

IPS Academy, Institute of Engineering & Science

(A UGC Autonomous Institute, Affiliated to RGPV, Bhopal)

Scheme Based on AICTE Flexible Curriculum

Department of Computer Science & Engineering

Bachelor of Technology (B.Tech.) [Computer Science & Engineering(IoT)]

IV Semester

S.No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory			Practical			L	T	P	
				End Sem	Mid Sem. Exam.	Quiz/ Assignment	End Sem	Term work Lab Work & Sessional					
1.	BSC-CIOT401	ESC	Computer Networks	70	20	10	60	40	200	3	—	2	4
2.	PCC-CIOT401	PCC	Sensors and Actuators	70	20	10	—	—	100	3	1	—	4
3.	PCC-CIOT402	PCC	Database Management Systems	70	20	10	60	40	200	2	—	4	4
4.	PCC-CIOT403	PCC	Web Technology	70	20	10	60	40	200	2	1	2	4
5.	PCC-CIOT404	PCC	Sensors and Actuators LAB	—	—	—	60	40	100	—	—	4	2
6.	HSMC-CIOT401	HSMC	Soft Skill & Interpersonal Communication-I	70	20	10	—	—	100	3	—	—	3
7.	MC-4	MC	Constitution of India	—	—	—	—	—	—	2	—	—	0
			Total	350	100	50	240	160	900	15	2	12	21

1 Hr Lecture	1 Hr Tutorial	2 Hr Practical
1 Credit	1 Credit	1 Credit

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ESC-CIOT401	Computer Network	3L: 0T: 2P (5 Hrs.)	Credits:04
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Prerequisite: Data Communication

Course Objective: This course provides foundation to understand computer networks using layered architectures.

Course Contents:

Module 1: (08 hrs.)

Introduction to computer networks: Network – Component and Categories – Topologies Reference Models: ISO/OSI Model and TCP/IP Protocol suite. Principles of physical layer: Transmission Media, Bandwidth, Multiplexing, Switching, X.25, ISDN.

Module 2: (08 hrs.)

Data Link Layer: Need, Services Provided, Framing, Flow Control, Error control. Data Link Layer Protocol: Elementary & Sliding Window protocol: 1-bit, Go-Back-N, Selective Repeat, Hybrid ARQ. Protocol verification: Finite State Machine Models & Petri net models. HDLC, ARP/RARP, error detection & correction technique.

Module 3: (9 hrs.)

MAC Sublayer: MAC Addressing, Binary Exponential Back-off (BEB) Algorithm, Distributed Random Access Schemes/Contention Schemes: for Data Services (ALOHA and Slotted- ALOHA), for Local-Area Networks (CSMA, CSMA/CD, CSMA/CA), Collision Free Protocols: Basic Bit Map, Binary Count Down, Adaptive Tree Walk, Performance Measuring Metrics. IEEE Standards 802 series & their variant.

Module 4: (08 hrs.)

Network Layer: Need, Services Provided, Design issues, Routing algorithms: Least Cost Routing algorithm, Dijkstra's algorithm, Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multicast Routing. IP Addresses, Header format, Packet forwarding, Fragmentation and reassembly, ICMP, Comparative study of IPv4 & IPv6.

Module 5: (10hrs.)

Transport Layer: Design Issues, UDP: Header Format, Per-Segment Checksum, Carrying Unicast/Multicast Real-Time Traffic, TCP: Connection Management, Reliability of Data Transfers, TCP Flow Control, TCP Congestion Control, TCP Header Format, TCP Timer Management. Application Layer: WWW and HTTP, FTP, SSH, Email (SMTP, MIME, IMAP), DNS, Network Management (SNMP).

Course Outcome:

1. Describe basics of computer network, network architecture, TCP/IP protocol suite, OSI reference models & fundamentals of physical layer.
2. Classify data link protocol like flow control, error control, bit oriented protocol.
3. Paraphrase multi-channel access protocol, IEEE 802 standards & use Ethernet standards.
4. Explain routing & congestion algorithm. State IP protocol, addressing & subnet.
5. Distinguish various transport & application layer protocols.

