NOIDA INSTITUTE OF ENGINEERING AND 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

B.Tech in Computer Science & Engineering (CSE)

Fourth Year

(Effective from the Session: 2026-27)

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute)

B. TECH (CSE)
Evaluation Scheme
SEMESTER VII

Sl. No.	Subject Codes	Subject Name	Type of Subject	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
COMPULSORY INDUCTION PROGRAM														
1	BCSE0701	Computer Vision	Mandatory	3	0	0	30	20	50		100		150	3
2		Departmental Elective-V	Deprtmental 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	BCSE0751	Computer Vision Lab	Mandatory	0	0	2				25		25	50	1
6	BCSE0759	Summer Internship Assessment	Mandatory	0	0	2				50			50	1
7	BCSE0758	Capstone Project - I	Mandatory	0	0	4				50		50	100	2
8		MOOCs (For B.Tech. Hons. Degree)	*MOOCs											
		TOTAL		**12**	**0**	**8**	**120**	**80**	**200**	**125**	**400**	**75**	**800**	**16**

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 MOOCs Based Recommended Courses for Fourth year B. Tech Students**

S. No.	Subject Code	Course Name	University/ Industry Partner Name	N. of Hours	Credits
1.	BMC0111	Deep Learning for Devlopers	Infosys Wingspan (Infosys Springboard)	34h 51m	2.5
2.	BMC0138	Spring Boot and Angular-React Stack-DevOps Tools and Capstone Project	Infosys Wingspan (Infosys Springboard)	107h 50m	4
3.	BMC0143	Continuous Integration and Delivery - DevOps	Infosys Wingspan (Infosys Springboard)	46h 41m	3.5
4.	BMC0113	Certificate Program in Deep Learning/NLP/Artificial Intelligence	NASSCOM	30h	2
5.	BMC0126	TechA Computer Vision Certificate	Infosys Wingspan (Infosys Springboard)	18h 20m	1

List of Department Elective

S.No.	Subject Code	Subject Name	Bucket Name	Semester
1	BCSAI0712	Natural Language Processing	AIML	VII
2	BCSE0713	Web Development using MERN STACK with DevOps	Full stack Development	VII
3	BCSE0712	RPA Implementation	CRM/RPA	VII
4	BCSAI0714	Cloud Security	Cloud Computing	VII

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA

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B. TECH (CSE)

Evaluation Scheme

SEMESTER VIII

Sl. 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		50		100	2
2	BCSE0858/ BCSE0859	Capstone Project - II / Industrial Internship	Mandatory	0	0	16				200		200	400	8
		MOOCs (For B.Tech. Hons. Degree)	*MOOCs											
		TOTAL		**2**	**0**	**16**	**30**	**20**	**50**	**200**	**50**	**200**	**500**	**10**
Mini Project or Internship (3-4 weeks) shall be conducted during summer break after VI semester and will be assessed during VII semester														

*** List of MOOCs Based Recommended Courses for Fourth year B. Tech Students**

S. No.	Subject Code	Course Name	University/ Industry Partner Name	N. of Hours	Credits
1.	BMC0158	Building Apps Powered by Generative AI	NASSCOM	30h	2
2.	BMC0109	Mobile App Development using Flutter	Infosys Wingspan (Infosys Springboard)	44h 37m	3.5
3.	BMC0159	Angular	Infosys Wingspan (Infosys Springboard)	36h 43m	3
4.	BMC0160	Decision Trees using Python	Infosys Wingspan (Infosys Springboard)	10h 47m	0.5
5.	BMC0161	Azure Devops	Infosys Wingspan (Infosys Springboard)	14h 6m	1

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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 Infosys Springboard/NASSCOM/CISCO (as applicable) 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 Infosys Springboard/NASSCOM/CISCO (as applicable) 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

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

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School of Computer Science & Information Technology

Course Code: BCSE0701	**Course Name: Computer Vision**	**L**	**T**	**P**	**C**
Course Offered in: CSE/CSE(R)/IT		3	1	0	4

Pre-requisite: Basic Knowledge of programming language Python/ Advanced Python features/ Libraries/

Course Objectives: 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.

