

**NOIDA INSTITUTE OF ENGINEERING & 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 Computer Applications

Third Year

(Effective from the Session: 2026-27)

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA**(An Autonomous Institute)****BCA****Evaluation Scheme****SEMESTER V**

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		
1	BBCA0501	Internet of Things	Mandatory	3	1	0	30	20	50		100		150	4
2	BBCA0502	Software Engineering	Mandatory	3	0	0	30	20	50		100		150	3
3	BBCA0503	System & Network Security	Mandatory	3	1	0	30	20	50		100		150	4
4		Departmental Elective – III	Departmental Elective	3	0	0	30	20	50		100		150	3
5	BBCA0552	Software Engineering Lab	Mandatory	0	0	4				50		50	100	2
6	BBCA0555	Competitive Programming Skill	Mandatory	0	0	6				50		100	150	3
7	BBCA0556	Workplace Communication Lab 5	Mandatory	0	0	4				50		50	100	2
8		Departmental Elective – III Lab	Departmental Elective	0	0	2				50		50	100	1
9	BBCA0559	Mini Project using Internet of Things	Mandatory	0	0	4				50		50	100	2
		TOTAL							200	250	400	300	1150	24

List of MOOCs (Infosys Springboard) Based Recommended Courses for Third Year (Semester-V) BCA

S. No.	Subject Code	Course Name	University/Industry Partner Name	No. of Hours
1	BMC0120	Software Engineering and ALM	Infosys Wingspan (Infosys Springboard)	2h 10m
2	BMC0040	Data Structures and Algorithms using Python - Part 2	IIHT	37h 41m

Abbreviation Used:

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam.
CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,
MOOCs: Massive Open Online Courses.

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List of Department Elective (if any):-

S. No.	Subject Code	Subject Name	Types of Subjects	Bucket Name	Applicable Branch	Semester
1	BBCA0511	Deep Learning	Elective-III	Emerging Technologies	BCA	V
2	BBCA0512	Robotics Process Automation (RPA)	Elective-III	CRM/RPA	BCA	V
3	BBCA0513	Video Editing with Photoshop/Capcut	Elective-III	Graphics & Video editing	BCA	V
4	BBCA0511P	Deep Learning Lab	Elective-III	Emerging Technologies Lab	BCA	V
5	BBCA0512P	Robotics Process Automation (RPA) Lab	Elective-III	CRM/RPA Lab	BCA	V
6	BBCA0513P	Video Editing with Photoshop/Capcut Lab	Elective-III	Graphics & Video editing Lab	BCA	V

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Evaluation Scheme

SEMESTER VI

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	BBCA0601	Cloud Computing	Mandatory	3	1	0	30	20	50		100		150	4
2	BBCA0602	Software Testing	Mandatory	3	1	0	30	20	50		100		150	4
3	BBCA0651	Cloud Computing Lab	Mandatory	0	0	4				50		50	100	2
4	BBCA0652	Software Testing Lab	Mandatory	0	0	4				50		50	100	2
5	BBCA0659	Project	Mandatory	0	0	24				200		300	500	12
		TOTAL							100	300	200	400	1000	24

List of MOOCs (Infosys Springboard) Based Recommended Courses for Third Year (Semester-VI) BCA

S. No.	Subject Code	Course Name	University/ Industry Partner Name	N. of Hours
1.	BMC0026	Introduction to Cloud Computing	Infosys Wingspan (Infosys Springboard)	5h 44m
2.	BMC0133	Software Testing Fundamentals	Infosys Wingspan (Infosys Springboard)	7h 59m

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MOOCs: Massive Open Online Courses.



