NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA, G.B. 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 (CS)

Fourth Year

(Effective from the Session: 2023-24)

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

Bachelor of Technology
Computer Science
EVALUATION SCHEME
SEMESTER - VII

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	ACS0701	Big Data Analytics	3	0	0	30	20	50		100		150	3
2		Departmental Elective-V	3	0	0	30	20	50		100		150	3
3		Open Elective-II	3	0	0	30	20	50		100		150	3
4		Open Elective-III	3	0	0	30	20	50		100		150	3
5	ACS0751	Big Data Analytics Lab	0	0	2				25		25	50	1
6	ACSE0759	Internship Assessment-III	0	0	2				50			50	1
7		MOOCs (For B.Tech. Hons. Degree)											
		GRAND TOTAL										**700**	**14**

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

S. No.	Subject Code	Course Name (Cloud)	University / Industry Partner Name	No of HOURS	Credits
1.	AMC0161	Hands-On Labs in Google Cloud for Networking Engineers	Google	5 hours	0
2.	AMC0155	Cyber security Roles, Processes & Operating System Security	IBM	11 hours	0.5

OR

S. No.	Subject Code	Course Name (Java)	University / Industry Partner Name	No of HOURS	Credits
1	AMC0105	Developing Cloud Apps with Node.js and React	IBM	16 Hours	1
2	AMC0167	Java Servlet Pages (JSPs)	LearnQuest	12 Hours	0.5

OR

S. No.	Subject Code	Course Name (Machine Learning)	University / Industry Partner Name	No of HOURS	Credits
1	AMC0165	Introduction to Computer Vision and Image Processing	IBM	21 hours	1.5
2	AMC0157	Deep Neural Networks with PyTorch	IBM	30 hours	2

PLEASE NOTE:-

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

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

Departmental Electives	Subject Codes	Subject Name	Bucket Name	Branch	Semester
Elective-V	ACSE0712	RPA Implementation	CRM-RPA	CS	7
Elective-V	ACSAI0712	Natural Language Processing	Data Analytics	CS	7
Elective-V	ACSE0713	Web Development using MERN Stack with DevOps	Full Stack Development	CS	7
Elective-V	ACSAI0713	Programming for Data Analytics	Cloud and Big Data	CS	7

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Bachelor of Technology
Computer Science
EVALUATION SCHEME
SEMESTER - VIII

Sl. No.	Subject Codes	Subject Name	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
1		Open Elective-IV	2	0	0	30	20	50		100		150	2
2	ACSE0859	Capstone Project/Industrial Internship	0	0	20					200	350	550	10
3		MOOCs (For B.Tech. Hons. Degree)											
4		**TOTAL**										**700**	**12**

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

S. No.	Subject Code	Course Name (Cloud)	University / Industry Partner Name	No of HOURS	Credits
1.	AMC0190	IoT (Internet of Things) Wireless & Cloud Computing Emerging Technologies	Yonsei University	12 hours	0.5
2.	AMC0183	Cloud Security Basics	University of Minnesota	12 hours	0.5

OR

S. No.	Subject Code	Course Name (Java)	University / Industry Partner Name	No of HOURS	Credits
1	AMC0184	Developing Applications with SQL, Databases, and Django	IBM	14 Hours	1
2	AMC0187	Getting started with Git & Github	IBM	8 Hours	0.5

OR

S. No.	Subject Code	Course Name (Machine Learning)	University / Industry Partner Name	No of HOURS	Credits
1	AMC0181	Building Deep learning Models with TensorFlow	IBM	7 Hours	0.5
2	AMC0177	AI Capstone Project with Deep Learning	IBM	15 Hours	1

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TE: Theory End Semester Exam., PE: Practical End Semester Exam.

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AICTE Guidelines in Model Curriculum:

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

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

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

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

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

B. TECH. FOURTH YEAR			
Course code	**ACS0701**	**L T P**	**Credits**
Course title	**BIG DATA ANALYTICS**	**3 0 0**	**3**

Course objective: To understand the basic concepts of Big Data in the cloud and analyze sample datasets using big data ecosystems.

