ACE
Engineering College
An Autonomous Institution
DEPARTMENT OF CSE(IoT)
B.Tech II Year COURSE STRUCTURE & SYLLABUS

II B.Tech CSE (IoT) I Semester

S.No	Course Type	Course Code	Course Title	% Deviation	Periods Per Week			Credits
					L	T	P	
1	ESC	EC301ES	Analog and Digital Electronics	0	3	0	0	3
2	PCC	CS302PC	Data Structures	0	3	1	0	4
3	BSC	MA303BS	Computer Oriented Statistical Methods	0	3	1	0	4
4	PCC	CS301PC	Discrete Mathematics	3	3	0	0	3
5	PCC	CS310PC	Advanced Python Programming	New	2	0	0	2
6	ESC	EC306ES	Analog and Digital Electronics Lab	0	0	0	2	1
7	PCC	CS307PC	Data Structures Lab	0	0	0	3	1.5
8	PCC	CS308PC	IT Workshop Lab	2	0	0	3	1.5
9	PCC	CS311PC	Advanced Python Programming Lab	New	0	0	2	1
10	**MC**	**MC309HS**	**Gender Sensitization Lab**	**-**	**0**	**0**	**2**	**0**
			Total Credits		**14**	**2**	**12**	**21**

II B.Tech CSE(IoT) II Semester

S.No	Course Type	Course Code	Course Title	% Deviation	Periods Per Week			Credits
					L	T	P	
1	PCC	CS404PC	Computer Organization and Architecture	10	3	0	0	3
2	HSMC	SM402MS	Business Economics & Financial Analysis	0	3	0	0	3
3	PCC	CS403PC	Operating Systems	0	3	0	0	3
4	PCC	CO401PC	Sensors and Devices	0	3	1	0	4
5	PCC	CS405PC	Java Programming	0	3	1	0	4
6	PCC	CS406PC	Operating Systems Lab	0	0	0	3	1.5
7	PCC	CO402PC	Sensors and Devices Lab	0	0	0	3	1.5
8	PCC	CS408PC	Java Programming Lab	0	0	0	2	1
9	**MC**	**MC409HS**	**Constitution of India**	-	**3**	**0**	**0**	**0**
			Total Credits		**18**	**2**	**10**	**21**

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**

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

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.

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/

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)

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/**

CS301PC: DISCRETE MATHEMATICS

Existing JNTUH R18 Syllabus	Proposed ACE CSE R20 Autonomous Syllabus	% Deviation with JNTUH R18 Syllabus	Reasons for the Deviation
UNIT – 4	**UNIT – 4**		
Discrete Probability and Advanced Counting Techniques : An Introduction to Discrete Probability, Probability Theory, Bayes' Theorem, Expected Value and Variance **Advanced Counting Techniques:** Recurrence Relations, Solving Linear Recurrence Relations, Divide- and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion- Exclusion, Applications of Inclusion- Exclusion	**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.**	**3%**	Repeated Concepts removed (**Recurrence Relations, Generating Functions, Inclusion-Exclusion, applications of Inclusion-Exclusion).**

CS301PC: DISCRETE MATHEMATICS

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS301PC	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 and engineering.
- 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.

CS310PC: ADVANCE PYTHON PROGRAMMING

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS310PC	**PC**	2	0	0	2	30	70	100
Contact Classes: 45	**Tutorial Classes:**	**Practical Classes: Nil**				**Total Classes: 45**		

Prerequisite: This course is intended for learners who have a basic knowledge of python programming.

Course Objectives:

- This course will enable students to learn how to write relatively advanced, well structured, computer programs in Python
- To learn how to Apply understanding of how to manipulate and analyze datasets
- To learn how to Apply Basic statistical analysis
- To learn how to effectively visualize results
- To learn how to Develop the skill of designing Graphical user Interfaces in Python
- To learn how to Develop the ability to write database applications in Python

Course Outcomes:

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

- Write high quality, maintainable Python programs
- Use the Numpy and pandas for performing complex numerical analysis tasks
- Produce high quality 2D data visualizations using Matplotlib Implement database and GUI applications.

Unit: I	**Regular Expressions and Python Multithreading**	**No. of Classes: 09**

Regular Expressions – Concept of regular expression, re module, Using Special Characters, Regular Expression Functions, Password, email, url validation using regular expression, Pattern finding programs using regular expression.

