NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(AN AUTONOMOUS INSTITUTE)

Affiliated to

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY UTTAR PRADESH, LUCKNOW

Evaluation Scheme & Syllabus

For

Bachelor of Technology

Computer Science And Engineering (Internet Of Things)

Third Year

(Effective from the Session: 2023-24)

NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(AN AUTONOMOUS INSTITUTE)

Bachelor of Technology
Computer Science And Engineering (Internet Of Things)
EVALUATION SCHEME
SEMESTER-V

Sl. No.	Subject Codes	Subject Name	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
WEEKS COMPULSORY INDUCTION PROGRAM													
1	ACSIOT0501	Arm Architecture for IoT	3	1	0	30	20	50		100		150	4
2	ACSE0502	Computer Networks	3	1	0	30	20	50		100		150	4
3	ACSE0503	Design Thinking-II	2	1	0	30	20	50		100		150	3
4	ACSE0505	Web Technology	3	0	0	30	20	50		100		150	3
5		Departmental Elective-I	3	0	0	30	20	50		100		150	3
6		Departmental Elective-II	3	0	0	30	20	50		100		150	3
7	ACSIOT0551	Arm Architecture for IoT Lab	0	0	2				25		25	50	1
8	ACSE0552	Computer Networks Lab	0	0	2				25		25	50	1
9	ACSE0555	Web Technology Lab	0	0	2				25		25	50	1
10	ACSE0559	Internship Assessment	0	0	2				50			50	1
11	ANC0501 / ANC0502	Constitution of India, Law and Engineering / Essence of Indian Traditional Knowledge	2	0	0	30	20	50		50		100	
12		MOOCs(For B.Tech. Hons. Degree)											
		GRAND TOTAL										**1100**	**24**

List of MOOCs (Coursera) Based Recommended Courses for Third Year (Semester-V) B. Tech Students

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	AMC0067	Capstone: Programming for the Internet of Things Project	University of California, Irvine	6	0.5
2	AMC0092	IoT Communications	University of Illinois at Urbana-Champaign	11	0.5

PLEASE NOTE:-

- **Internship (3-4 weeks) shall be conducted during summer break after semester-IV and will be assessed during semester-V**
- **Compulsory Audit Courses (Non Credit - ANC0501/ANC0502)**
  - All Compulsory Audit Courses (a qualifying exam) has no credit.
  - Total and obtained marks are not added in the Grand Total.

Abbreviation Used: -

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

List of Departmental Electives

Sl. No.	Departmental Electives	Subject Codes	Subject Name	Bucket Name	Branch	Semester
1	Elective-I	ACSE0511	CRM Fundamentals	CRM-RPA	IOT	5
2	Elective-II	ACSE0513	CRM Administration		IOT	5
3	Elective-I	ACSAI0512	Data Analytics	Data Analytics	IOT	5
4	Elective-II	ACSAI0519	Business Intelligence and Data Visualization		IOT	5
5	Elective-I	ACSE0512	Python Web Development with Django	Full Stack Development	IOT	5
6	Elective-II	ACSE0514	Design Patterns		IOT	5
7	Elective-I	ACSAI0517	System on Chip Design	Smart Systems	IOT	5
8	Elective-II	ACSAI0518	Applied Industrial IoT		IOT	5

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EVALUATION SCHEME
SEMESTER-VI

Sl. No.	Subject Codes	Subject Name	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	ACSML0601	Machine Learning	3	0	0	30	20	50		100		150	3
2	ACSIOT0601	IoT Protocols & Its Applications	3	1	0	30	20	50		100		150	4
3	ACSIOT0602	Cloud and Edge Computing	3	0	0	30	20	50		100		150	3
4		Departmental Elective-III	3	0	0	30	20	50		100		150	3
5		Departmental Elective-IV	3	0	0	30	20	50		100		150	3
6		Open Elective-I	3	0	0	30	20	50		100		150	3
7	ACSML0651	Machine Learning Lab	0	0	2				25		25	50	1
8	ACSIOT0651	IOT Lab using Raspberry PI	0	0	2				25		25	50	1
9	ACSIOT0652	Cloud and Edge Computing Lab	0	0	2				25		25	50	1
10	ACSE0659	Mini Project	0	0	2				50			50	1
11	ANC0602 / ANC0601	Essence of Indian Traditional Knowledge / Constitution of India, Law and Engineering	2	0	0	30	20	50		50		100	
12		MOOCs (For B.Tech. Hons. Degree)											
		GRAND TOTAL										**1100**	**23**

List of MOOCs (Coursera) Based Recommended Courses for Third Year (Semester-VI) B. Tech Students

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	AMC0091	IoT Cloud	University of Illinois at Urbana-Champaign	19	1.5
2	AMC0119	IoT Networking	University of Illinois at Urbana-Champaign	20	1.5

PLEASE NOTE: -

- **Internship (3-4 weeks) shall be conducted during summer break after semester-VI and will be assessed during semester-VII.**
- **Compulsory Audit Courses (Non Credit - ANC0601/ANC0602)**
  - All Compulsory Audit Courses (a qualifying exam) has no credit.
  - Total and obtained marks are not added in the Grand Total.

Abbreviation Used: -

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

List of Departmental Electives

Sl. No.	Departmental Electives	Subject Codes	Subject Name	Bucket Name	Branch	Semester
1	Elective-III	ACSE0611	CRM Development	CRM-RPA	IOT	6
2	Elective-IV	ACSE0613	Robotics Process Automation(RPA)		IOT	6
3	Elective-III	ACSAI0617	Programming for Data Analytics	Data Analytics	IOT	6
4	Elective-IV	ACSAI0622N	Social Media Analytics		IOT	6
5	Elective-III	ACSAI0612	Advanced Java Programming	Full Stack Development	IOT	6
6	Elective-IV	ACSE0614	Web Development using MEAN Stack		IOT	6
7	Elective-III	ACSAI0616	Privacy and Security in IoT	Smart Systems	IOT	6
8	Elective-IV	ACSAI0618	Advanced Communication		IOT	6

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AICTE Guidelines in Model Curriculum:

A student will be eligible to get Under Graduate degree with Honours only, if he/she completes the additional MOOCs courses such as Coursera certifications, or any other online courses recommended by the Institute (Equivalent to 20 credits). During Complete B.Tech. Program Guidelines for credit calculations are as follows.

1. For 6 to 12 Hours =0.5 Credit
2. For 13 to18 =1 Credit
3. For 19 to 24 =1.5 Credit
4. For 25 to 30 =2 Credit
5. For 31 to 35 =2.5 Credit
6. For 36 to 41 =3 Credit
7. For 42 to 47 =3.5 Credit
8. For 48 and above =4 Credit

For registration to MOOCs Courses, the students shall follow Coursera registration details as per the assigned login and password by the Institute these courses may be cleared during the B. Tech degree program (as per the list provided). After successful completion of these MOOCs courses, the students shall provide their successful completion status/certificates to the Controller of Examination (COE) of the Institute through their coordinators/Mentors only.

The students shall be awarded Honours Degree as per following criterion.

i. If he / she secures 7.50 as above CGPA.
ii. Passed each subject of that degree program in the single attempt without any grace.
iii. Successful completion of MOOCs based 20 credits.

B. TECH. THIRD YEAR

Course code	ACSIOT0501	L T P	Credits
Course title	ARM ARCHITECTURE FOR IoT	3 1 0	4

Course objective: The objective of this course is to understand the fundamental concepts of Arm processor architectures, learn about Arm-based microcontrollers as modern embedded computing platforms. It helps students to learn Target Board FRDM-KL25Z for embedded system design.

Pre-requisites: Knowledge of Microprocessor and Microcontroller

Course Contents / Syllabus

UNIT-I	EMBEDDED CONCEPTS	8 Hours

Introduction to embedded systems, Benefits of Embedded Computer Systems, Microcontroller vs. Microprocessor, MCU Hardware & Software for Concurrency, Difference between Embedded systems OS, IoT device OS, Mobile OS and Desktop OS.

ARM Architecture Processor: Introduction, ARM Processor Families, ARM Cortex-M Series, ARM Processor vs. ARM Architectures

UNIT-II	OVERVIEW OF CORTEX- M0+	8 Hours

Overview, Cortex-M0+ Block Diagram, Registers, Processor Memory Map, Instruction Sets: ARM and Thumb Instruction Set, Cortex-M0+ Instruction Set, Program Code C Language vs. Assembly Language, Program-Generation Flow, Cortex-M0+ Program Image, Program Data, how is Data Stored in RAM, Data Types, Mixed Assembly and C Programming, Digital Input and Output, GPIO Controller.

UNIT-III	OVERVIEW OF SOFTWARE LIBRARIES	8 Hours

Cortex Microcontroller Software Interface Standard (CMSIS), Introduction to mbed SDK for ARM, Introduction to Keil MDK and libraries for ARM.
Embedded Development Kit, Analog Input and Output Overview, DAC, ADC, Analog IO.

UNIT-IV	TARGET BOARD FRDM-KL25Z	8 Hours

Introduction & Features, General Purpose I/O, Freedom KL25Z, KL25Z GPIO Ports, Control Registers, Program, Clocking Logic, Interfacing**,** Timers**:** KL25 Timer Peripherals, Periodic Interrupt Timer, Timer/PWM Module (TPM), Modes of operation, Major Channel Modes, Wind Speed Indicator (Anemometer), Pulse-Width Modulation, Low Power Timer (LPTMR).

UNIT-V	APPLICATION DEVELOPMENT AND COMMUNICATION USING ARM	8 Hours

Overview, Data Transmission, Serial Communication Specifics, Error Detection, Software Structure – Handling asynchronous Communication & Parsing Messages, SPI Communications, I2C Communications, KL25Z I2C Controller, MMA8451 on Freedom KL25Z. Use case design study of Smart lighting in Smart cities using ARM processor.

Course outcome: After completion of this course students will be able to

CO 1	Describe ARM processor architectures.	K2
CO 2	Recognize ARM-based microcontrollers as modern IoT computing platforms.	K3,

CO 3	Realize Software design basics, software engineering principles.	K4
CO4	Explore Target Board FRDM-KL25Z for embedded system application.	K4
CO 5	Design smart IoT enabled devices using ARM.	K5

Text books:

1) ARM system developers guide, Andrew N Sloss, Dominic Symes and Chris Wright, Elsevier,Morgan Kaufman publishers, 2008.
2) Shibu K V, ―Introduction to Embedded Systems‖, Tata McGraw Hill Education Private Limited, 2009.
3) Joseph Yiu, "The Definitive Guide to the ARM Cortex-M0" Newnes publication

Reference Books:

1) ARM Cortex-M0 Technical Reference Manual
2) Embedded Systems: Architecture, Programming and design, Raj Kamal, Second Edition, Tata McGraw Hill publisher, 2010.
3) David E. Simon, "An Embedded Software Primer", Pearson Education.

Links:

Unit 1	https://www.youtube.com/watch?v=JO4AEkOVF2M
Unit 2	https://www.youtube.com/watch?v=JH4j7fCT_o4
Unit 3	https://www.youtube.com/watch?v=4oXc3EpUN4E
Unit 4	https://www.youtube.com/watch?v=Goem6NrCy8A
Unit 5	https://www.youtube.com/watch?v=eu1sQSPEX34

B. TECH THIRD YEAR

Course Code	ACSE0502	L T P	Credits
Course Title	COMPUTER NETWORKS	3 1 0	4

Course objective:

Objective of this course is to develop an understanding of computer networking basics, different components of computer networks, various protocols, modern technologies and their applications.

Pre-requisites: Basic knowledge of Computer system and their interconnection, operating system, Digital logic and design and hands on experience of programming languages.

Course Contents / Syllabus

UNIT-I	Introduction	8 Hours

Goals and applications of networks, Categories of networks, Organization of the Internet, ISP, The OSI reference model, TCP/IP protocol suite, Network devices and components, Mode of communications

Physical Layer: Network topology design, Types of connections, LAN, MAN and MAN Transmission media, Signal transmission and encoding, Network performance and transmission impairments, Switching techniques and multiplexing, IEEE standards.

UNIT-II	Data Link layer	8 Hours

Framing, Error Detection and Correction, Flow control (Elementary Data Link Protocols, Sliding Window protocols). Medium Access Control and Local Area Networks: Channel allocation, Multiple access protocols, LAN standards, Link layer switches & bridges.

UNIT-III	Network Layer	8 Hours

Point-to-point networks, Logical addressing, Basic internetworking (IP, CIDR, ARP, RARP, DHCP, ICMP), IPv4, Routing, forwarding and delivery, Static and dynamic routing, Routing algorithms and protocols, Congestion control algorithms, IPv6.

UNIT-IV	Transport Layer	8 Hours

Process-to-process delivery, Transport layer protocols (UDP and TCP), Connection management, Flow control and retransmission, Window management, TCP Congestion control, Quality of service.

UNIT-V	Application Layer	8 Hours

Domain Name System, World Wide Web and Hyper Text Transfer Protocol, Electronic mail, File Transfer Protocol, Remote login, Network management, Data compression, VPN, Cryptography – basic concepts, Firewalls.

Course outcome: After completion of this course students will be able to

CO 1	Build an understanding of the fundamental concepts and Layered Architecture of computer networking.	K2, K6
CO 2	Understand the basic concepts of link layer properties to detect error and develop the solution for error control and flow control.	K2, K6
CO 3	Design, calculate, and apply subnet masks and addresses to fulfil networking requirements and calculate distance among routers in subnet.	K3, K4, K6
CO 4	Understand the duties of transport layer, Session layer with connection management of TCP protocol.	K2, K4
CO 5	Discuss the different protocols used at application layer.	K2

Text books:

1. Behrouz Forouzan, "Data Communication and Networking" Fourth Edition-2006, Tata McGraw Hill
2. Andrew Tanenbaum "Computer Networks", Fifth Edition-2011, Prentice Hall.
3. William Stallings, "Data and Computer Communication", Eighth Edition-2008, Pearson.

Reference Books:	
1. Kurose and Ross, “Computer Networking- A Top-Down Approach”, Eighth Edition-2021, Pearson.	
2. Peterson and Davie, “Computer Networks: A Systems Approach”, Fourth Edition-1996, Morgan Kaufmann	
NPTEL/ YouTube/ Faculty Video Link:	
Unit 1	https://www.youtube.com/watch?v=LX_b2M3IzN8
Unit 2	https://www.youtube.com/watch?v=LnbvhoxHn8M
Unit 3	https://www.youtube.com/watch?v=ddM9AcreVqY
Unit 4	https://www.youtube.com/watch?v=uwoD5YsGACg
Unit 5	https://www.youtube.com/watch?v=bTwYSA478eA&list=PLJ5C_6qdAvBH01tVf0V4PQsCxGE3hSqEr https://www.youtube.com/watch?v=tSodBEAJz9Y

B. TECH THIRD YEAR

Course code	ACSE0503	L T P	Credits
Course title	DESIGN THINKING II	2 1 0	3

Course Objectives: The objective of this course is to upgrade Design Thinking skills by learning & applying advanced and contextual Design Thinking Tools. It aims to solve a Real-Life Problem by applying Design Thinking to create an impact for all the stakeholders

Pre-requisites: Student must complete Design Thinking-I course.

Course Contents / Syllabus

UNIT-I	INTRODUCTION	10 HOURS

Design thinking & Innovation, Design Thinking Mindset and Principles, recap of 5-Step Process of Design Thinking, Design Approaches, additional in-depth examples of each design approaches. Simon Sinek's – Start with Why, The Golden Circle, Asking the "Why" behind each example (an in-class activity of asking 5-WHYS) , The Higher Purpose, in-class activity for LDO & sharing insights

Visualization and it's importance in design thinking, reflections on wheel of life (in-class activity for visualization & Wheel of Life), Linking it with Balancing Priorities (in class activity), DBS Singapore and Bank of Americas' Keep the Change Campaign. Litter of Light & Arvind Eye Care Examples, understanding practical application of design thinking tools and concepts, case study on McDonald's Milkshake / Amazon India's Rural Ecommerce & Gillette

Working on 1-hour Design problem, Applying RCA and Brainstorm on innovative solutions.

Main project allocation and expectations from the project.