Pre-requisites: Introduction to LINUX Commands, Java & Python

Course Contents / Syllabus

UNIT-I	Introduction to Big Data	8 HOURS

Types of digital data, history of Big Data innovation, introduction to Big Data platform, drivers for Big Data, Big Data architecture and characteristics, 5 Vs of Big Data, Big Data technology components, Big Data importance and applications, Big Data features – security, compliance, auditing and protection, Big Data privacy and ethics, Big Data Analytics, Challenges of conventional systems, intelligent data analysis, nature of data, analytic processes and tools, analysis vs reporting, modern data analytic tools.

UNIT-II	Hadoop and Map Reduce	8 HOURS

Hadoop: History of Hadoop, Apache Hadoop, the Hadoop Distributed File System, components of Hadoop, data format, analyzing data with Hadoop, scaling out, Hadoop streaming, Hadoop pipes, Hadoop Echo System.

Map Reduce: Map Reduce framework and basics, how Map Reduce works, developing a Map Reduce application, unit tests with MR unit, test data and local tests, anatomy of a Map Reduce job run, failures, job scheduling, shuffle and sort, task execution, Map Reduce types, input formats, output formats, Map Reduce features, Real-world Map Reduce

UNIT-III	Hadoop Architecture	8 HOURS

Hadoop Eco System and YARN: Hadoop ecosystem components, schedulers, fair and capacity, Hadoop 2.0 New Features - NameNode high availability, HDFS federation, MRv2, YARN, Running MRv1 in YARN.

HDFS (Hadoop Distributed File System): Design of HDFS, HDFS concepts, benefits and challenges, file sizes, block sizes and block abstraction in HDFS, data replication, how does HDFS store, read, and write files, Java interfaces to HDFS, command-line interface, Hadoop file system interfaces, data flow, data ingest with Flume and Scoop, Hadoop archives, Hadoop I/O: compression, serialization, Avro and file-based data structures.

UNIT-IV	Hadoop Frameworks	8 HOURS

Hadoop Eco System Frameworks, Applications on Big Data using Pig, Hive, HBase and Zookeeper. Pig - Introduction to PIG, Architecture, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin- Input and output, Relational operators, User defined functions. Working with scripts, Data Processing operators.

Hive - Apache Hive architecture and installation, Hive shell, Hive services, Hive metastore, comparison with traditional databases, HiveQL, tables, querying data and user defined functions, sorting and aggregating, Map Reduce scripts, joins & subqueries.

HBase – Hbase concepts, clients, example, Hbase vs RDBMS, advanced usage, schema design, advance indexing,

Zookeeper – how it helps in monitoring a cluster, how to build applications with Zookeeper.

UNIT-V	**Sqoop, Spark & Scala**	**8 HOURS**

Importing and Handling Relational Data in Hadoop using Sqoop: Relational database management in Hadoop: Bi-directional transfer between Hadoop and external database. Import data- Transfer an entire table, import subset data, use different file formats incremental import new data, incrementally import data, preserving the value.

Sqoop: Export transfer data from Hadoop, update the data, update at the same time, export subset of columns. Hadoop ecosystem integration- import data to hive, using partitioned hive tables, replace special delimiters.

Spark: Installing spark, spark applications, jobs, stages and tasks, Resilient Distributed, Databases, anatomy of a Spark job run, Spark on YARN.

SCALA: Introduction, classes and objects, basic types and operators, built-in control structures, functions and closures, inheritance.

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

CO 1	Identify Big Data and relevance of Big Data Analytics.	K2
CO 2	Analyze Map Reduce and demonstrate its use in features extraction.	K4
CO 3	Explain the YARN and HDFC in Data management	K2
CO 4	Describe Hadoop and Hadoop Eco-System.	K2
CO 5	Evaluate various types of tools in Hadoop by data importing and handling Scenario.	K5

Textbooks:

1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013. 2. Big-Data Black Book, DT Editorial Services, Wily India

2. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012. 5. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.

3. E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012. 7. Lars George, "HBase: The Definitive Guide", O'Reilley, 2011.

Reference Books:

1) Alan Gates, "Programming Pig", O'Reilley, 2011.