Python Multithreading: Understanding Threads and Processes, Threading Module, Programming using multithreading, The Global Interpreter Lock, Synchronizing the threads.

Unit: II	**XML, JSON and Python DataBase Connectivity**	**No. of Classes: 09**

Working with XML and JSON: XML DOM and Sax, Introducing Element Tree and lxml, Parsing XML, Navigating the document, JSON: Introduction to JSON, JSON vs XML, JSON in Python, Serializing and Deserializing JSON.

Database Programming: Introduction, Python Database Application Programmer's Interface (DB-API), SQL

Database connection using python, Creating, Storing and Reading information on database, Object Relational Managers (ORMs).

Unit: III	**Numpy and SciPy**	**No. of Classes: 09**

Introduction to NumPy arrays , Creating and manipulating NumPy arrays , NumPy dtype, Computation on NumPy arrays , Arithmetic with NumPy Arrays, Indexing, Slicing and Sorting NumPy arrays, Mathematical and Statistical Methods, Reshaping Arrays,

SciPy - Installation and Environment Setup, Numpy VS SciPy, Linear Algebra in SciPy, Working with Polynomials in SciPy, Integration with SciPy, SciPy Special Functions.

Unit: IV	Pandas and Visualization with Matplotlib	No. of Classes: 09

Introduction to Pandas, Series and Data Frames in Pandas ,Data Indexing, Selection, and Filtering in Pandas, Selection with loc and iloc, Function Application and Mapping,Missing Data, Filtering and Filling In Missing Data, Vectorized String Functions in pandas, Data Transformation in pandas, Combining and Merging Datasets, Merging Joining and Concatenating, Group by, Grouping with Functions.

Visualization with Matplotlib , Line Plots, Pie Chart, Setting the title, axis labels, ticks, and ticklabels, Adding legends, Bar Graph, Histogram , Box (Whisker) Plot, Scatter Plot , Customizing Plots , Multiple Subplots. Plotting with pandas.

Unit: V	GUI and WEB Programming	No. of Classes: 09

GUI Programming in Python (using Tkinter/wxPython/Qt) -What is GUI, Advantages of GUI, Introduction to GUI libray, Layout management, Events and bindings, Font, Colors. Widget such as : Frame, Label, Button, Checkbutton, Entry, Listbox, Radiobutton, etc.

WEB Programming: Introduction, Web Surfing with Python, Creating Simple Web Clients, Interacting with Web APIs, Web Scraping, CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI, Web (HTTP) Servers.

Text Books:

1. Core Python Programming, Wesley J. Chun, Third Edition, Pearson.
2. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython by Wes McKinny, O'Reilly Media.
3. Elegant SciPy: The Art of Scientific Python By Juan Nunez-Iglesias, Stéfan van der Walt, Harriet Dashnow, O'Reilly Media.
4. A. Lukaszewski, MySQL for Python: Database Access Made Easy, Pact Publisher.

Reference Books:

1. Data Science from Scratch, 2nd Edition by Joel Grus, O'Reilly Media, Inc,May 2019.
2. Scipy And Numpy: An Overview for Developers by Eli Bressert, O'Reilly Media.

Web References:

E-Text Books:

EC306ES: ANALOG AND DIGITAL ELECTRONICS LAB

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
EC306ES	**ESC**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	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.

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

IT WORKSHOP LAB			
Existing JNTUH R18 Syllabus	**Proposed ACE CSE R20 Autonomous Syllabus**	**% Deviation with JNTUH R18 Syllabus**	**Reasons for the Deviation**
Experiment - 5 **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 students should 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.	**Experiment - 5** **INTERNET & WWW** **Task 1: Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they should configure the TCP/IP setting. Finally student should demonstrate, to the instructor, how to access the websites and e-mail. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN. **Task 2: Computer Networking:** MAN, WAN,Network Interface Card, Introduction of Networking devices.	**2%**	**To have the knowledge of various network types and networking devices.**

CS308PC:IT WORKSHOP LAB

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS308PC	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:

- IT Essentials is a training lab course to get training on PC Hardware, Internet & World Wide Web, and Productivity tools for documentation, Spreadsheet computations, and Presentation.
- To introduce a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers, hardware and software level troubleshooting process.
- To introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums. To get knowledge in awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks.
- To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools and LaTeX.

List of Experiments:

INTRODUCTION TO COMPUTERS

Task 1:

Generation of computers, computing environments, identifying the peripherals of a computer, components in CPU and its functions. Block diagram of the CPU.

