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 (Artificial Intelligence & Machine Learning)

Third Year

(Effective from the Session: 2022-23)

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

Bachelor of Technology
Computer Science And Engineering (Artificial Intelligence & Machine Learning)
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	ACSE0501	Design and Analysis of Algorithms	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	ACSE0551	Design and Analysis of Algorithms 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-II	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	AMC0086	Introduction to Machine Learning	Duke University	26	2
2	AMC0088	Introduction to NoSQL	IBM	18	1

PLEASE NOTE: -

- **Internship (3-4 weeks) shall be conducted during summer break after semester-IV and will be assessed during Semester-V**

- **Compulsory Audit Course (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	AIML	5
2	Elective-II	ACSE0513	CRM Administration		AIML	5
3	Elective-I	ACSAI0512	Data Analytics	Data Analytics	AIML	5
4	Elective-II	ACSAI0519	Business Intelligence and Data Visualization		AIML	5
5	Elective-I	ACSE0512	Python Web Development with Django	Full Stack Development	AIML	5
6	Elective-II	ACSE0514	Design Patterns		AIML	5
7	Elective-I	ACSAI0515	Mobile Application Development	Mobility Management	AIML	5
8	Elective-II	ACSAI0521	Development in Swift Fundamentals		AIML	5

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

Bachelor of Technology
Computer Science And Engineering (Artificial Intelligence & Machine Learning)
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	ACSML0602	Deep Learning	3	0	0	30	20	50		100		150	3
2	ACSML0603	Advanced Database Management Systems	3	1	0	30	20	50		100		150	4
3	ACSE0603	Software Engineering	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	ACSML0652	Deep Learning Lab	0	0	2				25		25	50	1
8	ACSML0653	Advanced Database Management Systems Lab	0	0	2				25		25	50	1
9	ACSE0653	Software Engineering 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	AMC0093	Machine Learning with Python	IBM	23	1.5
2	AMC0118	Introduction to Deep Learning & Neural Networks with Keras	IBM	8	0.5

OR

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	AMC0122	Natural Language processing with Classification and Vector Spaces	Deep Learning.AI	35	2.5
2	AMC0123	Natural Language Processing with Probabilistic Models	Deep Learning.AI	32	2.5

PLEASE NOTE: -

- **Internship (3-4 weeks) shall be conducted during summer break after semester-VI and will be assessed during semester-VII.**
  - **Compulsory Audit Course (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	AIML	6
2	Elective-IV	ACSE0613	Robotics Process Automation(RPA)		AIML	6
3	Elective-III	ACSAI0617	Programming for Data Analytics	Data Analytics	AIML	6
4	Elective-IV	ACSAI0622	Social Media Analytics		AIML	6
5	Elective-III	ACSAI0612	Advanced Java Programming	Full Stack Development	AIML	6
6	Elective-IV	ACSE0614	Web Development using MEAN Stack		AIML	6
7	Elective-III	ACSAI0614	Development in Swift Explorations and Data Collections	Mobility Management	AIML	6
8	Elective-IV	ACSAI0620	Augmented Reality and Virtual Reality		AIML	6

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

Bachelor of Technology
Computer Science And Engineering (Artificial Intelligence & Machine Learning)

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	ACSE0501	L T P	Credits
Course Title	DESIGN AND ANALYSIS OF ALGORITHMS	3 1 0	4

Course objective: Analyze asymptotic performance of algorithms designed using different computational model. Study advanced data structures like Red black Tree, binomial and Fibonacci heap and learn the concept of complexity classes.

Pre-requisites: Basic knowledge of any programming language like C/C++/ Python/Java, Data Structures, Discrete Structures and Graph Theory

Course Contents / Syllabus

UNIT-I	Introduction	8 Hours

Algorithms, Analyzing Algorithms, Complexity of Algorithms, Amortized Analysis, Growth of Functions, Methods of solving Recurrences, Performance Measurements, Sorting and Order Statistics –Insertion Sort, Shell Sort, Heap Sort, Priority queue, Comparison of Sorting Algorithms, Sorting in Linear Time, Counting Sort, Radix Sort.

UNIT-II	Advanced Data Structures	8 Hours

Red-Black Trees, B – Trees, Binomial Heaps, Fibonacci Heaps.

UNIT-III	Divide and Conquer and Greedy Methods	8 Hours

Divide and Conquer concepts with Examples Such as Quick sort, Merge sort, Strassen's Matrix Multiplication, Convex Hull, Searching. Greedy Methods with Examples Such as Activity Selection, Task scheduling, Knapsack, Minimum Spanning Trees – Prim's and Kruskal's Algorithms, Single Source Shortest Paths - Dijkstra's and Bellman Ford Algorithms, Huffman codes.

UNIT-IV	Dynamic Programming, Backtracking, Branch and Bound	8 Hours

Dynamic Programming concepts, Examples Such as All Pair Shortest Paths – Warshal's and Floyd's Algorithms, 0/1 Knapsack, Longest Common Sub Sequence, Matrix Chain Multiplication, Resource Allocation Problem. Graph searching (BFS, DFS), Backtracking, Branch and Bound with Examples Such as Travelling Salesman Problem, Graph Coloring, n-Queen Problem, Hamiltonian Cycles and Sum of Subsets.

UNIT-V	Selected Topics	8 Hours

String Matching Algorithms such as Rabin-karp Matcher, Finite Automaton Matcher, KMP Matcher, Boyer Moore Matcher. Theory of NP-Completeness, Approximation Algorithms and Randomized Algorithms.