2) Big-Data Black Book, DT Editorial Services, Wily India

3) Viktor Mayer-Schonberger, enneth Cukier, Big Data: A Revolution that will transform how we live,work and think.	
LINKS: NPTEL/ Youtube/ Faculty Video Links	
Unit 1	(4) noc19-cs33 Lecture 1-Introduction to Big Data - YouTube
Unit 2	(4) Lecture 26: Map-reduce and Hadoop - YouTube(3) Lecture 2 | Image Classification - YouTube
Unit 3	(4) Hadoop Ecosystem | Big Data Analytics Tools | Hadoop Tutorial | Edureka - YouTube (4) What is HDFS | Hadoop Distributed File System (HDFS) Introduction | Hadoop Training | Edureka - YouTube
Unit 4	(4) Hive Tutorial for Beginners | Hive Architecture | Hadoop Hive Tutorial | Hadoop Training | Edureka - YouTube (4) HBase Tutorial for Beginners | Introduction to Apache HBase | Hadoop Training | Edureka - YouTube (4) Introduction to Hadoop Zookeeper | Edureka - YouTube
Unit 5	(4) Sqoop Tutorial - How To Import Data From RDBMS To HDFS | Sqoop Hadoop Tutorial | Simplilearn - YouTube (4) Java in Spark | Spark-Submit Job with Spark UI Example | Tech Primers - YouTube (4) Java in Spark | Spark-Submit Job with Spark UI Example | Tech Primers - YouTube

B. TECH. THIRD YEAR			
Course code	**ACS0751**	**L T P**	**Credit**
Course title	**BIG DATA ANALYTICS LAB**	**0 0 2**	**1**

Suggested list of Experiments

Sr. No.	Name of Experiment	CO
1	Installation of VMWare to setup the Hadoop environment and its ecosystems.	CO1
2.	i. Perform setting up and Installing Hadoop in its three operating modes. a. Standalone. b. Pseudo distributed. c. Fully distributed. ii. Use web-based tools to monitor your Hadoop setup.	CO1
3.	Implementing the basic commands of LINUX Operating System – File/Directory creation, deletion, update operations.	CO1
4.	Perform various File Management tasks in Hadoop. i. Upload and download a file in HDFS. ii. See contents of a file. iii. Copy a file from source to destination. iv. Copy a file from/To Local file system to HDFS. v. Move file from source to destination. vi. Remove a file or directory in HDFS. vii. Display last few lines of a file viii. Display the aggregate length of a file.	CO1
5.	Implement Word Count Map Reduce program to understand Map Reduce Paradigm	CO1
6.	Implement matrix multiplication with Hadoop Map Reduce	CO1
7.	I. Installation of PIG. ii. Write Pig Latin scripts sort, group, join, project, and filter your data.	CO2
	i. Run the Pig Latin Scripts to find Word Count. ii. Run the Pig Latin Scripts to find a max temp for every year.	CO2
8.	i. Installation of HIVE. ii. Use Hive to create, alter, and drop databases, tables, views, functions, and indexes	CO2
10.	Install Hbase and perform CRUD operations using Hbase Shell.	CO2
11.	Implement Spark Core Processing RDD to run Word Count program.	CO2
12.	Implement Spark Core Processing RDD to read a table stored in a database and calculate the number of people for every age.	CO2
Lab Course Outcome: After completion of this course students will be able to		
CO 1	Develop basic R programs and implement statistical techniques on variety of data.	K6
CO 2	Apply visualization techniques on various data sets and explore different types of data and file formats.	K3

B. TECH FOURTH YEAR

Course code	ACSE0712	L T P	Credits
Course title	RPA IMPLEMENTATION	3 0 0	3

Course objective: This course is designed to give a thorough understanding and practical skills in developing and deploying software robots for Robotic Process Automation (RPA).

Pre-requisites: Basic Knowledge of C Programming

Course Contents / Syllabus

UNIT-I	DATA MANIPULATION	8 HOURS

Introduction to Data Manipulation, Scalar variables, collections and Tables, Text Manipulation, Data Manipulation, Gathering and Assembling Data Recording and Advanced UI Interaction; Recording Introduction, Basic and Desktop Recording, Web Recording, Input/output Methods, Screen Scraping, Data Scraping, Scraping advanced techniques.

UNIT-II	SELECTORS	8 HOURS

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.

UNIT-III	DATA TABLES AND AUTOMATION	8 HOURS

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.

