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
B.Tech in Information Technology (IT) Fourth Year

(Effective from the Session: 2025-26)

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

Bachelor of Technology
Information Technology
EVALUATION SCHEME
SEMESTER -VII

S. No.	Subject Codes	Subject Name	Type of Subject	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	ACSE0701	Computer Vision	Mandatory	3	0	0	30	20	50		100		150	3
2		Departmental Elective-V	Departmental Elective	3	0	0	30	20	50		100		150	3
3		Open Elective-II	Open Elective	3	0	0	30	20	50		100		150	3
4		Open Elective-III	Open Elective	3	0	0	30	20	50		100		150	3
5	ACSE0751	Computer Vision Lab	Mandatory	0	0	2				25		25	50	1
6	ACSE0759	Internship Assessment-III	Mandatory	0	0	2				50			50	1
		*Massive Open Online Courses (For B.Tech. Hons. Degree)	*MOOCs											
		TOTAL											**700**	**14**

*** List of Recommended MOOCs (Massive Open Online Courses) for Forth Year B. Tech Students (Semester-VII)**

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	AMC0241	Data Analytics	Infosys Wingspan (Infosys Springboard)	26h 1m	2
2	AMC0299	Scrum In Practice	Infosys Wingspan (Infosys Springboard)	26h 30m	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, CE: Core Elective,OE:Open Elective, DE: Departmental Elective, CA: Compulsory Audit, MOOCs: Massive Open Online Courses.

List of Departmental Electives

Subject Codes	Subject Name	Type of Subject	Bucket Name	Branch	Semester
ACSE0712	RPA Implementation	Departmental Elective-V	CRM-RPA	IT	7
ACSAI0712	Natural Language Processing	Departmental Elective-V	AI/ML	IT	7
ACSE0713	Web Development using MERN Stack with DevOps	Departmental Elective-V	Full Stack Development	IT	7
ACSAI0713	Programming for Data Analytics	Departmental Elective-V	Cloud Computing	IT	7

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S. No.	Subject Codes	Subject Name	Type of Subject	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1		Open Elective-IV	Open Elective	2	0	0	30	20	50		100		150	2
2	ACSE0859/ ACSE0858	Capstone Project/Industrial Internship	Mandatory	0	0	20				200		300	500	10
		*Massive Open Online Courses (For B.Tech. Hons. Degree)	*MOOCs											
		TOTAL											**650**	**12**

*** List of Recommended MOOCs (Massive Open Online Courses) for Forth Year B. Tech Students (Semester-VII)**

S.No.	Subject Code	Course Name	University/Industry Partner Name	No. of Hours	Credit
1	AMC0300	Fundamentals of Routing	Infosys Wingspan (Infosys Springboard)	83h 30m	4
2	AMC0301	Mobile App Development using Flutter	Infosys Wingspan (Infosys Springboard)	44h 37m	3.5

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, CE: Core Elective,OE:Open Elective, DE: Departmental Elective, CA: Compulsory Audit, MOOCs: Massive Open Online Courses.