ASSEMBLING AND DISASSEMBLING

Task 1:

A practice on disassembling the components of a PC and assembling them back to working condition.

SOFTWARE INSTALLATION

Task 1:

Operating System Installation – Windows and Linux installation.

Task 2:

Mobile Operating System Installation – Android.

HARDWARE AND SOFTWARE TROUBLESHOOTING

Task 1:

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.

Task 2:

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.

INTERNET & WORLD WIDE WEB

Task 1:

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

Task 2: Computer Networking: MAN, WAN,Network Interface Card, Introduction of Networking devices.

Task 3:

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 4:

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 5:

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 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

Word and LaTeX Orientation: Importance of LaTeX and MS office 2007. Overview of LaTeX and Microsoft (MS) office 2007 - Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 1:

Using LaTeX and Word to create project certificate: Features to be covered:- Drop Cap and Character Spacing in word, Formatting Fonts, Applying Text effects, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word

Task 2: Creating project abstract Features to be covered: Formatting Styles, Inserting table, Cell alignment, Bullets and Numbering, Changing Text Direction, Footnote, Hyperlink, Symbols, page numbering, Spell Check and Track Changes.

Task 3:

Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Excel Orientation: Importance of MS Excel 2007. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1:

Creating a Scheduler: Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Task 2:

Calculating GPA: Features to be covered:- Cell Referencing, Formulae in excel – average, standard 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.

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.

Task 2: Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide sorter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

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

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

R20 B.TECH IoT II YEAR I SEMESTER

CS311PC: ADVANCED PYTHON PROGRAMMING LAB

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS311PC	**PCC**	-	-	3	1.5	30	70	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 45**				**Total Classes: 45**		

Prerequisite:

- A course on "Data Science, GUI and Web Programming".
- A course on "Python Programming".

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

- Manipulate and Analyze dataset.
- Perform statistical analysis.
- Effectively visualizing result.
- Develop the skill of designing Graphical user Interfaces.
- Develop Database Application.

List of Experiments:

LIST OF PROGRAMS:

- Create Regular Expressions that
  - a) Recognize following strings bit, but, bat, hit, hat or hut
  - b) Match any pair of words separated by a single space, that is, first and last names.
  - c) Match any word and single letter separated by a comma and single space, as in last name, first initial.
  - d) Match simple Web domain names that begin with www. and end with a ".com" suffix; for example, www.yahoo.com. Extra Credit: If your regex also supports other high-level domain names, such as .edu, .net, etc. (for example, www.foothill.edu).
  - e) Match a street address according to your local format (keep your regex general enough to match any number of street words, including the type designation). For example, American street addresses use the format: 1180 Bordeaux Drive. Make your regex flexible enough to support multi-word street names such as: 3120 De la Cruz Boulevard.
- Create Regular Expressions that:
  - a) Extract the complete timestamps from each line.
  - b) Extract the complete e-mail address from each line.
  - c) Extract only the months from the timestamps.
  - d) Extract only the years from the timestamps.
  - e) Extract only the time (HH:MM:SS) from the timestamps.
- Write a multithread program to create 3 threads where one thread calculates the factorial and second thread calculates square and third thread calculates the summation of a list of numbers.

Write a python program to create two threads to count how many lines in two text files (one thread

will count lines from first file and other thread from second file).

- Write a python script that performs basic operations using MySQL database and a corresponding Python database adapter.
- Write a python script that performs basic operations using SQLite Database and a corresponding Python database adapter
- Write a program to demonstrate operations in Numpy.
- Write a python program to demonstrate data indexing, selection and filtering in Pandas.
- Write a python program to create GUI application to illustrate slider tool that controls the size of the text font in the label widget.(Greater the slider position, larger the font and vice-versa)
- Write a python program to create GUI application to implement road signs with the appropriate foreground and background colors based on sign type stop, wait and Go signal.
- Write a python program to create a "Comments" or "Feedback" page for a Web site. Take user feedback via a form, process the data in your script, and return a "thank you" screen.
- Create a CGI application that not only saves files to the server's disk, but also displays the content of file back to the client.

TEXT BOOKS:

- Core Python Programming, Wesley J. Chun, Third Edition, Pearson.
- Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython by Wes McKinny, O'Reilly Media.
- Elegant SciPy: The Art of Scientific Python By Nunez-Iglesias, Stefan van der Walt, Harriet Dashnow, O'Reilly Media.
- A. Lukaszewski, MySQL for Python: Database Access Made Easy, Pact
- Publisher.