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

CO 1	Analyze the asymptotic performance of algorithms and write rigorous correctness proofs for algorithms.	K4
CO 2	Use efficient data structures such as RB tree, B tree, binomial and Fibonacci heaps etc. according to the problem	K3
CO 3	Apply divide and conquer and greedy algorithm approach for solving different problems such	K5
CO 4	Apply important algorithmic design paradigms and methods of analysis such as dynamic programming, backtracking, branch and bound.	K5

CO 5	Demonstrate tractable and intractable problems and the classes P, NP and NP-complete problems. And also use Algorithms for solving string matching problem.	K3
Text books:		
1) Thomas H. Coreman, Charles E. Leiserson and Ronald L. Rivest, “Introduction to Algorithms”, Printice Hall of India.		
2) E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms".		
3) Aho, Hopcraft, Ullman, “The Design and Analysis of Computer Algorithms” Pearson Education, 2008.		
4) LEE "Design & Analysis of Algorithms (POD)", McGraw Hill.		
Reference Books:		
1. Richard E.Neapolitan "Foundations of Algorithms" Jones & Bartlett Learning.		
2. Jon Kleinberg and ÉvaTardos, Algorithm Design, Pearson, 2005.		
3. Michael T Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Wiley, 2006.		
4. Harry R. Lewis and Larry Denenberg, Data Structures and Their Algorithms, Harper Collins, 1997		
5. Robert Sedgewick and Kevin Wayne, Algorithms, fourth edition, Addison Wesley, 2011.		
NPTEL/ Youtube/ Faculty Video Link:		
Unit 1	https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs_O https://www.youtube.com/watch?v=aGjL7YXI31Q&list=PLEbnTDJUr_IeHYw_sfBOJ6gk5pie0yP-0 https://nptel.ac.in/courses/106/106/106106131/ https://nptel.ac.in/courses/106/101/106101060/EVALUATION SCHEME 3RD YEAR AI.docx	
Unit 2	https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs_O https://www.youtube.com/watch?v=aGjL7YXI31Q&list=PLEbnTDJUr_IeHYw_sfBOJ6gk5pie0yP-0 https://nptel.ac.in/courses/106/106/106106131/ https://nptel.ac.in/courses/106/101/106101060/	
Unit 3	https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs_O https://www.youtube.com/watch?v=aGjL7YXI31Q&list=PLEbnTDJUr_IeHYw_sfBOJ6gk5pie0yP-0 https://nptel.ac.in/courses/106/106/106106131/ https://nptel.ac.in/courses/106/101/106101060/	
Unit 4	https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs_O https://www.youtube.com/watch?v=aGjL7YXI31Q&list=PLEbnTDJUr_IeHYw_sfBOJ6gk5pie0yP-0 https://nptel.ac.in/courses/106/106/106106131/ https://nptel.ac.in/courses/106/101/106101060/	
Unit 5	https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs_O https://www.youtube.com/watch?v=aGjL7YXI31Q&list=PLEbnTDJUr_IeHYw_sfBOJ6gk5pie0yP-0 https://nptel.ac.in/courses/106/106/106106131/ https://nptel.ac.in/courses/106/101/106101060/	

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.

<table>
<tr><td colspan="2">3. William Stallings, “Data and Computer Communication”, Eighth Edition-2008, Pearson.</td></tr>
<tr><td colspan="2">Reference Books:</td></tr>
<tr><td colspan="2">1. Kurose and Ross, “Computer Networking- A Top-Down Approach”, Eighth Edition-2021, Pearson.</td></tr>
<tr><td colspan="2">2. Peterson and Davie, “Computer Networks: A Systems Approach”, Fourth Edition-1996, Morgan Kaufmann</td></tr>
<tr><td colspan="2">NPTEL/ YouTube/ Faculty Video Link:</td></tr>
<tr><td>Unit 1</td><td>https://www.youtube.com/watch?v=LX_b2M3IzN8</td></tr>
<tr><td>Unit 2</td><td>https://www.youtube.com/watch?v=LnbvhoxHn8M</td></tr>
<tr><td>Unit 3</td><td>https://www.youtube.com/watch?v=ddM9AcreVqY</td></tr>
<tr><td>Unit 4</td><td>https://www.youtube.com/watch?v=uwoD5YsGACg</td></tr>
<tr><td>Unit 5</td><td>https://www.youtube.com/watch?v=bTwYSA478eA&list=PLJ5C_6qdAvBH01tVf0V4PQsCxGE3hSqEr
https://www.youtube.com/watch?v=tSodBEAJz9Y</td></tr>
</table>

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 its 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: Career buddy, 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 behavior, 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, XQuery, 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, Pseudoclass, Navigation Bar, Image Sprites,Attributesector),CSSColor,CreatingpageLayoutandSite. 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	ACSE0551	L T P	Credit
Course Title	DESIGN AND ANALYSIS OF ALGORITHMS LAB	0 0 2	1

List of Experiments

Sr. No.	Name of Experiment	CO
1	Program for Recursive Binary & Linear Search.	CO1, CO2
2	Program for Heap Sort.	CO1
3	Program for Merge Sort.	CO2
4	Program for Insertion Sort.	CO1
5	Program for Quick Sort.	CO2
6	Program to implement Knapsack Problem using Greedy Solution.	CO3
7	Program for 0/1 knapsack.	CO4
8	Program for LCS.	CO4
9	Program for BFS and DFS.	CO1
10	Program to implement Dijkstra's Algorithm.	CO4
11	Program to find Minimum Spanning Tree using Kruskal's Algorithm.	CO3
12	Program to implement N Queen Problem using Backtracking.	CO4

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

CO 1	Implement algorithm to solve problems by iterative approach.	K3
CO 2	Implement algorithm to solve problems by divide and conquer approach.	K3
CO 3	Implement algorithm to solve problems by Greedy algorithm approach.	K3
CO 4	Implement algorithm to solve problems by Dynamic programming, backtracking, branch and bound approach.	K3

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,CO 4
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:

https://youtu.be/C_oPLDaSy-8

https://youtu.be/NU_1StN5Tkk

B. TECH THIRD YEAR (ELECTIVE -I)

Course Code	ACSAI0515	L T P	Credits
Course Title	MOBILE APPLICATION DEVELOPMENT	3 0 0	3

Course objective:

This course introduces students to programming technologies, design and development related to mobile applications using android/ iOS. Course also aims at mobile application development frameworks; mobile architecture, design and engineering issues, techniques, methodologies for mobile application development.