UNIT-II	REFINEMENT AND PROTOTYPING	8 HOURS

Refine and narrow down to the best idea, 10-100-1000gm, QBL, Design Tools for Convergence – SWOT Analysis for 1000gm discussion. In-class activity for 10-100-1000gm & QBL

Prototyping (Convergence): Prototyping mindset, tools for prototyping – Sketching, paper models, pseudo-codes, physical mockups, Interaction flows, storyboards, acting/role-playing etc., importance of garnering user feedback for revisiting Brainstormed ideas.

Napkin Pitch, Usability, Minimum Viable Prototype, Connecting Prototype with 3 Laws, A/B Testing, Learning Launch. Decision Making Tools and Approaches – Vroom Yetton Matrix, Shift-Left, Up, Right, Value Proposition, Case study: Careerbuddy, You-Me-Health Story & IBM Learning Launch.
In-class activities on prototyping- paper-pen / physical prototype/ digital prototype of project's 1000gm idea.

UNIT-III	STORYTELLING, TESTING AND ASSESSMENT	8 HOURS

Storytelling: Elements of storytelling, Mapping personas with storytelling, Art of influencing, Elevator Pitch, Successful Campaigns of well-known examples, in-class activity on storytelling. Testing of design with people, conducting usability test, testing as hypothesis, testing as empathy, observation and shadowing methods, Guerrilla

Interviews, validation workshops, user feedback, record results, enhance, retest, and refine design, Software validation tools, design parameters, alpha &beta testing, Taguchi, defect classification, random sampling.
Final Project Presentation and assessing the impact of using design thinking

UNIT-IV	INNOVATION, QUALITY AND LEADERSHIP	6 HOURS

Innovation: Need & Importance, Principles of innovations, Asking the Right Questions for innovation, Rationale for innovation, Quality: Principles & Philosophies, Customer perception on quality, Kaizen, 6 Sigma. FinTech case study of Design Thinking application – CANVAS

Leadership, types, qualities and traits of leaders and leadership styles, Leaders vs Manager, Personas of Leaders & Managers, Connecting Leaders-Managers with 13 Musical Notes, Trait theory, LSM (Leadership Situational Model), Team Building Models: Tuckman's and Belbin's. Importance of Spatial elements for innovation.

UNIT-V	UNDERSTANDING HUMAN DESIRABILITY	8 HOURS

Comprehensive human goal: the five dimensions of human endeavour (Manaviya - Vyavstha) are: Education- Right living (Sikhsa- Sanskar), Health – Self-regulation (Swasthya - Sanyam), Justice – Preservation (Nyaya- Suraksha), Production – Work (Utpadan – Karya), Exchange – Storage (Vinimya – Kosh), Darshan-Gyan-Charitra (Shifting the Thinking)

Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature, thinking expansion for harmony: Self-exploration (Johari's window), group behaviour, interpersonal behaviour and skills, Myers-Briggs personality types (MBTI), FIRO-B test to repair relationships.

Course outcome: After completion of this course, students will be able to

CO 1	Learn sophisticated design tools to sharpen their problem-solving skills	K2
CO 2	Construct innovate ideas using design thinking tools and converge to feasible idea for breakthrough solution	K6
CO 3	Implement storytelling for persuasive articulation	K3
CO 4	Understanding the nature of leadership empowerment	K2
CO 5	Understand the role of a human being in ensuring harmony in society and nature.	K2

Textbooks:

1. Arun Jain, UnMukt : Science & Art of Design Thinking, 2020, Polaris
2. Gavin Ambrose and Paul Harris, Basics Design 08: Design Thinking, 2010, AVA Publishing SA
3. R R Gaur, R Sangal, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, First Edition, 2009, Excel Books: New Delhi

Reference Books:

1. Jeanne Liedta, Andrew King and Kevin Benett , Solving Problems with Design Thinking – Ten Stories of What Works, 2013, Columbia Business School Publishing.
2. Dr Ritu Soryan, Universal Human Values and Professional Ethics, 2022, Katson Books.
3. Vijay Kumar, 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization, 2013, John Wiley and Sons Inc, New Jersey.
4. Roger L. Martin, Design of Business: Why Design Thinking is the Next Competitive Advantage, 2009, Harvard Business Press, Boston MA.
5. Tim Brown, Change by Design, 2009, Harper Collins.
6. Pavan Soni, Design your Thinking : The Mindsets, Toolsets and Skill Sets for Creative Problem-Solving, 2020, Penguin Books.

Links: NPTEL/ YouTube/ Web Link

Unit I https://www.youtube.com/watch?v=6_mHCOAAEI8

https://nptel.ac.in/courses/110106124

https://designthinking.ideo.com/

https://blog.experiencepoint.com/how-mcdonalds-evolved-with-design-thinking

Unit II https://www.coursera.org/lecture/uva-darden-design-thinking-innovation/the-ibm-story-iq0kE

https://www.coursera.org/lecture/uva-darden-design-thinking-innovation/the-meyouhealth-story-part-i-what-is-W6tTs

https://onlinecourses.nptel.ac.in/noc19_mg60/preview

Unit III https://nptel.ac.in/courses/109/104/109104109/

https://www.d-thinking.com/2021/07/01/how-to-use-storytelling-in-design-thinking/

Unit IV https://www.worldofinsights.co/2020/10/infographic-8-design-thinking-skills-for-leadership-development/

Unit V https://www.youtube.com/watch?v=hFGVcx1Us5Y

B. TECH THIRD YEAR

Course Code	ACSE0505	L T P	Credits
Course Title	WEB TECHNOLOGY	3 0 0	3

Course objective: This course covers different aspect of web technology such as HTML, CSS, Java Script and provide fundamental concepts of Internet, Web Technology and Web Programming**.** Students will be able to build a proper responsive website.

Pre-requisites: Basic Knowledge of any programming language like C/C++/Python/Java. Familiarity with basic concepts of Internet.

Course Contents / Syllabus

UNIT-I	Basics of Web Technology & Testing	8 Hours

History of Web and Internet, connecting to Internet, Introduction to Internet services and tools, Client-Server Computing, Protocols Governing Web, Basic principles involved in developing a web site, Planning process, Types of Websites, Web Standards and W3C recommendations, Web Hosting Basics, Types of Hosting Packages, Introduction to Web testing, Functional Testing,
Usability & Visual Testing, Performance & Load Testing.

UNIT-II	Introduction to HTML & XML	8 Hours

HTML, DOM- Introduction to Document Object Model, Basic structure of an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, Understand the structure of HTML tables. Lists, working with Hyperlinks, Image Handling, Understanding Frames and their needs, HTML forms for User inputs. New form Elements- date, number, range, email, search and data list, Understanding audio, video and article tags XML Syntax, Elements, Attributes, Namespaces, Display, HTTP request, Parser, DOM, XPath, XSLT, XQuerry, XLink, Validator, DTD and XML Schema.

UNIT-III	Concepts of CSS3 & Bootstrap	8 Hours

Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS-Id and Class, Box Model (Introduction, JavaScript Border properties, Padding Properties, Margin properties) CSS Advanced (Grouping, Dimension, Display, Positioning,

Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Color, Creating page Layout and Site. Bootstrap Features & Bootstrap grid system, Bootstrap Components, Bootstrap Plug-Ins.

UNIT-IV	JavaScript and ES6	8 Hours

Introduction to Java Script, Javascript Types, Var, Let and Const Keywords, Operators in JS, Conditional Statements, Java Script Loops, JS Popup Boxes JS Events, JS Arrays, Working with Arrays, JS Objects, JS Functions Validation of Forms, Arrow functions and default arguments, Template Strings, Strings methods, Callback functions, Object de-structuring, Spread and Rest Operator, Typescript fundamentals, Typescript OOPs- Classes, Interfaces, Constructor etc. Decorator and Spread Operator, Asynchronous Programming in ES6, Promise Constructor, Promise with Chain, Promise Race.

UNIT-V	Introduction to PHP	8 Hours

Basic Syntax of PHP, Variables & Constants, Data Type, Operator & Expressions, Control flow and Decision making statements, Functions, Strings, Arrays, understanding file& directory, Opening and closing, a file, Copying, renaming and deleting a file, working with directories, Creating and deleting folder, File Uploading &Downloading. Introduction to Session Control, Session Functionality What is a Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session.

Course outcome: After completion of this course students will be able to

CO 1	Identify the basic facts and explaining the basic ideas of Web technology and internet.	K1, K2
CO 2	Applying and creating various HTML5 semantic elements and application with working on HTML forms for user input.	K3, K6
CO 3	UnderstandingandapplyingtheconceptsofCreatingStyleSheetCSS3 and bootstrap.	K2, K3
CO 4	Analysing and implementing concept of JavaScript and its applications.	K4, K6
CO 5	Creating and evaluating dynamic web pages using the concept of PHP.	K5, K6

Text books:

1. C Xavier, "Web Technology and Design", 1nd Edition 2003, New Age International.
2. Raj Kamal, "Internet and Web Technologies", 2nd Edition 2017, Mc Graw Hill Education.
3. Oluwafemi Alofe, "Beginning PHP Laravel",2nd Edition 2020, kindle Publication.

Reference Books:

1. Burdman, Jessica, "Collaborative Web Development" 5th Edition 1999, Addison Wesley Publication.
2. Randy Connolly, "Fundamentals of Web Development",3rd Edition 2016,
3. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", 4th Edition 2010 BPB Publication

NPTEL/ YouTube/Faculty Video Link:

Unit 1	https://youtu.be/96xF9phMsWA https://youtu.be/Zopo5C79m2k https://youtu.be/ZliIs7jHi1s https://youtu.be/htbY9-yggB0
Unit 2	https://youtu.be/vHmUVQKXlVo https://youtu.be/qz0aGYrrlhU https://youtu.be/BsDoLVMnmZs https://youtu.be/a8W952NBZUE
Unit 3	https://youtu.be/1Rs2ND1ryYc https://youtu.be/vpAJ0s5S2t0 https://youtu.be/GBOK1-nvdU4 https://youtu.be/Eu7G0jV0ImY
Unit 4	https://youtu.be/-qfEOE4vtxE https://youtu.be/PkZNo7MFNFg https://youtu.be/W6NZfCO5SIk https://youtu.be/DqaTKBU9TZk
Unit 5	https://youtu.be/_GMEqhUyyFM https://youtu.be/ImtZ5yENzgE https://youtu.be/xIApzP4mWyA https://youtu.be/qKR5V9rdht0

B. TECH. THIRD YEAR			
Course Code	**ACSIOT0551**	**L T P**	**Credit**
Course Title	**ARM ARCHITECTURE FOR IoT LAB**	**0 0 2**	**1**

List of Experiments:

Sr. No.	Name of Experiment	CO
1	Describe architecture and Pin diagram of Freedom KL25Z board.	CO1
2	Write and compile assembly code of I/O interfacing and debug the program image on an KL25Z board using the Keil MDK-ARM tool. Interface Following: a) LED's b) Switch's c) Potentiometer	CO1
3	Write and compile assembly code of Sensor interfacing and debug the program image on an KL25Z board using the Keil MDK-ARM tool. Interface following: - a) DHT sensor b) Proximity Sensor c) Waterflow sensor d) PIR sensor	CO1
4	Write and compile assembly code of Actuator interfacing and debug the program image on an KL25Z board using the Keil MDK-ARM tool. Interface following: - a) DC motors b) Servo motors c) LCD	CO1
5	Write programs to Interface peripherals using serial communication using ARM freedom board. a) Use SPI to interface LCD display b) Use I2C to interface Temperature sensor	CO2
6	Develop a system of an audio player using the timer, PWM, and interrupts. The audio player should have following functions: a) Play a simple piece of music using the speaker b) Display the melody of the music to the LEDs. Use two potentiometers to adjust the music speed and the volume respectively.	CO2

Lab Course Outcome: At the end of course, students will be able to:

CO 1	Write a program for ARM based microcontroller and Analyze Freedom KL25Z board to build a system.	K4
CO 2	Design an ARM-based embedded Systems and program to satisfy user specifications.	K6

B. TECH THIRD YEAR

Course Code	ACSE0552	L T P	Credit
Course Title	COMPUTER NETWORKS LAB	0 0 2	1

List of Experiments

Sr. No.	Name of Experiment	CO
1	To make an UTP cable with RJ-45 connector, and build and test simple network using UTP cable (crossover) and a hub based network.	CO1
2	Implementation of data link layer framing method such as bit stuffing in any language like C++, Java or Python.	CO2
3	Test the Network connection using ping command and use of ipconfig, netstat and trcert command provided by TCP/IP.	CO3
4	Implementation of CRC algorithm in any language like C++ , Java or Python.	CO3
5	Implementation of stop and wait protocol in any language like C++ , Java or Python.	CO3
6	Implementation of hamming code (7, 4) code to limit the noise. We have to code the bit data in to 7bit data by adding 3 parity bits. Implement in in any language like C++ , Java or Python.	CO3
7	Implementation of Caesar cipher technique & RSA algorithm in any language like C++ , Java or Python.	CO4
8	Write a program in java to find the IP address of the system.	CO4
9	Write a program in java to find the IP address of the any site if name is given.	CO4
10	Introduction to Network Devices (Repeater, Hub, Bridge, Switch, Router, Gateways, NIC etc.).	CO5
11	Introduction to CISCO Packet Tracer. Design Bus, Star, Mesh, Ring Topology and check the connectivity using ping command.	CO5
12	Switch Configuration on CISCO packet tracer using CLI.	CO5

Lab Course Outcome: After the completions of this course students will be able to

CO 1	Build an understanding of UTP cable with RJ-45 connector, and build and test simple network using UTP cable.	K2, K4, K6
CO 2	Understand and implementation of the bit stuffing protocol.	K2, K3
CO 3	Understand and test the various network connection commands of TCP/IP and error control, flow control.	K2, K4
CO 4	Understand and implementation of the concept of IP addressing and security technique like Caesar cipher and RSA.	K2, K3
CO 5	Design and understanding the various topology and configuration of switch and router using cisco packet tracer	K2, K6

B. TECH THIRD YEAR

Course Code	ACSE0555	L T P	Credit
Course Title	WEB TECHNOLOGY LAB	0 0 2	1

List of Experiments:

Sr. No.	Name of Experiment	CO
1.	Write HTML program to display your CV in navigator, your Institute website, Department Website and Tutorial website for specific subject.	CO2
2.	Write a program in XML for creation of DTD, which specifies set of rules. Create a style sheet in CSS/ XSL & display the document in internet explorer.	CO2
3.	Write a program to show the use of XML Schema.	CO2
4.	Write a CSS program to show use of Inline, Internal and External CSS.	CO3
5.	Write a program for CSS Box Model.	CO3
6.	Write a program to show the use of Bootstrap components and Grid System	CO3
7.	Write HTML program to design Registration form and Validate it using JavaScript.	CO1, CO4
8.	Write JavaScript program to show the use of Dialogue Boxes i.e. Alert, Confirm and Prompt Boxes.	CO4
9.	Write a program to show various types of JavaScript Events.	CO4
10.	Write a program in PHP to find the factorial of given number.	CO5
11.	Write a program in PHP to perform file handling.	CO5
12.	Write a PHP program to show the use of Session & Cookies.	CO5

Lab Course Outcome: After completion of this course students will be able to

CO 1	Implementing the concepts and creating pages of HTML	K3
CO 2	Implementing the concepts and creating HTML and XML pages.	K3, K6
CO 3	Implementing the concepts of CSS and Bootstrap and Creation of various types of style sheets.	K3, K6
CO 4	Implementing JavaScript and creating Client Side Pages with functionalities.	K3, K6
CO 5	Implementing the concepts of PHP and creating Server Side Pages.	K3, K6

B. TECH THIRD YEAR (ELECTIVE I)

Course Code	ACSE0511	L T P	Credits
Course Title	CRM FUNDAMENTALS	3 0 0	3

Course objective: This course is designed to help in understanding the fundamentals of CRM. It will help in providing better services for Sales, Marketing and Customer Relations in an Enterprise. To make the students understand the organizational need, benefits and process of creating long-term value for individual customers. To disseminate knowledge regarding the concept of e-CRM and e-CRM technologies. To enable the students understand the technological and human issues relating to implementation of Customer Relationship Management in the organizations.