REFERENCE BOOKS:

- Data Science from Scratch, 2nd Edition by Joel Grus, O'Reilly Media, Inc, May 2019.
- Scipy and Numpy: An Overview for Developers by Eli Bressert, O'Reilly Media.

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

Python.org

MC309HS: GENDER SENSITIZATION LAB

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
MC309HS	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.

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

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%

COMPUTER ORGANIZATION and ARCHITECTURE			
Existing JNTUH R18 Syllabus	**Proposed ACE CSE R20 Autonomous Syllabus**	**% Deviation with JNTUH R18 Syllabus**	**Reasons for the Deviation**
UNIT – 5	**UNIT – 5**		
Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics. Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence	**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. **8086 Processor:** Register Organization of 8086, Architecture, PIN diagram, Minimum and Maximum Modes, Instruction formats, Addressing Modes, Instruction set, Assembler Directives and Operators. **AssemblyLanguage Programming with 8086:** Assembly Language Example programs.	**10%**	**To familiarize and have the knowledge of Processor architecture and Assembly Language Programming.** **It is also a part of syllabus in most of the competitive exams.**

CS404PC: COMPUTER ORGANIZATION and ARCHITECTURE

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS404PC	PCC	3	0	0	3	30	70	100
Contact Classes: 50	Tutorial Classes: 0	Practical Classes: 0				Total Classes: 50		

Prerequisite: Nil

Course Objectives:

- Students should grasp the basic concepts of computer organization and microprocessors, and understand the key skills needed for constructing cost-effective computer systems.
- To familiarize the students with the assembly language programming and interfacing of microprocessors.

Course Outcomes:

At the end of the Course Student will be able to:

- Master the binary and hexadecimal number systems including computer arithmetic. (L1)
- Understand the basic components and the design of CPU, ALU , Memory and Control Unit.(L2)
- Analyze the instruction set, instruction formats and addressing modes of 8086 and select appropriate for solving real world problems.(L3)
- Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor.(L3)
- Design a pipeline for consistent execution of instructions with minimum hazards.(L4)

Unit - 1	Digital Computers	No.of Classes: 10

Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt. CISC Characteristics, RISC Characteristics.

Unit - 2	Microprogrammed Control	No.of Classes: 10

Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program

Control Instructions, Zero, One, Two and Three address instructions.

Unit - 3	**Data Representation & Computer Arithmetic**	No.of Classes: 10

Data types, Complements, Fixed Point Representation, Floating Point Representation. Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations

Unit - 4	**Input-Output Organization**	No.of Classes: 10

Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

Unit - 5	**Pipeline and Vector Processing**	No.of Classes: 10

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.
8086 Processor: Register Organization of 8086, Architecture, PIN diagram, Minimum and Maximum Modes, Instruction formats, Addressing Modes, Instruction set, Assembler Directives and Operators.
Assembly Language Programming with 8086: Assembly Language Example programs.

Text Books:

1. Computer System Architecture – M. Moris Mano, Third Edition, Pearson/PHI.

Reference Books:

1. Computer Organization – Car Hamacher, ZvonksVranesic, SafeaZaky, VthEdition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings Sixth Edition,Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4thEdition,PHI/Pearson.

Web References:

0. https://nptel.ac.in/courses/106/105/106105163/

E-Text Books:

1.https://www.academia.edu/31003870/Computer_System_Architecture_3rd_Ed_by_M_Morris_Mano_text.pdf

R20 B.TECH IoT II YEAR II SEMESTER

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:	Practical Classes: Nil				Total Classes: 45		

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

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

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

R20 B.TECH IoT II YEAR II SEMESTER

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 Data Structures".
- A course on "Computer Organization and Architecture".

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**
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/