Course Outcome: After completion of the course, the student will be able to		**Bloom's Knowledge Level (KL**
CO1	Classify knowledge of deep architectures used for solving various Vision and Pattern Association Tasks	**K2**
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**

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	3	3	2	2	2	-	-	1	-	-	1	1	2	2	3
CO2	3	3	3	3	2	3	-	-	1	-	-	2	2	3	2	2
CO3	3	3	3	2	3	2	-	-	1	1	1	2	2	3	3	3
C04	3	3	3	3	3	2	-	2	2	1	1	2	3	3	3	3
CO5	3	3	2	3	3	3	1	1	2	1	-	2	3	3	3	3

Course Contents/ Syllabus

Module 1	**Computer Vision FOUNDATIONS**	**8 hours**

Computer Vision, Research and Applications, Geometric primitives and transformations - Photometric image formation, The digital **Smart Cameras** camera - Point operators - Linear filtering, Digital Image fundamentals, Image Sensing and acquisition, Sampling and Quantization, Image formation models, OpenCV Basics, Edge Detection (Sobal, Canny) ,Most popular examples Categorization of Images, Retrieval of Images Based on Their Contents, Computer Vision Tasks classification.

Module 2	**Architectures**	**10 hours**

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.

Module 3	**Segmentation**	**8 hours**

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.		
Module 4	**Object Detection**	**8 hours**
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, Object classification. R-CNN, F-RCN, SSD, Retinanet, YOLO, CornerNet, Image Segmentation- U-Net, SegNet, Mask-RCNN, Attention Models- Vision Transformers.		
Module 5	**Visualization and Generative Models**	**8 hours**
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. Case Study: Computer Vision based Mouse, Computer Vision based Text Scanner, Computer Vision based Smart Selfie, Surveillance Robot, Sixth Sense Robot, IoT-enabled assistive devices, **S**urveillance Robots **or** Smart CCTV.		
	Total Lecture Hours	**42 hours**

Textbook:

S. No		
1.	"Introductory Techniques for 3D Computer Vision", edition 2009	William Stallings and Lawrie Brown
2	"Computer Vision: Algorithms and Applications", 2022, The University of Washington Edition, 2022	Szelisk Richard
3	"Computer Vision - A Modern Approach", Prentice Hall,, Edition 2015	Forsyth D. and Ponce J.,
4	"Introductory Techniques for 3D Computer Vision", Prentice Hall.	Trucco E. and Verri A.,
5	"Computer & Machine Vision", Academic Press 4th Edition 2012	Davies E. R.,
6	"Computer Vision: Models, Learning, and Inference", Cambridge University Press Edition, 2012	Simon J. D. Prince,

Reference Books:

S.No	**Book Title**.	**Author**
1.	"Computer Vision: A Modern Approach", Prentice Hall, 2nd edition, 2015	Forsyth D. and Ponce J.,
2	"Computer Vision: Models, Learning, And Inference". Cambridge University Press, 1st Edition, 2012.	"Prince, Simon J.D.
3	"Computer Vision", Prentice-Hall, 2008.	Ballard D. H., Brown C. M
4	"Understanding Augmented Reality, Concepts and Applications", Morgan Kaufmann, Edition 2013	Craig Alan B
5	"Computer Vision: Algorithms and Applications (CVAA)", Springer edition, 2022	Richard Szeliski

Self Study Content Link:		**Hours**
MOOCs	NPTEL Computer Vision Course https://nptel.ac.in/courses/106106224?	**80 Hrs**
	Coursera Deep Learning for Computer Vision https://www.coursera.org/learn/deep-learning-computer-vision?	**20 Hrs**
Video Lectures	OpenCV Tutorial for Beginners https://www.youtube.com/watch?v=oXlwWbU8l2o	**3 Hrs**
	CNN and Object Detection Tutorial https://www.youtube.com/watch?v=pj9-rr1wDhM	**3 Hrs**

	YOLO Object Detection Explained https://www.youtube.com/watch?v=MPU2HistivI	**2 Hrs**
Web References	TensorFlow Computer Vision Tutorials https://www.tensorflow.org/tutorials/images? PyTorch Vision Tutorials	

Mode of Evaluation

CIE							ESE	Total
ST1	**ST2**	**ST3**	**TA1**	**TA2**	**TA3**	**Attendance**		
			10	**10**	**10**	**10**		
30			**20**				**100**	**150**

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School of Computer Science & Information Technology

Course Code: BCSE0751	**Course Name:** Computer Vision Lab	**L**	**T**	**P**	**C**
Course Offered in: CSE/CSE(R)/IT		**0**	**0**	**4**	**2**

Pre-requisite: Python , Machine Learning

Course Objectives:

The objective of this course is to provide practical knowledge of designing, training, and evaluating CNN models for image classification, object detection, and transfer learning applications. It aims to develop skills in digital image processing techniques such as enhancement, segmentation, compression, restoration, and color processing.