Pre-requisites: None

Course Contents / Syllabus

UNIT-I Introduction — 8 Hours

CRM- definition, history, goals. Sources of CRM value. Components of CRM: people, process, technology. Evolution of CRM: marketing and its principles, customer relations to CRM. Dynamics of Customer Supplier Relationships, Nature and context of CRM, Strategy and Organization of CRM: strategy, The relationship-oriented organization: Mission, Culture, Structure, People, Communication & Information Systems.

UNIT-II CRM Strategy and Framework — 8 Hours

Developing a CRM strategy. Customer oriented (C in CRM), Relationship driven, 360 degree view of customer. CRM system features- functions, application, benefits and solutions. Importance of loyalty- active, passive, split, shifting and switchers, customer profiling, customer segmentation model, Customer Experience, relationship marketing and journey, Case study.

UNIT-III Solution Design and Architecture — 8 Hours

CRM system solution- specifications. Data Analysis, Solution Requirements. Types of CRM- On-Premise, cloud based. Pros and Cons of each. Integration CRM with other enterprise applications.
The Technology of CRM: Data warehouses and customer relationships, creating data mart model, components of operational data warehouse.

UNIT-IV CRM for Business — 8 Hours

CRM in Sales, Service, Marketing, E-commerce. Social Customer Relationship Management. Analytical CRM: Predictive Analytics Vs Operational Analytics. Channel Partner Relationship management, Collaborative CRM (using data pooling), Business Benefits of Cloud Based System, SLAs, Practical Challenges.

UNIT-V CRM implementation — 8 Hours

Building CRM roadmaps: current processes, customers, strategic goals, technology issues, pilot and proof of concept projects. Preliminary Roadmap and its template, developing roadmap midstream. Design stage, custom development, integration, reporting, data migration, and implementation, testing, launching and application management. Introduction to following CRM tools: ZOHO, Pega, Microsoft Dynamics 365, Sales force.

Course Outcome: At the end of course, the student will be able

CO 1	Understand the basic concepts of Customer relationship management.	K1, K2
CO 2	To understand strategy and framework of Customer relationship management.	K2
CO 3	Learn basics of Cloud Based Customer relationship management.	K1

CO 4	Understand Customer relationship management in context with business use cases.	K2, K3
CO 5	Understand implementation basics of CRM.	K2, K3

Text books:

1. CRM Fundamentals by Scott Kostojohn Mathew Johnson Brian Paulen. Apress, 2011.
2. Customer Relationship Management- How to develop and execute a CRM strategy By Michael Pearce, Business Expert Press, 2021.

Reference Books:

1. The CRM Handbook-A Business Guide to Customer Relationship Management by Jill Dyché; Addison-Wesley (for case studies)
2. Customer Relationship Management Systems handbook by Duane E Sharp. AUERBACH PUBLICATIONS by CRC Press Company

NPTEL/ YouTube/ Faculty Video Link:

https://onlinecourses.nptel.ac.in/noc20_mg57/preview
https://archive.nptel.ac.in/courses/110/105/110105145/

B. TECH THIRD YEAR (ELECTIVE II)

Course Code	ACSE0513	L	T	P	Credits
Course Title	CRM ADMINISTRATION	3	0	0	3

Course objective: This course focus on to understand the concept of Sales force, and the concepts of Sales force App which familiarize with the concepts administration to understand the concepts of Admin Essentials in Lightning Experience

Pre-requisites: Creative thinking and which is being used by the creative talent in your business areas.

Course Contents / Syllabus

UNIT I	Introduction	8 Hours

Sales force Platform Basics, User Management, Data Modelling ,Data Management, Identity Basic , Data Security ,Lightning Experience Customization, Lightning APP Builder Sales force Mobile App Customization, User Engagement , Formulas and Validation, Data Security, Picklist Administration.

UNIT II	Lightning & Salesforce App Experience Customization	8 Hours

Formula and Validation, Accounts and Contacts for Lightning Experience, Lead and Opportunity for Lightning Experience, Product Quotes and Contracts, Campaign Basic.

UNIT III	Salesforce Administration	8 Hours

Service Cloud for lightning Experience, Sales force mobile app customization, AppExchange basic Duplicate Management Lightning Experience for Sales force Classic Users, Chatter Administration for Lightning Experience, Reports and Dashboards for lightning experience, Lightning experience customization, Lightning experience rollout , Sales force flow, Lightning experience report dashboard Specialist.

UNIT IV	Lightning Experience	8 Hours

Prepare Your Sales force Org for Users, Customize an Org to Support a New Business Unit, Protect Your Data in Sales force, Customize a Sales Path for Your Team, Customize a Sales force Object, Import and Export with Data Management Tools.

UNIT V	Learn Admin Essentials in Lightning Experience	8 Hours

Create Reports and Dashboards for Sales and Marketing Managers, Improve Data Quality for Your Sales and Support Teams, Create a Process for Managing Support Cases, User Engagement, Business Administration Specialist.

Course Outcome: At the end of course, the student will be able to

CO1	Understand the basic working environment of Sales force	K1, K2
CO2	Understand the concepts of Lightning & Sales force App Experience Customization	K1, K2
CO3	Familiarize with concepts reports chatter administration	K3
CO4	Understand the concepts of Lightning Experience	K1, K2
CO5	Learn Admin Essentials in Lightning Experience	K1, K3

Text Books:

1. Alok Kumar Rai : Customer Relationship Management : Concepts and Cases(Second Edition), PHI Learning, 2018
2. Bhasin- Customer Relationship Management (Wiley Dreamtech) ,2019
3. Sales force for beginners by ShaarifSahaalane book by Amazon (Online edition)

Reference Books:

1. Sales force Essentials for Administrators , By ShrivasthavaMohith, Edition Ist ,2018
2. Sales force : A quick Study laminated Reference Guide by Christopher Mathew Spencer eBook by Amazon (Online)
3. Mastering Sales force CRM Administration By Gupta Rakesh Edition IInd 2018
NPTEL/YouTube/Faculty Video Link:
www. Trailhead.salesforce.com
www.mindmajix.com/salesforce-tutorial
www,youtube.com/watch?v=7K42geizQCI

B. TECH. THIRD-YEAR (ELECTIVE-I)

Course Code	ACSAI0512	L T P	Credits
Course Title	DATA ANALYTICS	3 0 0	3

Course objective:

The objective of this course is to understand the fundamental concepts of Data analytics and learn about various types of data formats and their manipulations. It helps students to learn exploratory data analysis and visualization techniques in addition to R/Python/Tableau programming language.

Pre-requisites: Basic Knowledge of Statistics and Probability.

Course Contents / Syllabus

UNIT-I — Introduction To Data Science — 8 Hours

Introduction to Data Science, Big Data, the 5 V's, Evolution of Data Science, Datafication, Skillsets needed, Data Science Lifecycle, types of Data Analysis, Data Science Tools and technologies, Need for Data Science, Analysis Vs Analytics Vs Reporting, Big Data Ecosystem, Future of Data Science, Applications of Data Science in various fields, Use cases of Data science-Facebook, Netflix, Amazon, Uber, AirBnB.

UNIT-II — Data Handling — 8 Hours

Types of Data: structured, semi-structured, unstructured data, Numeric, Categorical, Graphical, High Dimensional Data, Transactional Data, Spatial Data, Social Network Data, standard datasets, Data Classification, Sources of Data, Data manipulation in various formats, for example, CSV file, pdf file, XML file, HTML file, text file, JSON, image files etc. import and export data in R/Python.

UNIT-III — Data Pre-processing — 8 Hours

Form of Data Pre-processing, data Attribute and its types, understanding and extracting useful variables, KDD process, Data Cleaning: Missing Values, Noisy Data, Discretization and Concept hierarchy generation (Binning, Clustering, Histogram), Inconsistent Data, Data Integration and Transformation. Data Reduction: Data Cube Aggregation, Data Compression, Numerosity Reduction.

UNIT-IV — Exploratory Data Analysis — 8 Hours

Handling Missing data, Removing Redundant variables, variable Selection, identifying outliers, Removing Outliers, Time series Analysis, Data transformation and dimensionality reduction techniques such as Principal Component Analysis (PCA), Factor Analysis (FA) and Linear Discriminant Analysis (LDA), Univariate and Multivariate Exploratory Data Analysis. Data Munging, Data Wrangling- APIs and other tools for scrapping data from the web/ internet using R/Python.

UNIT-V — Data Visualization — 8 Hours

Introductions and overview, Debug and troubleshoot installation and configuration of the Tableau. Creating Your First visualization: Getting started with Tableau Software, Using Data file formats, connecting your Data to Tableau, creating basic charts (line, bar charts, Tree maps), Using the Show me panel.

Tableau Calculations: Overview of SUM, AVR, and Aggregate features Creating custom calculations and fields, Applying new data calculations to your visualization.
Manipulating Data in Tableau: Cleaning-up the data with the Data Interpreter, structuring your data, Sorting, and filtering Tableau data, Pivoting Tableau data.

Advanced Visualization Tools: Using Filters, Using the Detail panel Using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colours, Creating Dashboards & Stories, Distributing & Publishing Your Visualization

Course outcome: After completion of this course students will be able to:

CO 1	Understand the fundamental concepts of data analytics in the areas that plays major role within the realm of data science.	K1
CO 2	Explain and exemplify the most common forms of data and its representations.	K2
CO 3	Understand and apply data pre-processing techniques.	K3
CO4	Analyse data using exploratory data analysis.	K4
CO 5	Illustrate various visualization methods for different types of data sets and application scenarios.	K3

Text books:

1) Glenn J. Myatt, Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, John Wiley Publishers, 2007.

2) Data Analysis and Data Mining, 2nd Edition, John Wiley & Sons Publication, 2014.

Reference Books:

1) Open Data for Sustainable Community: Glocalized Sustainable Development Goals, Neha Sharma, Santanu Ghosh, Monodeep Saha, Springer, 2021.

2) The Data Science Handbook, Field Cady, John Wiley & Sons, Inc, 2017

3) Data Mining Concepts and Techniques, Third Edition, Jiawei Han, Micheline Kamber, Jian Pei, Morgan Kaufmann, 2012.

Links:

Unit 1	https://www.youtube.com/playlist?list=PL15FRvx6P0OWTlNBS_93NHG2hIn9cynVT
Unit 2	https://www.youtube.com/playlist?list=PLLy_2iUCG87DxxkLX4Pc3wCvsF1yAvz0T
Unit 3	https://www.youtube.com/watch?v=lhO3fBiMDag
Unit 4	https://www.youtube.com/watch?v=q4pyaVZjqk0
Unit 5	https://www.youtube.com/playlist?list=PLWPirh4EWFpGXTBu8ldLZGJCUeTMBpJFK

B. TECH THIRD YEAR (ELECTIVE-II)

Course code	ACSAI0519	L T P	Credits
Course title	BUSINESS INTELLIGENCE AND DATA VISUALIZATION	3 0 0	3

Course objective: This course covers fundamental concepts of Business Intelligence tools, techniques, components and its future. As well as a bit more formal understanding of data visualization concepts and techniques. The underlying theme in the course is feature of Tableau, its capabilities.

Pre-requisites: Basic Knowledge of Business intelligence.

Course Contents / Syllabus

UNIT-I	INTRODUCTION TO BUSINESS INTELLIGENCE	8 HOURS

Business Intelligence (BI), Scope of BI solutions and their fitting into existing infrastructure, BI Components and architecture, BI Components, Future of Business Intelligence, Functional areas of BI tools, End user assumptions, setting up data for BI, Data warehouse, OLAP and advanced analytics, Supporting the requirements of senior executives including performance management, Glossary of terms and their definitions specific to the field of BI and BI systems.

UNIT-II	ELEMENTS OF BUSINESS INTELLIGENCE SOLUTIONS	8 HOURS

Business Query and Reporting, Reporting, Dashboards and Scorecards Development, Development, Scorecards, Metadata models, Automated Tasks and Events, Mobile Business Intelligence, Software development kit (SDK). Stages of Business Intelligence Projects, Project Tasks, Risk Management and Mitigation, Cost justifying BI solutions and measuring success, BI Design and Development, Building Reports, Building a Report, Drill-up, Drill-down Capabilities.

UNIT-III	TABLEAU	8 HOURS

Introductions and overview: What Tableau can and cannot do well, Debug and troubleshoot installation and configuration of the software.
Creating Your First visualization: Getting started with Tableau Software, Using Data file formats, connecting your Data to Tableau, creating basic charts (line, bar charts, Tree maps), Using the Show me panel
Tableau Calculations: Overview of SUM, AVR, and Aggregate features Creating custom calculations and fields, Applying new data calculations to your visualization.

Formatting Visualizations: Formatting Tools and Menus, formatting specific parts of the view, Editing and Formatting Axes.

UNIT-IV	DATA VISUALIZATION	8 HOURS

Manipulating Data in Tableau: Cleaning-up the data with the Data Interpreter, structuring your data, Sorting, and filtering Tableau data, Pivoting Tableau data.
Advanced Visualization Tools: Using Filters, Using the Detail panel Using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colours.
Creating Dashboards & Stories: Using Storytelling, creating your first dashboard and Story, Design for different displays, Adding interactivity to your Dashboard
Distributing & Publishing Your Visualization: Tableau file types, Publishing to Tableau Online, sharing your visualization, Printing, and exporting.

Given a case study: Perform Interactive Data Visualization with Tableau

UNIT-V	INTRODUCTION TO POWER BI	8 HOURS

Describe the Power BI ecosystem, Define Power BI and its relationship with Excel, Discuss the Power BI suite of products, Describe how the Power BI products integrate, Explain the typical analytics process flow, Differentiate between the various data sources, Connect Power BI to a data source, Clean and transform data to ensure data quality, Load the data to the Power BI Data Model, Describe the Power BI ecosystem, Define Power BI and its relationship with Excel, Discuss the Power BI suite of products, Describe how the Power BI products integrate, Explain the typical analytics process flow.

Course outcome: After completion of this course students will be able to

CO 1	Apply quantitative modelling and data analysis techniques to the solution of real-world business problems	K2
CO 2	Understand the importance of data visualization and the design and use of many visual components	K2
CO 3	Understand as products integrate defining various analytical process flow.	K2
CO 4	Learn the basics of troubleshooting and creating charts using various formatting tools.	K4
CO 5	Learn basics of structuring data and creating dashboard stories adding interactivity dashboard stories.	K6

Textbooks:

1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.
2. Learning Tableau 10 - Second Edition: Business Intelligence and data visualization that brings your business into focus" by Joshua N. Milligan
3. Tableau Your Data! - "Daniel G. Murray and the Inter Works BI Team"-Wiley

Reference Books:

1. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.
2. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
3. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager"s Guide", Second Edition, 2012.

NPTEL/ Youtube/ Faculty Video Link:

Unit 1	Introduction to Business Intelligence - YouTube
Unit 2	Business Intelligence Tutorial - YouTube
Unit 3	What Is Power BI? | Introduction To Microsoft Power BI | Power BI Training | Edureka - YouTube
Unit 4	https://www.tableau.com/academic/students

B. TECH THIRD YEAR (ELECTIVE I)

Course Code	ACSE0512	L T P	Credits
Course Title	PYTHON WEB DEVELOPMENT WITH DJANGO	3 0 0	3

Course objective: This course focuses on how to design and build static as well as dynamic webpages and interactive web based applications. These courses mainly focus how Python operates within web development using the increasingly popular Django framework.

Pre-requisites: Students should have good knowledge of Python Programming and Python coding experience.

Course Contents / Syllabus

UNIT-I	Python libraries for web development	8 Hours

Collections-Container datatypes, Tkinter-GUI applications, Requests-HTTP requests, BeautifulSoup4-web scraping, Scrapy, Zappa, Dash, CherryPy, Turbo Gears, Flask, Web2Py, Bottle, Falcon, Cubic Web, Quixote, Pyramid.

UNIT-II	Introduction to Django Framework	8 Hours

Understanding Django environment, Features of Django and Django architecture, MVC and MTV, Urls and Views, Mapping the views to URLs, Django Template, Template inheritance Django Models, Creating model for site, Converting the model into a table, Fields in Models, Integrating Bootstrap into Django, Creating tables, Creating grids, Creating carousels.