Course Code: BBKA0501				Course Name: Internet of Things				L	T	P	C
Course Offered in: BCA								3	1	0	4
Pre-requisite: Basic knowledge of electronics, computer networks, and programming											
Course Objectives:											
This course emphasizes the study of the introduction of IoT technology, Components, architecture, network Communications and applications protocols. The course also aims at understanding various hardware for IoT, programming concepts using Arduino and Raspberry Pi, and studying about applications of IoT											
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy			
CO1:	Describe the Architectural Overview of IoT.							K2			
CO2:	Apply Sensors, actuators, and microcontrollers used in IoT implementation.							K3			
CO3:	Execute and verify programs with the help of Arduino, Node MCU, and Raspberry Pi.							K3			
CO4:	Illustrate various applications of IoT protocols.							K2			
CO5:	Analyze applications like Smart metering systems, Smart streetlights, home automation, and smart city applications.							K4			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	3	1	2	1	1	1	1			
CO2	3	3	2	2	2	1	1	1			
CO3	3	2	3	2	2	1	1	1			
CO4	3	2	3	2	2	1	1	1			
CO5	3	2	2	2	2	2	2	1			
Course Contents / Syllabus											
Unit 1		An Architectural Overview								12 hours	
Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.											
Unit 2		Hardware Components:								12 hours	
Sensors, different types of Sensors, Transducer, Actuators, Radio Frequency Identification (RFID) Technology. Overview of IOT supported Hardware Computational platforms such as Arduino, NetArduino, Raspberry Pi, Node MCU, and ARM cortex and its Architecture											
Unit 3		Programming Arduino and Raspberry Pi:								12 hours	



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Arduino platform boards anatomy, Arduino IDE coding, using emulator, using libraries, arithmetic addition in Arduino IDE, programming the Arduino for IoT. Programming with Node MCU, Introduction to Raspberry Pi Board. Interfacing and programming the various sensors, IOs, etc. with different platforms

Unit 4	Transport & Session Layer Protocols:	12 hours
PHY/MAC Layer ,Bluetooth Low Energy, Zigbee Smart Energy, Network Layer- IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP ,CoAP, XMPP, AMQP, MQTT		
Unit 5	IoT Applications:	12 hours
Smart metering, e-health, Smart city automation, Automotive applications, home automation, communicating data with H/W units, mobiles, and tablets, Designing smart streetlights in smart cities, and Ideation of Mini Project		
Total Lecture Hours		60 hours
Textbook:		
1. —The Internet of Things, 1st Edition March 2015		Michael Miller

2. INTERNET OF THINGS, 2nd Edition, May 2022		McGraw-Hill
Reference Books:		
Programming arduino next steps Education ,2nd Edition, 2018		Mc Graw-Hill
Internet of Things (A Hands-on-Approach) , 1st Edition VPT, 2015.		Vijay Madiseti and Arshdeep Bahga
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0130009559159357441881_shared/overview	2 hr 53 m
Video Lectures	1. https://www.youtube.com/watch?v=7iWriXyl2cE&t=2s 2. https://www.youtube.com/watch?v=FRxRT0DjE7A 3. https://www.youtube.com/watch?v=qtkKa0Dsv30 4. https://www.youtube.com/watch?v=bIbfkOPhJL4	16 hr 51 m
Web References	https://www.geeksforgeeks.org/blogs/top-iot-project-ideas/	



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Course Code: BBKA0502	Course Name: Software Engineering	L	T	P	C
Course Offered in: BCA		3	0	0	3

Pre-requisite: Basic knowledge about software, along with any programming language.

Course Objectives:

To enable students to develop methods and procedures for software development that can scale up for large systems and that can be used consistently to produce high, quality software at low cost and with a small cycle of time.

Students will be able to understand the concepts of requirement engineering, designing and its principles, testing techniques and maintenance methods for effective software development.

Course Outcome: After completion of the course, the student will be able to

Bloom's Taxonomy

CO1:	Explain various software characteristics and analyze different software Development Models	K4
CO2:	Demonstrate the contents of an SRS and apply basic software quality assurance practices to ensure that design, development meet or exceed applicable standards.	K3
CO3:	Discuss various methods for software design.	K2
CO4:	Discuss testing strategy for software systems, employ techniques such as unit testing, Test driven development and functional testing.	K3
CO5:	Explain maintenance and different techniques for project management.	K2

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

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	3	3	2	2	3	3
CO2	3	3	2	3	3	2	3	3
CO3	2	3	3	3	3	2	2	3
CO4	3	3	3	3	3	2	3	3
CO5	3	3	3	3	3	2	3	3

Course Contents / Syllabus

Unit 1	Introduction	09 hours
Evolving role of Software, Software Characteristics, Software Crisis, Silver Bullet, Software Myths, Software Process, Software Engineering Phases, Team Software Process (TSP), Emergence of Software Engineering, Software process, Project, and Product. Software Process Models: SDLC, Waterfall Model, Prototype Model, Spiral, Model, Iterative Model, Incremental Model, V Process Model, Agile Methodology		
Unit 2	Software Requirement Specifications (SRS)	09 hours
Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modelling, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Quality concepts, Software quality assurance, SQA activities, Formal approaches to SQA; Statistical software quality assurance; CMM, The ISO standard.		
Unit 3	Software Design	09 hours
Software Design: Design principles, the design process; Design concepts: Abstraction, Refinement, Modularity (Cohesion and coupling), Software Architecture (Function Oriented Design, Object Oriented Design), Control Hierarchy (Top-Down and Bottom-Up Design), Structural partitioning, Data structure, Software procedure, Information hiding. .		