Course Outcome: After completion of the course, the student will be able to		**Bloom's Level**
CO1	Apply, implement, train, and evaluate deep learning models based on Artificial Neural Networks (ANNs) and Convolutional Neural Networks (CNNs) for classification, object detection, and transfer learning tasks.	K3
CO2	Apply image processing techniques for image enhancement, segmentation, morphology, compression, restoration, and color image analysis using appropriate software tools and libraries.	K3
CO3	Evaluate and analyze advanced deep learning architectures, including Autoencoders, Variational Autoencoders (VAEs), and Generative Adversarial Networks (GANs), for feature extraction, image transformation, and image generation applications.	K5

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	2	2	1	3	–	–	–	–	–	–	1	3	1	3	3
CO2	3	3	2	2	3	–	–	–	–	–	–	–	3	1	2	3
CO3	3	3	3	2	3	–	–	–	2	–	–	1	3	–	3	3

Course Contents / Syllabus

Total Hours:30 hrs

Lab No.	**Title of Program**	**CO**
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.	Building a simple convolutional neural network for spam classification.	CO1
15.	Implement a program for image compression	CO2
16.	Implement a program for color image processing	CO2
17.	Implement a program for image segmentation	CO2
18.	Design a program for image morphology	CO2
19.	Implementing De-noising auto encoder.	CO2
20.	Implementing Deep auto encoder.	CO2
21.	Implementing convolutional auto encoder.	CO2
22.	Implementing feature extraction for classification using auto encoder.	CO3
23.	Implementing feature extraction for regression using auto encoder.	CO3
24.	Perform scaling, rotation and shifting operations on an image using OpenCV()	CO3
25.	Perform image reflection on an image using OpenCV().	CO3
26.	Implementing a basic Variational Autoencoder (VAE) for image generation	CO3
27.	Training a Generative Adversarial Network (GAN) to generate synthetic images.	CO3
28.	Implement and apply using Image Restoration	CO3
29.	Implement and apply using Edge detection	CO3
30.	Implement a program for color image processing	CO2

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Course Code: BCSAI0712	**Course Name:** Natural Language Processing	**L**	**T**	**P**	**C**
Course Offered in: CSE/CSE(R)/IT/M.Tech Int. (CSE)		**3**	**0**	**0**	**3**

Pre-requisite: Machine learning, formal languages, Data Structures, Algorithms Probability and Statistics

Course Objectives:

The goal of natural language processing (NLP) is to design and build computer systems that are able to analyze natural languages like English, and that generate their outputs in a natural language

Course Outcome: After completion of the course, the student will be able to		**Bloom's Knowledge Level (KL)**
CO1	Understand and explain the fundamentals of Natural Language Processing	**K2**
CO2	Apply text vectorization and similarity techniques	**K3**
CO3	Analyze text analytics methods	**K4**
CO4	Demonstrate knowledge of sequential models and transformer architectures	**K3**
CO5	Evaluate real-world NLP applications	**K5**

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO2**	**PSO3**
CO1	3	3	1	1	2	-	-	-	1	1	-	1	3	–	2
CO2	3	3	2	2	3	-	-	-	1	1	-	-	3	–	2
CO3	3	3	2	3	3	1	-	-	1	2	1	1	3	–	2
CO4	3	2	3	2	3	1	-	-	1	2	1	1	3	–	3
CO5	3	3	3	2	3	2	1	1	1	2	1	1	3	1	3

Course Contents/ Syllabus

Module 1	**Introduction to 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.

Module 2	**Text Vectorization and Similarity**	**8 hours**

Text Vectorization: Bag-of-Words model, N-Gram Models and vector space models, Term Presence, TF-IDF Textual Similarity: Cosine similarity, Word Mover's distance, Word embeddings: Word2Vec, GloVe.

Module 3	**Text Analytics**	**8 hours**

Text classification, Sentiment Analysis, Topic modelling, LSA, LDA, Opinion Mining, Information Extraction, Information Retrieval.

Module 4	**Sequential Modelling and Transformers**	**8 hours**

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

Module 5	**Applications and Case Studies**	**8 hours**

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

Automatic Document Separation: A Combination of Probabilistic Classification and Finite-State Sequence Modelling: Introduction, Related Work, Data Preparation, Document Separation as a Sequence Mapping Problem, Results.