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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		
Subject Code: ACSE0701		**L T P** **3 0 0**
Subject Name: Computer Vision		**Credits** **3**
Course Objective: To learn about key features of Computer Vision, design, implement and provide continuous improvement in the accuracy and outcomes of various datasets with more reliable and concise analysis results.		
Pre- requisites: Basic Knowledge of programming language Python/ Advanced Python features/ Libraries/		
Course Contents/Syllabus		
Unit -1	**Introduction to Computer Vision** Computer Vision, Research and Applications, (Self-Driving Cars, Facial Recognition, Augmented & Mixed Reality, Healthcare). Most popular examples Categorization of Images, Object Detection, Observation of Moving Objects, Retrieval of Images Based on Their Contents, Computer Vision Tasks classification, object detection, Instance segmentation. Convolutional Neural Networks, Evolution of CNN Architectures for Image, Recent CNN	**8 Hours**
Unit -2	**Architectures** Representation of a Three-Dimensional Moving Scene. Convolutional layers, pooling layers, and padding. Transfer learning and pre-trained models Architectures. Architectures Design: LeNet-5, AlexNet, VGGNet, GoogLeNet, ResNet, Efficient Net, Mobile Net, RNN Introduction.	**8 Hours**
Unit -3	**Segmentation** Popular Image Segmentation Architectures, FCN Architecture, Upsampling Methods, Pixel Transformations, Geometric Operations, Spatial Operations in Image Processing, Instance Segmentation, Localisation, Object detection and image segmentation using CNNs, LSTM and GRU's. Vision Models, Vision Languages, Quality Analysis, Visual Dialogue, Active Contours & Application, Split & Merge, Mean Shift & Mode Finding, Normalized Cuts.	**8 Hours**
Unit -4	**Object Detection** Object Detection and Sliding Windows, R-CNN, Fast R-CNN, Object Recognition, 3-D vision and Geometry, Digital Watermarking. Object Detection, face recognition instance Recognition, Category Recognition Objects, Scenes, Activities, Object classification.	**8 Hours**
Unit -5	**Visualization and Generative Models** Benefits of Interpretability, Fashion MNIST, Class Activation, Map code walkthrough, GradCAM,ZFNet. Introduction about Deep Generative Models, Generative Adversarial Networks Combination VAE and GAN's, other VAE and GAN's deep generative models. GAN Improvements, Deep Generative Models across multiple domains,Deep Generative Models image and video applications.	**8 Hours**
Course Outcomes –		

CO1	Analyse knowledge of deep architectures used for solving various Vision and Pattern Association tasks.	K4
CO2	Develop appropriate learning rules for each of the architectures of perceptron and learn about different factors of back propagation.	K3
CO3	Deploy training algorithm for pattern association with the help of memory network.	K5
CO4	Design and deploy the models of deep learning with the help of use cases.	K5
CO5	Understand, Analyse different theories of deep learning using neural networks.	K4

Text Books:

1. "Introductory Techniques for 3D Computer Vision", edition 2009
2. Szelisk Richard, "Computer Vision: Algorithms and Applications", 2022, The University of Washington Edition, 2022
3. Forsyth D. and Ponce J., "Computer Vision - A Modern Approach", Prentice Hall,, Edition 2015
4. Trucco E. and Verri A., "Introductory Techniques for 3D Computer Vision", Prentice Hall.
5. Davies E. R., "Computer & Machine Vision", Academic Press 4th Edition 2012
6. Simon J. D. Prince, "Computer Vision: Models, Learning, and Inference", Cambridge University Press Edition, 2012

Reference Books:

1. Forsyth D. and Ponce J., "Computer Vision: A Modern Approach", Prentice Hall, 2nd edition, 2015
2. "Prince, Simon J.D. "Computer Vision: Models, Learning, And Inference". Cambridge University Press, 1st Edition, 2012.
3. Ballard D. H., Brown C. M., "Computer Vision", Prentice-Hall, 2008.
4. Craig Alan B., "Understanding Augmented Reality, Concepts and Applications", Morgan Kaufmann, Edition 2013
5. Richard Szeliski, "Computer Vision: Algorithms and Applications (CVAA)", Springer edition, 2022

Links: NPTEL/You Tube/Web Link

https://nptel.ac.in/courses/106/105/106105216/
https://onlinecourses.nptel.ac.in/noc23_ee78/preview/

https://nptel.ac.in/courses/106/106/106106224/
https://nptel.ac.in/courses/108103174/

https://nptel.ac.in/courses/106/106/106106224/ 2023
https://onlinecourses.nptel.ac.in/

