

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



**Affiliated to
DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**



Evaluation Scheme & Syllabus

For

Bachelor of Technology

Computer Science and Engineering (Artificial Intelligence & Machine Learning)

Fourth Year

(Effective from the Session: 2026-27)

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA**(AN AUTONOMOUS INSTITUTE)****(Artificial Intelligence and Machine Learning)****Evaluation Scheme****SEMESTER: VII**

Sl. No.	Subject Codes	Subject Name	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
WEEKS COMPULSORY INDUCTION PROGRAM														
1	BCSE0701	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	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
		MOOCs (For B.Tech. Hons. Degree)	*MOOCs											
		Total		12	0	8	120	80	200	125	400	75	800	16

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

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credit
1	BMC0126	TechA Computer Vision Certificate	IIHT	17h 24m	1
2	BMC0138	Spring Boot and Angular-React Stack-DevOps Tools and Capstone Project	Infosys Wingspan (Infosys Springboard)	107h 50m	4
3	BMC0128	Microsoft Power BI Data Analyst (PL-300) by Microsoft	NASSCOM	13h 16m	1

List of Departmental Electives

Subject Codes	Subject Name	Type of Subject	Bucket Name	Branch	Semester
BCSE0712	RPA Implementation	Departmental Elective-V	CRM-RPA	AIML	7
BCSDS0711	Business Analytics	Departmental Elective-V	Data Analytics	AIML	7
BCSE0713	Web Development using MERN Stack with DevOps	Departmental Elective-V	Full Stack Development	AIML	7
BCSAI0711	Game Programming	Departmental Elective-V	Mobility Management	AIML	7

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.

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA
(AN AUTONOMOUS INSTITUTE)

(Artificial Intelligence and Machine Learning)

Evaluation Scheme

SEMESTER: VIII

S. No.	Subject Codes	Subject Name	Types of Subjects	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

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

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	BMC0059	TechA Build and Deploy Projects Certification	IIHT	13h 41m	1
2	BMC0152	Project Management with Agile	IIHT	14h 58m	1
3	BMC0118	Gen AI 101	NASSCOM	15h	1

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MOOCs: Massive Open Online Courses.

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

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 to 18 =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

Course Code: BCSE0701	Course: Computer Vision	L	T	P	C
Course Offered in: CSE(AIML)		3	0	0	3

Pre-requisite: Students should have a basic understanding of **programming (preferably Python)**, **data structures**, and **object-oriented programming concepts**. Familiarity with **linear algebra**.

Course objective:

The course aims to provide students with a comprehensive understanding of the fundamental concepts, techniques, and applications of Computer Vision and Image Processing. It also develops the ability to apply computer vision algorithms using modern tools and libraries to solve real-world problems. Furthermore, the course enables students to analyze visual data and design intelligent vision-based systems for object detection, recognition, and image understanding.

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

CO	CO Statements	KL
CO1	Analyze knowledge of deep architectures used for solving various Vision and Pattern Association tasks.	K4
CO 2	Apply appropriate learning rules for each of the architectures of perceptron and learn about different factors of back propagation.	K3
CO 3	Apply training algorithm for pattern association with the help of memory network.	K3
CO 4	Examine the models of deep learning with the help of use cases.	K3
CO 5	Analyze different theories of deep learning using neural networks.	K4

High=3, Moderate=2, Low=1

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	2	–	–	–	–	–	–	1	3	3
CO2	3	3	2	2	2	–	–	–	–	–	–	1	3	3
CO3	2	3	3	3	2	–	–	–	1	–	–	1	3	2
CO4	2	3	3	3	3	1	–	1	2	1	–	2	3	3
CO5	3	3	1	2	1	–	–	–	–	–	–	2	2	2

Pre-requisites: Python, along with fundamental knowledge of mathematics, including linear algebra.

Course Contents / Syllabus

UNIT-I	Introduction to Computer Vision	10 Hours
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		
UNIT-II	Architectures	9 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.