UNIT-III	Integrating Accounts & Authentication on Django	8 Hours

Introduction to Django Authentication System, Security Problem & Solution with Django Creating Registration Form using Django, Adding Email Field in Forms, Configuring email settings, Sending emails with Django, Adding Grid Layout On Registration Page, Adding Page Restrictions, Login Functionality Test and Logout.

UNIT-IV	Connecting SQLite with Django	8 Hours

Database Migrations, Fetch Data From Database, Displaying Data On Templates, Adding Condition On Data, Sending data from url to view, Sending data from view to template, Saving objects into database, Sorting objects, Filtering objects, Deleting objects, Difference between session and cookie, Creating sessions and cookies in Django.

UNIT-V	Deploying Django Web Application on Cloud	8 Hours

Creating a functional website in Django, Four Important Pillars to Deploy, registering on Heroku and GitHub, Push project from Local System to GitHub, Working with Django Heroku, Working with Static Root, Handling WSGI with gunicorn, Setting up Database & adding users.

Course Outcome: After completion of this course students will be able to

CO 1	Apply the knowledge of python programing that are vital in understanding Django application and analyze the concepts, principles and methods in current client-side technology to implement Django application over the web.	K3,K6
CO 2	Demonstrate web application framework i.e. Django to design and implement typical dynamic web pages and interactive web based applications.	K3, K6
CO 3	Implementing and analyzing the concept of Integrating Accounts & Authentication on Django.	K3, K4
CO 4	Understand the impact of web designing by database connectivity with SQLite in the current market place where everyone uses to prefer electronic medium for shoping, commerce, and even social life also.	K2, K3
CO 5	Analyzing and creating a functional website in Django and deploy Django Web Application on Cloud.	K3, K6

Text books:

1. Martin C. Brown, “Python: The Complete Reference Paperback”, 4th Edition 2018, McGraw Hill Education Publication.
2. Reema Thareja, “Python Programming: Using Problem Solving Approach”, 3rd Edition 2017, Oxford University Press Publication.
3. Daniel Rubio, Apress,” Beginning Django Web Application Development and Deployment with Python”, 2nd Edition 2017, Apress Publication.
4. William Jordon, “Python Django Web Development: The Ultimate Django web framework guide for Beginners”, 2nd Edition 2019, Kindle Edition.

Reference Books:

1. Tom Aratyn, “Building Django 2.0 Web Applications: Create enterprise-grade, scalable Python web applications easily with Django 2.0”, 2nd Edition 2018, and Packt Publishing.
2. Nigel George, “Build a website with Django”, 1st Edition 2019, GNW Independent Publishing Edition.
3. Ray Yao,” Django in 8 Hours: For Beginners, Learn Coding Fast! 2nd Edition 2020, independently published Edition.
4. Harry Percival, “Test-Driven Development with Python: Obey the Testing Goat: Using Django, Selenium, and JavaScript”, 2nd Edition 2019, Kindle Edition.

NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://youtu.be/eoPsX7MKfe8?list=PLIdgECt554OVFKXRpo_kuI0XpUQKk0ycO https://youtu.be/tA42nHmmEKw?list=PLh2mXjKcTPSACrQxPM2_1Ojus5HX88ht7 https://youtu.be/8ndsDXohLMQ?list=PLDsnL5pk7-N_9oy2RN4A65Z-PEnvtc7rf https://youtu.be/QXeEoD0pB3E?list=PLsyeobzWxl7poL9JTVyndKe62ieoN-MZ3 https://youtu.be/9MmC_uGjBsM?list=PL3pGy4HtqwD02GVgM96-V0sq4_DSinqvf
Unit 2	https://youtu.be/F5mRW0jo-U4 https://youtu.be/yD0_1DPmfKM?list=PLQVvvaa0QuDe9nqlirjacLkBYdgc2inh3 https://youtu.be/rHux0gMZ3Eg https://youtu.be/jBzwzrDvZ18 https://youtu.be/RiMRJMbLZmg
Unit 3	https://youtu.be/8DF1zJA7cfc https://youtu.be/CTrVDi3tt8o https://youtu.be/FzGTpnI5tpo https://youtu.be/z4lfVsb_7MA https://youtu.be/WuyKxdLcw3w
Unit 4	https://youtu.be/UxTwFMZ4r5k https://youtu.be/2Oe55iXjZQI https://youtu.be/zV8GOI5Zd6E https://youtu.be/uf2tdzh7Bq4 https://youtu.be/RzkVbz7Ie44
Unit 5	https://youtu.be/kBwhtEIXGII https://youtu.be/Q_YOYNiSVDY https://youtu.be/_3AKAdHUY1M https://youtu.be/6DI_7Zja8Zc https://youtu.be/UkokhawLKDU

B. TECH THIRD YEAR (ELECTIVE II)

Course Code	ACSE0514	L T P	Credits
Course Title	DESIGN PATTERNS	3 0 0	3

Course objective: The course objective is to familiarize the student with techniques for designing reusable combinations of Java classes and organizing their cooperation to produce modular and maintainable Java programs.

Pre-requisites: Object Oriented Analysis and Design. Data structures and algorithms. Programming Language (C++ or Java)

Course Contents / Syllabus

UNIT-I	Introduction	8 Hours

Describing Design Patterns, Design Patterns in Smalltalk MVC, The Catalog of Design Patterns, Organizing the Catalogue, Design Patterns for Solving the Real life Problems, Selection and Use of Design patterns. Principle of least knowledge.

UNIT-II	Creational Design Pattern	8 Hours

Creational Patterns: Abstract Factory, Builder, Factory Pattern, Prototype Pattern, Singleton pattern..

UNIT-III	Structural Design Pattern	8 Hours

Structural Pattern Part-I, Adapter, Bridge, Composite.
Structural Pattern Part-II, Decorator Pattern, Façade Pattern, Flyweight Pattern, Proxy Pattern.

UNIT-IV	Behavioural Design Pattern – I	8 Hours

Behavioural Patterns Part: I, Chain of Responsibility Pattern, Command Pattern, Interpreter Pattern, Iterator Pattern.
Behavioural Patterns Part: II, Mediator, Memento, Observer Pattern.

UNIT-V	Behavioural Design Pattern – II	8 Hours

Behavioural Patterns Part: III, State Patterns, Strategy, Template Patterns, Visitor, Expectation from Design Patterns

Course outcome: After completion of this course students will be able to

CO 1	Construct a design consisting of a collection of modules.	K2, K6
CO 2	Exploit well-known design patterns (such as Iterator, Observer, Factory and Visitor)	K4, K5
CO 3	Distinguish between different categories of design patterns	K4
CO 4	Ability to understand and apply common design patterns to incremental/iterative development	K2, K6
CO 5	Ability to identify appropriate patterns for design of given problem and Design the software using Pattern Oriented Architectures	K1, K2, K6

Text books:

1. Eric Freeman, Elisabeth Freeman, Kathy Sierra, Bert Bates Head First Design Patterns, 2004, O'Reilly
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides Design Patterns: Elements of Reusable Object-oriented Software Addison-Wesley, 1995

Reference Books:

1. Design Pattern s By Erich Gamma , Pearson Education
2. Patterns in JAVA Volume -I By Mark Grand, Wiley Dream

NPTEL/ YouTube/ Faculty Video Link:

1. https://youtu.be/C_oPLDaSy-8
2. https://youtu.be/NU_1StN5Tkk

B. TECH. THIRD-YEAR (ELECTIVE-I)

Course code	ACSAI0517	L T P	Credits
Course title	SYSTEM ON CHIP DESIGN	3 0 0	3

Course objective: The objective of this course is to develop Arm Cortex-A based SoCs, create high level functional specifications to design, implementation and testing on FPGA platforms using standard hardware description and software programming languages.

Pre-requisites: Basic Knowledge of Microprocessor and Microcontroller.

Course Contents / Syllabus

UNIT-I	INTRODUCTION TO SYSTEM-ON-CHIP DESIGN	8 Hours

Moore's Law, Scaling, The Design Productivity Gap, Bridging the Design Productivity Gap, SoC, Example Arm-based SoC, Advantages of SoCs, Limitations of SoCs, SoC v Microcontroller v Processor, SoC Design Flow.

UNIT-II	ARM CORTEX-M0 PROCESSOR	8 Hours

Arm Cortex-M0 Processor Architecture, Thumb Instruction Set, Thumb-2 Instruction Set, Cortex-M0 Instruction Set, Cortex-M0: Generic Format of Instructions, Register Access: The Move Instruction, Memory Access: The LOAD Instruction, The STORE Instruction, Multiple Data Access, Stack Access: PUSH and POP, Arithmetic ADD, Arithmetic SUB, MUL, Arithmetic CMP, Logic Operation, Arithmetic Shift Operation, Logical Shift Operation, Rotate Operation, Reverse Ordering Operation, Extend Operation, Program Flow Control, Conditional Branch Example, Cortex-M0 Low Power Features, Cortex-M0 Sleep Mode, Sleep-on-Exit Feature, Processor Wakeup Conditions, Wakeup Interrupt Controller.

UNIT-III	AMBA 3 AHB-LITE BUS	8 Hours

AMBA 3 AHB-Lite Bus Architecture, Bus Terminology, Bus Operation in General, A Typical Bus Operation Example, Communication Architecture Standards, Arm AMBA System Bus Families, AMBA 3 AHB-Lite Bus, AHB-Lite Bus Block Diagram, AHB-Lite Master and Slave Interface, Address Decoder, Slave Multiplexor, Hardware Implementation, AHB-Lite Operation Principles, AHB-Lite Bus Timing, Basic Read Transfer and Write Transfer.

AHB VGA Peripheral Architecture, AHB UART Peripheral, Timer, GPIO and 7-Segment Peripherals, Interrupt Mechanisms.

UNIT-IV	PROGRAMMING AN SOC USING C LANGUAGE	8 Hours

C language Terminology, Define Interrupt Vector in C, Define Stack and Heap, Accessing Peripherals in C, calling a C Function from Assembly, Calling an Assembly Function from C, Embedded Assembly, Arm CMSIS and Software Drivers**,** CMSIS Components, Access NVIC Using CMSIS, Access Special Registers Using CMSIS, Arm Development Studio.

UNIT-V	ARM CORTEX-A9 PROCESSOR	8 Hours

ARM Cortex-A9 Processor Architecture, AMBA AXI4 Bus Architecture, Design and Implementation of an AXI4-Lite™ GPIO peripheral and a DDR Memory Controller.

Course outcome: After completion of this course students will be able to:

CO 1	Understand SoC Design flow.	K3
CO 2	Recognize Arm Cortex-M0 Processor Architecture.	K2
CO 3	Describe AMBA 3 AHB-Lite Bus Architecture, VGA, GPIO and 7-Segment UART Peripheral**.**	K3
CO4	Program SoC Using C Language.	K4
CO 5	Understand ARM Cortex-A9 Processor and AXI UART and AXI-Stream Peripheral.	K2

Text books:

1. ARM System-on-Chip Architecture by Steve B. Furber
2. The Definitive Guide to the ARM Cortex-M0 by Joseph Yiu

Reference Books:

1. ARM Assembly Language: Fundamentals and Techniques by William Hohl

Links:

Unit 1	https://www.youtube.com/watch?v=KxryzSO1Fjs
Unit 2	https://www.springboard.com/blog/data-wrangling/
Unit 3	https://towardsdatascience.com/exploratory-data-analysis-in-r-for-beginners-fe031add7072
Unit 4	https://learn.datacamp.com/courses/exploratory-data-analysis-in-python
Unit 5	https://onlinecourses.nptel.ac.in/noc20_cs80/preview

B. TECH. THIRD-YEAR (ELECTIVE-II)

Course code	ACSAI0518	L T P	Credits
Course title	APPLIED INDUSTRIAL IoT	3 0 0	3

Course objective: Students will be able to understand the concepts behind Industrial IoT along with real world projects.

Pre-requisites: Introduction to IOT, sensors and connectivity protocols.

Course Contents / Syllabus

UNIT-I	INTRODUCTION OF INDUSTRIAL IOT AND INDUSTRIAL IOT ARCHITECTURE	8 Hours

Introduction of IIOT, Information and Operational Technology, Layers of IIoT Architecture, Functions of IIoT Architecture Layers, Demo of practical use cases, Components of IIoT Architecture, Introduction to On-premise servers and Cloud, Review of Components in various layers of IoT.

UNIT-II	THE EDGE COMPUTING AND THE GATEWAY	8 Hours

Edge Computing, Gateway Overview, Types and Features of Gateway, selecting a Gateway, IoT Gateway, Choice of Gateway, Configuring the Gateway IoT Video Analytics and Quality Control at the Edge.

UNIT-III	PLATFORM ARCHITECTURE	8 Hours

Types of Server Architecture, Data Architecture, Data Ingestion and Stream Processing, Smart Monitoring of Diesel Generators, Big Data Architecture and Stream Processing, Storage Devices, Storage Technologies, Storage Dimensioning Database, Monitor and Control Schedule, Cost and Resources, Analytics Overview, Types of Analytics, Algorithms and Machine Learning, Visualization.

UNIT-IV	IIOT SECURITY	8 Hours

IIoT Security Concerns, IIoT Device Security, IIoT Connection Security, IIoT Application Platform and Cloud Security, Threat Modeling, Industrial Example - IoT Connected Workplace Solution.

UNIT-V	SOFTWARE DEFINED NETWORKS	8 Hours

Types of Network and Internet Traffic, Demand: Big Data, Cloud Computing and Mobile Traffic Requirements: QoS and QoE, Routing Congestion Control, SDN and NFV, Modern Networking Elements, Network Requirements, The SDN Approach, SDN and NFV Related Standards, SDN Data Plane, Open Flow Logical Network Device, Open Flow Protocol, SDN Control Plane Architecture, REST API, SDN Application Plane Architecture.

Course outcome: After completion of this course students will be able to

CO 1	Link functionality to the layers appropriately and identify the components required in an IIoT solution.	K3
CO 2	Identify the components, features, and size of the gateway required for the application.	K3

CO 3	Explain platform architecture and identify the right database, and dimensions.	K3
CO 4	Foresee possible security threats and gaps and identify solutions to overcome them.	K3
CO 5	Design basic IoT network using Software Defined Networks.	K6

Text Books:

1. Internet of Things: A Hands-on Approach, By Arshdeep Bahga and Vijay Madjsetti.
2. Industry 4.0, The Industrial Internet of Things by Alasdair Gilchrist.

Reference Books:

1. Making Sense of Edge Computing: Cody Bumgardner, Caylin Hickey.

NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=_7XntF6K_0Y
Unit 2	https://www.youtube.com/watch?v=Xm8frqTZRVI
Unit 3	https://www.youtube.com/watch?v=k02a1TvVQfI
Unit 4	https://www.youtube.com/watch?v=E4h4Z3g-eLM
Unit 5	https://www.youtube.com/watch?v=TQVl5-G3u2U

B. TECH. THIRD YEAR 5th/ 6th			
Course code	**ANC0501**	**L T P**	**Credits**
Course Title	**CONSTITUTION OF INDIA, LAW AND ENGINEERING**	**2 0 0**	**2**

Course objective: To acquaint the students with legacies of constitutional development in India and help them to understand the most diversified legal document of India and philosophy behind it.

Pre-requisites: Computer Organization and Architecture

Course Contents / Syllabus

UNIT-I	**INTRODUCTION AND BASIC INFORMATION ABOUT INDIAN CONSTITUTION**	**8 Hours**

Meaning of the constitution law and constitutionalism, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947,Enforcement of the Constitution, Indian Constitution and its Salient Features, The Preamble of the Constitution, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Parliamentary System, Federal System, Centre-State Relations, Amendment of the Constitutional Powers and Procedure, The historical perspectives of the constitutional amendments in India, Emergency Provisions: National Emergency, President Rule, Financial Emergency, and Local Self Government – Constitutional Scheme in India.

UNIT-II	**UNION EXECUTIVE AND STATE EXECUTIVE**	**8 Hours**

Powers of Indian Parliament Functions of Rajya Sabha, Functions of Lok Sabha, Powers and Functions of the President, Comparison of powers of Indian President with the United States, Powers and Functions of Vice-President, Powers and Functions of the Prime Minister, Judiciary – The Independence of the Supreme Court, Appointment of Judges, Judicial Review, Public Interest Litigation, Judicial Activism, LokPal, Lok Ayukta, The Lokpal and Lok ayuktas Act 2013, State Executives – Powers and Functions of the Governor, Powers and Functions of the Chief Minister, Functions of State Cabinet, Functions of State Legislature, Functions of High Court and Subordinate Courts.