B.TECH FOURTH YEAR		
Subject Code:ACSE0751		**L T P** **0 0 2**
Subject Name: Computer Vision Lab		**Credits 1**
Course Objective: Through practical programming exercises, students will deepen their understanding CNN, Segmentation, Image Compression based models. They will be exposed to various practical considerations, using autoencoders. Study of various advanced topics which are crucial for making deep learning systems perform well in practice.		
Course outcome: After completion of this practical, students will be able to :		
CO 1	Implement a various convolutional neural network and understand its architecture.	K3
CO 2	Apply image Modelling acquisition, Segmentation and develop a programming model to implement an Image morphological features.	K3
CO 3	Understand Visualization of various models and Deep GAN Networks .	K2
List of Practical		
Lab No.	**Program Logic Building**	**CO Mapping**
1	Building a simple convolutional neural network for spam classification.	CO1
2	Building a simple convolutional neural network for image classification.	CO1
3	Implementing different types of pooling layers and comparing their effects on network performance.	CO2
4	Training a CNN model on a large-scale image classification dataset using cloud-based GPU acceleration.	CO1
5	Building a simple convolutional neural network for Cats-v-dogs classification	CO1
6	Fine-tuning a pre-trained CNN for a specific image recognition task.	CO1
7	Building a simple convolutional neural network for transfer learning using finetuning.	CO1
8	Building a simple convolutional neural network for transfer learning using feature extraction.	CO1
9	Building a CNN model for object detection using a pre-trained architecture like YOLO.	CO1
10	Exploring different activation functions and comparing their effects on network performance.	CO1
11	Write a program to Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.	CO1
12	Implement a program for basic image operations.	CO2
13	Implement a program for image enhancement	CO2
14	Implement a program for image compression	CO2

15	Implement a program for color image processing	CO2
16	Implement a program for image segmentation	CO2
17	Design a program for image morphology	CO2
18	Implementing De-noising auto encoder.	CO2
19	Implementing Deep auto encoder.	CO2
20	Implementing convolutional auto encoder.	CO2
21	Implementing feature extraction for classification using auto encoder.	CO3
22	Implementing feature extraction for regression using auto encoder.	CO3
27	Perform scaling, rotation and shifting operations on an image using OpenCV()	CO3
28	Perform image reflection on an image using OpenCV().	CO3
23	Implementing a basic Variational Autoencoder (VAE) for image generation	CO3
24	Training a Generative Adversarial Network (GAN) to generate synthetic images.	CO3
25	Implement and apply using Image Restoration	CO3
26	Implement and apply using Edge detection	CO3
29	Perform Image shearing on an image using OpenCV().	CO3
30	Write a function for all the geometric transformations and apply it to any image	CO3
Links:		
https://nptel.ac.in/courses/106/105/106105216/ 2023 https://onlinecourses.nptel.ac.in/noc23_ee78/preview/		
https://nptel.ac.in/courses/106/106/106106224/ https://nptel.ac.in/courses/108103174/		
https://nptel.ac.in/courses/106/106/106106224/ 2023 https://onlinecourses.nptel.ac.in/		

B.TECH FOURTHYEAR		
Subject Code: ACSE0712		**L T P** **3 0 0**
Subject Name: RPA Implementation		**Credits** **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-1	**Data Manipulation:** 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	**8 Hours**
Unit-2	**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	**8 Hours**
Unit-3	**Data Tables and Automation:** 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	**8 Hours**
Unit-4	**Debugging and Exception Handling:** Debugging Tools, Strategies for solving issues, Catching errors. Orchestrator: Tenants, Authentication, Users, Roles, Robots, Environments, Queues & Transactions, Schedules	**8 Hours**
Unit-5	**Robotic Framework:** Re-Framework template, Re-Framework template works, Use Re-Framework to automate your own processes. .NET Classes and Objects	**8 Hours**
Course Outcomes:		
CO1	Apply the concepts and methods for data manipulation.	K3
CO2	Learn basic implementation of Selectors.	K2
CO3	Implement the knowledge of RPA tools, and functions in various industries	K4
CO4	Gain expertise in Desktop, Web & Citrix Automation and use RE-Framework to build a structured business automation process.	K2
CO5	Develop a real-world workflow automation project and will be able to debug a workflow.	K5
Textbooks:		
1. Jain Vaibhav, “Crisper Learning: For UiPath”, Latest Edition, Independently Published, 2018.		
2. Tripathi Alok Mani, “Learning Robotics Process Automation”, Latest Edition, Packt Publishing ltd, Birmingham. March 2018		
Reference Books/E-Books:		