List of Text / Reference Books:

1. Andrew S. Tanenbaum, David J. Wetherall, "Computer Networks" Pearson New International Edition, 5th Edition, 2013.
2. Douglas E Comer, "Internetworking with Tcp/Ip Principles, Protocols, And Architecture -Volume I" 6th Edition, Prentice Hall of India.
3. Dimitri Bertsekas, Robert Gallager, "Data Networks", PHI Publication, Second Edition.
4. Kaveh Pahlavan, Prashant Krishnamurthy, "Networking Fundamentals", Wiley Publication. First Edition, 2009
5. Uyless Black, "Computer Networks", PHI Publication, Second Edition.
6. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", McGrawHill. 2011.
7. Behrouz A. Forouzan, "Data Communication and Networking", McGrawHill, 5th Edition, 2013.
8. William Stallings, "Data and Computer Communication" 8th Edition, 2007.
9. W. Richard Stevens. "TCP/IP Illustrated, Volume 1", Addison-Wesley, United States of America.

List of Experiments:

1. Study of Different Type of LAN & Network Equipments.
2. Study Transmission media & standard Network topologies i.e. Star, Bus, Ring etc.
3. LAN installations and Configurations.
4. Write a program to implement various types of error correcting techniques.
5. Write a program to implement various types of farming methods.
6. Study of Tool Command Language (TCL).
7. Study and Installation of Standard Network Simulator: N.S-2, N.S3.OpNet, QualNet etc.
8. Study & Installation of ONE (Opportunistic Network Environment) Simulator for High Mobility Networks.
9. Configure 802.11 WLAN.
10. Implement & Simulate various types of routing algorithm.
11. Study & Simulation of MAC Protocols like Aloha, CSMA, CSMA/CD and CSMA/CA using Standard Network Simulators.
12. Study of Application layer protocols-DNS, HTTP, HTTPS, FTP an TelNet.

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IV Semester

PCC-CIOT401	SENSORS AND ACTUATORS	3L : 1T : 0P (4 hrs.)	4 credits
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Prerequisite: Basic introduction to IoT

Course Objective:

The objective of this course is to recognize the importance of sensors and actuators, gain knowledge in the physical principles behind each sensor

Course Contents: (42 hrs.)

Module 1: (08 hrs.)

Historical development of sensors, classification of sensors, Sensor as a passive or active element, sensor as a part of a measurement system, sensor properties, Actuators in IoT,

Module 2: (08 hrs.)

Physical Principles Of Sensing :- Electric Charges, Fields, and Potentials - Capacitance - Magnetism - Induction - Resistance - Piezoelectric Effect -Pyroelectric Effect - Hall Effect - Seebeck and Peltier Effects – SoundWaves - Temperature and Thermal Properties - Heat Transfer

Module 3: (10 hrs.)

Acoustic Sensors: Microphone characteristics - Resistive Microphones - Condenser Microphones - Fiber-Optic Microphone - Piezoelectric Microphones - Electret Microphones –dynamic microphones
Humidity and moisture sensors : Concept of Humidity - Capacitive Sensors – Resistive sensors - Thermal Conductivity Sensor - Optical HygrometerOscillating Hygrometer – Soil Moisture Temperature Sensors-Thermoresistive Sensors - Resistance Temperature Detectors - Silicon Resistive Sensors - Thermistors -NTC Thermistors -SelfHeating Effect in NTC Thermistors - PTC Thermistors
- Thermoelectric Contact Sensors - Semiconductor P-N Junction Sensors - Optical Temperature Sensors - Acoustic Temperature Sensor - Piezoelectric Temperature Sensors .

Module 4: (08 hrs.)

Pressure Sensors :Concepts of Pressure - Units of Pressure - Mercury Pressure Sensor -Bellows, Membranes, and Thin Plates - Piezoresistive Sensors - Capacitive Sensors - VRP Sensors - Optoelectronic Sensors –Indirect pressure sensors -Vacuum Sensors
Flow Sensors - Basics of Flow Dynamics - Pressure Gradient Technique - Thermal Transport Sensors
- Ultrasonic Sensors - Electromagnetic Sensors. - Microflow Sensors - Breeze Sensor - Coriolis Mass Flow Sensors - Drag Force Flow Sensors- Cantilever MEMS sensors – Dust and smoke detectors

Module 5: (08 hrs.)