UNIT-III	**INTRODUCTION AND BASIC INFORMATION ABOUT LEGAL SYSTEM**	**8 Hours**

The Legal System: Sources of Law and the Court Structure: Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law, Principles taken from decisions of judges constitute binding legal rules. The Court System in India and Foreign Courtiers (District Court, District Consumer Forum, Tribunals, High Courts, Supreme Court). Arbitration: As an alternative to resolving disputes in the normal courts, parties who are in dispute can agree that this will instead be referred to arbitration. Contract law, Tort, Law at workplace.

UNIT-IV	**INTELLECTUAL PROPERTY LAWS AND REGULATION TO INFORMATION**	**8 Hours**

Intellectual Property Laws: Introduction, Legal Aspects of Patents, Filing of Patent Applications, Rights from Patents, Infringement of Patents, Copyright and its Ownership, Infringement of Copyright, Civil Remedies for Infringement, Regulation to Information, Introduction, Right to Information Act, 2005, Information Technology Act, 2000, Electronic Governance, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Offences, Limitations of the Information Technology Act.

UNIT-V	**BUSINESS ORGANIZATIONS AND E-GOVERNANCE**	**8 Hours**

Sole Traders, Partnerships: Companies: The Company's Act: Introduction, Formation of a Company, Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, General Meetings and

Proceedings, Auditor, Winding up. E-Governance and role of engineers in E-Governance, Need for reformed engineering serving at the Union and State level, Role of I.T. professionals in Judiciary, Problem of Alienation and Secessionism in few states creating hurdles in Industrial development.

COURSE OUTCOMES: After completion of this course students will be able to

CO 1	Identify and explore the basic features and modalities about Indian constitution.	K1
CO 2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level.	K2
CO 3	Differentiate different aspects of Indian Legal System and its related bodies.	K4
CO 4	Discover and apply different laws and regulations related to engineering practices.	K4
CO 5	Correlate role of engineers with different organizations and governance models	K4

Text Books:

1. M Laxmikanth: Indian Polity for civil services and other State Examination,6th Edition, Mc Graw Hill
2. Brij Kishore Sharma: Introduction to the Indian Constitution, 8th Edition, PHI Learning Pvt. Ltd.
3. Granville Austin: The Indian Constitution: Cornerstone of a Nation (Classic Reissue), Oxford University Press.

Reference Books:

1. Madhav Khosla: The Indian Constitution, Oxford University Press.
2. PM Bakshi: The Constitution of India, Latest Edition, Universal Law Publishing.
3. V.K. Ahuja: Law Relating to Intellectual Property Rights (2007)

B. TECH. THIRD YEAR 5th/ 6th			
Course code	**ANC0502**	**L T P**	**Credits**
Course Title	**ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**	**2 0 0**	**2**

Course objective: This course aims to provide basic knowledge about different theories of society, state and polity in India, Indian literature, culture, Indian religion, philosophy, science, management, cultural heritage and different arts in India.

Pre-requisites: Computer Organization and Architecture

Course Contents / Syllabus

UNIT-I	**SOCIETY STATE AND POLITY IN INDIA**	**8 Hours**

State in Ancient India: Evolutionary Theory, Force Theory, Mystical Theory Contract Theory, Stages of State Formation in Ancient India, Kingship , Council of Ministers Administration Political Ideals in Ancient India Conditions' of the Welfare of Societies, The Seven Limbs of the State, Society in Ancient India, Purusārtha, Varnāshrama System, Āshrama or the Stages of Life, Marriage, Understanding Gender as a social category, The representation of Women in Historical traditions, Challenges faced by Women.

UNIT-II	**INDIAN LITERATURE, CULTURE, TRADITION, AND PRACTICES**	**8 Hours**

Evolution of script and languages in India: Harappan Script and Brahmi Script. The Vedas, the Upanishads, the Ramayana and the Mahabharata, Puranas, Buddhist And Jain Literature in Pali,Prakrit And Sanskrit, Sikh Literature, Kautilya's Arthashastra, Famous Sanskrit Authors, Telugu Literature, Kannada Literature,Malayalam Literature ,Sangama Literature Northern Indian Languages & Literature, Persian And Urdu ,Hindi Literature

UNIT-III	**INDIAN RELIGION, PHILOSOPHY, AND PRACTICES**	**8 Hours**

Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy, Shankaracharya, Various Philosophical Doctrines , Other Heterodox Sects, Bhakti Movement, Sufi movement, Socio religious reform movement of 19th century, Modern religious practices.

UNIT-IV	**SCIENCE, MANAGEMENT AND INDIAN KNOWLEDGE SYSTEM**	**8 Hours**

Astronomy in India, Chemistry in India, Mathematics in India, Physics in India, Agriculture in India, Medicine in India , Metallurgy in India, Geography, Biology, Harappan Technologies, Water Management in India, Textile Technology in India ,Writing Technology in India Pyrotechnics in India Trade in Ancient India/,India's Dominance up to Pre-colonial Times.

UNIT-V	**CULTURAL HERITAGE AND PERFORMING ARTS**	**8 Hours**

Indian Architect, Engineering and Architecture in Ancient India, Sculptures, Pottery, Painting, Indian Handicraft, UNESCO'S List of World Heritage sites in India, Seals, coins, Puppetry, Dance, Music, Theatre, drama, Martial Arts Traditions, Fairs and Festivals, UNESCO'S List of Intangible Cultural Heritage, Calenders, Current developments in Arts and Cultural, Indian's Cultural Contribution to the World. Indian Cinema.

COURSE OUTCOMES: After completion of this course students will be able to

CO 1	Understand the basics of past Indian politics and state polity.	K2
CO 2	Understand the Vedas, Upanishads, languages & literature of Indian society.	K2
CO 3	Know the different religions and religious movements in India.	K4

CO 4	Identify and explore the basic knowledge about the ancient history of Indian agriculture, science & technology, and ayurveda.	K4
CO 5	Identify Indian dances, fairs & festivals, and cinema.	K1

Text Books:

1. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014.
2. S. Baliyan, Indian Art and Culture, Oxford University Press, India
3. Nitin Singhania, Indian Art and Culture: for civil services and other competitive Examinations,3rd Edition,Mc Graw Hill

Reference Books:

1. Romila Thapar, Readings In Early Indian History Oxford University Press, India
2. Basham, A.L., The Wonder that was India (34th impression), New Delhi, Rupa & co.

B. TECH. THIRD YEAR

Course code	ACSML0601	L T P	Credits
Course title	MACHINE LEARNING	3 0 0	3

Course objective: To introduction to the fundamental concepts in machine learning and popular machine learning algorithms. To understand the standard and most popular supervised learning algorithm.

Pre-requisites: Basic Knowledge of Machine learning.

Course Contents / Syllabus

UNIT-I	INTRODUCTION TO MACHINE LEARNING	8 Hours

INTRODUCTION – Learning, Types of Learning, Well defined learning problems, Designing a Learning System, History of ML, Introduction of Machine Learning Approaches, Introduction to Model Building, Sensitivity Analysis, Underfitting and Overfitting, Bias and Variance, Concept Learning Task, Find – S Algorithms, Version Space and Candidate Elimination Algorithm, Inductive Bias, Issues in Machine Learning and Data Science Vs Machine Learning.

UNIT-II	MINING ASSOCIATION AND SUPERVISED LEARNING	8 Hours

Classification and Regression, Regression: Linear Regression, Multiple Linear Regression, Logistic Regression, Polynomial Regression, Decision Trees: ID3, C4.5, CART.
Apriori Algorithm: Market basket analysis, Association Rules.

Neural Networks: Introduction, Perceptron, Multilayer Perceptron, Support vector machine.

UNIT-III	UNSUPERVISED LEARNING	8 Hours

Introduction to clustering, K-means clustering, K-Nearest Neighbor, Iterative distance-based clustering, Dealing with continuous, categorical values in K-Means, Hierarchical: AGNES, DIANA, Partitional: K-means clustering, K-Mode Clustering, density-based clustering, Expectation Maximization, Gaussian Mixture Models.

UNIT-IV	PROBABILISTIC LEARNING & ENSEMBLE	8 Hours

Bayesian Learning, Bayes Optimal Classifier, Naıve Bayes Classifier, Bayesian Belief Networks.

Ensembles methods: Bagging & boosting, C5.0 boosting, Random Forest, Gradient Boosting Machines and XGBoost.

UNIT-V	REINFORCEMENT LEARNING & CASE STUDIES	8 Hours

Reinforcement Learning: Introduction to Reinforcement Learning, Learning Task, Example of Reinforcement Learning in Practice, Learning Models for Reinforcement – (Markov Decision process, Q Learning – Q Learning function, QLearning Algorithm), Application of Reinforcement Learning.

Case Study: Health Care, E Commerce, Smart Cities.

Course outcome: After completion of this course students will be able to:

CO1	Understanding utilization and implementation proper machine learning algorithm.	K2
CO2	Understand the basic supervised machine learning algorithms.	K2
CO3	Understand the difference between supervise and unsupervised learning.	K2
CO4	Understand algorithmic topics of machine learning and mathematically deep enough to introduce the required theory.	K2
CO5	Apply an appreciation for what is involved in learning from data.	K3

Text books:

1) Marco Gori , Machine Learning: A Constraint-Based Approach, Morgan Kaufmann. 2017
2) Ethem Alpaydin, Machine Learning: The New AI, MIT Press-2016
3) Bishop, Christopher. Neural Networks for Pattern Recognition. New York, NY: Oxford University Press, 1995
4) Tom M. Mitchell, "Machine Learning", McGraw-Hill, 2010

Reference Books:

1) Ryszard, S., Michalski, J. G. Carbonell and Tom M. Mitchell, Machine Learning: An Artificial Intelligence Approach, Volume 1, Elsevier. 2014
2) Stephen Marsland, Taylor & Francis 2009. Machine Learning: An Algorithmic Perspective.
3) Ethem Alpaydin, (2004) "Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press.

Fundamentals of Machine Learning for Predictive Data Anayltics: Algorithms, Worked Examples, and Case Studies 1st Edition by **John D. Kelleher**

Links:

Unit 1	https://www.youtube.com/watch?v=fC7V8QsPBec&list=PL1xHD4vteKYVpaIiy295pg6_SY5qznc77&index=2
Unit 2	https://www.youtube.com/watch?v=OTAR0kT1swg&list=PL1xHD4vteKYVpaIiy295pg6_SY5qznc77&index=3 https://www.youtube.com/watch?v=OCwZyYH14uw https://www.youtube.com/watch?v=9_LY0LiFqRQ https://www.youtube.com/watch?v=EYeF2e2IKEo https://www.youtube.com/watch?v=_PwhiWxHK8o https://www.youtube.com/watch?v=wTF6vzS9fy4 https://www.youtube.com/watch?v=lt65K-REdHw
Unit 3	https://www.youtube.com/watch?v=HTSCbxSxsg&list=PL1xHD4vteKYVpaIiy295pg6_SY5qznc77&index=4 https://www.youtube.com/watch?v=NnlS2BzXvyM https://www.youtube.com/watch?v=7enWesSofhg

Unit 4	https://youtu.be/rthuFS5LSOo https://youtu.be/kho6oANGu_A
Unit 5	https://www.youtube.com/watch?v=9vMpHk44XXo&list=PL1xHD4vteKYVpaIiy295pg6_SY5qznc77&index=5 Reinforcement Learning Tutorial | Reinforcement Learning Example Using Python | Edureka - YouTube Association Rule Mining - Solved Numerical Question on Apriori Algorithm(Hindi) - YouTube Q Learning Explained | Reinforcement Learning Using Python | Q Learning in AI | Edureka - YouTube

B. TECH. THIRD YEAR

Course code	ACSIOT0601	L T P	Credits
Course title	IoT PROTOCOLS & ITS APPLICATIONS	3 1 0	4

Course objective: The main objective of the course is to make students know the basic concept of IOT protocols and architecture of IOT layers. Students will gain knowledge about the IoT protocols of each layers and interfacing with different cloud platforms.

Pre-requisites: Introduction to IoT.

Course Contents / Syllabus

UNIT-I	INTRODUCTION	8 HOURS

Introduction to IOT protocols, IoT layered Architecture, Comparison with OSI Model layers, Applications of IOT protocols, Use cases of IOT protocols.

Raspberry Pi: Introduction to Raspberry pi, Exploring the Raspberry pi Learning Board, Raspberry pi Operating Systems.

UNIT-II	APPLICATION LAYER	8 HOURS

CoAP: COAP features and Architecture, MQTT: MQTT characteristics and Architecture, XMPP: XMPP characteristics and Architecture, DDS: DDS characteristics and Architecture, AMQP: AMQP model, characteristics and Architecture, HTTP etc.
Application layers Use cases/Services.

UNIT-III	NETWORK AND SERVICE LAYERS	8 HOURS

IPV4, IPV6, IPsec, EIGRP, ICMP, IGMP, OSPF, RPL, TCP, UDP, data analysis and prediction related protocols etc.
Network and service layers Use cases/Services.

UNIT-IV	DEVICE LAYER	8 HOURS

IEEE 802.15.4: Introduction of IEEE 802.15.4 and its Features, IEEE 802 series, RFID: Features and applications, LORA and its features, Zigbee: Introduction of Zigbee and its Features, 6LoWPAN and its features, Z-Wave : Features and its applications, NFC: Features and applications, Wireless- HART: Features and applications, Bluetooth: Features and applications.
Device Layer Use cases/Services.

UNIT-V	INTEGRATION AND CUSTOMIZATION OF IOT PROTOCOLS	8 HOURS

Interfacing IOT Protocols with Blynk, Thing speak and MQTT Cloud**.** Implementation of COAP protocol. Smart Cities Use cases.

Course outcome: After completion of this course students will be able to

CO 1	Identifying the essentials of IOT protocols.	K1
CO 2	Articulate Application layer protocols.	K3

CO 3	Tagging Network and service layer protocols.	K2
CO 4	Understand the concepts of Device layer protocols.	K2
CO 5	Build IoT-based smart systems for real-world problems using IOT	K6

TextBooks :

1. Bassi, Alessandro, et al, "Enabling things to talk", Springer-Verlag Berlin An, 2016.
2. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", CISCO Press, 2017
3. Hersent, Olivier, David Boswarthick, and Omar Elloumi. The internet of things: Key applications and protocols. John Wiley & Sons, 2011.
4. Buyya, Rajkumar, and Amir Vahid Dastjerdi, eds. Internet of Things: Principles and paradigms. Elsevier, 2016.

NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=e7mPuhSz8o8 https://www.youtube.com/watch?v=J0EfiB2uSxY https://www.youtube.com/watch?v=CfDEHd8nn2k
Unit 2	https://www.youtube.com/watch?v=jv_5pijEyoo
Unit 3	https://www.youtube.com/watch?v=gl7Jfhy3J0U
Unit 4	https://www.youtube.com/watch?v=jqbBWJ622Jo https://www.youtube.com/watch?v=U0XlAqFT34s
Unit 5	https://www.youtube.com/watch?v=itCSqra-MBY

B. TECH. THIRD YEAR

Course code	ACSIOT0602	L T P	Credits
Course title	CLOUD AND EDGE COMPUTING	3 0 0	3

Course objective: To understand basics concept of cloud computing, different cloud computing services, storage and concept of edge computing.

Pre-requisites: Basics of OS.

Course Contents / Syllabus

UNIT-I	Introduction	8 HOURS

Introduction to Cloud Computing – Definition of Cloud – Evolution of Cloud Computing – Underlying Principles of Parallel and Distributed Computing – Cloud Characteristics – Elasticity in Cloud – On-demand Provisioning, EC2 Instances and its types. Overview of different cloud service providers

UNIT-II	Cloud Enabling Technologies:	8 HOURS

Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish Subscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures – Tools and Mechanisms – Virtualization of CPU – Memory – I/O Devices –Virtualization Support and Disaster Recovery.