Pre-requisites: Overview of programming language: JAVA and XML.

Course Contents / Syllabus

UNIT-I	Introduction to Mobile Application and Architecture	8 Hours

Mobile applications, History of mobile application frameworks, Characteristics and types of mobile applications, Achieving quality constraints.

Mobile Architecture- Mobile Hardware Architecture: processors used for Mobile and Handheld devices and SoC architecture; Mobile Software Architecture: Real Time Operating systems and Mobile Real Time Operating Systems, SDK's.

UNIT-II	Android Developing Environment	6 Hours

Introduction to Android, Android ecosystem, Android SDK and Installation, Layered Architecture of Android, Android API levels (versions & version names), Android Development Tools, Basic Building blocks – Protocols, Activities, Services, Broadcast Receivers & Content providers.

UNIT-III	UI Components and Multimedia	10 Hours

Fundamental UI design, layout and view types, Interaction with server-side applications – Using Google Maps, GPS and Wi-Fi, Integration with social media applications, Interfacing sensor data with mobile application, Accessing applications hosted in a cloud computing environment.

Multimedia Supported audio and video formats, Audio capture, Bluetooth, Animation.

UNIT-IV	Android Application Deployment	8 Hours

Persisting data using SQLite database, Testing and debugging Android Application, Packaging and Android Application Deployment on device with Windows, Android Permissions. Testing and publishing of Mobile Applications on different app stores.

UNIT-V	iOS and Swift	8 Hours

Introduction to Objective C, iOS features, UI implementation, Touch frameworks, Data persistence using Core Data and SQLite, Location aware applications using Core Location and Map Kit, integrating calendar and address book with social media application, using Wifi - iPhone marketplace.

Swift: Introduction to Swift, Features of swift.

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

CO 1	Recall vision, definition, conceptual framework, architecture of mobile applications.	K1

CO 2	Describe and configure android development environment, tools, and architecture.	K2
CO 3	Create and implement UI components and multimedia framework, fragments, audio capture, animation, and other activities.	K6
CO 4	Integrate and interact with server-side applications with testing and deployment of android application.	K3
CO 5	Analyze iOS and swift features, frameworks, map kit, and social media applications.	K4

Textbooks:

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
2. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012

Reference Books:

1. Bill Phillips, Chris Stewart, Brian Hardy, and Kristin Marsicano, Android Programming: The Big Nerd Ranch Guide, Big Nerd Ranch LLC, 3rd edition, 2017
2. S. Poslad, “Ubiquitous Computing: Smart Devices, Environments and Interactions,” Wiley, 2009
3. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS 6 Development: Exploring the iOS SDK”, Apress, 2013
4. Nick Lecrenski, Karli Watson, “Windows Phone 7 Application Development” version 2011
5. James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012

B. TECH THIRD YEAR (ELECTIVE- II)			
Course code	**ACSAI0521**	**L T P**	**Credits**
Course title	**DEVELOPMENT IN SWIFT FUNDAMENTALS**	**3 0 0**	**3**

Course objective: The objective of this course is to learn the fundamental iOS app development skills with Swift. The objective of this course is to provide the ability to design and develop iOS Apps from scratch.

Pre-requisites: Basic understanding of Object-Oriented Concepts and Programming Languages

Course Contents / Syllabus

UNIT-I	**INTRODUCTION TO SWIFT -I**	**8 Hours**

Introduction to Swift and Playgrounds, Constants, Variables, and Data Types, Operators, Control Flow, Strings, Functions, Collections, Loops.

UNIT-II	**INTRODUCTION TO SWIFT -II**	**8 Hours**

Structures, Classes and Inheritance, Optionals, Type Casting, Guard, Scope, Enumerations.

UNIT-III	**XCODE - I**	**8 Hours**

XCode: Basics, Building, Running, and Debugging an App, Introduction to UIKit: Displaying Data, Controls in Action.

UNIT-IV	**XCODE - II**	**8 Hours**

Auto layout and Stack Views, Segues, Navigation Controllers, Tab Bar Controllers

UNIT-V	**GUIDED PROJECTS**	**8 Hours**

Light, Apple Pie, Personality Quiz.

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

CO 1	Build fundamental iOS app development skills with Swift	K6
CO 2	Learn key computing concepts, building a solid foundation in programming with Swift.	K1
CO 3	Understand the XCode interface and its capabilities and build a basic fluency in XCode source and UI editors.	K6
CO 4	Create iOS apps that adhere to standard practices, including the use of stock UI elements, layout techniques, and common navigation interfaces.	K6
CO 5	Apply the basic concepts of Swift and XCode to build the projects	K3

Textbooks:

1) Develop in Swift Fundamentals, XCode 12 or Higher, Apple Inc.