1. Wibbenmeyer Kelly, “The Simple Implementation Guide to Robotic Process Automation (RPA)”, Latest Edition, iUniverse Press, 2018.
2. https://www.uipath.com/hubfs/ebook-its-time-to-automate.pdf
Links: NPTEL/You Tube/Web Link
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 VII Semester		
Subject Code: ACSAI0712		**L T P** **3 0 0**
Subject Name: Natural Language Processing		**Credits** **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-1	**Overview of Natural Language Processing** 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.	**8 Hours**
Unit-2	**Regular Expressions** Data Preprocessing: 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.	**8 Hours**
Unit-3	**Text Analysis and Similarity** 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.	**8 Hours**
Unit-4	**Text Classification & NLP Applications** 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.	**8 Hours**
Unit-5	**Advanced NLP Techniques** 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.	**8 Hours**
Course outcome: After completion of this course students will be able to:		
CO 1	Discuss 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	K4

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:

https://realpython.com/nltk-nlp-python/

https://www.coursera.org/lecture/python-text-mining/basic-nlp-tasks-with-nltk-KD8uN

https://www.coursera.org/lecture/nlp-sequence-models/learning-word-embeddings-APM5s

https://www.coursera.org/projects/regular-expressions-in-python

https://www.coursera.org/learn/python-text-mining/lecture/sVe8B/regular-expressions

B.TECH FOURTHYEAR	
Subject Code: ACSE0713	**L T P** **3 0 0**
Subject Name:Web Development using MERN Stack with DevOps	**Credits** **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: Student should have the knowledge of HTML, CSS and ES6

Course Contents/Syllabus

Unit-1	**Introduction to React JS:** 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,	**8 Hours**
Unit-2	**Connecting React with mongodB:** 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.	**8 Hours**
Unit-3	**Node js & Express Framework:** 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	**8 Hours**
Unit-4	**Evolution of DevOps:** 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.	**8 Hours**
Unit-5	**CI/CD concepts (GitHub, Jenkins, Sonar):** 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.	**8 Hours**

Course Outcomes –

CO1	Apply the knowledge of ES6 that are vital to implement react application over the web.	K3
CO2	Implement and understand the impact of web designing by database connectivity with Mongodb .	K3
CO3	Explain, analyze and apply the role of server-side scripting language like Nodejs and Express js framework	K4
CO4	Identify the benefits of DevOps over other software development processes to Gain insights into the DevOps environment.	K2
CO5	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:

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: NPTEL/You Tube/Web Link:

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

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

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

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

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

B. Tech.- B. Tech Fourth Year VII Semester	
Course Code: ACSAI0713	**L T P** **3 0 0**
Course Title: Programming for Data Analytics	**Credits** **3**

Course objective: This course aims to equip students with the knowledge of statistical data analysis techniques relevant to business decision-making, empowering them to apply Data Science principles in analyzing and resolving business problems. By the end of the course, students will be well-prepared to make informed decisions in a data-driven business landscape.

Pre-requisites: Basic Knowledge of Python and R

Course Contents / Syllabus

Unit-1	**Basic Data Analysis Using Python/R** 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.	**8 Hours**
Unit-2	**R Graphical User Interfaces** 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.	**8 Hours**
Unit-3	**Data Engineering Foundation** 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.	**8 Hours**
Unit-4	**Introduction to Tensor Flow And AI** Introduction, Using TensorFlow for AI Systems, Up and Running with TensorFlow, Understanding TensorFlow Basics, Convolutional Neural Networks, Working with Text and Sequences, and Tensor Board 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.	**8 Hours**
Unit-5	**Deep Learning with Keras** 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.	**8 Hours**

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.	K5

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:

https://www.ibm.com/cloud/blog/python-vs-r

https://www.youtube.com/watch?v=C5R5SdYzQBI

https://hevodata.com/learn/data-engineering-and-data-engineers/

https://www.youtube.com/watch?v=IjEZmH7byZQ

https://www.youtube.com/watch?v=pWp3PhYI-OU