UNIT-III	Segmentation	10 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.		
UNIT-IV	Object Detection	7 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 Objects, Scenes, Activities, Object classification.		
UNIT-V	Visualization and Generative Models	9 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.		
TOTAL: 45 Hours		
Text books:		
Sl. No.	Book Title	Author(s)
1	<i>Introductory Techniques for 3D Computer Vision</i> , 2009 Edition	Emanuele Trucco, Alessandro Verri
2	<i>Computer Vision: Algorithms and Applications</i> , The University of Washington Edition, 2022	Richard Szeliski
3	<i>Computer Vision: A Modern Approach</i> , Prentice Hall, 2015 Edition	David A. Forsyth, Jean Ponce
4	<i>Introductory Techniques for 3D Computer Vision</i> , Prentice Hall	Emanuele Trucco, Alessandro Verri
5	<i>Computer & Machine Vision: Theory, Algorithms, Practicalities</i> , Academic Press, 4th Edition, 2012	E. R. Davies
6	<i>Computer Vision: Models, Learning, and Inference</i> , Cambridge University Press, 2012 Edition	Simon J. D. Prince
Reference Books:		
Sl. No.	Book Title	Author(s)
1	<i>Computer Vision: A Modern Approach</i> , Prentice Hall, 2nd Edition, 2015	David A. Forsyth, Jean Ponce
2	<i>Computer Vision: Models, Learning, and Inference</i> , Cambridge University Press, 1st Edition, 2012	Simon J. D. Prince
3	<i>Computer Vision</i> , Prentice-Hall, 2008	Dana H. Ballard, Christopher M. Brown

4	<i>Understanding Augmented Reality: Concepts and Applications</i> , Morgan Kaufmann, 2013 Edition	Alan B. Craig
5	<i>Computer Vision: Algorithms and Applications (CVAA)</i> , Springer, 2022 Edition	Richard Szeliski

Self-Study Contents

Resources	Name and Link	Duration
MOOCs	(edX – Computer Vision and Image Analysis) https://www.edx.org/learn/computer-vision?utm_source=chatgpt.com	33h
Video Links	1. https://www.youtube.com/playlist?list=PLoROMvodv4rOmsNzYBM_e0g_JY2XS8AQg16&utm_source=chatgpt.com 2. https://www.youtube.com/playlist?list=PL05umP7R6ij35L2MHGzis8AEHz7mg381_&utm_source=chatgpt.com	10h
Web References	https://trainbrain.app/youtube/x7n85SJMjUA/?utm_source=chatgpt.com	2h

Course code	BCSE0712	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	K3
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	solutions of real-world problems.	
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=KE9raKNTkfl&list=PL41Y-9S9wmyLeXL1DY9j-XepNb_vg9N8t

<https://www.youtube.com/watch?v=2rjr8QhD9oc&list=PL41Y-9S9wmyJi2zmWY77yPZrdVI7ab3Ja>

Course code	BCSDS0711	L T P	Credits
Course title	Business Analytics	3 0 0	3
Course objective: To learn the fundamental concepts of Business Analytics with focus on Data Warehousing and Business Statistics, enabling students to design data-driven decision systems, perform statistical analysis, and generate meaningful business insights.			
Pre-requisites: Basic knowledge of statistics, database systems, and spreadsheet tools such as Microsoft Excel.			
Course Contents / Syllabus			
UNIT-I	Introduction to Business Analytics	8 HOURS	
Business Analytics: Definition, Importance, Scope. Types of Analytics: Descriptive and Diagnostic. Business Analytics vs Business Intelligence. Role of Data in Decision Making. Applications and Analytics Lifecycle.			
UNIT-II	Data Warehousing	8 HOURS	
Data Warehouse Architecture: Fundamentals of Data Warehouse, Components of Data Warehouse, Three-Tier Architecture, Data Warehouse Models, Data Integration Techniques, Data Storage and Organization, OLTP vs OLAP Systems: ETL Process, Data Marts, Metadata, Star and Snowflake Schema, fact constellation schema.			
UNIT-III	Business Statistics	8 HOURS	
Descriptive statistics: Definition and importance, Types, Measures of central tendency, dispersion, shape, Probability distributions: Basic concepts of probability, Random variables, Probability distribution functions, Expected value and variance, Applications in business decision-making, Sampling: Population vs Sample, Sampling techniques, Sampling distribution, Hypothesis testing: Concept of hypothesis, Types of errors, Statistical tests, Decision-making using hypothesis testing, Correlation Regression, Time series basics.			
UNIT-IV	R Programming for Business Analytics	8 HOURS	
Business Analytics Life Cycle, Model deployment, Steps in Problem Solving Process, Software used in Business Analytics Getting Started with R. Data Manipulation & Statistics: Basics, Merging, Data Creation, Quantiles, Calculating Variance, Calculating Covariance, Cumulative Frequency, Library (mass), Head (faithful), Scatter Plot, Control Flow. Business Analytics using R: Normal PDF, Not Normal, SAT Example, Example- Birth Weights, dNorm, pNorm, qNorm Understanding Estimation, Properties of Good Estimators, Central Limit Theorem, Kurtosis, Constructing Central Limit Theorem, Confidence Intervals for the Mean, Confidence Intervals Examples, t-distribution			
UNIT-V	Dashboard Tools for Business Analytics : Zoho Analytics	8 HOURS	