Reference Books:
1) Develop in Swift Fundamentals, XCode 12 or Higher, Apple Inc.
Links: NPTEL/ YouTube/ Faculty Video Link
https://developer.apple.com/videos/swift
https://developer.apple.com/videos/play/wwdc2020/10119/
https://developer.apple.com/videos/play/wwdc2019/405/

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.s

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	ACSML0602	L T P	Credits
Course title	DEEP LEARNING	3 0 0	3

Course objective: To be able to learn unsupervised techniques and provide continuous improvement in accuracy and outcomes of various datasets with more reliable and concise analysis results.

Pre-requisites: Python, Basic Modeling Concepts.

Course Contents / Syllabus

UNIT-I	INTRODUCTION	8 HOURS

Model Improvement and Performance: Curse of Dimensionality, Bias and Variance Trade off, Overfitting and underfitting, Regression - MAE, MSE, RMSE, R Squared, Adjusted R Squared, p-Value, Classification - Precision, Recall, F1, Other topics, K-Fold Cross validation, RoC curve, Hyper-Parameter Tuning Introduction – Grid search, random search, Introduction to Deep Learning.

Artificial Neural Network: Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: Single layer and Multilayer feed forward networks, recurrent networks. Various learning techniques; Perception and Convergence rule, Hebb Learning. Perceptron's, Multilayer perceptron, Gradient descent and the Delta rule, Multilayer networks, Derivation of Backpropagation Algorithm.

UNIT-II	CONVOLUTION NEURAL NETWORK	8 HOURS

What is computer vision? Why Convolutions (CNN)? Introduction to CNN, Train a simple convolutional neural net, Explore the design space for convolutional nets, Pooling layer motivation in CNN, Design a convolutional layered application, Understanding and visualizing a CNN, Transfer learning and fine-tuning CNN, Image classification, Text classification, Image classification and hyper-parameter tuning, Emerging NN architectures.

UNIT-III	DETECTION & RECOGNITION	8 HOURS

Padding & Edge Detection, Strided Convolutions, Networks in Networks and 1x1Convolutions, Inception Network Motivation, Object Detection, YOLO Algorithm.

UNIT-IV	RECURRENT NEURAL NETWORKS	8 HOURS

Why use sequence models? Recurrent Neural Network Model, Notation, Back-propagation through time (BTT), Different types of RNNs, Language model and sequence generation, Sampling novel sequences, Vanishing gradients with RNNs, Gated Recurrent Unit (GRU), Long Short-Term Memory (LSTM), Bidirectional RNN, Deep RNNs

UNIT-V	AUTO ENCODERS IN DEEP LEARNING	8 HOURS

Auto-encoders and unsupervised learning, Stacked auto-encoders and semi-supervised learning, Regularization - Dropout and Batch normalization.

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

CO 1	Analyze ANN model and understand the ways of accuracy measurement.	K4
CO 2	Develop a convolutional neural network for multi-class classification in images	K6
CO 3	Apply Deep Learning algorithm to detect and recognize an object.	K3

CO 4	Apply RNNs to Time Series Forecasting, NLP, Text and Image Classification;	K4
CO 5	Apply Lower-dimensional representation over higher-dimensional data for dimensionality reduction and capture the important features of an object.	K3

Text books:

1. Zurada and Jacek M, "Introduction to Artificial Neural Systems", West Publishing Company, 1992, ISBN: 9780534954604
2. Bishop, C. M. Neural Networks for Pattern Recognition. Oxford University Press. 1995.
3. Simon Haykin, "Neural Networks and Learning Machines" Third Edition
4. Deep Learning", I Goodfellow, Y Bengio and A Courville, 1st Edition 2016
5. Introduction to Machine Learning with Python ", by Andreas C. Müller, Sarah Guido
6. R2. Deep Learning with Python by François Chollet 1st Edition

Reference Books:

1. Aston Zhang, Zachary C. Lipton, Mu Li, and Alexander J. Smola "Dive into Deep Learning", Release 0.17.4
2. Artificial Intelligence: A Modern Approach. Prentice Hall Series in Arti□Russell, S. and Norvig, N. Arti Intelligence. 2003.

NPTEL/ Youtube/ Faculty Video Link:

Unit 1	(371) Lec-1 Introduction to Artificial Neural Networks - YouTube (3) Deep Learning(CS7015): Lec 8.1 Bias and Variance - YouTube (3) Mod-10 Lec-39 Assessing Learnt classifiers; Cross Validation; - YouTube (3) Lec-1 Introduction to Artificial Neural Networks - YouTube (3) Lec-2 Artificial Neuron Model and Linear Regression - YouTube (3) Evaluation and Cross-Validation - YouTube
Unit 2	(3) Lecture 1 | Introduction to Convolutional Neural Networks for Visual Recognition - YouTube (3) Lecture 2 | Image Classification - YouTube (3) Lecture 3 | Loss Functions and Optimization - YouTube (3) Hyperparameter optimization - YouTube (3) Deep Learning(CS7015): Lec 11.3 Convolutional Neural Networks - YouTube
Unit 3	(3) C4W3L09 YOLO Algorithm - YouTube (3) Edge Detection - YouTube (3) Neural Networks - Networks in Networks and 1x1 Convolutions - YouTube
Unit 4	(3) Backpropagation in CNNs - YouTube (3) Deep RNNs and Bi- RNNs - YouTube (3) Deep Learning(CS7015): Lec 13.4 The problem of Exploding and Vanishing Gradients - YouTube (3) Deep Learning(CS7015): Lec 14.2 Long Short Term Memory(LSTM) and Gated Recurrent Units(GRUs) - YouTube
Unit 5	(3) Deep Learning(CS7015): Lec 7.1 Introduction to Autoncoders - YouTube (3) Deep Learning(CS7015): Lec 9.5 Batch Normalization - YouTube (3) Deep Learning(CS7015): Lec 7.3 Regularization in autoencoders (Motivation) - YouTube

B. TECH. THIRD YEAR

Course code	ACSML0603	L T P	Credits
Course title	ADVANCED DATABASE MANAGEMENT SYSTEMS	3 1 0	4

Course objective: This course provides an introduction to the advanced database management system. The course introduces both theoretical (knowledge-based) and practical approaches, illustrate the use of advanced database and tools in a variety of application areas, as well as provide insight into many open research problems.