Total Lecture Hours	**40 hours**

Textbook:

S. No	Book Title	Author
1.	Speech and Language Processing, 3rd Edition, Pearson Education, 2008	Daniel Jurafsky, James H.Martin
2.	Deep Learning for Natural Language Processing, 1st Edition, Apress, 2018Cryptography and Network	Palash Goyal, Sumit Pandey, Karan Jain

Reference Books:

S. No	Book Title	Author
1.	Natural Language Understanding, 2nd Edition, Pearson, 1995	James Allen
2.	Neural Network Methods for Natural Language Processing, 1st Edition, Morgan & Claypool Publishers, 2017	JYaov Goldeberg

Self Study Content Link:

MOOCs	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_cs45 https://www.coursera.org/specializations/deep-learning?utm_medium=sem&utm_source=gg&utm_campaign=b2c_india_deep-learning_deeplearning-ai_ftcof_specializations_cx_dr_bau_gg_pmax_pr_in_all_m_hyb_24-01_desktop&campaignid=20920191021&adgroupid=&device=c&keyword=&matchtype=&network=x&devicemodel=&creativeid=&assetgroupid=6487004747&targetid=&extensionid=&placement=&gad_source=1&gad_campaignid=20930155807&gbraid=0AAAADdKX6Z3pSpwkoWShwEGojAlPVNXW&gclid=Cj0KCQjw3K7RBhDJARIsAKRtP5QRJj8-PsTe1razzbMavqCMSxjvO9s1VAm6-uBOUoSqHvjEGVV0wJcaAgNHEALw_wcB	**12 Weeks** **40 hrs**
Video Lectures	https://www.youtube.com/watch?v=XRpJMxLaLeA&list=PLZ2ps__7DhBY8Mbke8rzGsACDQlIOcCqH https://www.youtube.com/watch?v=AfVhsg9jJNA&list=PLtCBuHKmdxOefxJhd6u8KY9vTN8G5D5yG&index=31	**30 hrs** **8 hrs**
Web References	https://huggingface.co/docs https://www.nltk.org	

Mode of Evaluation

CIE							ESE	Total
ST1	ST2	ST3	TA1 10	TA2 10	TA3 10	Attendance 10		
30			20				100	150

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GREATER NOIDA-201306

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School of Computer Science & Information Technology

Course Code: BCSE0713	**Course Name: Web Development using MERN STACK with Devops**	**L**	**T**	**P**	**C**
Course Offered in: CSE/CSE(R)/IT/M.Tech Int. (CSE)		**3**	**0**	**0**	**3**

Pre-requisite: Basic knowledge of HTML, CSS, JavaScript, and fundamental programming concepts in any language.

Course Objectives: This course aims to equip students with practical skills in building dynamic full-stack applications using React, Node.js, Express, and MongoDB. It also introduces DevOps principles, Agile methodologies, and CI/CD automation using tools like GitHub, Jenkins, Docker, and Kubernetes.

Course Outcome: After completion of the course, the student will be able to		Bloom's Knowledge Level (KL)
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	Apply the benefits of DevOps over other software development processes to Gain insights into the DevOps environment.	**K4**
CO5	Demonstrate popular open-source tools with features and associated terminology used to perform Continuous Integration and Continuous Delivery.	**K3**

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	2	3	1	3	1	1	-	1	-	2	1	2	2	3	1
CO2	3	2	3	1	3	1	1	-	1	-	2	1	2	2	3	1
CO3	3	2	3	1	3	1	1	2	1	2	2	1	2	2	2	2
CO4	3	1	1	1	3	2	-	-	2	1	2	2	2	1	2	1
CO5	3	1	1	1	3	1	-	-	2	1	2	2	2	1	3	2

Course Contents / Syllabus

Module 1	**Modern Frontend Development with React JS**	**8 hours**

Introduction: to React, Setting up React projects, React Folder Structure, JSX, Functional Components, and React Hooks (useState, useEffect, use Context), Props vs State, Stateless vs Stateful Components, Component Lifecycle, Routing with react-router-dom Introduction to Next.js for Server-Side Rendering and SEO, Integrating APIs with axios or fetch,.