Light Detectors: Introduction -Photodiodes - Phototransistor –Photoresistors - Cooled Detectors – Imaging sensors –UV detectors -Thermal Radiation Detectors
Importance of actuators, types: Pneumatic actuators, Hydraulic actuators, Electric actuators, Thermal actuators. Case studies IoT system containing sensor devices and use of Actuators

Course Outcome:

1. Describe the importance of sensors
2. Outline the physical principles behind each sensor.
3. Bring out the different types of temperature, acoustic, humidity & moisture sensors.
4. Identify different pressure and flow detectors for sensing
5. Introduce the concept of actuators and its features.

List of Text / Reference Books:

1. Jacob Fraden, “ Handbook of Modern Sensors – Physics, Designs and Applications” Springer fifth edition, 2016
2. John Vetelino and AravindReghu, “Introduction to Sensors” CRC Press, 1st Edition, 2010.
3. Ion Sinclair,” Sensors and transducers” Newnws publisher, Third Edition, 2001

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IV Semester

PCC-CIOT402	Database Management System	2L: 1T: 2P (5 hrs.)	4 credits
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Prerequisite: Nil

Course Objective:

The main objective of this course is to understand fundamental of database management system.

Course Contents: (45 hrs.)

Module 1: (06 hrs.)

DBMS Concepts and architecture Introduction, Database approach v/s Traditional file accessing approach, Advantages, of database systems, Data models, Schemas and instances, Data independence, Data Base Language and interfaces, Overall Database Structure, Functions of DBA and designer, ER data model: Entities and attributes, Entity types, Defining the ER diagram, Concept of Generalization, Aggregation and Specialization, Transforming ER diagram into the tables. Various other data models object- oriented data Model, Network data model, and Relational data model, Comparison between the three types of models.

Module 2: (08hrs.)

Relational Data models: Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints. Referential integrity, Relational Query languages: SQL-DDL, DML, integrity constraints, Complex queries, various joins, Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union. Types of relational calculus i.e. Tuple oriented and domain oriented relational calculus and its operations.

Module 3: (14 hrs.)

Data Base Design: Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and dangling tuples, multivalued dependencies. Query Optimization: Introduction, steps of optimization, various algorithms to implement select, project and join operations of relational algebra, optimization methods: heuristic based, cost estimation based.

Module 4: (09 hrs.)

Transaction Processing Concept: Transaction system, Testing of Serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures. Log based recovery. Checkpoints deadlock handling. Concurrency Control Techniques: Concurrency Control, locking Techniques for concurrency control, time stamping protocols for concurrency control, validation based protocol, multiple granularity. Multi version schemes, Recovery with concurrent transaction.

Module 5:**(08 hrs.)**

Study of Relational Database Management Systems through Oracle/PL SQL/MySQL: Architecture, physical files, memory structures, background process. Concept of table spaces, segments, extents and block. Dedicated server, multi threaded server. SQL queries, Data extraction from single, multiple tables equi-join, non equi-join, self-join, outer join. Usage of like, any, all, exists, in Special operators. Cursor management: nested and parameterized cursors, Oracle exception handling mechanism. Stored procedures, in, out, in out type parameters, usage of parameters in procedures. User defined functions their limitations. Triggers, mutating errors, instead of triggers.

Course Outcomes:

1. Describe basic concepts of DBMS and Explain ER model.
2. Solve queries using Relational Algebra, Relational Calculus and SQL.
3. Explain database schema and discuss the Query optimization methods.
4. Describe transaction processing, concurrency control and recovery technique.
5. Analyze the Various DBMS software like Oracle, SQL/PL SQL etc.

List of Text / Reference Books:

1. Date C J, "An Introduction to Database System", Pearson Educations, 8th Edition, 2003.
2. Korth, Silbertz, Sudarshan, "Fundamental of Database System", McGraw Hill, 5th Edition, 2006.
3. Peter Rob, "Data Base System: Design Implementation & Management", Cengage Learning 4th Edition, 2000.
4. Elmasri, Navathe, "Fundamentals of Database Systems", Pearson Educations, 7th Edition 2017.
5. Atul Kahate, "Introduction to Database Management System", Pearson Educations, 2004.
6. Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press, TMH.
7. Paneerselvam, "Data Base Management System", PHI Learning, 3rd Edition, 2018.
8. J. D. Ullman, "Principles of Database and Knowledge – Base Systems", Computer Science Press, 2nd Edition 1988.
9. Serge Abiteboul, Richard Hull, Victor Vianu, "Foundations of Databases", Addison-Wesley, 1995.