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Unit 4	Software Testing	09 hours
Software Testing: Testing Objectives, Unit Testing, Integration Testing, User Acceptance Testing, Regression Testing, testing for Functionality and Testing for Performance, Top Down and Bottom, Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards. Software Quality Assurance (SQA): Quality concepts, Software quality assurance, SQA activities		
Unit 5	Software Maintenance	09 hours
Preventive, Corrective and Perfective Maintenance, Project Management concepts, Planning the Software Project, Cost of Maintenance, Estimation—Empirical Estimation COCOMO, Risk analysis and management, Software reengineering, Reverse Engineering, Forward engineering, CASE Tool		

		Total Lecture Hours	45 hours
Textbook:			
1., —Software Engineering, New Age International Publishers, Fourth Edition, 21 August 2022		KK Aggarwal and Yogesh Singh	
2. RS Pressman, Software Engineering: A Practitioners Approach, Hill, 9th edition 2020		McGraw	
3, Fundamentals of Software Engineering, PHI Publication. 5th Edition 2018		Rajib Mall	
Reference Books:			
1., Software Engineering, Wiley. 1 January 2010		Pankaj Jalote	
2., Software Engineering, Addison Wesley. 9th Edition. 29 October 2017		Ian Sommerville	
Self-Study Content Links:		Duration (in Hrs)	
MOOCs	1. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013382690411003904735_shared/overview	1 hr 50 m	
	2. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013382690411003904735_shared/overview	5 hr 21 m	
	3. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01318222764601344033_shared/overview	7 hr 10 m	
Video Lectures	1. https://www.youtube.com/watch?v=OT2O7uNldQk	2 hr 50 m	
	2. https://www.youtube.com/watch?v=wEr6mwquPLY	5 hr 21 m	
	3. https://www.youtube.com/watch?v=izAq05SBvMI	7 hr 10 m	
	4. https://viit.digimat.in/nptel/courses/video/106105150/L01.html	2 hr 50 m	
	5. https://www.youtube.com/watch?v=PXYqu-OcBoY	5 hr 21 m	



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Web References	1. https://www.atlassian.com/agile 2. https://www.ibm.com/think/topics 3. https://www.tutorialspoint.com/ 4. https://www.browserstack.com/guide/unit-testing-vs-integration-testing 5. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01260589506387148827_shared/overview	2 hr 25 m 5 hr 15 m 7 hr 10 m 2 hr 15 m 5 hr 21 m
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Course Code: BBKA0503			Course Name: System and Network Security				L	T	P	C
Course Offered in: BCA							3	1	0	4
Pre-requisite: Basic knowledge of Computer Systems, Operating Systems, and Computer Networks.										
Course Objectives:										
To provide knowledge of system and network security concepts, threats, vulnerabilities, and protection mechanisms. The course focuses on securing systems, networks, and communication using modern security tools and techniques										
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy		
CO1	Understand fundamental concepts of system and network security							K2		
CO2	Analyze various network threats, attacks, and vulnerabilities							K2		
CO3	Apply cryptographic and network security mechanisms							K3		
CO4	Demonstrate network security mechanisms							K3		
CO5	Evaluate System Security and hardening practices							K4		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1		3	2	1	2	-	-	2	1	
CO2		2	3	2	2	-	-	3	1	
CO3		2	2	3	3	1	-	3	1	
CO4		1	2	3	3	2	1	2	1	
CO5		2	3	2	2	1	1	3	2	
Course Contents / Syllabus										
Unit 1		Fundamentals of System & Network Security							12 hours	
Definition, Evolution, and Need of System & Network Security, Difference between Information Security, Cyber Security, Network Security Cyber Forensics, The CIA Triad (Confidentiality, Integrity and Availability), Security Concepts: Threats, Vulnerabilities, Exploits, Risks, Attacks, Type of Attacks: Passive & Active, Security Policies, Procedures, and Awareness.										
Unit 2		Network Threats and Attack Techniques							12 hours	
Network Attacks: DoS, DDoS, Spoofing, Sniffing, Man-in-the-Middle, Malware: Virus, Worm, Trojan, Ransomware, Spyware, Social Engineering: Phishing, Baiting, Pretexting, Web Attacks: SQL Injection, Cross-Site Scripting (XSS), Clickjacking, Wireless Network Threats and Rogue Access Points , Emerging Threats: IoT and Mobile Security										
Unit 3		Network Security Defense Techniques							12 hours	
Authentication Mechanisms: Passwords, OTPs, Biometrics, Access Control Models: DAC, MAC, RBAC, Firewalls: Types, Configurations, Limitations, Intrusion Detection and Prevention Systems (IDS/IPS), Cryptography: Basic Idea of Encryption and Decryption, Endpoint Protection: Antivirus, Anti-Malware, Backup Types: Full, Incremental, Differential, Incident Response Basics.										
Unit 4		Network Security Mechanisms							12 hours	
Basic Network Security Concepts: IP, MAC, Ports, Protocols (HTTP, HTTPS, FTP), Firewalls: Types, Configuration, Limitations, Intrusion Detection and Prevention Systems (IDS/IPS), Virtual Private Networks (VPNs), Network Security Devices: Routers, Switches, Proxies, Authentication Techniques: Passwords, OTP, Biometrics.										
Unit 5		System Security & Hardening							12 hours	