Getting started with Zoho Analytics - Terminologies & Workflows, Importing Data From Files, Feeds, and Cloud Storage, Data Modeling Building powerful Formulas Formatting Tables & Custom Sorting Lookups & Data Blending, Creating Reports Building Charts, Pivot Tables, Tabular Views, and Summary Tables Applying Filters Customizing Reports Chart picker guide, Creating Dashboards
Creating a Dashboard Adding KPI Widgets Adding User Filters Customizing Dashboards Timeline Filter and Merging User Filters.

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

CO1	Understand concepts of Business Analytics and Data Warehousing	K2
CO2	Apply data preprocessing and SQL techniques	K3
CO3	Analyze data using statistical methods	K4
CO4	Design data warehouse and OLAP models	K5
CO5	Develop dashboards and reports	K5

Textbooks:

1. Business Statistics – S.C. Gupta & V.K. Kapoor
2. Fundamentals of Data Warehousing – Paulraj Ponniah
3. Business Analytics – James Evans.

Reference Books:

1. Data Warehousing in the Real World – Sam Anahory
2. Excel Data Analysis – Wayne Winston
3. Data Warehouse Toolkit – Ralph Kimball

Links:

https://www.bmu.edu.in/social/delve-into-the-mba-in-business-analytics-syllabus-subjects/#Module_1

https://www.depaul.edu/academics/programs/business-analytics-ms?utm_content=772307929901&utm_term=business%20analytics%20universities%20usa&utm_medium=cpc&utm_source=google&utm_campaign=extm_international-nonbrand&gclid=aw.ds&gad_source=1&gad_campaignid=22975247660&gbraid=0AAAAADlwX7