Pre-requisites: The student should have knowledge of relational database management system (RDBMS) and SQL.

Course Contents / Syllabus

UNIT-I	RELATIONAL DATABASE THEORY AND CONCEPTS	8 Hours

Introduction to relational database, Describe the relational model: Conformity and integrity, Use of constraints, Mapping design approaches to relational systems, Processing database data: Describe advanced SQL programming, Query optimization: Query transformations, Optimization approaches, Use of constraints, Creation and use of a variety of index types. Concurrency control and transaction management: The ACID principle, Two-phase locking and Deadlocks, Recovery and transaction design.

UNIT-II	DISTRIBUTED RELATIONAL DATABASE	8 Hours

Distributed Database: Homogeneous and heterogeneous databases, distributed transactions, Database System Catalogs, Query Processing and Evaluation, Data replication- Synchronous, Asynchronous, The Two-Phase Commit protocol and its weaknesses, concurrency control in distributed databases Implications for cloud storage.

UNIT-III	NoSQL DATABASE	8 Hours

An Overview of NoSQL, Distributed Databases: Sharding and Replication, Consistency, The CAP Theorem, NoSQL Data Models.

MongoDB: An introduction, Getting started, difference between SQL and NoSQL, CRUD operations with MongoDB, Querying, Modifying and Managing NoSQL Data stores, Indexing and ordering datasets (MongoDB). features and different query processing.

UNIT-IV	POST RELATIONAL DATABASE SYSTEM	8 Hours

Advanced Data Types: Time in databases, Object-Oriented Database, Spatial and Geographic databases, Multimedia Databases, Deductive database, Temporal database, Constraint in database, Database and XML, New database applications and architectures: Data warehousing, Multimedia, Mobility, Document-oriented databases.

UNIT-V	DATABASE STANDARDS, SECURITY METHODS AND TECHNIQUES	8 Hours

SQL and NoSQL standards: Use of SQL/NoSQL and standards in the industry, Limitations of standardization, standards for interoperability and integration: Web services, JSON. Data encryption, Redaction and masking techniques, Authentication and Authorization, Database auditing.

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

CO 1	Understand relational database with SQL	K2

CO 2	Understand about the advance relational database	K2
CO 3	Comprehend the concepts of NoSQL for database design and query processing	K4
CO4	Demonstrate and analyze different post relational databases	K3
CO 5	Apply SQL standards, security and protection to the database design for real-world applications	K3

Textbooks:

1) Database System Concepts (sixth edition) 2010, A. Silberschatz, H. Korth and S. Sudarshan,
2) Principles of Database Management: Practical Guide to Storing, Managing and Analyzing Big and Small Data. (2018) W. Lemahieu, S. vanden Broucke and B. Baesens
3) Advanced Database System(2020) , Chhanda Ray, ISBN: 9798691380891

Reference Books:

1) Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems(2017) , ISBN: 978-1449373320
2) The Ultimate Guide from Beginner to Expert - Learn and Master SQL in No Time(2016) P. Adams, ISBN: 978-1540700520

Links:

Unit 1	https://nptel.ac.in/courses/106104135
Unit 2	https://www.coursera.org/lecture/introduction-to-nosql-databases/distributed-databases-Y5y2o
Unit 3	https://www.coursera.org/learn/introduction-to-nosql-databases/home/week/2
Unit 4	https://www.youtube.com/watch?v=meWQLWq7QSE(NPTEL)
Unit 5	http://www.nptelvideos.com/lecture.php?id=6516

B. TECH THIRD YEAR

Course code	ACSE0603	L T P	Credits
Course title	SOFTWARE ENGINEERING	3 0 0	3

Course objective:

"To teach the students all phases of the Software Development Life Cycle(SDLC) and their role in software development through theory as well as practice." Students will be able to apply the scientific knowledge in systematic way to create and build cost effective software solutions.

Pre-requisites: Basic knowledge about software and its types. Basic knowledge of OOPs concepts.

Course Contents / Syllabus

UNIT-I	INTRODUCTION	8 Hours

Introduction: Evolving role of software, Software Characteristics, Software crisis, Silver bullet, Software myths, Software Engineering Phases, Team Software Process (TSP), emergence of software engineering, Software process, project and product, Software Process Models: Waterfall Model, Prototype Model, Spiral Model, Iterative Model, Incremental Model, Agile Methodology: Scrum Sprint, Scrum Team, Scrum Master, Product Owner.

UNIT-II	SOFTWARE REQUIREMENT	8 Hours

Software Requirement Specifications (SRS): Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modelling, Use Case Diagram, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Quality concepts, SQA activities, Formal approaches to SQA; Statistical software quality assurance; CMM, The ISO standard.

UNIT-III	SOFTWARE DESIGN	8 Hours

Software Design: Design principles, the design process; Design concepts: refinement, modularity: Cohesion, Coupling, Effective modular design: Functional independence, Design Heuristics for effective modularity, Software architecture: Function Oriented Design, Object Oriented Design: OOPs concepts-Abstraction, object, classification, inheritance, encapsulation, UML Diagrams-Class Diagram, Interaction diagram, Activity Diagram, control hierarchy: Top-Down and Bottom-Up Design, structural partitioning, software procedure.