List of Experiments

1. Introduction to Oracle and SQL
2. Write the queries for Data Definition language (DDL)
3. Write the queries for Data manipulation language (DML)
4. Use of various types of Integrity Constraints
5. Write the queries for Data Control language (DCL)
6. Use of SELECT command with different clauses.
7. Write SQL queries using logical operation (AND, OR, NOT)
8. Write SQL queries for aggregate functions (Max, Min, Sum, Avg, and Count)
9. Write SQL queries for group by and having
10. Write SQL queries for sub queries and nested queries
11. Write an SQL query to implement JOINS
12. Write SQL queries to create views
13. Write program by the use of PL/SQL
14. Design and implementation of any Database system (like Banking, University etc.)

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IV Semester

PCC-CIOT403	WEB TECHNOLOGY	2L : 0T : 2P (4 hrs.)	4 credits
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Prerequisite: HTML, CSS

Course Objective:

The objective of this course is to understand how a website is created using html pages. Enhancing its working using CSS, JavaScript and php

Course Contents: (48 hrs.)

Module 1:

(10 Hrs)

The basics of Internet, Web Client vs Web Servers, World Wide Web, FTP, HTTP vs HTTPS, Introduction to HTML, History, HTML Tags and Attributes, HTML Tag vs Element, HTML: Basic Tags, Lists, Images, Hyperlink, Table, Introduction and Advantages of HTML 5, HTML5 Web Forms, HTML5 Media (Video & Audio)

Module 2:

(10 Hrs)

Introduction to Cascading Style Sheets, Creating Style Sheet, CSS Selectors, Introduction to CSS3: Border and box effects, Background Images, 2D & 3D Transformation, Transition and animation, Multi Column Layout, Introduction to CSS library framework - Bootstrap

Module 3:

(10 Hrs)

JavaScript: Introduction, Language Syntax - variables, operators, control statements, loops, array, Dialog Boxes, Built in Functions, HTML Document object Model, Cookies, Animation using JavaScript, Introduction to JavaScript library - jQuery

Module 4:

(10 Hrs)

Creating a webserver using XAMPP, Static vs Dynamic websites, Server-Side Programming, PHP: Intro, Basic Syntax, defining variable and constant, Data types, Operator and Expression, Handling Html Form with Php, Decisions and loop, Function, String, Array, Working with file

Module 5:

(8 Hrs)

PHP State management: query string (URL rewriting), Hidden Field, cookies, session, Database Connectivity with MySQL: Connection with MySql Database, performing basic database operation (DML) (Insert, Delete, Update, Select), Setting query parameter, Executing query

Course Outcome:

1. Understand the concept of a web page using HTML
2. Construct web pages that meet, guidelines for better look and feel using CSS
3. Evaluate how JavaScript use web pages in relationship to an entire web site.
4. Introduce the concept of server-side programming: PHP
5. Demonstrate the ability to retrieve data from a database and present it in a web page.

List of Text / Reference Books:

1. Uttam K Roy, —Web Technologies, Oxford University Press, 1st Edition, 2010
2. Douglas Crockford, - JavaScript: The Good Parts, O'Reilly, 1st Edition
3. Steven Holzner, —The Complete Reference PHP, Tata McGraw-Hill, 1st Edition, 2007.

List of Experiments:

1. Installation of XAMPP servers.
2. HTML:
 - a. Create a table to show your class time table.
 - b. Use tables to provide layout to your HTML page describing your college infrastructure.
 - c. Use and tags to provide a layout to the above page instead of a table layout.
3. HTML:
 - a. Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.
 - b. Embed Audio and Video into your HTML web page.
4. HTML:
 - a. Create a webpage with HTML describing your department use paragraph and list tags
 - b. Apply various colors to suitably distinguish key words , also apply font styling like italics, underline and two other fonts to words you find appropriate , also use header tags.
 - c. Create links on the words e.g. —Wi-Fi and —LAN to link them to Wikipedia pages.
 - d. Insert an image and create a link such that clicking on image takes user to other page
 - e. Change the background color of the page; At the bottom create a link to take user to the top of the page.
5. Develop static pages (using only HTML) of an online book store, the pages should resemble: www.amazon.com, the website should consist the following pages, home page, registration and user login, user profile page, books catalog, shopping cart, payment by credit card, order confirmation.
6. Write an HTML page that contains a selection box with a list of 5 countries, when the user selects a country, its capital should be printed next to the list; Add CSS to customize the properties of the font of the capital (color, bold and font size).
7. JAVASCRIPT:
 - a. Write a java script program to sort a list of elements using quick sort
 - b. Write a java script for loop that will iterate from 0 to 15 for each iteration, it will check if the current number is odd or even, and display a message to the screen.
8. JAVASCRIPT:
 - a. Write a java script program to sort a list of elements using quick sort
 - b. Write a java script for loop that will iterate from 0 to 15 for each iteration, it will check if the current number is odd or even, and display a message to the screen.
9. JAVASCRIPT:
 - a. Write a java script program which compute, the average marks of the following students then this average is used to determine the corresponding grade.
 - b. Write a java script program to sum the multiple s of 3 and 5 under 1000.
 - c. To design the scientific calculator and make event for each button using java script
10. PHP:
 - a. A simple calculator web application that takes two numbers and an operator (+, /, * and %) from an HTML page and returns the result page with the operation performed on the operands.
 - b. Write PHP program how to send mail using PHP

11. PHP:

- a. Write PHP program to convert a string, lower to upper case and upper case to lower case or capital case.
- b. Write PHP program to change image automatically using switch case.
- c. Write PHP program to calculate current age without using any pre-define function
- d. Write PHP program to upload image to the server using html and PHP.

12. PHP:

- a. Write PHP program to upload registration form into database.
- b. Write PHP program to display the registration form from the database.

13. PHP:

- a. Write PHP program to update the registration form present in database.
- b. Write PHP program to delete the registration form from database .

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IV Semester

PCC-CIOT404	SENSORS & ACTUATORS LAB	0L : 0T : 4P (4 hrs.)	2 credits
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Prerequisite: Basic introduction to IoT

Course Objective:

The objective of this course is to recognize the importance of sensors and actuators, gain knowledge in the physical principles behind each sensor

Course Contents: (40 hrs.)

Module 1: (8 Hrs)

Sensor vs Sensor module, PIR and IR Sensor, PCB Mounted Active Buzzer Module, Servo motor, LCD, I2C module.

Module 2: (8 Hrs)

Ultrasonic Sensor, Stepper motor, RGB LEDs, LDR sensors

Module 3: (8 Hrs)

Gas and Dust Sensor, Flame Sensor, Temperature & Humidity Sensor, Water TDS, pH, Flow, Level and Pressure Sensor

Module 4: (8 Hrs)

RFID cards, Tags & Readers: working principle, frequency ranges: Low Frequency, High Frequency, and Ultra-High Frequency, Types: Active RFID, Passive RFID

Module 5: (8 Hrs)

Distance Sensor, Light/Color Sensor, Motor Driver, BO motor, sound sensor

Course Outcome:

1. Understand the importance of different IR sensors
2. Identify working of Ultrasonic and LDRs
3. Bring out the different types of temperature, acoustic, humidity & moisture sensors.
4. Outline the physical principles behind RFID
5. Bring out the different types of Distance, Sound sensors and motors

List of Text / Reference Books:

1. Jacob Fraden, "Handbook of Modern Sensors – Physics, Designs and Applications" Springer fifth edition, 2016
2. John Vetelino and Aravind Reghu, "Introduction to Sensors" CRC Press, 1st Edition, 2010.
3. Ion Sinclair, "Sensors and transducers" Newnws publisher, Third Edition, 2001

List of Experiments:

Creating the following mini project using required sensors and actuators

1. Car Parking System
2. Burglar Alarm with PIR Motion Sensor

3. Smart street light system
4. Smart Dust-Bin
5. LPG detector and auto exhaust
6. Soil Moisture Detection
7. Water Pressure & Flow Control system
8. Smart toll tax system
9. Acoustic Sensors home automation
10. Line sensor car

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IV Semester

HSMC-CIOT401	Soft Skills & Interpersonal Communication	3L : 0T : 0P (3hrs.)	Credits:03
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Prerequisite:

Course Objectives:

The course will help students to learn effective communication skills, group and team building skills. It will help them to learn the goal setting process and thus become more effective in achieving it.