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OS Security: Operating System Security (Windows/Linux Basics), System Hardening Techniques, Secure Configuration Practices, System Updates: Patch Management and Software Updates, User Privileges and Access Management, Endpoint Security: Antivirus, Anti-malware, Backup & Recovery: Full, Incremental, Differential, Email Security and Safe Browsing			Total Lecture Hours	60 hours
Textbook:				
1. Computer Security: Principles and Practice, , Lawrie Brown, Edition 4th, 2017			Pearson, William Stallings	
2. Computer Security Fundamentals, ,Edition 4th, 2019			Pearson, Chuck Easton	
Reference Books:				
1. Computer System Security -23			Katson Books Niraj Kumar Tiwari 2022	
2. Computer Network Security, , First published:28 February 2020			WILEY, Ali Sadiqui	
Self-Study Content Links:			Duration (in Hrs)	
MOOCs	Infyspringboard Course: SSCP Certification Systems Security Certified Practitioner https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0130944425750691842701_shared/overview			6 H 33 M
Video Lectures	https://www.youtube.com/watch?v=z5nc9MDbvkW https://nptel.ac.in/courses/106106129 https://www.youtube.com/watch?v=BdluJhRaAMA https://nptel.ac.in/courses/106105183 https://nptel.ac.in/courses/106106129			16h 53 m
Web References	https://www.geeksforgeeks.org/computer-networks/network-security/ https://www.w3schools.com/cybersecurity/cybersecurity_network_attacks.php https://www.geeksforgeeks.org/computer-networks/protection-methods-for-network-security/ https://www.geeksforgeeks.org/computer-networks/types-of-security-mechanism/ https://www.geeksforgeeks.org/computer-networks/what-is-system-hardening/			5h 50 m



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Course Code: BBKA0511				Course Name: Deep Learning				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Basic programming knowledge in Python, fundamentals of mathematics and statistics. Basic Modeling Concepts.											
Course Objectives:											
1. To introduce the fundamental concepts of Artificial Intelligence, Machine Learning, and Deep Learning along with their real-world applications.											
2. To develop understanding of neural networks, convolutional neural networks, recurrent neural networks, and autoencoders for solving image and sequence-based problems.											
3. To provide practical exposure to deep learning techniques such as image classification, object detection, text analysis, and anomaly detection using modern deep learning frameworks and tools.											
4. To enable students to implement deep learning models and mini-projects for solving real-world applications using TensorFlow/Keras.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy			
CO1	Explain the basic concepts of Artificial Intelligence, Machine Learning, Deep Learning, and performance evaluation metrics.							K2			
CO2	Apply neural network concepts and activation functions to develop simple deep learning models.							K3			
CO3	Implement convolutional neural networks and object detection techniques for image-based applications							K3			
CO4	Analyze sequence data using RNN, LSTM, and GRU models for text and sequence-based applications							K4			
CO5	Apply autoencoders, encoder-decoder concepts, and regularization techniques to solve practical problems using deep learning tools and mini-projects							K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	2	1	2	1	1	1	2		
CO2		3	2	2	3	2	1	1	2		
CO3		3	3	3	3	2	1	1	2		
CO4		3	3	2	3	2	1	1	3		
CO5		3	2	3	3	3	1	1	3		
Course Contents / Syllabus											
Unit 1		Introduction & Foundations								08 hours	
Introduction: Artificial Intelligence, Machine Learning and Deep Learning, real-world applications of Deep Learning, Basic data concepts: types of data, features and labels, model performance metrics: accuracy, precision, recall and F1- score, overfitting and underfitting, train-test split and basic validation techniques, introduction to neural networks, biological neuron and artificial neuron model, Activation functions ReLU, Sigmoid, Tanh and SoftMax, basic architecture of neural networks.											
Unit 2		Convolutional Neural Network								10 hours	
Introduction to computer vision, image representation using pixels and RGB channels, image preprocessing techniques: resizing and normalization, Basic concepts of convolutional neural networks: convolution, filters, feature maps and pooling layers, feature extraction using CNN, simple CNN architecture, image classification using CNN models, introduction to transfer learning and pre-trained models, applications of CNN in face detection, medical imaging and object recognition.											
Unit 3		Detection & Recognition								10 hours	