Module 2	**UI Libraries & MongoDB Integration**	**8 hours**

UI Libraries : Introduction to Google Material UI, Tailwind CSS, Theming and responsive design with MUI, Creating reusable UI components (Navbar, Toolbar, Dialogs), Introduction to MongoDB, CRUD Operations using Mongoose Indexes: Creating, Getting, Dropping, Aggregation Pipelines and Query Optimization, Data Modeling & Relationships, Auto-Sharding and Replication Concepts, Modern MongoDB tools: MongoDB Atlas, Compass.

Module 3	**Backend with Node.js & Express**	**8 hours**

Node.js: Introduction to Node.js Setting up Express applications, Routing & Middleware, Restful API Design , JWT-based Authentication & Authorization ,Working with dotenv, CORS, body-parser. Express MVC Architecture in Express, File Upload Handling with Multer, Connecting Frontend with Backend via APIs, Introduction to GraphQL.

Module 4	**DevOps Culture and Lifecycle**	**8 hours**

Introduction to DevOps: Culture & Principles, DevOps Lifecycle and Agile vs DevOps, SDLC Models: Agile, Lean, Scrum, Kanban, Scrum: Process flow, Planning, Testing, Release Management, Introduction to Site Reliability Engineering (SRE), Overview of Terraform/Ansible, Configuration Management basics

Module 5	**CI/CD, Docker & Kubernetes**	**8 hours**

Git & GitHub: Introduction to Git, GitHub, Branching strategies, CI/CD Pipelines: Jenkins, GitHub Actions, Creating Jenkins Jobs and Pipelines, Integrating Git, Maven, and SonarQube, Introduction to Docker: Images, Containers, Lifecycle ,Building custom Docker Images, Docker Compose for multi-container apps, Container orchestration with Kubernetes
Creating Deployments, Services, and scaling with K8s, Basic monitoring tools: Prometheus and Grafana

Total Lecture Hours	**40 hours**

Textbook:

S.No	Book Title	Author
1.	Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node Paperback, 2nd Edition (2017)	Vasan Subramanian
2.	Hands-On MERN Stack Web Development: Build production-grade web apps and APIs with MERN stack ,3rd Edition (2019)	Shama Hoque
3.	Beginning MERN Stack: Build and Deploy a Full Stack MongoDB, Express, React, Node.js App 2nd Edition (2021)	Greg Lim

Reference Books:

S.No	Book Title	Author
1.	The DevOps Handbook: How to Create World-Class Agility, Reliability, & Security in Technology Organizations 2nd Edition (2003).	Gene Kim, Jez Humble, Patrick Debois, John Willis
2.	Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation, 2nd Edition (2004).	Jez Humble, David Farley
3.	Test and Deploy Production-Grade Web Applications 1st Edition (2023).	Nabendu Biswas

Self Study Content Link:

MOOCs	https://www.coursera.org/learn/fullstack-web-development https://www.coursera.org/professional-certificates/ibm-full-stack-cloud-developer	**4 Weeks** **6 Months**
Video Lectures	https://youtu.be/CvCiNeLnZ00 https://youtu.be/4nKWREmCvsE https://youtu.be/f2EqECiTBL8 https://youtu.be/6GQRb4fGvtk https://youtu.be/kTp5xUtcalw	**8 hrs** **25 Min** **7 hrs** **8 Min** **6 hrs**
Web References	https://react.dev https://docs.docker.com	

Mode of Evaluation

CIE							ESE	Total
ST1	ST2	ST3	TA1 10	TA2 10	TA3 10	Attendance 10		
30			20				100	150

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

School of Computer Science & Information Technology

Course Code: BCSE0712	**Course Name: RPA Implementation**	**L**	**T**	**P**	**C**
Course Offered in: CSE/CS/IT/CSE(AI)/CSE(AIML)/CSE(DS)/CSE-R/M.Tech int		**3**	**0**	**0**	**3**

Pre-requisite: Basic Knowledge of C Programming

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

Course Outcome: After completion of the course, the student will be able to		**Bloom's Knowledge Level (KL)**
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**

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PS O2	PSO3	PSO4
CO1	3	2	1	1	2	-	-	-	-	-	1	1	2	–	2	1
CO2	2	2	1	-	3	-	-	-	-	-	1	1	1	–	2	1
CO3	2	2	2	1	3	1	-	1	-	1	2	1	3	–	2	2
CO4	2	3	3	2	3	1	-	1	1	2	2	1	3	–	3	2
CO5	2	3	3	2	3	1	1	2	2	3	2	2	3	–	3	3

Course Contents / Syllabus

Module 1	**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

Module 2	**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

Module 3	**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

Module 4	**Debugging and Exception Handling**	**8 hours**

Debugging and Exception Handling: Debugging Tools, Strategies for solving issues, Catching errors.

