interfaces- defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.
Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

Unit - 3	Exception handling	No. of Classes:12

Exception handling - Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.
Multithreading- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

Unit - 4	Collections Framework	No. of Classes:12

The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable ,Properties, Stack, Vector More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner

Unit - 5	GUI Programming	No. of Classes:12

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.
Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.
A Simple Swing Application, Applets – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, **The Swing Buttons**- JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JCombo Box, Swing Menus, Dialogs.

Text Books:

1. Java The complete reference, 9thedition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

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Reference Books:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley &sons
2. Introduction to Java programming, Y. Daniel Liang, PearsonEducation.
3. Object Oriented Programming through Java, P. Radha Krishna, UniversityPress.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ.Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

Web References:

1. https://nptel.ac.in/courses/106/105/106105191/

E-Text Books:

1.https://www.oracle.com/technetwork/java/newtojava/java8book-2172125.pdf

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CS406PC: OPERATING SYSTEMS Lab

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS406PC	PCC	0	0	3	1.5	30	70	100
Contact Classes: 0	Tutorial Classes: 0	Practical Classes:45				Total Classes:45		

Prerequisite:

- A course on "Programming for Problem Solving".
- A course on "Computer Organization and Architecture".

Course Objectives:

- To provide an understanding of the design aspects of operating system concepts through simulation
- Introduce basic Unix commands, system call interface for process management, inter-process communication and I/O in Unix

Course Outcomes:

- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Able to implement C programs using Unix system calls

List of Experiments:

1. Write C programs to simulate the following CPU Scheduling algorithms

   a) FCFS b)SJF c)Round Robin d)priority

2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms

   a) Pipes b) FIFOs c)Message Queues d) Shared Memory

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6. Write C programs to simulate the following memory management techniques

   a) Paging b) Segmentation

List of Equipment/Software (with Specifications or Range) Required:

A Computer System with Ubuntu operating system and GCC Compiler

References

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition–2005, PearsonEducation/PHI
2. Operating System - A Design Approach-Crowley,TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition,Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/PearsonEducation
5. UNIX Internals: The New Frontiers, U. Vahalia, PearsonEducation

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CS407PC: DATABASE MANAGEMENT SYSTEMS LAB

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS407PC	PCC	0	0	3	1.5	30	70	100
Contact Classes: 0	Tutorial Classes: 0	Practical Classes: 45				Total Classes:45		

Prerequisite: Nil

Course Objectives:

- Introduce ER data model, database design and normalization
- Learn SQL basics for data definition and data manipulation

Course Outcomes:

- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers

List of Experiments:

1. Concept design with E-RModel
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraint setc.)
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, updatetrigger)
9. Procedures
10. Usage of Cursors

List of Equipment/Software (with Specifications or Range) Required:

- System with MySQL / Oracle

References

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7thEdition.
2. Fundamentals of Database Systems, ElmasriNavrate, *PearsonEducation*
3. Introduction to Database Systems, C.J. Date, *PearsonEducation*
4. Oracle for Professionals, The X Team, S. Shah and V. Shah,*SPD*.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah,*PHI*.
6. Fundamentals of Database Management Systems, M. L. Gillenson, *Wiley StudentEdition*.

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CS408PC: JAVA PROGRAMMING LAB

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS408PC	PCC	0	0	2	1	30	70	100
Contact Classes: 0	Tutorial Classes: 0	Practical Classes:45				Total Classes:45		

Prerequisite: Nil

Course Objectives:

- To write programs using abstract classes.
- To write programs for solving real world problems using java collection framework.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

Course Outcomes:

- Able to write programs for solving real world problems using java collection framework.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

List of Experiments:

1. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a forloop.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided byzero.

3. a)Develop an applet in Java that displays a simple message.

   b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.

4. Write a Java program that creates a user interface to perform integer divisions.

The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

6. Write a Java program for the following: Create a doubly linked list of elements. Delete a given element from the above list. Display the contents of the list after deletion.

7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.

8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.

10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

12. Write a Java program that correctly implements the producer – consumer problem using the concept of interthread communication.

13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order

15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

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List of Equipment/Software (with Specifications or Range) Required:

- Ubuntu System
- Eclipse or Net bean

References

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition *Pearson*education.
2. Thinking in Java, Bruce Eckel, *Pearson*Education.
3. Java Programming, D. S. Malik and P. S. Nair, *Cengage*Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell,*Pearson*.

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*MC410: CONSTITUTION OF INDIA

B.Tech. II Year II Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
***MC410**	**MC**	3	0	0	0	30	70	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 45**				**Total Classes: 45**		
Prerequisite: Nil								

Course Objectives:

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

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List of Experiments:

Course content

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21

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MC411IT: PYTHON PROGRAMMING –II LAB

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
MC411IT	MC	-	-	2	0	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes: 32		

Prerequisite: Nil

COURSE OBJECTIVE:

At the end of the course students should be able to:

- To learn how to write different types of Searching and sorting programs using Basic Python Knowledge
- To learn how to solve critical problems with Python lab Knowledge

List of Experiments

Searching and Sorting Programs:

1. Python Program for Binary Search (Recursive and Iterative)
2. Python Program for Linear Search
3. Python Program for Insertion Sort
4. Python Program for Recursive Insertion Sort
5. Python Program for Quick Sort
6. Python Program for Selection Sort
7. Python Program for Bubble Sort
8. Python Program for Merge Sort
9. Python Program for Heap Sort
10. Python Program for Shell Sort
11. Python Program for Topological Sorting
12. Python Program for Radix Sort

Exercise Programs:

1. Python Program to Reverse a linked list
2. Python Program for Find largest prime factor of a number
3. Python Program for Find sum of odd factors of a number
4. Python Program for Coin Change
5. Python Program for Tower of Hanoi
6. Python Program to Check if binary representation is palindrome
7. Python Program for Number of elements with odd factors in given range
8. Python Program for Common Divisors of Two Numbers
9. Python Program for GCD of more than two (or array) numbers
10. Python Program for Check if count of divisors is even or odd
11. Python Program for Difference between sums of odd and even digits
12. Python Program for Program to Print Matrix in Z form
13. Python Program for Smallest K digit number divisible by X
14. Python Program for Print Number series without using any loop
15. Python Program for Program to calculate area of a Tetrahedron
16. Python Program for Find the perimeter of a cylinder

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17. Python Program for Finding the vertex, focus and directrix of a parabola
18. Python Program for Check if all digits of a number divide it
19. Python program to convert float decimal to Octal number
20 Python program to check if a string contains all unique characters

Visualization of Different Distributions

- Random Permutations of Elements
- Random Data Distribution
- Normal Distribution
- Poisson Didistribution
- Uniform Distribution
- Logistic Distribution
- Multinomial Distribution
- Exponential Distribution
- Chi Square Distribution
- Rayleigh Distribution
- Pareto Distribution
- Zipf Distribution
- Binomial Distribution

Using NumPy and Pandas

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