Basic concepts of feature detection in images, edge detection fundamentals, image classification and object detection concepts, difference between image classification and object detection, introduction to object detection techniques, overview of YOLO algorithm, object localization and recognition, practical understanding of object detection using real-world applications such as surveillance, autonomous vehicles and face detection.

Unit 4	Recurrent Neural Networks	09 hours
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Introduction to sequence data such as text and time series, basic concepts and working of recurrent neural networks, applications of RNN in natural language processing, text prediction and sentiment analysis, vanishing gradient problem

(conceptual overview), introduction to Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU), bidirectional RNN concept, real-world applications such as chatbots, language translation and speech recognition.

Unit 5	Autoencoders, Decoders & Applications	08 hours
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Introduction to unsupervised learning, basic concepts of autoencoders including encoder and decoder architecture, encoding, latent representation and decoding process, dimensionality reduction and data reconstruction, applications of autoencoders in image denoising, anomaly detection and data compression, regularization techniques including dropout and batch normalization, implementation of basic deep learning models using TensorFlow/Keras, mini-projects based on image classification and text classification.

Total Lecture Hours	45 hours
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Textbook:

1. 1. Fundamental of Neural Network and Deep Learning, 1st edition (25 September 2022).	Dr. Sushma Jaiswal and Dr. A. Kumar
2. 2. Neural Networks and Learning Machines 3e 3 Edition, 2016.	Simon Haykin
3. Deep Learning with Python, First Edition, December 2017	François Chollet

Reference Books:

1. Dive into Deep Learning, 7 December 2023	Aston Zhang, Zachary C. Lipton, Mu Li, and Alexander J. Smola
2. Artificial Intelligence: A Modern Approach, 3rd edition, December 2009	Russell, S. and Norvig

Self-Study Content Links:

		Duration (in Hrs)
MOOCs	https://www.coursera.org/specializations/deep-learning https://www.coursera.org/specializations/machine-learning-introduction https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_cs66 https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_cs01 https://course.fast.ai/	10 hrs
Video Lectures	(371) Lec-1 Introduction to Artificial Neural Networks - YouTube (3) Deep Learning(CS7015): Lec 8.1 Bias and Variance - YouTube (3) Mod-10 Lec-39 Assessing Learnt classifiers; Cross Validation; - YouTube (3) Lec-1 Introduction to Artificial Neural Networks - YouTube (3) Lecture 1 Introduction to Convolutional Neural Networks for Visual Recognition - YouTube (3) Lecture 2 Image Classification - YouTube	22 hr 56 m



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नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

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Web References	1. TensorFlow Official Documentation 2. Keras Documentation 3. Deep Learning Specialization – Coursera 4. PyTorch Tutorials 5. Scikit-learn Machine Learning Documentation 6. Google AI Education Resources 7. MIT Introduction to Deep Learning 8. DeepLearning.AI Resources	6 hr 51 m
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Course Code: BBKA0512	Course Name: Robotics Process Automation (RPA)	L	T	P	C
Course Offered in: BCA		3	0	0	3

Pre-requisite: Basic computer skills, fundamental programming knowledge and problem-solving skills.

Course Objectives:

This course aims to provide a comprehensive understanding of Robotic Process Automation (RPA), covering its basics, tools, advanced concepts, and techniques, as well as practical deployment and maintenance.