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

Module 5	**Robotic Framework**	**8 hours**

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

	Total Lecture Hours	**40 hours**

Textbook:

S.No	Book Title	Author
1.	Crisper Learning: For UiPath", Latest Edition, Independently Published, 2018.	Jain Vaibhav
2.	Learning Robotics Process Automation", Latest Edition, Packt Publishing ltd, Birmingham. March 2018	Tripathi Alok Mani

Reference Books:

S.No	Book Title	Author
1.	The Simple Implementation Guide to Robotic Process Automation (RPA)", Latest Edition, iUniverse Press, 2018.	Wibbenmeyer Kelly
2.	https://www.uipath.com/hubfs/ebook-its-time-to-automate.pdf	-

Self Study Content Link:

MOOCs	https://www.coursera.org/specializations/roboticprocessautomation?utm_medium=sem&utm_source=gg&utm_campaign=b2c_india_x_multi_ftcof_career-academy_cx_dr_bau_gg_pmax_gc_in_all_m_hyb_24-03_desktop&campaignid=21104989118&adgroupid=&device=c&keyword=&matchtype=&network=x&devicemodel=&creativeid=&assetgroupid=6544944776&targetid=&extensionid=&placement=&gad_source=1&gad_campaignid=21104990591&gbraid=0AAAADdKX6aXcPLWGmJWBlA433bccIMYa&gclid=CjwKCAjwxb7RBhA5EiwAQ-AAdJGt-_GPrxeE7nSRqYwH3uZiSRIdivr2driMGoBV_dG-XXfgwjyPtRoCtpQQAvD_BwE	**51 hours**
Video Lectures	https://www.youtube.com/watch?v=MBl-3Yb30FA&list=PL9ooVrP1hQOEeFvW5KaSea6mrlEU6TZ9s, https://www.youtube.com/watch?v=T3gssUSHonI	**10 hours** **11 hours**
Web References	https://www.researchgate.net/publication/390855446_Robotic_process_automation_Implementation https://nibmehub.com/opac-service/pdf/read/The%20Robotic%20Process%20Automation%20Handbook%20by%20Tom%20Taulli.pdf	

Mode of Evaluation

CIE							ESE	Total
ST1	ST2	ST3	TA1 10	TA2 10	TA3 10	Attendance 10		
30			20				100	150

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

School of Computer Science & Information Technology

Course Code: BCSAI0714	**Course Name: Cloud Security**	**L**	**T**	**P**	**C**
Course Of ered in: CSE/CSE(R)/IT/M.Tech Int. (CSE)		3	0	0	**3**

Pre-requisite: Basics of Cloud Computing

Course Object ves: To provide in-depth knowledge of securing cloud environments, with pract cal alignment to AWS security services, best pract ces, and cert f cat on domains.

Course Outcome: Af er complet on of the course, the student will be able to		Bloom's Knowledge Level (KL)
CO1	Explain cloud security principles, threat landscape, and governance frameworks.	K2
CO2	Infer ident ty and access management techniques for secure cloud environments.	K2
CO3	Assess data protect on mechanisms including encrypt on and secure storage pract ces	K4
CO4	Analyze cloud infrastructure security components and network protect on mechanisms	K4
CO5	Analyze monitoring, incident response, and compliance strategies in cloud systems.	K4

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	-	-	-	-	-	-	-	-	1	1	3	–	2
CO2	2	3	2	-	3	-	-	-	-	-	2	2	3	1	2
CO3	2	3	3	-	2	-	-	-	2	-	-	-	3	1	2
C04	2	2	3	3	3	-	-	-	2	-	1	1	3	1	3
CO5	2	3	-	-	-	2	2	3	-	-	-	-	3	–	2