UNIT-IV	SOFTWARE TESTING	8 Hours

Software Testing: Testing Objectives, 7 Principals of Testing, Levels of Testing: Unit Testing, System Testing, Integration Testing, User Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Functional Testing(DAO, BO) Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

UNIT-V	PROJECT MAINTENANCE AND MANAGEMENT CONCEPTS	8 Hours

Project management concepts, Planning the software project, Estimation: Software Measurement and Metrics, Various Size Oriented Measures-LOC based, FP based, Halestead's Software Science, Cyclomatic Complexity Measures: Control Flow Graphs, Use-case based, empirical estimation COCOMO- A Heuristic estimation techniques, staffing level estimation, team structures, risk analysis and management. Configuration Management, Software reengineering: reverse engineering, restructuring: forward engineering, Clean Room software engineering. Case Tools, Software Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Need of Maintenance.

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

CO 1	Identify, formulate, analyse, and solve problems, as well as identify the computing requirements appropriate to their solutions. The ability to work in one or more significant application domains	K2, K4, K5
CO 2	Design, implement, and evaluate software-based systems, components, or programs of varying complexity that meet desired needs, satisfy realistic constraints, and demonstrate accepted design and development principles.	K2, K3, K4, K6
CO 3	Apply knowledge of computing, mathematics, science, and engineering appropriate to the discipline, particularly in the modelling and design of software systems and in the analysis of trade-offs inherent in design decisions.	K3, K4
CO 4	Formulate testing strategies for software system, apply various testing techniques such as unit testing, test driven development and functional testing.	K3
CO 5	Understand ability to engage in life-long maintenance and continuing Software development using various software management tools.	K2, K5

Text books:

1. KK Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers 3RDEdition(December 11, 2008)
2. RS Pressman, Software Engineering: A Practitioners Approach, McGraw Hill. 7thEdition.(14-Jan-2022)
3. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.4th Edition.(1 January 2014)

Reference Books:

1. Pankaj Jalote, Software Engineering, Wiley. (1 January 2010)
2. Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication. 2nd Edition. (1 January 2007)
3. Kassem Saleh, "Software Engineering", Cengage Learning. (2009)
4. Ian Summerville, Software Engineering, Addison Wesley. 9th Edition.(29 October 2017)

NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://youtu.be/x-jqSXYE4S4
Unit 2	https://youtu.be/mGkkZoFc-4I
Unit 3	https://youtu.be/sGxgZxwuHzc
Unit 4	https://youtu.be/BNk7vni-1Bo
Unit 5	https://youtu.be/8swQr0kckZI

B. TECH THIRD YEAR

Course code	ACSML0652	L T P	Credit
Course title	DEEP LEARNING LAB	0 0 1	1

Suggested list of Experiments

Sr. No.	Name of Experiment	CO
1	Write a program Print Dimensions of dataset	CO1
2.	Write a program to Calculate of Accuracy Values.	CO1
3.	Write a program to Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.	CO1
4.	Write a program to Compose Matrix Shape and Tensor Shape.	CO2
5.	Write a program to showing Accessing and Manipulation of tensors.	CO2
6.	Write a program to understand the mechanism of practically training a binary classifier.	CO2
7.	Implement with a program showing Access and manipulation of tensors.	CO2
8.	Write a program to show Regression Data Sampling.	CO2
9.	Write a program to Combat Overfitting.	CO1
10.	Write a program Print Dimensions of dataset.	CO2
11.	Write a program to Calculate of Accuracy Values.	CO2
12.	Write a program to Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.	CO1
13.	Write a program to build a simple autoencoder based on a fully-connected layer in Keras.	CO3
14.	Implement Long Short-Term Memory Networks using sample data.	CO1
15.	Write a program showing Automatic Image Captioning with Keras ---Facial Recognition.	CO3

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

CO1	Develop python programs to work on Data sets and Implement Artificial Neural Network Techniques.	K6
CO2	Explore different types of tensor and perform exploratory data analysis on different data sets.	K4
CO3	Apply Automatic Image Captioning with Keras ---Facial Recognition.	K3

B. TECH. THIRD YEAR

Course code	ACSML0653	L T P	Credit
Course title	ADVANCED DATABASE MANAGEMENT SYSTEMS LAB	0 0 2	1

List of Experiments:

Sr. No.	Name of Experiment	CO
1	Basic SQL queries for DDL and DML.	CO1
2	Advance SQL queries for DML and normalization techniques.	CO1
3	Distributed Database for Bookstore	CO2
4	Study of Open Source NOSQL Database: MongoDB (Installation, Basic CRUD operations, Execution)	CO2
5	Design and Develop MongoDB Queries using CRUD operations. (Use CRUD operations, SAVE method, logical operators)	CO2
6	Implement aggregation and indexing with suitable example using MongoDB.	CO2
7	Object Oriented Database – Extended Entity Relationship (EER) model for University Database	CO3
8	Parallel Database – University Counselling for Engineering colleges	CO3
9	Parallel Database – Implementation of Parallel Join & Parallel Sort Algorithm	CO3
10	Active Database – Implementation of Triggers & Assertions for Bank Database	CO3
11	Deductive Database – Constructing Knowledge Database for Kinship Domain (Family Relations)	CO3
12	Designing XML Schema for Company Database	CO3

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

CO 1	Learn and analyze the basic and advanced applications of SQL	K4
CO 2	Learn the various types of databases and apply their advanced applications and where databases are used in industry.	K3
CO 3	Examine the requirements on special databases.	K4