Email Automation: Email Automation, Incoming Email automation, Sending Email automation.

UNIT-IV	DEBUGGING AND EXCEPTION HANDLING	8 HOURS

Debugging Tools, Strategies for solving issues, Catching errors.

Orchestrator: Tenants, Authentication, Users, Roles, Robots, Environments, Queues & Transactions, Schedules.

UNIT-V	ROBOTIC FRAMEWORK	8 HOURS

Re-Framework template, Re-Framework template works, Use Re-Framework to automate your own processes. .NET Classes and Objects.

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

CO 1	Apply basic concepts and methods from design engineering to explore creative solutions of real-world problems.	K3
CO 2	Learn Robotic Process Automation, and massive career opportunity in this field.	K2
CO 3	Implement the knowledge of RPA tools, functions in various industries and perform, control various tasks using RPA bots.	K3
CO4	Gain expertise in Desktop, Web & Citrix Automation and use RE-Framework to build a structured business automation process.	K2
CO 5	Develop a real-world workflow automation project and will be able to debug a workflow.	K6

Textbooks:
1) Vaibhav Jain, “Crisper Learning: For UiPath”, Latest Edition, Independently Published, 2018.
2) Alok Mani Tripathi, “Learning Robotics Process Automation”, Latest Edition, Packt Publishing ltd, Birmingham. March 2018
Reference Books/E-Books:
1) Kelly Wibbenmeyer, “The Simple Implementation Guide to Robotic Process Automation (RPA)”, Latest Edition, iUniverse Press.
2) https://www.uipath.com/hubfs/ebook-its-time-to-automate.pdf
Links:
https://www.youtube.com/watch?v=6QoCG6YIPVo&list=PL41Y-9S9wmyJarNN2KnB4XudpT1yE1kVd
https://www.youtube.com/watch?v=YOHFgrOvPTM&list=PL41Y-9S9wmyLvF6Ou0oPhg6MrFWSw7sn4
https://www.youtube.com/watch?v=QMBuyLMjOhM&list=PL41Y-9S9wmyIYX6kciM8DboVYymsv2y6K
https://www.youtube.com/watch?v=KE9raKNTkfI&list=PL41Y-9S9wmyLeXL1DY9j-XepNb_vg9N8t
https://www.youtube.com/watch?v=2rjr8QhD9oc&list=PL41Y-9S9wmyJi2zmWY77yPZrdVI7ab3Ja

B. TECH FOURTH YEAR

Course code	ACSAI0712	L T P	Credits
Course title	NATURAL LANGUAGE PROCESSING	3 0 0	3

Course objective: The course aims to provide an understanding of the foundational concepts and techniques in NLP. The focus is on providing application-based knowledge.

Pre-requisites: Programming Skills, Data Structures, Algorithms, Probability and Statistics, Machine Learning.

Course Contents / Syllabus

UNIT-I	OVERVIEW OF NATURAL LANGUAGE PROCESSING	8 HOURS

Definition, Applications and emerging trends in NLP, Challenges. Ambiguity.

NLP tasks using NLTK: Tokenization, stemming, lemmatization, stop-word removal, POS tagging, Parsing, Named Entity Recognition, coreference resolution.

UNIT-II	REGULAR EXPRESSIONS	8 HOURS

Data Preprocessing: Using Python - Convert to lower case, handle email-id, HTML tags, URLs, emojis, repeat characters, normalization of data (contractions, standardize) etc.

Vocabulary, corpora, and linguistic resources, Linguistic foundations: Morphology, syntax, semantics and pragmatics, Language models: Unigram, Bigram, N-grams.

UNIT-III	TEXT ANALYSIS AND SIMILARITY	8 HOURS

Text Vectorization: Bag-of-Words model and vector space models, Term Presence, Term Frequency, TF-IDF

Textual Similarity: Cosine similarity, Word Mover's distance, Word embeddings: Word2Vec, GloVe.

UNIT-IV	TEXT CLASSIFICATION & NLP APPLICATIONS	8 HOURS

Text classification: Implement of applications of NLP using text classification- Sentiment Analysis, Topic modelling, Spam detection.

High Level NLP applications: Machine translation: Rule-based and statistical approaches, Text summarization Dialog systems, conversational agents and chatbots.