UNIT-III	Cloud Architecture, Services and Storage:	8 HOURS

Layered Cloud Architecture Design – NIST Cloud Computing Reference Architecture – Public, Private and Hybrid Clouds – laaS – PaaS – SaaS – Architectural Design Challenges – Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – S3, RDS, EBS.

UNIT-IV	Edge Computing	8 HOURS

Introduction of edge computing, Difference between client server model and edge computing, components of edge computing, Edge Testbed: edge environment, launching an edge testbed, launching an edge application, Building an edge application; Agent based systems, Secret agent communications.

UNIT-V	OTA & IoT Agent	8 HOURS

OTA introduction, Terminology, Design Considerations, OTA example, Porting the OTA Library. IoT agent: overview, Agent Console, Comparison between Edge and Fog computing.

Streaming complex event processing: Streaming data, complex event processing, and complex event processing in edge computing.

Course outcome: After completion of this course students will be able to

CO 1	Understand Cloud Computing and different deployment models.	K1
CO 2	Describe importance of virtualization along with their technologies.	K2
CO 3	Apply different cloud computing services.	K3
CO 4	Build an Edge application.	K6
CO5	Manage IoT for Edge computing.	K4

TextBooks:

1. Rajkumar Buyya, Satish Narayana Srirama "Fog and Edge Computing: Principles and Paradigms" Wiley Publication E1 January 2019
2. Raj kumarBuyya, Christian Vecchiola, S. Thamaraiselvi, "Mastering Cloud Computing", Tata Mcgraw Hill, 2013.

Reference Books:

1. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing – A Practical Approach, Tata Mcgraw Hill, 2009.
2. Anwesha Mukherjee (Editor), Debashis De (Editor), Soumya K. Ghosh (Editor), Rajkumar Buyya Mobile Edge Computing Springer; 1st ed. 2021 edition (November 19, 2021)

NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=ZHCtVZ6cjdg&list=PLmmuEIIZy1cbwIMvGF1EsV4ZtAe8vA_7I
Unit 2	https://www.youtube.com/watch?v=ZHCtVZ6cjdg&list=PLmmuEIIZy1cbwIMvGF1EsV4ZtAe8vA_7I
Unit 3	https://www.youtube.com/watch?v=ZHCtVZ6cjdg&list=PLmmuEIIZy1cbwIMvGF1EsV4ZtAe8vA_7I
Unit 4	https://www.youtube.com/watch?v=ZHCtVZ6cjdg&list=PLmmuEIIZy1cbwIMvGF1EsV4ZtAe8vA_7I
Unit 5	https://www.youtube.com/watch?v=ZHCtVZ6cjdg&list=PLmmuEIIZy1cbwIMvGF1EsV4ZtAe8vA_7I

B. TECH THIRD YEAR

Course code	ACSML0651	L T P	Credit
Course title	MACHINE LEARNING LAB	0 0 2	1

List of Experiments:

Sr. No.	Name of Experiment	CO
1	Write a program to perform various types of regression (Linear & Logistic).	CO2
2	Implement Apriori algorithm using sample data in Python.	CO1
3	Write a program to demonstrate the working of the decision tree based ID3algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.	CO2
4	Write a program to implement k-Nearest Neighbour algorithm to classify the iris dataset. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.	CO1
5	Apply EM algorithm to cluster a set of data. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering.	CO3
6	Implement Support Vector Machine using Scikit-learn.	CO5
7	Implement the non-parametric Locally Weighted Regression algorithm to fit data points. Select appropriate data set for your experiment and draw graphs.	CO1
8	Implement Gradient Boosting Machine Ensemble in Python.	CO4
9	Implement of ANN algorithm using a sample dataset.	CO2
10	Implement naïve Bayesian Classifier model. Write the program to calculate the accuracy, precision, and recall for your data set.	CO4

Lab Course Outcome:

CO1	Understand the implementation procedures for the machine learning algorithms.	K2
CO2	Identify and apply Machine Learning algorithms to solve real-world problems.	K1
CO 3	Examine the requirements on special databases.	K4

B. TECH. THIRD YEAR					
Course code	**ACSIOT0651**	**L**	**T**	**P**	**Credit**
Course title	**IoT LAB USING RASPBERRY PI**	**0**	**0**	**2**	**1**

List of Experiments

Sr. No.	Name of Experiment	CO
1.	Understanding the concept of Raspberry Pi board GPIO and perform necessary software installation	CO1
2.	Interfacing Raspberry PI with I/O Peripherals a. LED b. Push Buttons c. Potentiometer d. LCD	CO1
3.	Interfacing Raspberry PI with Sensors e. Ultrasonic Sensor f. Temperature Sensor g. Humidity Sensor h. GAS Sensor i. LDR Sensor j. Pressure Sensor k. Piezo Sensor	CO1
4.	Interfacing Raspberry PI with Actuators a. Servo Motor b. Stepper Motor c. DC Motor d. Relays	CO1
5.	Implementation of MQTT protocol.	CO2
6.	Implementation of COAP protocol.	CO2
7.	Development of Mini Project	CO2

Lab Course Outcome: Upon the completion of the course, the student will be able to

CO1	Understand the various enabling IoT concepts using Raspberry Pi.	K2
CO2	Apply the concepts of IOT using Raspberry PI to configure MQTT and COAP protocols	K3

B. TECH. THIRD YEAR			
Course code	**ACSIOT06052**	**L T P**	**Credit**
Course title	**CLOUD AND EDGE COMPUTING LAB**	**0 0 2**	**1**

List of Experiment:

Sr. No.	Name of Experiment	
1	How to create free AWS account?	CO1
2	AWS Pricing Calculator and TCO Calculator.	CO1
3	Launch an EC2 and configure Security Groups to access control.	CO1
4	Build your VPC and deploy an EC2 instance with a Web Server.	CO1
5	Getting Started with S3 in Cloud.	CO1
6	Hosting a static website on S3 in Cloud.	CO1
7	Deploy and connect RTOS using AWS IoT for edge.	CO2
8	Manage and secure RTOS using AWS IoT for edge.	CO2
9	Development of mini project.	CO2

Lab Course Outcome: Upon the completion of the course, the student will be able to

CO 1	Implement cloud services like EC2 VPC S3 using AWS	K6
CO 2	Build edge computing deploys, connect, manage and secure RTOS.	K6

B. TECH THIRD YEAR (ELECTIVE III)

Course code	ACSE0611	L T P	Credits
Course title	CRM DEVELOPMENT	3 0 0	3

Course objective: Meet the tools and technologies that power development on the Salesforce platform. Give your data structure with objects, fields, and relationships. Automate processes for every app, experience, and portal with declarative tools. Use Visual force to build custom user interfaces for mobile and web apps. Write robust code by executing Apex unit tests.

Pre-requisites: Creative thinking and which is being used by the creative talent in your business areas.

UNIT-I	Salesforce Fundamentals	8 Hours

Building blocks of Salesforce, Data model & Security model, Business process automation options, Master Sales Cloud and Service Cloud , Salesforce platform, Salesforce terminology, force platform,Multi-tenancy and cloud, Salesforce metadata and APIs, Salesforce architecture.

UNIT-II	Salesforce Data Modeling	8 Hours

Salesforce Data model, IDIC model QIC model, CRM value chain model ,Payne & Frow's five forces and CRM objects , Relationship types, Formula fields and roll-up summary fields ,Importing and exporting data

UNIT-III	Logic and Process Automation	8 Hours

Formulas and Validations, Formula Operators and Functions, Screen Flow Distribution, Salesforce Flow, Apex Basics , Apex Triggers, Database & .NET Basics, Search Solution Basics, Triggers and Order of Execution, Platform Events Basics, Process Automation Specialist, Apex Specialist, Apex integration Services, Apex Metadata API.

UNIT-IV	User Interface	8 Hours

General development, Apex code development Visualforce development , Sales dashboard , Visualforce performance ,Technique for optimizing performance Lightning Web Components Basics Lightning App Builders Development.

UNIT-V	Testing, Debugging, and Deployment	8 Hours

Apex Testing, Apex code Test Method, Custom controller and Controller Extension, Test Data Developer Console Basics, Asynchronous Apex, Debugging Tool and Techniques, Debug logs, Application lifecycle and development model, Change Set Development model.

Course Outcome: At the end of course, the student will be able to:

CO1	Implement the working concept of variables	K1, K2
CO2	Apply the concepts of Data Management	K1, K2
CO3	Understand the concepts of APEX	K3
CO4	Understand the concepts of APEX Code development	K1, K2
CO5	Implement concepts of APEX Integration	K1, K3

Text Books:

1. Alok Kumar Rai : Customer Relationship Management : Concepts and Cases(Second Edition), PHI Learning, 2018

2. Bhasin- Customer Relationship Management (Wiley Dreamtech),2019
3. Salesforce for beginners by Shaarif Sahaalane book by Amazon(Online Edition)

Reference Books:

1. Salesforce : A quick Study laminated Reference Guide by Christopher Mathew Spencer eBook by Amazon(Online)
2. Salesforce Platform Developer By Vandevelde Jain Edition Ist 2018
3. Learning Salesforce Development By Paul Battisson E-book (Online)

NPTEL/ YouTube/Faculty Video Link:

www. Trailhead.salesforce.com

www.mindmajix.com/salesforce-tutorial

www,youtube.com/watch?v=7K42geizQCI

B. TECH THIRD YEAR (ELECTIVE-IV)

Course code	ACSE0613	L	T	P	Credits
Course Title	ROBOTICS PROCESS AUTOMATION (RPA)	3	0	0	3

Course objective: This course focus on The Robotic Process Automation (RPA) specialization offers comprehensive knowledge and professional-level skills focused on developing and deploying software robots. It starts with the basic concepts of Robotic Process Automation. It builds on these concepts and introduces key RPA Design and Development strategies and methodologies, specifically in the context of UiPath products. A student undergoing the course shall develop the competence to design and develop automation solutions for business processes.

Pre-requisites: Computer Organization and Architecture

Course Contents / Syllabus

UNIT-I	PROGRAMMING BASICS &RECAP	8 Hours

PROGRAMMING BASICS &RECAP: Programming Concepts Basics - Understanding the application - Basic Web Concepts - Protocols - Email Clients -. Data Structures - Data Tables - Algorithms - Software Processes - Software Design - Scripting - .Net Framework - .Net Fundamentals - XML - Control structures and functions - XML - HTML - CSS - Variables & Arguments.

UNIT-II	RPA Concepts	8 Hours

RPA Concepts: RPA Basics - History of Automation - What is RPA - RPA vs Automation - Processes & Flowcharts - Programming Constructs in RPA - What Processes can be Automated - Types of Bots - Workloads which can be automated - RPA Advanced Concepts - Standardization of processes - RPA Development methodologies - Difference from SDLC - Robotic control flow architecture - RPA business case - RPA Team - Process Design Document/Solution Design Document - Industries best suited for RPA - Risks & Challenges with RPA - RPA and emerging ecosystem

UNIT-III	RPA TOOL INTRODUCTION &BASICS	8 Hours

RPA TOOL INTRODUCTION &BASICS: Introduction to RPA Tool - The User Interface - Variables - Managing Variables - Naming Best Practices - The Variables Panel - Generic Value Variables - Text Variables - True or False Variables - Number Variables - Array Variables - Date and Time Variables - Data Table Variables - Managing Arguments - Naming Best Practices - The Arguments Panel - Using Arguments - About Imported Namespaces - Importing New Namespaces Control Flow - Control Flow Introduction - If Else Statements - Loops - Advanced Control Flow - Sequences - Flowcharts - About Control Flow - Control Flow Activities - The Assign Activity - The Delay Activity - The Do While Activity - The If Activity - The Switch Activity - The While Activity - The For Each Activity - The Break Activity - Data Manipulation - Data Manipulation Introduction - Scalar variables, collections and Tables - Text Manipulation - Data Manipulation - Gathering and Assembling Data

UNIT-IV	ADVANCED AUTOMATION CONCEPTS AND TECHNIQUES	8 Hours

ADVANCED AUTOMATION CONCEPTS AND TECHNIQUES : Recording and Advanced UI Interaction- Recording Introduction-Basic and Desktop Recording-Web Recording - Input/output Methods - Screen Scraping- Data Scraping - Scraping advanced techniques - Selectors - Selectors - Defining and Assessing Selectors - Customization - Debugging - Dynamic Selectors - Partial Selectors - RPA Challenge - Image, Text & Advanced Citrix Automation - Introduction to Image & Text Automation - Image based automation - Keyboard based automation - Information Retrieval - Advanced Citrix Automation challenges - Best Practices - Using tab for Images - Starting Apps - Excel Data Tables & PDF - Data Tables in RPA - Excel and Data Table basics - Data Manipulation in excel - Extracting Data from PDF - Extracting a single piece of data - Anchors - Using anchors in PDF

UNIT-V	**EMAIL AUTOMATION & EXCEPTIONAL**	**8 Hours**

EMAIL AUTOMATION & EXCEPTIONAL: Email Automation - Email Automation - Incoming Email automation - Sending Email, automation - Debugging and Exception Handling - Debugging Tools - Strategies for solving issues - Catching errors.

COURSE OUTCOMES: After completion of this course students will be able to

CO 1	Understand RPA principles, its features and applications	K3
CO 2	Demonstrate proficiency in handling several types of variables inside a workflow and data manipulation techniques	K3
CO 3	Gain insights into Desktop, Web, Citrix, Email Automation and exception handling.	K2
CO 4	Analyze and design a real-world automation project and debug the workflows.	K2
CO5	Student will be able to understand architecture of computing technology.	K2

TEXT BOOKS:

1. Tripathi, Alok Mani. Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool–UiPath. Packt Publishing Ltd, 2018.
2. Primer, A. "Introduction to Robotic Process Automation." Institute for Robotic Process Automation (2015).
3. Murdoch, Richard. Robotic Process Automation: Guide to Building Software Robots, Automate Repetitive Tasks & Become an RPA Consultant. Richard Murdoch & RPA Ultra, 2018.
4. Taulli, Tom. "The robotic process automation handbook." The Robotic Process Automation Handbook. https://doi. org/10.1007/978-1-4842-5729-6 (2020).

Reference Books:

1. Gaonkar, Sushant. "Future of work: Leveraging the power of technologies to create a near-human like digital worker." Gavesana Journal of Management 13.1 (2020): 15-23.
2. Vellaichamy, Mr NMS S., Mr R. Dinesh, and Mrs JR Rajalakshmi. "Reskillng Indian Workforce: The Need of the Hour LavanyanjaliMukkerlaDr.Braou."

NPTEL/YouTube/Faculty Video Links:

Unit 1	https://www.youtube.com/watch?v=3SMZHd_ngIw
Unit 2	https://www.youtube.com/watch?v=3zXb8H3odek
Unit 3	https://www.youtube.com/watch?v=3zXb8H3odek
Unit 4	https://www.youtube.com/watch?v=3zXb8H3odek

B.TECH. THIRD YEAR (ELECTIVE-III)

Course code	ACSAI0617	L T P	Credits
Course title	PROGRAMMING FOR DATA ANALYTICS	3 0 0	3

Course objective: Demonstrate knowledge of statistical data analysis techniques utilized in business decision making. Apply principles of Data Science to the analysis of business problems. Use data mining software to solve real-world problems. Employ cutting edge tools and technologies to analyze Big Data.

Pre-requisites: Basic Knowledge of Python and R

Course Contents / Syllabus

UNIT-I	BASIC DATA ANALYSIS USING PYTHON/R	8 Hours

Pandas data structures – Series and Data Frame, Data wrangling using pandas, Statistics with Pandas, Mathematical Computing Using NumPy, Data visualization with Python Descriptive and Inferential Statistics, Introduction to Model Building, Probability and Hypothesis Testing, Sensitivity Analysis, Regular expression: RE packages.

UNIT-II	R GRAPHICAL USER INTERFACES	8 Hours

Built-in functions, Data Objects-Data Types & Data Structure, Structure of Data Items, Manipulating and Processing Data in R using Dplyr package & Stringr package, Building R Packages, Running and Manipulating Packages, data import and export, attribute and data types, descriptive statistics, exploratory data analysis, Flex dashboard and R-shiny.