[3S3SFQuWnG_AxmtiVHO1Z8z&gclid=CjwKCAjwwJzPBhBREiwAJfHRnLC70RK4_t99A9YQ2ggDt8bLEiP3tvAFr7pTdVeDFjrHPRPd0ysNB0CIjMQAvD_BwE](https://sunstone.in/blog/mba-in-business-analytics-syllabus)
[https://sunstone.in/blog/mba-in-business-analytics-syllabus](https://www.onlinemanipal.com/blogs/mba-in-business-analytics-subjects-list) <https://www.onlinemanipal.com/blogs/mba-in-business-analytics-subjects-list> <https://www.eicta.iitk.ac.in/knowledge-hub/data-analytics/business-analytics-course-syllabus>
<https://noida.amity.edu/blog/academics/mba-in-business-analytics-syllabus-scope-colleges-and-career-opportunities>
https://management.buffalo.edu/degree-programs/master-of-science-ms/business-analytics/campaigns/ub-msba-landing-page-google.html?utm_source=google&utm_medium=cpc&utm_campaign=FM-PPC-UB-SOM-MS-BusinessAnalytics-International-Program&gad_source=1&gad_campaignid=13724693728&gbraid=0AAAAADiSHE8chFADxOw5S7ybamtD_UqOhQ&gclid=CjwKCAjwwJzPBhBREiwAJfHRnXo9xdoI9IdhL1kZLNhxWW8F4rc3cWTbT2ApiuzLk02Ze7BT4Bws_BoChtAQAvD_BwE
[https://admission.isb.edu/admissions/amp/ampba/?utm_source=google&utm_medium=cpc&utm_campaign=AMPBA-B26_Google_Generic-Search_AI-Max_CPC_LP_GT&keyword=business%20analytics%20course&term={searchterm}&utm_source=google&utm_medium=cpc&campaignname=&adgroupname=Business_\(Broad-Phrase\)&keyword=business%20analytics%20course&term={searchterm}&creative=799773152771&devicemodel=&target=&device=c&network=g&matchtype=b&placement=&gclid=CjwKCAjwwJzPBhBREiwAJfHRnTC534j8TIwCVE55FA0ncZmj5yfvFg1htT4T2Nhw2UB7KCBOs0IQIRoCAE4QAvD_BwE&gad_source=1&gad_campaignid=23639572256&gbraid=0AAAABBtlpHKOhPhwiiAmtWB77e5nGEVei&gclid=CjwKCAjwwJzPBhBREiwAJfHRnTC534j8TIwCVE55FA0ncZmj5yfvFg1htT4T2Nhw2UB7KCBOs0IQIRoCAE4QAvD_BwE](https://admission.isb.edu/admissions/amp/ampba/?utm_source=google&utm_medium=cpc&utm_campaign=AMPBA-B26_Google_Generic-Search_AI-Max_CPC_LP_GT&keyword=business%20analytics%20course&term={searchterm}&utm_source=google&utm_medium=cpc&campaignname=&adgroupname=Business_(Broad-Phrase)&keyword=business%20analytics%20course&term={searchterm}&creative=799773152771&devicemodel=&target=&device=c&network=g&matchtype=b&placement=&gclid=CjwKCAjwwJzPBhBREiwAJfHRnTC534j8TIwCVE55FA0ncZmj5yfvFg1htT4T2Nhw2UB7KCBOs0IQIRoCAE4QAvD_BwE&gad_source=1&gad_campaignid=23639572256&gbraid=0AAAABBtlpHKOhPhwiiAmtWB77e5nGEVei&gclid=CjwKCAjwwJzPBhBREiwAJfHRnTC534j8TIwCVE55FA0ncZmj5yfvFg1htT4T2Nhw2UB7KCBOs0IQIRoCAE4QAvD_BwE)

[https://admission.isb.edu/admissions/amp/ampba/?utm_source=google&utm_medium=cpc&utm_campaign=AMPBA-B26_Google_Generic-Search_AI-Max_CPC_LP_GT&keyword=business%20analytics%20course&term={searchterm}&utm_source=google&utm_medium=cpc&campaignname=&adgroupname=Business_\(Broad-Phrase\)&keyword=business%20analytics%20course&term={searchterm}&creative=799773152771&devicemodel=&target=&device=c&network=g&matchtype=b&placement=&gclid=CjwKCAjwwJzPBhBREiwAJfHRnTC534j8TIwCVE55FA0ncZmj5yfvFg1htT4T2Nhw2UB7KCBOs0IQIRoCAE4QAvD_BwE&gad_source=1&gad_campaignid=23639572256&gbraid=0AAAABBtlpHKOhPhwiiAmtWB77e5nGEVei&gclid=CjwKCAjwwJzPBhBREiwAJfHRnTC534j8TIwCVE55FA0ncZmj5yfvFg1htT4T2Nhw2UB7KCBOs0IQIRoCAE4QAvD_BwE](https://admission.isb.edu/admissions/amp/ampba/?utm_source=google&utm_medium=cpc&utm_campaign=AMPBA-B26_Google_Generic-Search_AI-Max_CPC_LP_GT&keyword=business%20analytics%20course&term={searchterm}&utm_source=google&utm_medium=cpc&campaignname=&adgroupname=Business_(Broad-Phrase)&keyword=business%20analytics%20course&term={searchterm}&creative=799773152771&devicemodel=&target=&device=c&network=g&matchtype=b&placement=&gclid=CjwKCAjwwJzPBhBREiwAJfHRnTC534j8TIwCVE55FA0ncZmj5yfvFg1htT4T2Nhw2UB7KCBOs0IQIRoCAE4QAvD_BwE&gad_source=1&gad_campaignid=23639572256&gbraid=0AAAABBtlpHKOhPhwiiAmtWB77e5nGEVei&gclid=CjwKCAjwwJzPBhBREiwAJfHRnTC534j8TIwCVE55FA0ncZmj5yfvFg1htT4T2Nhw2UB7KCBOs0IQIRoCAE4QAvD_BwE)