UNIT-V	ADVANCED NLP TECHNIQUES	8 HOURS

Sequential data, Introduction to sequence models - RNN and LSTM, Attention Mechanism, Transformer, Transformer-based models: BERT, GPT, T5, Introduction to Hugging Face Transformers, Case studies.

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

CO 1	Appreciate the emerging trends and challenges in NLP and perform the basic NLP tasks using some NLP library.	K2
CO 2	Apply regular expressions for data cleaning and understand the fundamental concepts and theories underlying NLP.	K3
CO 3	Extract features and find similarity in text data.	K3

CO4	Implement NLP techniques to design real-world NLP applications	K3
CO 5	Apply advanced techniques like sequential modelling and attention mechanism to develop NLP applications	K3

Textbooks:

1)Daniel Jurafsky, James H. Martin, "Speech and Language Processing", Second Edition, Pearson Education, 2009 ISBN 0131873210.
2)James Allen, Natural Language Understanding, 2nd edition, 1995 Pearson Education ISBN 13: 9780805303346.
3)Akshar Bharti, Vineet Chaitanya and Rajeev Sangal, NLP: A Paninian Perspective,1st edition1995, Prentice ISSBN 9788120309210

Reference Books:

1)Christopher D.Manning and Hinrich Schutze,, "Foundations of Statistical Natural Language Processing" , MIT Press, 1999 Second Edition, ISBN No. 0-262-13360-l.
2)T. Winograd, Language as a Cognitive Process, 1st edition, 1983 Addison- Wesley ISBN 020108-571-2
3)L.M. Ivansca, S. C. Shapiro, Natural Language Processing and Knowledge Representation, 2nd edition, 2000 AAAI Press ISBN-13: 978-0262590211

Links:

1) https://realpython.com/nltk-nlp-python/
2) https://www.coursera.org/lecture/python-text-mining/basic-nlp-tasks-with-nltk-KD8uN
3) https://www.coursera.org/lecture/nlp-sequence-models/learning-word-embeddings-APM5s
4) https://www.coursera.org/projects/regular-expressions-in-python
5) https://www.coursera.org/learn/python-text-mining/lecture/sVe8B/regular-expressions

B.TECH. FOURTH YEAR

Course code	ACSE0713	L T P	Credits
Course title	WEB DEVELOPMENT USING MERN STACK WITH DEVOPS	3 0 0	3

Course objective: This course focuses on how to design and build static as well as dynamic web pages and interactive web applications. Students can understand how to put them together to create a MERN stack application.

Pre-requisites: Basic Knowledge of C Programming

Course Contents / Syllabus

UNIT-I	INTRODUCTION TO REACT JS	8 HOURS

Overview of frameworks, NPM commands, React App, Project Directory Structure, React Component Basic, Understanding JSX, Props and State, Stateless and Stateful Components, Component life cycle, Hooks, react-router vs react-router-dom.

UNIT-II	CONNECTING REACT WITH MONGO DB	8 HOURS

Google Material UI, AppBar, Material UI's Toolbar, NavBar, Material UI Buttons, SQL and Complex Transactions, Dynamic Schema, create Index (), get Indexes () & drop Index (), Replication, Statement-based vs. Binary Replication.

Auto-Sharding and Integrated Caching, Load balancing, Aggregation, scalability.

UNIT-III	NODE JS & EXPRESS FRAMEWORK	8 HOURS

Introduction, Environment Setup, serving static resources, template engine with vash and jade, Connecting Node.js to Database, Mongoose Module, Creating Rest APIs, Express Framework, MVC Pattern, Routing, Cookies and Sessions, HTTP Interaction, User Authentication.

UNIT-IV	EVOLUTION OF DevOps	8 HOURS

DevOps Principles, DevOps Lifecycle, DevOps Tools, and Benefits of DevOps, SDLC (Software Development Life Cycle) models, Lean, ITIL and Agile Methodology, Agile vs DevOps, Process flow of Scrum Methodologies, Project planning, scrum testing, sprint Planning and Release management, Continuous Integration and Delivery pipeline.