UNIT-III	DATA ENGINEERING FOUNDATION	8 Hours

Connecting to a database (sqlite) using Python, Sending DML and DDL queries and processing the result from a Python Program, Handling error, NOSQL query using MongoDB, MongoDB Compass.

UNIT-IV	INTRODUCTION TO TENSOR FLOW AND AI	8 Hours

Introduction, Using TensorFlow for AI Systems, Up and Running with TensorFlow, Understanding TensorFlow Basics, Convolutional Neural Networks, Working with Text and Sequences, and TensorBoard Visualization, Word Vectors, Advanced RNN, and Embedding Visualization. TensorFlow Abstractions and Simplifications, Queues, Threads, and Reading Data, Distributed TensorFlow, Exporting and Serving Models with TensorFlow.

UNIT-V	DEEP LEARNING WITH KERAS	8 Hours

Introducing Advanced Deep Learning with Keras, Deep Neural Networks, Autoencoders, Generative Adversarial Networks (GANs), Improved GANs, Disentangled Representation GANs, Cross-Domain GANs, Variational Autoencoders (VAEs), Deep Reinforcement Learning, Policy Gradient Methods.

Course outcome: After completion of this course students will be able to:

CO1	Install, Code and Use Python & R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices and Data frames.	K1
CO2	Implement the concept of the R packages.	K3
CO3	Understand the basic concept of the MongoDB.	K2
CO4	Understand and apply the concept of the RNN and tensorflow.	K4
CO5	Understand and evaluate the concept of the keras in deep learning.	K4

Textbooks:

1.Glenn J. Myatt, Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, John Wiley Publishers, 2007.

2. Learning TensorFlow by Tom Hope, Yehezkel S. Resheff, Itay Lieder O'Reilly Media, Inc.

3. Advanced Deep Learning with TensorFlow 2 and Keras: Apply DL, GANs, VAEs, deep RL, unsupervised learning, object detection and segmentation, and more, 2nd Edition.

4. Glenn J. Myatt, Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, John Wiley Publishers, 2007.

Reference Books:

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, 1 st Edition, Wrox, 2013.

2. Chris Eaton, Dirk Deroos et. al., “Understanding Big data”, Indian Edition, McGraw Hill, 2015.

3. Tom White, “HADOOP: The definitive Guide”, 3 rd Edition, O Reilly, 2012

Links:

Unit 1	https://www.ibm.com/cloud/blog/python-vs-r
Unit 2	https://www.youtube.com/watch?v=C5R5SdYzQBI
Unit 3	https://hevodata.com/learn/data-engineering-and-data-engineers/
Unit 4	https://www.youtube.com/watch?v=IjEZmH7byZQ
Unit 5	https://www.youtube.com/watch?v=pWp3PhYI-OU

B. TECH THIRD YEAR

Course code	ACSAI0622N	L T P	Credits
Course title	SOCIAL MEDIA ANALYTICS	3 0 0	3

Course objective: To understand text mining and social media data analytic activities and apply the complexities of processing text and network data from different data sources.

Pre-requisites: Python/R.

Course Contents / Syllabus

UNIT-I	SENTIMENT MINING	8 HOURS

Overview: Text and Sentiment Mining, Semantic Analysis Applications, Sentiment Analysis Process, Speech Analytics, Text Representation- tokenization, stemming, stop words, TF-IDF, Feature Vector Representation, Named Entity Recognition (NER), N-gram modelling, Text Clustering, Text Classification, Topic Modelling-LDA, HDP. Sentiment Classification, feature based opinion mining, comparative sentence, and relational mining, Opinion Summarization, Opinion spam detection.

UNIT-II	WEB-MINING	8 HOURS

Web Mining Overview, Web Structure Mining, Search Engine, Web Analytics, Machine Learning for extracting knowledge from the web, Inverted indices and Boolean queries. PLSI, Query optimization, SEO, page ranking, social graphs (Interaction, Latent and Following Graphs), Ethics of Scraping, Static data extraction and Web Scraping using Python.

UNIT-III	MINING SOCIAL MEDIA	8 HOURS

Introduction to Social Media Mining, Challenges in Social Media Mining, Process of Social media mining, Essentials of social graphs and its types, Social Networks Measures, Network Models, Information Diffusion in social media, Behavioral Analytics, Influence and Homophily, Recommendation in social media.

UNIT-IV	TEXT SUMMARIZATION	8 HOURS

Introduction to Text Summarization, Text extraction, classification and clustering, Anomaly and Trend Detection, Text Processing, N-gram Frequency Count and Phrase Mining, Page Rank and Text Rank Algorithm, LDA Topic Modelling, Machine-Learned Classification and Semantic Topic Tagging, Python libraries for Text Summarization. (NumPy, Pandas, Ntlk, Matplotlib).

UNIT-V	RECENT TRENDS	8 HOURS

Trend Analysis, Types of trend analysis, Recent Trends in Text, Data Localization Role of Web Mining in E-Commerce, Social Media Analytics, Social media analytics tools.
Case Studies: Facebook Insights Using Python, Sentiment and Text Mining of Twitter data and Google analytics.

Course outcome: After completion of this course students will be able to

CO 1	Apply state of the art mining tools and libraries on realistic data sets as a basis for business decisions and applications.	K3
CO 2	Apply a wide range of classification, clustering, estimation and prediction algorithms on web data.	K3
CO 3	Implement social network analysis to identify important social actors, subgroups and network properties in social media sites.	K3

CO 4	Interpret the terminologies, metaphors and perspectives of text summarization.	K3
CO 5	Design new solutions to opinion extraction, sentiment classification and data summarization problems.	K6

Textbooks

1. BingLiu,"WebDataMining-ExploringHyperlinks,Contents,andUsageData",Springer,Second Edition, 2011.
2. RezaZafarani, Mohammad AliAbbasiandHuanLiu,"SocialMediaMining-AnIntroduction", Cambridge University Press, 2014.
3. Bing Liu, "Sentiment Analysis and Opinion Mining", Morgan & Claypool Publishers, 2012.

Reference Books

1. NitinIndurkhya, FredJDamerau,"HandbookofNaturalLanguageProcess",2ndEdition,CRC Press, 2010.
2. Matthew A. Russell, "Mining the social web", 2nd edition- O'Reilly Media, 2013.
3. M Berry, "Text Mining: Applications and Theory", John Wiley & Sons Inc; 1st edition (12 March 2010)

NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=Uqs0GewlMkQ https://www.youtube.com/watch?v=tUNwSH7671Y&t=2s https://www.youtube.com/watch?v=zz1CFBS4NaY
Unit 2	https://slideplayer.com/slide/14222744/
Unit 3	https://www.youtube.com/watch?v=KjWu1-dZn00
Unit 4	https://www.youtube.com/watch?v=ntOaoW0T604
Unit 5	https://www.youtube.com/watch?v=otoXeVPhT7Q&list=PL34t5iLfZddt0tt5GdDy3ny6X5RQvwrp6&index=2

B. TECH THIRD YEAR (ELECTIVE III)

Course Code	ACSAI0612	L T P	Credits
Course Title	ADVANCED JAVA PROGRAMMING	3 0 0	3

Course objective:

Objective of this course is to provide the ability to design console based, GUI based ,web based applications, integrated development environment to create, debug and run multi-tier and enterprise-level applications.

Pre-requisites: Basics of C, C++, and basic concept of Core JAVA.

Course Contents / Syllabus

UNIT-I	Introduction	8 Hours

JDBC: Introduction, JDBC Driver, DB Connectivity, Driver Manager, Connection, Statement, Result Set, Prepared Statement, Transaction Management, Stored Procedures.

Servlet: Servlet Overview, Servlet API, Servlet Interface, Generic Servlet, HTTP Servlet, Servlet Life Cycle, Redirect requests to other resources, Session Tracking, Event and Listener.

UNIT-II	JSP	8 Hours

JSP: Introduction, Overview, JSP Scriptlet Tag, JSP expression Tag, JSP declaration Tag, Life Cycle of JSP, JSP API, Implicit Objects: JSP request, JSP response, JSP config, JSP session, JSP Application, JSP Page Context; JSP Page, JSP Exception.

UNIT-III	Spring 5.0	8 Hours

Spring 5.0: Spring Core Introduction and Overview, Managing Beans, The Spring Container, The Factory Pattern, Dependency Injection (DI), Spring Managed Bean Lifecycle, Constructor Injection, Metadata/Configuration: Life Cycle Annotations, Java Configuration, XML Free configuration.

UNIT-IV	Spring MVC & Spring Boot	8 Hours

Spring MVC: Introduction/Developing Web Application with Spring MVC, Advanced Techniques, Spring Controllers

Spring Boot: Spring Boot Starters, CLI, Application Class, Logging, Auto Configuration Classes, Spring Boot dependencies, Spring data JPA introduction and Overview.

UNIT-V	JPA	8 Hours

JPA: Introduction & overview of data persistence, Overview of ORM tools, Understanding JPA, Entities: Requirement for Entity Class, Persistent Fields and Properties, Primary keys in Entries, Entity Management, Querying Entities, Entities Relationships.

Course outcome: After completion of this course students will be able to

CO 1	Understand the concept of implementing the connection between Java and Database using JDBC.	K2, K4
CO 2	Understand, Analyse, and Build dynamic web pages for server-side programming	K2, K3
CO 3	Analyze and design the Spring Core Modules and DI to configure and wire beans (application objects) together	K4,K5
CO 4	Design Model View Controller architecture and ready components that can be used to develop flexible and loosely coupled web applications.	K2, K3, K6
CO 5	Deploy JPA to Map, store, retrieve, and update data from java objects to relational databases and vice versa.	K5

Text books:

1. Bhave, "Programming with Java", Pearson Education, 2009
2. Herbert Schieldt, "The Complete Refernce: Java", TMH, 1991
3. Hans Bergsten, "Java Server Pages", SPD O'Really, 1985
4. Katy Sierra and Bert Bates, "Head First: Java", O'Really, 2008
5. Katy Sierra and Bert Bates, "Head First: Servlets & JSP", O'Really , 2008

Reference Books:

1. NaughtonSchildt, "The Complete Refernce: JAVA2", TMH ,1991
2. Balagurusamy E, "Programming in JAVA", TMH, 2010
3. Introduction to Web Development with HTML, CSS, JavaScript (Cousera Course)

NPTEL/ YouTube/ Faculty Video Link:

Unit1	https://youtu.be/96xF9phMsWA https://youtu.be/Zopo5C79m2k https://youtu.be/ZliIs7jHi1s https://youtu.be/htbY9-yggB0
Unit2	https://youtu.be/vHmUVQKXlVo https://youtu.be/qz0aGYrrlhU https://youtu.be/BsDoLVMnmZs https://youtu.be/a8W952NBZUE
Unit 3	https://youtu.be/1Rs2ND1ryYc https://youtu.be/vpAJ0s5S2t0 https://youtu.be/GBOK1-nvdU4 https://youtu.be/Eu7G0jV0ImY
Unit 4	https://youtu.be/-qfEOE4vtxE

	https://youtu.be/PkZNo7MFNFg https://youtu.be/W6NZfCO5SIk https://youtu.be/DqaTKBU9TZk
Unit 5	https://youtu.be/_GMEqhUyyFM https://youtu.be/ImtZ5yENzgE https://youtu.be/xIApzP4mWyA https://youtu.be/qKR5V9rdht0

B. TECH THIRD YEAR (ELECTIVE IV)

Course Code	ACSE0614	L T P	Credits
Course Title	WEB DEVELOPMENT USING MEAN STACK	3 0 0	3

Course objective:

This course focuses on how to design and build static as well as dynamic webpages and interactive web applications. Students examine advanced topics like Angular, nodejs, Mongodb and Express framework for interactive web applications that use rich user interfaces.

Pre-requisites: Basic knowledge of HTML, CSS and ES6 required.

Course Contents / Syllabus

UNIT-I	Introduction to Nodejs	8 Hours

Installing Nodejs, Node in-built packages (buffer, fs, http, os, path, util, url) Node.js modules, File System Module, Json data, Http Server and Client, Error handling with appropriate HTTP, Callback function, asynchronous programing REST API's(GET, POST PUT, DELETE UPDATE), GraphQL, Promises, Promise Chaining, Introduction to template engine (EJS).

UNIT-II	Express Framework	8 Hours

Configuring Express, Postman configuration, Environment Variables, Routing, Defining pug templates, HTTP method of Express, URL binding, middleware function, Serving static files, Express sessions, REST full API's, FORM data in Express, document modeling with Mongoose.

UNIT-III	Basics of Angular js	8 Hours

Typescript, Setup and installation, Power of Types, Functions, Function as types Optional and default parameters, Arrow functions, Function overloading, Access modifiers, Getters and setters, Read-only & static, Abstract classes, Interfaces, Extending and Implementing Interface, Import and Export modules.

UNIT-IV	Building Single Page App with Angular js	8 Hours

MVC Architecture, One-way and Two-way data binding, AngularJS Expressions, AngularJS Controllers, AngularJS Modules, adding controller to a module, Component, Dependency Injection, Filters, Tables, AngularJS Forms and Forms validation, Select using ng-option, AngularJS AJAX.

UNIT-V	Connecting Angular js with MongoDB	8 Hours

Environment Setup of Mongodb, data modeling, The current SQL/NoSQL landscape, Create collection in Mongodb, CRUD Operations in MongoDB. Mongo's feature set, Introduction to Mongoose, understanding mongoose schemas and datatypes, Connecting Angular with mongoDB using API.

Course outcome: After completion of this course students will be able to

CO 1	Explain, analyze and apply the role of server-side scripting language like Nodejs in the workings of the web and web applications.	K2, K3
CO 2	Demonstrate web application framework i.e., Express is to design and implement typical dynamic web pages and interactive web based applications.	K3, K6
CO 3	Apply the knowledge of Typescript that are vital in understanding angular is, and analyze the concepts, principles and methods in current client-side technology to implement angular application over the web.	K3, K6
CO 4	Analyze build and develop single page application using client-side programming i.e. angular js and also develop a static web application.	K3, K4

CO 5	Understand the impact of web designing by database connectivity with Mongodb in the current market place where everyone use to prefer electronic medium for shoping, commerce, and even social life also.	K2, K3

Text books:

1. Amos Q. Haviv (Author), Adrian Mejia (Author), Robert Onodi (Author), "Web Application Development with MEAN",3rdIllustrated Edition 2017,Packt Publications.
2. Simon Holmes (Author), Clive Herber (Author), "Getting MEAN with Mongo, Express, Angular, and Node", 2nd Edition 2016, Addison Wesley Publication.
3. Dhruti Shah, "Comprehensive guide to learn Node.js", 1st Edition, 2018 BPB Publications.
4. Christoffer Noring, Pablo Deeleman, "Learning Angular",3rd Edition,2017
5. Packt publications.

Reference Books:

1. Anthony Accomazzo, Ari Lerner, and Nate Murray, "Fullstack Angular: The Complete Guide to AngularJS and Friends",4th edition, 2020 International Publishing.
2. David Cho, "Full-Stack Angular, Type Script, and Node: Build cloud-ready web applications using Angular 10 with Hooks and GraphQL",2nd edition, 2017 Packt Publishing Limited.
3. Richard Haltman & Shubham Vernekar, "Complete node.js: The fast guide: Learn complete backend development with node.js"5th edition, 2017 SMV publication.
4. Glenn Geenen,Sandro Pasquali , Kevin Faaborg, "Mastering Node.js: Build robust and scalable real-time server-side web applications efficiently" 2nd edition Packt Publishing Limited.
5. Greg Lim,"Beginning Node.js, Express & MongoDB Development ,kindle edition, international publishing.
6. Daniel Perkins, "AngularJS Master Angular.js with simple steps, guide and instructions" 3rd edition, 2015 SMV publication.
7. Peter Membrey, David Hows, Eelco Plugge, "MongoDB Basics", 2nd edition,2018 International Publication.