Course Outcome: After completion of the course, the student will be able to

Bloom's Taxonomy

CO1 Understand RPA fundamentals and applications

K2

CO2 Use RPA tools and environment effectively

K3

CO3 Design workflows using control flow

K5

CO4 Perform data handling and scraping tasks

K3

CO5 Debug and deploy RPA bots

K4

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

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	-	1	-	-	1	-
CO2	3	2	1	3	-	1	2	1
CO3	3	3	2	3	-	1	2	-
CO4	2	3	2	3	1	1	2	1
CO5	2	2	3	3	1	1	3	1

Course Contents / Syllabus

Unit 1 **Introduction to RPA Automation concepts** **09 hours**

Definition of RPA; RPA vs Traditional Automation; Benefits of RPA; Applications in industries (banking, healthcare, education); Types of Bots (Attended, Unattended); Characteristics of RPA; Advantages and limitations; RPA lifecycle overview; Basic real-world examples.

Unit 2 **RPA Tools & Environment** **10 hours**

Introduction to UiPath and other tools; Installation and setup; UiPath Studio interface (panels, ribbon, properties); Project types; Activities overview; Managing packages; Variables (String, Int, Boolean, Array); Data types; Arguments (basic idea); Input/Output dialogs; Message box; File and folder operations (basic); Naming conventions and best practices

Unit 3 **Workflow Design** **08 hours**

Control flow basics; If-Else conditions; Switch activity; Loops (For Each, While, Do While); Decision making; Assign activity; Delay activity; Break activity; Basic workflow design; Recording (Desktop and Web); Introduction to automation steps; Simple process flow design

Unit 4 **Data Handling & Scraping** **09 hours**

Excel automation (Read Range, Write Range); Data tables basics; Filtering and sorting data; Data manipulation (add/remove rows/columns); Screen scraping methods; Selectors basics; Text extraction; PDF data extraction; Clipboard operations; Introduction to image-based automation; Handling simple dynamic data; Basic anchors concept

Unit 5 **Debugging & Deployment** **09 hours**

Debugging basics; Breakpoints; Step into/over; Highlight elements; Error handling (Try-Catch); Logging and messages; Common errors and solutions; Running automation; Publishing projects; Introduction to Orchestrator (overview only); Scheduling basics; Simple deployment concepts; Best practices for testing bots

Lecture Hours **45 hours**

Textbook:

1. —Learning Robotic Process Automation, Pack Publishing, 2018.	Alok Mani Tripathi,
2.: The Robotic Process Automation Handbook: A Guide to Implementing RPA Systems Springer India; 1st edition (31 December 2021)	Tom Taulli



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Reference Books:		
1. —Introduction to Robotic Process Automation: a Primer , Institute of Robotic Process Automation,1st Edition 2015.		Frank Casale, Rebecca Dilla, Heidi Jaynes, Lauren Livingston,
2. , Robotic Process Automation: Guide to Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultantl, Independently Published, 1st Edition 2018		Richard Murdoch
Self-Study Content Links		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0138419672862310408789_shared/overview	2 hrs
Video Lectures	https://www.youtube.com/watch?v=MBL-3Yb30FA&list=PL9ooVrP1hQOEeFvW5KaSea6mrlEU6TZ9s&ab_channel=edureka%21 https://www.youtube.com/watch?v=n6nxTBB16ag&list=PL9ooVrP1hQOEeFvW5KaSea6mrlEU6TZ9s&index=2&ab_channel=edureka%21 https://www.youtube.com/watch?v=p2SFDD9ViHg&list=PL9ooVrP1hQOEeFvW5KaSea6mrlEU6TZ9s&index=46&ab_channel=edureka%21 https://www.youtube.com/watch?v=A6FzMO73vdc&list=PL9ooVrP1hQOEeFvW5KaSea6mrlEU6TZ9s&index=47&ab_channel=edureka%21 https://www.youtube.com/watch?v=JMEZJOMGa-A&list=PL9ooVrP1hQOEeFvW5KaSea6mrlEU6TZ9s&index=41&ab_channel=edureka%21	16h 50 m
Web References	https://www.geeksforgeeks.org/blogs/robotic-process-automation/ https://academy.uipath.com/courses/introduction-to-robotic-enterprise-framework-v202110	1h 53 m