 Noida Institute of Engineering & Technology, Greater Noida नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा (An Autonomous Institute) Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)     		
Subject Code: BCSE0713		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, Docker, 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 Mongoddb .	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. Dhruvi 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/TIB_eWDSMt4 <https://youtu.be/QFaFicGhPoM>
https://youtu.be/Kvb0c_HWFkdc
https://youtu.be/pQcV5_CMara8
https://youtu.be/c3Hz1_qUUIyQ
<https://youtu.be/Mfp94RjugWQ>
<https://youtu.be/SyEQLbbSTWg>

<https://youtu.be/BLI32FvcdVM> <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/UVI6BbPcMQk> <https://youtu.be/fqMOX6JhGo>

<https://youtu.be/m0a2CzgLNsc> https://youtu.be/lji_9scA2C4
<https://youtu.be/tuIZok81iLk>
<https://youtu.be/IluhOk86prA> <https://youtu.be/13FpCxCCILY>

Course code	BCSE0711	L T P	Credits
Course title	GAME PROGRAMMING	3 0 0	3
Course objective: The objective of this course is to understand the basic concepts of Game design and development. The course will help to build the programming skills needed to turn ideas into games.			
Pre-requisites: None			
Course Contents / Syllabus			
UNIT-I	3D GRAPHICS FOR GAME PROGRAMMING	8 HOURS	
3D Transformations, Quaternions, 3D Modeling and Rendering, Ray Tracing, Shader Models, Lighting, Color, Texturing, Camera and Projections, Character Animation, Physics-based Simulation, Scene Graphs.			
UNIT-II	GAME ENGINE DESIGN	8 HOURS	
Game engine architecture, Engine support systems, Resources and File systems, Game loop and real-time simulation, Human Interface devices, Collision and rigid body dynamics, Game profiling.			
UNIT-III	GAME PROGRAMMING	8 HOURS	
Application layer, Game logic, Game views, managing memory, controlling the main loop, loading and caching game data, User Interface management, Game event management.			
UNIT-IV	GAMING PLATFORMS AND FRAMEWORKS	8 HOURS	
2D and 3D Game development, Game engines -Unity. Game Development & Documentation, Game Idea Visualization and Story Telling, Introduction to Unity interface.			
UNIT-V	GAME DEVELOPMENT	8 HOURS	
Developing 2D and 3D interactive games using Unity – Isometric and Tile Based Games, Puzzle games, Single Player games, multi-Player games. Use of 3D Game Kit to create 3D platform gameplay and puzzles in Unity.			
Course outcome: After completion of this course students will be able to:			
CO 1	Create VR experiences by setting up environments, interactions, and immersive elements using modern concepts of Game design.	K2	
CO 2	Propose and design the processes and use mechanics for games.	K3	
CO 3	Create 3D scenes with Unity and experiment with various user interface techniques that are used in VR AR applications.	K6	
CO4	Create a 2D and 3D game in Unity and arrange Game programming	K6	

	platforms.	
CO 5	Evaluate and use emerging technologies and tools for creating interactive Games.	K5

Textbooks:

1. Shaffrffy Mike Mc and Graham David, “Game Coding Complete”, Fourth Edition, Cengage Learning, PTR, 2012.
2. Gregory Jason, “Game Engine Architecture”, CRC Press / A K Peters, 2009
3. Eberly David H., “3D Game Engine Design, Second Edition: A Practical Approach to Real-Time Computer Graphics” 2nd Editions, Morgan Kaufmann, 2006.

Reference Books:

1. Adams Ernest and Rollings Andrew, “Fundamentals of Game Design”, 2nd edition Prentice Hall/ New Riders, 2009.
2. Lengyel Eric, “Mathematics for 3D Game Programming and Computer Graphics”, 3rd edition, Course
3. Schell Jesse, The Art of Game Design: A book of lenses, 1st Editions, CRC Press, 2008.