NPTEL/ YouTube/ Faculty Video Link:

Unit-1	https://youtu.be/BLl32FvcdVM https://youtu.be/fCACk9ziarQ https://youtu.be/YSyFSnisip0 https://youtu.be/mGVFltBxLKU https://youtu.be/bWaucYA1YRI
Unit-2	https://youtu.be/7H_QH9nipNs https://youtu.be/AX1AP83CuK4 https://youtu.be/SccSCuHhOw0 https://youtu.be/lY6icfhap2o https://youtu.be/z7ikpQCWbtQ
Unit-3	https://youtu.be/0LhBvp8qpro https://youtu.be/k5E2AVpwsko https://youtu.be/SQJkj0WYWOE?list=PLvQjNLQMdagP3OzoBMfBT48uJ-SPfSsWj https://youtu.be/0eWrpsCLMJQ?list=PLC3y8-rFHvwhBRAgFinJR8KHIrCdTkZcZ https://youtu.be/ZSB4JcLLrIo
Unit-4	https://youtu.be/0LhBvp8qpro https://youtu.be/k5E2AVpwsko https://youtu.be/SQJkj0WYWOE?list=PLvQjNLQMdagP3OzoBMfBT48uJ-SPfSsWj https://youtu.be/0eWrpsCLMJQ?list=PLC3y8-rFHvwhBRAgFinJR8KHIrCdTkZcZ https://youtu.be/ZSB4JcLLrIo
Unit-5	https://youtu.be/Kvb0cHWFkdc

	https://youtu.be/pQcV5CMara8 https://youtu.be/c3Hz1qUUIyQ https://youtu.be/Mfp94RjugWQ https://youtu.be/SyEQLbbSTWg

B.TECH. THIRD YEAR (ELECTIVE-III)

Course code	ACSAI0616	L T P	Credits
Course title	PRIVACY AND SECURITY IN IoT	3 0 0	3

Course objective: This course is designed to have students become acquainted with IoT security. Students will be able to understand or master IoT security related to hardware, system and networking.

Pre-requisites: Basic C programming.

Course Contents / Syllabus

UNIT-I	INTRODUCTION: SECURING THE INTERNET OF THINGS	8 Hours

Security Requirements in IoT Architecture - Security in Enabling Technologies - Security Concerns in IoT Applications. Security Architecture in the Internet of Things - Security Requirements in IoT - Insufficient Authentication/Authorization - Insecure Access Control - Threats to Access Control, Privacy, and Availability - Attacks Specific to IoT. Vulnerabilities – Secrecy and Secret-Key Capacity - Authentication/Authorization for Smart Devices - Transport Encryption – Attack & Fault trees.

UNIT-II	CRYPTOGRAPHIC FUNDAMENTALS FOR IOT	8 Hours

Cryptographic primitives and its role in IoT – Encryption and Decryption – Hashes – Digital Signatures – Random number generation – Cipher suites – key management fundamentals – cryptographic controls built into IoT messaging and communication protocols – IoT Node Authentication.

UNIT-III	IDENTITY & ACCESS MANAGEMENT SOLUTIONS FOR IOT	8 Hours

Identity lifecycle – authentication credentials – IoT IAM infrastructure – Authorization with Publish / Subscribe schemes – access control.

UNIT-IV	PRIVACY PRESERVATION AND TRUST MODELS FOR IOT	8 Hours

Concerns in data dissemination – Lightweight and robust schemes for Privacy protection – Trust and Trust models for IoT – self-organizing Things - Preventing unauthorized access.

UNIT-V	CLOUD SECURITY FOR IOT	8 Hours

Cloud services and IoT – offerings related to IoT from cloud service providers – Cloud IoT security controls – An enterprise IoT cloud security architecture – New directions in cloud enabled IoT computing.

Course outcome: After completion of this course students will be able to

CO 1	Understand the security requirements in IoT.	K2
CO 2	Understand the cryptographic fundamentals for IoT.	K4
CO 3	Understand the authentication credentials and access control.	K2, K3
CO 4	Understand the various types of trust models.	K2
CO 5	Implement cloud security for IoT.	K3

Text Books:	
1) Practical Internet of Things Security (Kindle Edition) by Brian Russell, Drew Van Duren.	
2) Securing the Internet of Things Elsevier.	
Reference Books:	
1) Security and Privacy in Internet of Things (IoTs): Models, Algorithms, and Implementations.	
NPTEL/ YouTube/ Faculty Video Link:	
Unit 1	https://www.youtube.com/watch?v=bcVztl4lJN8&t=453s https://www.youtube.com/watch?v=Fki7MCRWgdo
Unit 2	https://www.youtube.com/watch?v=_bVoW7FoZWc
Unit 3	https://www.youtube.com/watch?v=7v2x0omNMe8
Unit 4	https://www.youtube.com/watch?v=E4h4Z3g-eLM
Unit 5	https://www.youtube.com/watch?v=V7wLJZszDYk

B. TECH. THIRD YEAR (ELECTIVE-IV)

Course code	ACSAI0618	L T P	Credits
Course title	ADVANCED COMMUNICATION	3 0 0	3

Course Objective: To learn Advance Communication techniques and understand the requirements of 4G and 5G communication needs for IoT devices.

Prerequisite:
Time- frequency Transformation, Analog and Digital Signals and Systems

Course Contents / Syllabus

UNIT-I	ANALOG COMMUNICATION	8 Hours

Frequency domain representation of signal: Fourier transform and its properties, Overview of Communication system, Communication channels Need for modulation, Baseband and Pass band signals, Amplitude Modulation: Double side band with Carrier (DSB-C), Types of angle modulation, Frequency Modulation its frequency spectrum, transmission BW, methods of generation (Direct & Indirect).

UNIT-II	DIGITAL COMMUNICATION	8 Hours

Properties of Line codes- Unipolar / Polar RZ & NRZ – Bipolar NRZ, Geometric Representation of signals - Generation, detection, PSD & BER of Coherent BPSK, BFSK & QPSK - QAM – Carrier. Synchronization. Introduction to mobile device communication.

UNIT-III	OFDM	8 Hours

4G Communication Systems, Introduction, principle of OFDM, implementation of transceivers, frequency-selective channels, channel estimation, peak to average power ratio, inter carrier interference, Bit Error Rate, adaptive modulation and capacity, multiple access, multi carrier code division multiple access, single carrier modulation with frequency-domain equalization.

UNIT-IV	ADVANCE MIMO SYSTEMS	8 Hours

5G Communication: Multi antenna system: smart antennas, multiple input multiple output systems, multi user MIMO. Massive MIMO.

UNIT-V	COGNITIVE RADIO	8 Hours

Problem description before CR, cognitive radio transceiver architecture, principle of interweaving, spectrum sensing, spectrum management, spectrum sharing, overlay, underlay.

Course outcome: After completion of this course students will be able to

CO1	Understand wireless Analog communication system and use of modulation.	K2

CO 2	Understand Digital communication and signal coding.	K2
CO 3	Describe 4th generation Communication using OFDM technology.	K1
CO 4	Describe 5th generation technology using MU-MIMO and Massive MIMO.	K1
CO 5	Understand Wireless communication using Cognitive radio.	K2

Text Books:

1. B P Lathi; Zhi Ding, Modern Digital and Analog Communication Systems, Oxford University Press
2. Peyman Setoodeh, Simon Haskin, Fundamentals of Cognitive Radio, July 2017
3. Haykin: Mordern Wireless Communication, Pearson Education
4. Thomas L. Marzetta, Erik G. Larsson, Hong Yang, Hien Quoc Ngo, Fundamentals of Massive MIMO, Cambridge University Press

Reference Books:

1. Raj Kamal: Mobile Computing, Oxford University Press.
2. Lee: Cellular and Mobile Telecommunication- Analog & digital systems, TMH.
3. Rappaport: Wireless Communications- principles and practice, Pears3. Lee: Mobile communications design fundamentals, Wiley India
4. Price: Wireless Communication and Networks, TMH.

Links:

Unit-I	https://www.youtube.com/watch?v=s_vmLqT_6NQ&list=PLPeKeikHHWGfaHVBYrqxRk2Wl8uYSjRWM
Unit-II	https://www.youtube.com/watch?v=qQcpnmJNluU&list=PLF84ABD7D4EBA31C4
Unit-III	https://www.youtube.com/watch?v=-ymnQ5rpcYA&list=PLbMVogVj5nJSi8FUsvglRxLtN1TN9y4nx
Unit-IV	https://www.youtube.com/watch?v=pWs_PXDD_VA&list=PL2rY_MetoyGnxjllP1eC6Lc0GXeS5Kfly
Unit-V	https://www.youtube.com/watch?v=SljXFf0vgvw&list=PL48UwQJyfW3SmrjLgl5LrVciqfWz9XazY

B. TECH. THIRD YEAR 5th/ 6th			
Course code	**ANC0602**	**L T P**	**Credits**
Course Title	**ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**	**2 0 0**	**2**

Course objective: This course aims to provide basic knowledge about different theories of society, state and polity in India, Indian literature, culture, Indian religion, philosophy, science, management, cultural heritage and different arts in India

Pre-requisites: Computer Organization and Architecture

Course Contents / Syllabus

UNIT-I	**SOCIETY STATE AND POLITY IN INDIA**	**8 Hours**

State in Ancient India: Evolutionary Theory, Force Theory, Mystical Theory Contract Theory, Stages of State Formation in Ancient India, Kingship , Council of Ministers Administration Political Ideals in Ancient India Conditions' of the Welfare of Societies, The Seven Limbs of the State, Society in Ancient India, Purusārtha, Varnāshrama System, Āshrama or the Stages of Life, Marriage, Understanding Gender as a social category, The representation of Women in Historical traditions, Challenges faced by Women.

UNIT-II	**INDIAN LITERATURE, CULTURE, TRADITION, AND PRACTICES**	**8 Hours**

Evolution of script and languages in India: Harappan Script and Brahmi Script. The Vedas, the Upanishads, the Ramayana and the Mahabharata, Puranas, Buddhist And Jain Literature in Pali,Prakrit And Sanskrit, Sikh Literature, Kautilya's Arthashastra, Famous Sanskrit Authors, Telugu Literature, Kannada Literature, Malayalam Literature ,Sangama Literature Northern Indian Languages & Literature, Persian And Urdu ,Hindi Literature

UNIT-III	**INDIAN RELIGION, PHILOSOPHY, AND PRACTICES**	**8 Hours**

Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy, Shankaracharya, Various Philosophical Doctrines, Other Heterodox Sects, Bhakti Movement, Sufi movement, Socio religious reform movement of 19th century, Modern religious practices.

UNIT-IV	**SCIENCE, MANAGEMENT AND INDIAN KNOWLEDGE SYSTEM**	**8 Hours**

Astronomy in India, Chemistry in India, Mathematics in India, Physics in India, Agriculture in India, Medicine in India, Metallurgy in India, Geography, Biology, Harappan Technologies, Water Management in India, Textile Technology in India ,Writing Technology in India Pyrotechnics in India Trade in Ancient India/,India's Dominance up to Pre-colonial Times.

UNIT-V	**CULTURAL HERITAGE AND PERFORMING ARTS**	**8 Hours**

Indian Architect, Engineering and Architecture in Ancient India, Sculptures, Pottery, Painting, Indian Handicraft, UNESCO'S List of World Heritage sites in India, Seals, coins, Puppetry, Dance, Music, Theatre, drama, Martial Arts Traditions, Fairs and Festivals, UNESCO'S List of Intangible Cultural Heritage, Calenders, Current developments in Arts and Cultural, Indian's Cultural Contribution to the World. Indian Cinema.

COURSE OUTCOMES: After completion of this course students will be able to

CO 1	Understand the basics of past Indian politics and state polity.	K2
CO 2	Understand the Vedas, Upanishads, languages & literature of Indian society.	K2

CO 3	Know the different religions and religious movements in India.	K4
CO 4	Identify and explore the basic knowledge about the ancient history of Indian agriculture, science & technology, and ayurveda.	K4
CO 5	Identify Indian dances, fairs & festivals, and cinema.	K1

Text Books:

3. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014.
4. S. Baliyan, Indian Art and Culture, Oxford University Press, India
5. Nitin Singhania, Indian Art and Culture: for civil services and other competitive Examinations,3rd Edition,Mc Graw Hill

Reference Books:

1. Romila Thapar, Readings In Early Indian History Oxford University Press, India
2. Basham, A.L., The Wonder that was India (34th impression), New Delhi, Rupa & co.

B. TECH. THIRD YEAR 5th/ 6th			
Course code	**ANC0601**	**L T P**	**Credits**
Course Title	**CONSTITUTION OF INDIA, LAW AND ENGINEERING**	**2 0 0**	**2**

Course objective: To acquaint the students with legacies of constitutional development in India and help them to understand the most diversified legal document of India and philosophy behind it.

Pre-requisites: Computer Organization and Architecture

Course Contents / Syllabus

UNIT-I	**INTRODUCTION AND BASIC INFORMATION ABOUT INDIAN CONSTITUTION**	**8 Hours**

Meaning of the constitution law and constitutionalism, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947,Enforcement of the Constitution, Indian Constitution and its Salient Features, The Preamble of the Constitution, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Parliamentary System, Federal System, Centre-State Relations, Amendment of the Constitutional Powers and Procedure, The historical perspectives of the constitutional amendments in India, Emergency Provisions: National Emergency, President Rule, Financial Emergency, and Local Self Government – Constitutional Scheme in India.

UNIT-II	**UNION EXECUTIVE AND STATE EXECUTIVE**	**8 Hours**

Powers of Indian Parliament Functions of Rajya Sabha, Functions of Lok Sabha, Powers and Functions of the President, Comparison of powers of Indian President with the United States, Powers and Functions of Vice-President, Powers and Functions of the Prime Minister, Judiciary – The Independence of the Supreme Court, Appointment of Judges, Judicial Review, Public Interest Litigation, Judicial Activism, LokPal, Lok Ayukta, The Lokpal and Lok ayuktas Act 2013, State Executives – Powers and Functions of the Governor, Powers and Functions of the Chief Minister, Functions of State Cabinet, Functions of State Legislature, Functions of High Court and Subordinate Courts.

UNIT-III	**INTRODUCTION AND BASIC INFORMATION ABOUT LEGAL SYSTEM**	**8 Hours**

The Legal System: Sources of Law and the Court Structure: Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law, Principles taken from decisions of judges constitute binding legal rules. The Court System in India and Foreign Courtiers (District Court, District Consumer Forum, Tribunals, High Courts, Supreme Court). Arbitration: As an alternative to resolving disputes in the normal courts, parties who are in dispute can agree that this will instead be referred to arbitration. Contract law, Tort, Law at workplace.

UNIT-IV	**INTELLECTUAL PROPERTY LAWS AND REGULATION TO INFORMATION**	**8 Hours**

Intellectual Property Laws: Introduction, Legal Aspects of Patents, Filing of Patent Applications, Rights from Patents, Infringement of Patents, Copyright and its Ownership, Infringement of Copyright, Civil Remedies for Infringement, Regulation to Information, Introduction, Right to Information Act, 2005, Information Technology Act, 2000, Electronic Governance, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Offences, Limitations of the Information Technology Act.

UNIT-V	**BUSINESS ORGANIZATIONS AND E-GOVERNANCE**	**8 Hours**

Sole Traders, Partnerships: Companies: The Company's Act: Introduction, Formation of a Company, Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, General Meetings and Proceedings, Auditor, Winding up. E-Governance and role of engineers in E-Governance, Need for reformed engineering serving at the Union and State level, Role of I.T. professionals in Judiciary, Problem of Alienation and Secessionism in few states creating hurdles in Industrial development.

COURSE OUTCOMES: After completion of this course students will be able to

CO 1	Identify and explore the basic features and modalities about Indian constitution.	K1
CO 2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level.	K2
CO 3	Differentiate different aspects of Indian Legal System and its related bodies.	K4
CO 4	Discover and apply different laws and regulations related to engineering practices.	K4
CO 5	Correlate role of engineers with different organizations and governance models	K4

Text Books:

1. M Laxmikanth: Indian Polity for civil services and other State Examination,6th Edition, Mc Graw Hill
2. Brij Kishore Sharma: Introduction to the Indian Constitution, 8th Edition, PHI Learning Pvt. Ltd.
3. Granville Austin: The Indian Constitution: Cornerstone of a Nation (Classic Reissue), Oxford University Press.

Reference Books:

1. Madhav Khosla: The Indian Constitution, Oxford University Press.
2. PM Bakshi: The Constitution of India, Latest Edition, Universal Law Publishing.
3. V.K. Ahuja: Law Relating to Intellectual Property Rights (2007)