CO401PC: SENSORS AND DEVICES

<table>
<tr><td colspan="9">B.Tech. II Year II Semester</td></tr>
<tr><td>Course Code</td><td colspan="2">Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="2">Maximum Marks</td></tr>
<tr><td rowspan="2">CO401PC</td><td rowspan="2" colspan="2">PCC</td><td>L</td><td>T</td><td>P</td><td>C</td><td>CIA</td><td>SEE</td><td>Total</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td><td>30</td><td>70</td><td>100</td></tr>
<tr><td colspan="2">Contact Classes: 45</td><td colspan="2">Tutorial Classes: 0</td><td colspan="3">Practical Classes: Nil</td><td colspan="2">Total Classes: 45</td></tr>
<tr><td colspan="9">Course Objectives:
• To introduce the terminology, technology and its applications
• To introduce the concept of M2M (machine to machine) with necessary protocols
• To introduce the Python Scripting Language which is used in many IoT devices
• To introduce the Raspberry PI platform, that is widely used in IoT applications
• To introduce the implementation of web-based services on IoT devices</td></tr>
<tr><td colspan="9">Course Outcomes:
• Understanding of IoT value chain structure (device, data cloud), application areas and technologies involved.
• Understand IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules
• Market forecast for IoT devices with a focus on sensors
• Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi</td></tr>
<tr><td>Unit- I</td><td colspan="5">Introduction to Internet of Things</td><td colspan="3">No.of Classes: 09</td></tr>
<tr><td colspan="9">Introduction to Internet of Things- Definition and Characteristics of IoT, Sensors, Actuators, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Agriculture and Industry</td></tr>
<tr><td>Unit-II</td><td colspan="5">IoT and M2M</td><td colspan="3">No.of Classes: 09</td></tr>
<tr><td colspan="9">IoT and M2M- Software defined networks, network function virtualization, difference between SDN and NFV for IoT, Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER</td></tr>
<tr><td>Unit- III</td><td colspan="5">IoT Physical Devices and Endpoints</td><td colspan="3">No.of Classes: 09</td></tr>
<tr><td colspan="9">IoT Physical Devices and Endpoints- Introduction to Arduino and Raspberry Pi- Installation, Interfaces (serial, SPI, I2C), Programming – Python program with Raspberry PI with focus on interfacing external gadgets, controlling output, reading input from pins.</td></tr>
<tr><td>Unit-IV</td><td colspan="5">Controlling Hardware & Sensors</td><td colspan="3">No.of Classes: 09</td></tr>
<tr><td colspan="9">Controlling Hardware- Connecting LED, Buzzer, Switching High Power devices with transistors, Controlling AC Power devices with Relays, Controlling servo motor, speed control of DC Motor, unipolar and bipolar Stepper motors
Sensors- Light sensor, temperature sensor with thermistor, voltage sensor, ADC and DAC, Temperature and Humidity Sensor DHT11, Motion Detection Sensors, Wireless Bluetooth Sensors,</td></tr>
</table>

Level Sensors, USB Sensors, Embedded Sensors, Distance Measurement with ultrasound sensor		
Unit- V	**IoT Physical Servers and Cloud Offerings**	**No.of Classes: 09**
IoT Physical Servers and Cloud Offerings– Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API		
Text Books: 3. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547 4. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759 5. Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 7989352133895		
Reference Books: 6. Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan 7. Peter Friess,'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014 8. N. Ida, Sensors, Actuators and Their Interfaces, SciTech Publishers, 2014		

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, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.

2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

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

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

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

CO402PC: SENSORS AND DEVICES LAB

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CO402PC	PCC	0	0	3	1.5	30	70	100
Contact Classes: 0	Tutorial Classes: 0	Practical Classes:45				Total Classes:45		

List of Experiments:

1. Connect an LED to GPIO pin 25 and control it through command line.
2. Connect an LED to GPIO pin 24 and a Switch to GPIO 25 and control the LED with the switch.
3. The state of LED should toggle with every press of the switch Use DHT11 temperature sensor and print the temperature and humidity of the room with an interval of 15 seconds
4. Use joystick and display the direction on the screen
5. Use Light Dependent Resistor (LDR) and control an LED that should switch-on/off depending on the light.
6. Create a traffic light signal with three colored lights (Red, Orange and Green) with a duty cycle of 5-2-10 seconds.
7. Switch on and switch of a DC motor based on the position of a switch.
8. Convert an analog voltage to digital value and show it on the screen.
9. Create a door lock application using a reed switch and magnet and give a beep when the door is opened.
10. Control a 230V device (Bulb) with Raspberry Pi using a relay.
11. Control a 230V device using a threshold temperature, using temperature sensor.
12. Create an application that has three LEDs (Red, Green and white). The LEDs should follow the cycle (All Off, Red On, Green On, White On) for each clap (use sound sensor).
13. Create a web application for the above applications wherever possible with suitable modifications to get input and to send output.

R20 B.TECH IoT II YEAR II SEMESTER

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.

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*.

MC409HS: CONSTITUTION OF INDIA

B.Tech. II Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
MC409HS	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".

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