B. TECH THIRD YEAR

Course code	ACSE0653	L T P	Credit
Course title	SOFTWARE ENGINEERING LAB	0 0 2	1

Suggested list of Experiments

Sr. No.	Name of Experiment	CO
1.	Team formation and allotment of Mini project: Problem statement, Literature survey, Requirement analysis.	CO1
2.	Draw the use case diagram: specify the role of each of the actors, Data Flow Diagram (DFD): All levels.	CO2
3.	Design an ER diagram for with multiplicity.	CO2
4.	Prepare a SRS document in line with the IEEE recommended standards.	CO2
5.	Create a Software Design Document (SDD): Object and Class diagram.	CO3
6.	Create Interaction diagram: sequence diagram, collaboration diagram for SDD.	CO3
7.	Create Activity diagram and Component diagram for SDD	CO4
8.	Estimation of Test Coverage Metrics and Structural Complexity.	CO5
9.	Design test suite for equivalence class partitioning.	CO5
10.	Design test cases for Boundary value analysis	CO5
11.	Mini Project with CASE tools.	CO5
12.	Mini Project with CASE tools.	CO4

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

CO1	Develop python programs to work on Data sets and Implement Artificial Neural Network Techniques.	K6
CO2	Explore different types of tensor and perform exploratory data analysis on different data sets.	K4
CO3	Apply Automatic Image Captioning with Keras ---Facial Recognition.	K3

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, Flexdashboard 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 (ELECTIVE-IV)

Course Code	ACSAI0622	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

Text Representation- tokenization, stemming, stop words, TF-IDF, Feature Vector Representation, NER, N-gram modelling, Text Clustering, Text Classification, Topic Modelling-LDA, HDP. Sentiment Classification, feature based opinion mining, comparative sentence, and relational mining, Opinion spam.

UNIT-II	WEB-MINING	8 Hours

Web Search, Data Mining, and Machine Learning for extracting knowledge from the web, Inverted indices and Boolean queries. PLSI, Query optimization, page ranking, Essentials of Social graphs, Social Networks, Models, Information Diffusion in social media.

UNIT-III	MINING SOCIAL MEDIA	8 Hours

Essentials of Social graphs, Social Networks, Models, Information Diffusion in social media, Behavioural Analytics, Influence and Homophily, Recommendation in social media.

UNIT-IV	TEXT SUMMARIZATION	8 Hours

Introduction to Text Summarization, Text Processing, N-gram Frequency Count and Phrase Mining, LDA Topic Modelling, Machine-Learned Classification and Semantic Topic Tagging.

UNIT-V	RECENT TRENDS	8 Hours

Trend Analysis, Types of trend analysis, Recent Trends in Text, Web, and Social Media Analytics, Free social media analytics tools, Facebook Insights, Twitter analytics, Google analytics.

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

CO 1	Design new solutions to opinion extraction, sentiment classification and data summarization problems.	K6
CO 2	Apply a wide range of classification, clustering, estimation and prediction algorithms on web data.	K3
CO 3	Perform 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.	K2
CO 5	Apply state of the art mining tools and libraries on realistic data sets as a basis for business decisions and applications.	K4

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.

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
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 (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	ACSAI0614	L T P	Credits
Course Title	DEVELOPMENT IN SWIFT EXPLORATIONS AND DATA COLLECTIONS	3 0 0	3

Course objective: The objective of this course is to provide the ability to design and develop iOS Apps managing static as well as dynamic data. Also, this course is designed to understand the mindset of developers through app design process: brainstorming, planning, prototyping, and evaluating an app of their own.

Pre-requisites: Basic understanding of Swift and Project Development

Course Contents / Syllabus

UNIT-I	TABLES AND PERSISTENCE	8 Hours

Protocols, App Anatomy and Life Cycle, Model-View-Controller, Scroll Views, Table Views, Intermediate Table Views, Saving Data, System View Controllers, Complex Input Screens

UNIT-II	WORKING WITH THE WEB	8 Hours

Closures, Extensions, Practical Animation, Working with the web: HTTP and URL session; decoding JSON; Concurrency.

UNIT-III	ADVANCED-DATA DISPLAY	8 Hours

Collection Views, Swift Generics, Dynamic Data, Compositional Layout, Advanced Compositional Layout.

UNIT-IV	THE DESIGN LIFE CYCLE	8 Hours

Brainstorm, Plan: define the problem; Create the persona; Create Feature Set, Prototype: Formalize the prototype, Evaluate, Iterate, Create Higher Quality Prototype.

UNIT-V	GUIDED PROJECTS	8 Hours

BouncyBall App, ChatBot, Rock-Paper-Scissors, MemeMaker.

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

CO 1	Expand on the knowledge and skills they developed in Fundamentals by extending their work in iOS app development and create more complex and capable apps.	K1
CO 2	Work with data from a server and analyze new iOS APIs that allow for much richer app experiences.	K4
CO 3	Learn to display large collections of data in multiple formats.	K1
CO 4	Learn how to turn an idea into a concrete app design through brainstorming, planning, iterative prototyping, and user interviews	K1
CO 5	Apply tsshe advanced concepts of Swift and XCode to build the projects	K3

Textbooks:

1) Develop in Swift Data Collections, XCode 12 or Higher, Apple Inc.
2) Develop in Swift Explorations, XCode 12 or Higher, Apple Inc.
Reference Books:
1) Develop in Swift Data Collections, XCode 12 or Higher, Apple Inc.
2) Develop in Swift Explorations, XCode 12 or Higher, Apple Inc.
Links: NPTEL/ Youtube/ Faculty Video Link:
https://youtu.be/g0kOJk4hTnY
https://youtu.be/WK5vrOD1zCQ
https://developer.apple.com/videos/play/wwdc2021/10134/

B. TECH THIRD YEAR (ELECTIVE-IV)

Course code	ACSAI0620	L T P	Credits
Course title	AUGMENTED REALITY AND VIRTUAL REALITY	3 0 0	3

Course objective: The objective of this course is to understand the basics of AR and VR. It will focus on understanding Unreal Engine. The course will cover the top platform for game development and the creation of cutting-edge real-time 3D environments. It will explore the understanding of essential tools driving important fields like VR/AR, training, and architectural visualization.