Course Contents/ Syllabus		
UNIT-I	**Cloud Security Foundat ons & Governance**	9 hours
Introduct on to cloud security concepts, Security benef ts and challenges in cloud comput ng, Cloud Threat Landscape, CSA Top Threats, Insider Threats, Data Breaches, Security design principles (defense in depth, least privilege, zero trust), Edge Locat ons, AWS Shared Responsibility Model(customer vs provider responsibilit es), AWS Well-Architected Framework (Security Pillar), Policies, Standards, Cloud Governance Framework.		
UNIT-II	**Ident ty, Access Management & Security Administrat on**	9 hours
IAM: Introduct on, JSON elements, Users, Roles, Groups, Policies, Policy evaluat on logic, role chaining, Managed vs inline policies, permission boundaries, Principle of least privilege and policy opt mizat on, Authent cat on & Authorizat on, Mult -Factor Authent cat on, Federat on & Single Sign-On, SAML, Open Authorizat on basics. **Access Control Models:** RBAC vs ABAC, Trust Boundaries, Temporary credent als using AWS Security Token Service.		
UNIT-III	**Data Security & Protect on**	9 hours
Data Security Concepts: CIA Triad (Conf dent ality, Integrity, Availability), **Data States:** Data at Rest, In Transit, In Use. **Encrypt on Techniques:** Symmetric vs Asymmetric Encrypt on, Encrypt on at rest and in transit (TLS/SSL), AWS Key Management, KMS, Envelope Encrypt on, Key Rotat on. **Secure Storage:** S3 Security (Bucket Policies, Versioning, Access Control), Database security (RDS encrypt on, backups, IAM authent cat on).		
UNIT-IV	**Cloud Infrastructure Security**	9 hours
Infrastructure Security: Host-Level, Network-Level, Applicat on-Level Security**,** Secure Cloud Architecture**,** VM Security, Auto Scaling, Load Balancing**.** **Amazon VPC Design:** Subnets (Public/Private), Rout ng Tables, Internet Gateway, NAT Gateway, Bast on Hosts, DNS security with Amazon Route 53. **Security Controls:** Security Groups vs Network ACLs (stateful vs stateless), DDoS Protect on & Mit gat on, Hybrid Cloud Security, VPN, Direct Connect.		
UNIT-V	**Cloud Monitoring, Incident Response & Compliance**	9 hours
Monitoring & Logging: CloudTrail, CloudWatch, Log Analysis, Threat Detect on (Behavioral Analysis, Anomaly Detect on, Incident Response Lifecycle, Preparat on) Containment, Recovery. **AWS Security Services:** GuardDuty, CloudWatch, Security Hub, Applicat on Security. Privacy & Compliance, Data Privacy Concepts, GDPR, HIPAA, Digital Personal Data Protect on Act-2023, ISO 27001 basics, Legal & Regulatory Framework.		
	Total Lecture Hours	**45 hours**
Textbook:		

S. No	**Book Title**	**Author**

1.	"Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance" O'ReillyMedia; 1edition [ISBN:0596802765], 2009	Tim Mather, Subra Kumara swamy,Shahed Latif
2.	"Cloud Security Handbook: Find out how to effectively secure cloud environments using AWS, Azure, and GCP", Packt Publishing; 1st edition, 2023	Eyal Estrin

Reference Books:

S.No	Book Title	Author
1.	"Cloud Computing Security: Strategies and Best Practices", CRC Press; 1st edition, 2021	Krishnendu Gupta, Nabanita Roy
2.	"Cloud Security: Concepts, Applications and Practices", Springer; 1st edition, 2017,	Kumar Saurabh

Self Study Content Link:

MOOCs	1. https://nptel.ac.in/courses/106106248 2. https://skillbuilder.aws/learn/S2N5PM41ZK/aws-security-fundamentals/E71QQGTCRZ	12 Weeks 15 hrs
Video Lectures	1. ht ps://youtu.be/XsRBDJ5hcdg 2. ht ps://youtu.be/w2caA8ty36s 3. ht ps://youtu.be/fpNmvxYhsN0 4. ht ps://youtu.be/amCrXVFX1C4 5. ht ps://youtube.com/playlist?list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J&si=wLJBL0TKrcs8Jkmc 6. ht ps://youtu.be/1ZKuwyATV3c 7. ht ps://youtu.be/ZHCtVZ6cjdg?si=G0w6pE1v4dDNt2KV	26 Min 38 Min 27 Min 39 Min 13 hrs 1 hr 17 Min 8 Min
Web References	1. https://owasp.org 2. https://cloudsecurityalliance.org	

Mode of Evaluat on

CIE							ESE	Total
ST1	**ST2**	**ST3**	**TA1**	**TA2**	**TA3**	**Attendance**		
			10	**10**	**10**	**10**		
30			**20**				**100**	**150**