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

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**

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

B.Tech. II Year II Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CO401PC	**PCC**	3	0	0	3	30	70	100
Contact Classes: 45	**Tutorial Classes: 0**	**Practical Classes: Nil**				**Total Classes: 45**		

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

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

Unit- I	Introduction to Internet of Things	No.of Classes: 09

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

Unit-II	IoT and M2M	No.of Classes: 09

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

Unit- III	IoT Physical Devices and Endpoints	No.of Classes: 09

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.

Unit-IV	Controlling Hardware & Sensors	No.of Classes: 09

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,

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 ofthe 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