Pre-requisites: None

Course Contents / Syllabus

UNIT-I	INTRODUCTION TO VIRTUAL REALITY & AUGMENTED REALITY	8 Hours

Introduction to Virtual Reality & Augmented Reality. Difference between VR and AR, History of VR.

Learn the basics - The differences between VR&AVR. Why are these technologies so popular now?, key players in this space, Popular VR & AR Devices? How do we create VR/AR experiences, Benefits of VR-AR, Challenges in VR, AR, and Careers related to VR, AR.

Platforms and Paradigms**:** VR-AR Developer Platforms -Demystifying the jargons- FOV- Degrees of freedom VR, Sensors required for VR devices, Evolution of VR-AR, Learn about the Multidisciplinary stream that combines various techniques to create VR-AR experiences, World of 360^{o} videos.

UNIT-II	VR-AR TECHNOLOGY COMPONENTS, APPLICATIONS	8 Hours

Principles of AR/VR - Immersion, Teleportation, Interaction, Sensors, Haptics, 360-degree view, Motion & Orientation, Accelerometer, Gyroscope, Magnetometer, Depth sensing, Azure Kinect; Challenges – Realistic sense, Nausea, Depth, Non interfering sensors, Ergonomics.

Introduction to Headsets and SW tools required to create VR-AR applications. Basic steps required to create VR-AR experience.

AR, VR Applications, Platforms, Devices – HMD, Smart Glasses, Smart Phone based systems; Intro to Vuforia ; Examples - Gaming, Manufacturing, Oil & Gas, E-Commerce, Entertainment, Facebook, Snapchat, Instagram filters and much more, Education, Training (VMT, Disti), Medical, Fundamental surgery, Military

UNIT-III	UNREAL BASICS, MESH TYPES, INPUTS AND COLLISIONS IN UNREAL ENGINE	8 Hours

Installing Unreal Engine & Account Setup, Unreal Engine Overview and Resources, Editor Interface Overview, Templates & Creating Your First Project, View Modes & Navigation Basics.

Mesh Types, Inputs, and Collisions in Unreal Engine: Importing Meshes Collisions, Mesh Editor & Mesh Types, Greyboxing, Static Mesh vs. Skeletal Meshes and Other Mesh Import Types, Brief Blueprint Basics, View Modes, Snapping, and Hotkeys, Skydomes, Lights (Overview) & Rendering Quality, Rendering & Performance Basics.

UNIT-IV	Lighting and Materials in Unreal	8 Hours

Lighting Overview: Science, Optimization & Measurement, Lighting Design & Terminology, Setting Up Your Scene to Light, Light Types, Use Cases: Static, Stationary & Moveable, Lights Baking Lighting & Lightmap Resolution, Real Time Lighting & Shadows, Lighting Effects: IES / Light Rays / Volumetrics. External: Sun & Sky Actor Location & Time of Day. The Road to Real-Time Raytracing.

Materials in Unreal: Materials Overview, Creating Your First Material, Shading Models, Masks Material Expressions Textures: Texture Map Types. Instances & Master Materials. Material: Parameters & Blueprints, Non-UV Based Material Tools External: Quixel, Substance Designer Workflows. Profiling & Baking Down.

UNIT-V	**Physics, Rigid Simulation and Post-Process Volumes**	**8 Hours**

Physics Content Examples. Physics Bodies: Mass, Gravity. Physics Forces: Motors, Forces, Constraints. Physics Volumes Collisions &Complexity. Introduction to Skeletal Physics & Rag Dolls. PPVs Key Settings, Lens & Film Effects, Tone Mapping, LUTs, Materials for UI, Rendering & Stylization. Visual FX Use Cases & Visual Warping Example.

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

CO 1	Analyze various requirements and capabilities of modern augmented and virtual reality systems.	K4
CO 2	Describe augmented and virtual reality applications to suit a wide variety of needs.	K2
CO 3	Describe the capabilities and limitations of the techniques that make virtual and augmented reality possible.	K2
CO4	Identify audit and logging needs in application development, Describe the background of augmented and virtual reality and apply counter measures.	K1
CO 5	Demonstrate and use emerging technologies and tools for Augmented and Virtual reality analysis to provide the best Application.	K3

Textbooks:

1. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013.
2. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press, 2003/2006.

Reference Books:

1. Jason Jerald. *The VR Book: Human-Centered Design for Virtual Reality*.Morgan& Claypool:2015
2. Jack Donovan. *Mastering Oculus Rift Development*. Packt Publishing:2017
3. Michael Wohl. *A 360 Video Handbook - A step by step guide to creating video for VR*.Michael Wohl:2017

Links:

Unreal Online Learning Courses **Introducing Unreal Engine** Introducing Unreal Engine (https://www.unrealengine.com/en-US/onlinelearning-courses/introducing-unreal-engine)
Lighting in Unreal Engine Lighting Essential Concepts and Effects (https://dev.epicgames.com/community/learning/courses/Xwp/lighting-essential-concepts-and-effects/0ax/lighting-essential-concepts-and-effects-introduction)
Materials Unreal Editor Fundamentals - Materials (https://dev.epicgames.com/community/learning/courses/pm/material-editor-fundamentals-for-game-development/V1X/introduction-to-the-course

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)