UNIT-V	CI/CD CONCEPTS (GITHUB, JENKINS, SONAR)	8 HOURS

GitHub, Introduction to Git, Version control system, Jenkins Introduction, Creating Job in Jenkins, adding plugin in Jenkins, Creating Job with Maven & Git, Integration of Sonar, Dockers, Containers Image: Run, pull, push containers, Container lifecycle, Introduction to Kubernetes.

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

CO 1	Apply the knowledge of ES6 that are vital to implement react application over the web.	K3
CO 2	Implement and understand the impact of web designing by database connectivity with Mongodb.	K3
CO 3	Explain, analyze, and apply the role of server-side scripting languages like Nodejs and Express as a framework	K4
CO4	Identify the benefits of DevOps over other software development processes to Gain insights into the DevOps environment.	K2
CO 5	Demonstrate popular open-source tools with features and associated terminology used to perform Continuous Integration and Continuous Delivery.	K3

Textbooks:

1) Kirupa Chinnathambi, “Learning React”, 2nd Edition 2016, Addison Wesley Publication.
2) Mohan Mehul, “Advanced Web Development with React”, 2nd Edition 2020, BPB Publications.
3) Dhruti Shah, “Comprehensive guide to learn Node.js”, 1st Edition, 2018 BPB Publications.
4) Jennifer Davis, Ryn Daniels, “Effective DevOps: Building, Collaboration, Affinity, and Tooling at Scale”,1st Edition, 2016, O'Reilly Media Publication.
5) John Edward Cooper Berg, “DevOps. Building CI/CD Pipelines with Jenkins, Docker Container, AWS (Amazon Web Services) ECS, JDK 11, Git and Maven 3, Sonar, Nexus”, Kindle Edition,2019, O'Reilly Media Edition.

Reference Books/E-Books:

1) Anthony Accomazzo, Ari Lerner, and Nate Murray, “Fullstack React: The Complete Guide to ReactJS and Friends”, 4th edition, 2020 International Publishing.
2) David Cho, “Full-Stack React, Type Script, and Node: Build cloud-ready web applications using React 17 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,2017 Publishing Limited.
5) Greg Lim,” Beginning Node.js, Express & MongoDB Development, kindle edition,2019 international publishing.
6) Daniel Perkins, “ReactJS Master React.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.

Links:

Unit 1: https://youtu.be/QFaFIcGhPoM?list=PLC3y8-rFHvwgg3vaYJgHGnModB54rxOk3
https://youtu.be/pKd0Rpw7O48
https://youtu.be/TlB_eWDSMt4
https://youtu.be/QFaFIcGhPoM
https://youtu.be/EHTWMpD6S0

Unit 2: https://youtu.be/Kvb0cHWFkdc
https://youtu.be/pQcV5CMara8
https://youtu.be/c3Hz1qUUIyQ
https://youtu.be/Mfp94RjugWQ
https://youtu.be/SyEQLbbSTWg

Unit 3: https://youtu.be/BLl32FvcdVM
https://youtu.be/fCACk9ziarQ
https://youtu.be/YSyFSnisip0
https://youtu.be/7H_QH9nipNs
https://youtu.be/AX1AP83CuK4

Unit 4: https://youtu.be/2N-59wUIPVI
https://youtu.be/hQcFE0RD0cQ
https://youtu.be/UV16BbPcMQk
https://youtu.be/K2OMTp8PKjg
https://youtu.be/fqMOX6JJhGo

Unit 5: https://youtu.be/m0a2CzgLNsc
https://youtu.be/1ji_9scA2C4
https://youtu.be/tuIZok81iLk
https://youtu.be/IluhOk86prA
https://youtu.be/13FpCxCClLY

B.TECH. FOURTH YEAR

Course code	ACSAI0713	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.	K2
CO2	Implement the concept of the R packages.	K3
CO3	Understand the basic concept of the MongoDB.	K2

CO4	Apply the concept of the RNN and tensorflow.	K3
CO5	Evaluate the concept of the keras in deep learning.	K5

Textbooks:

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

1. Learning TensorFlow by Tom Hope, Yehezkel S. Resheff, Itay Lieder O'Reilly Media, Inc.
2. Advanced Deep Learning with TensorFlow 2 and Keras: Apply DL, GANs, VAEs, deep RL, unsupervised learning, object detection and segmentation, and more, 2nd Edition.
3. 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