Links:

Unit 1: [Install the Unity Hub and Editor](#)

How to download and install Unity Editor using Unity Hub <https://learn.unity.com/tutorial/publish-your-first-mobile-runnergmae> <https://learn.unity.com/tutorial/platformer-mod-add-speed-and-bounce-pads#5d5af56dedbc2a005fb9216c> <https://learn.unity.com/tutorial/quick-start?uv=2019.4&courseId=5c616a81edbc2a0021b1bd11&projectId=5c514897edbc2a001fd5bdd0#5c7f8528edbc2a002053b740> <https://learn.unity.com/project/3d-game-kit?uv=2019.4&courseId=5c616a81edbc2a0021b1bd11>

Unit2: <https://learn.unity.com/project/3d-game-kit-lite>

Unit3: <https://learn.unity.com/tutorial/3d-game-kit-reference-guide>
<https://learn.unity.com/tutorial/next-steps-certifications-game-jams-and-beyond?courseId=6046c239edbc2a2720f9983b>

Unit4:

<https://learn.unity.com/tutorial/week-1-player-control-may-17-21?courseId=6046c239edbc2a2720f9983b> <https://learn.unity.com/tutorial/week-2-basic-gameplay-may-24-28?uv=2020.3&courseId=6046c239edbc2a2720f9983b>

Unit5: <https://learn.unity.com/project/unit-3-oi?uv=2019.4&courseId=5edebd48edbc2a444960263e>
<https://docs.unity3d.com/Manual/index.html>

<https://msl.cs.uiuc.edu/vr/vrbook.pdf>

 NIET Greater Noida Autonomous Institute				Noida Institute of Engineering & Technology, Greater Noida नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा (An Autonomous Institute) Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)      Approved by AICTE, Ministry of Education, Government of India 101-150 Rank Band in Engineering 151-200 Rank Band in Overall Accredited Grade A+ 3.23 CSE/IT/EC/EE/ET/ME/BIOMEDICAL Prestigious 'Diamond' Rating CSE I-Gauge, NIRF Greater Noida											
LAB Course Code: BCSE0751						LAB Course Name Computer Vision Lab						L	T	P	C
Course Offered in: CSE(AI)/CSE(AI ML)												0	0	2	1
Pre-requisite: Python Programming, Machine Learning															
Course Objectives:															
The course also enables students to explore image compression models and their applications in efficient image representation. It provides knowledge of autoencoders and their role in feature learning, dimensionality reduction, and image reconstruction. In addition, the course introduces advanced deep learning concepts and techniques that enhance the performance, robustness, and reliability of vision-based systems for real-world applications.															
Course Outcome: After completion of the course, the student will be able to															
CO		CO Statements										KL			
CO1		Implement a various convolutional neural network and understand its architecture.										K3			
CO2		Apply image Modeling acquisition, Segmentation and develop a programming model to implement an Image morphological										K3			
CO3		Apply Visualization of various models and Deep GAN Networks .										K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)															
COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2		
CO1	3	3	3	2	3	1	1	1	1	2	2	3	3		
CO2	3	3	2	3	3	1	1	1	1	2	2	3	3		
CO3	2	3	3	3	3	1	1	1	1	2	3	3	3		

List Of Practical's (Indicative & Not Limited To)		
S.No.	Experiment (Case Study Based Question)	CO Mapping
1	Fine-tuning a pre-trained CNN for a specific image recognition task.	CO1
2	Building a simple convolutional neural network for transfer learning using Finetuning	CO1
3	Building a simple convolutional neural network for transfer learning using feature extraction.	CO1
4	Building a CNN model for object detection using a pre-trained architecture like YOLO.	CO1
5	Exploring different activation functions and comparing their effects on network performance.	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
23	Perform scaling, rotation and shifting operations on an image using OpenCV ()	CO3
24	Perform image reflection on an image using OpenCV ().	CO3
25	Implementing a basic Variational Autoencoder (VAE) for image generation	CO3
26	Training a Generative Adversarial Network (GAN) to generate synthetic images.	CO3
27	Implement and apply using Image Restoration	CO3
28	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
31	Implement a program for color image processing	CO2
32	Implement a program for image segmentation	CO2
Total Hours: 30 hrs.		