Module-I: Introduction to Soft Skills

Importance of Soft Skills, Effective Communication Skills, Verbal: Oral and Written, Merits and Demerits. Non Verbal: Kinesics, Proxemics, Haptics, Chronemics, Paralanguage, Sign/Symbol, Meta Communication, and Cultural differences in Non-Verbal Communication

Module-II: Aspects of Communication

Process of Listening, Types of Listening, Barriers to Listening, Strategies to Develop Listening Skills, Listening Comprehension, Culture as Communication, Communicating across Cultures, Communication Breakdown and ways to overcome

Module-III: Interpersonal Skills

Introduction and Importance to Interpersonal Skills, Personal Attributes, Interpersonal Attributes, Decision making, Creative Problem Solving, Dealing with Glossophobia, , Logical Reasoning Tony Buzan's Mind Mapping Techniques: Argumentation, Inductive, Deductive reasoning, Persuasion

Module-IV: Group Behavior

Leadership skills, Team Management, Group Dynamics, Negotiation, Assertiveness, Emotional Intelligence

Module-V: Practical Approach to Soft Skills and Interpersonal Skills

Case Studies, SWOC Analysis and Goal Setting, Mindfulness Training, Brain Storming, Group Discussion, Team Building Activities.

Course Outcomes:

The outcome of this course will be to make students aware about the different facets of self. It will also help them learn skills to strengthen their inner capacities so that they are able to understand themselves, think and act effectively to lead.

List of Text Books / Reference Books:

1. Soft Skills by G.S. Chouhan and Sangeeta Sharma, Wiley, New Delhi, 2016
Communication Skills by Sanjay Kumar and Pushplata, OUP, New Delhi, 2011
2. Communication Skill for Engineers and Scientist by Sangeeta Sharma and Vinod Mishra, PHI Learning, New Delhi, 2015
3. Developing Communication Skill by Krishna Mohan, Meera Banerji, McMillan India Limited, 2018
4. Effective Listening Skills by Kratz, Abby Robinson. Toronto: ON: Irwin Professional Publishing, 1995.
5. Soft Skill for Everyone by Jeff Butterfield, Cengage Learning, New Delhi, 2010
6. Theories of Personality by Hall, Calvin S. et al. . New Delhi: Wiley. rpt. 2011.
7. Corporate Conversations by Holtz, Shel. New Delhi: PHI. 2007.
8. The Art of Public Speaking by Lucas, Stephen E. McGraw-Hill Book Co. International Edition, 11th Ed. 2014.
9. Winning at Interviews by Thorpe, Edgar and Showick Thorpe. Pearson Education. 2004.
10. Business Communication for Managers by Penrose, John M., et al. New Delhi: Thomson South Western. 2007

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IV Semester

MC-4	IV	Constitution of India	2L:0T:0P (02 hrs)	Credits:00
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Course Objective: The objective of this course is to familiarize the students with the feature of the Indian constitution, laws, democracy etc.

Course content-

MODULE 1: (08 hrs)

Historical background: Formation and working of constituent assembly, formation and working of drafting committee, commencement of Indian constitution, Dr. Ambedkar's ideas of reservation in constitution.

MODULE 2: (08 hrs)

Important feature of the constitution: Preamble, fundamental rights, directive principles of state policy, fundamental duties, centerstate relation.

MODULE 3: (08 hrs)

Parliamentary democracy: Loksabha, Rajyasabha, central executive president, prime minister, and central ministry, Vidhansabha, Vidhanparishad and state executive (Governor, Chief minister, Minister of state).

MODULE 4: (08 hrs)

Special provisions in Indian constitution: finance commission contingency fund, consolidated fund, public service commissions, election commission, safeguards for SC, ST and backward classes, provisions for emergency and constitutional amendments, Indian judiciary supreme court and high court.

Course Outcomes:

After completion of this course, the students are able to:

- 1: Commencement of Indian Constitution
- 2: Features of Indian constitution
- 3: Working and functions of Parliamentary house
- 4: Provisions in Indian Constitution

Text/Reference Book-

1. Austin, G. (1999), The Indian Constitution, Oxford, Oxford University Press
2. Pylee, M. V. (2016), India's Constitution (16 Edition), New, Delhi, S. Chand Publication
3. Kumar, R. (2011), Ambedkar and Constitution (1st Edition), New Delhi, Commonwealth Publication Pvt. Ltd.