Course Code: BBCA0513			Course Name: Video Editing with Photoshop/Capcut			L	T	P	C
Course Offered in: BCA						3	0	0	3
Pre-requisite: Basic understanding of digital media files, computer file management, and familiarity with graphical user interfaces.									
Course Objectives:									
To equip students with fundamental skills in video editing using Photoshop and Capcut, including timelines, cuts, transitions, keyframe animation, and basic compositing.									
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy	
CO1	basic video concepts and apply proper project setup and asset-ingestion workflows in Photoshop and Capcut								(K3)
CO2	Apply timeline editing tools, cuts, transitions, and speed control techniques to construct rhythmically coherent video sequences.								(K4)
CO3	: Implement keyframe-based animations using masking, chroma-keying, and AI-driven effects in Photoshop and Capcut.								(K4)
CO4	Develop professional audio-visual layouts by applying multi-track audio mixing, typography, and captioning workflows in Capcut and Photoshop.								(K4)
CO5	Evaluate visual style choices and produce final deliverables by applying color grading, blend modes, and export optimizations for online platforms.								(K5)
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	2	2	1	3	1	1	1	3	
CO2	2	3	2	3	2	2	1	3	
CO3	1	2	2	3	1	1	1	3	
CO4	1	2	1	3	3	2	1	3	
CO5	1	2	2	3	2	3	2	3	
Course Contents / Syllabus									
Unit 1		Introduction to Video Workspaces & Asset Ingestion							09 hours
Introduction: Introduction to the video workspaces in Photoshop (Timeline panel) and Capcut (Desktop/Mobile interfaces). Video formats(MP4, MOV, AVI, etc.), understanding frame rates, aspect ratios and resolutions. Importing video codecs, audio assets, and image sequences.									
Operators & Basic Tools: The Splitting tool, Selection tools, Playhead behavior, and Canvas Scaling.									
Best Practices in Project Management: File naming conventions, folder directory nesting, and proxy file creation to enhance machine rendering readability and performance.									
Unit 2		Timeline Control, Transitions & Speed Control							09 hours
Decision Statements & Cuts: The anatomy of a cut: J-cuts, L-cuts, Match cuts, and Jump cuts. Utilizing the standard Ripple Edit, Slip, and Slide functions.									
Iterative Effects & Transitions: Working with repetitive adjustment layers in Photoshop. Linear vs. Non-linear speed ramping in Capcut. Seamless transition integration, Freeze frames, and implementing Loop cycles for digital backgrounds									
Unit 3		Compositing, Keyframing & Animation Curves							09 hours
Functions & Custom Animations: Introduction to spatial and temporal keyframing. Creating manual linear animations for position, scale, and opacity.									
Advanced Compositing: Video masking inside Photoshop utilizing vector paths. Capcut chroma-keying (Green screen									



removal), auto cutouts, and AI-driven background isolations.

Unit 4	Audio Engineering, Typography & Overlay Textures	09 hours
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Audio Controls: Multi-track audio mixing. Audio ducking techniques (fading music behind dialogue background tracks). Noise reduction, voice isolation filters, and utilizing sound effect libraries.

Typography & Graphics: Creating lower-thirds and title sequences in Photoshop using smart objects. Capcut auto-captions, keyframed text paths, and text-to-speech engine workflows.

Unit 5	Color Grading, Blend Modes & Final Delivery	09 hours
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Color Tools: Utilizing Photoshop's Camera Raw filter for video color grading. Capcut Look-Up Tables (LUTs), curve graphs, and manual HSL adjustments.

Overlay & Blend Modes: Screen, Multiply, and Overlay applications for light leaks and film textures.

File Handling & Rendering: Mastering export pipelines. Intricate configurations of H.264/HEVC codecs, bit-rate control (VBR vs. CBR), and direct upload presets for media deployment.

Total Lecture Hours	45 hours
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Textbook:

1. Maxim Jago, Adobe Premiere Pro Classroom in a Book (Adapting timeline and composition theories applicable to Photoshop Video Engine), Adobe Press.
2. Digital Media Academy, The Digital Filmmaking and Non-Linear Editing Guide, Wiley Publishing.

Reference Books:

1. Vector Press, The Mobile Creator Handbook: Editing with Capcut & Consumer Tools.
2. Adobe Creative Team, Adobe Photoshop Classroom in a Book (Video Layers Edition).

Self-Study Content Links:

Duration
(in Hrs)

MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013843352_08647065637299_shared/overview	16h 53 m
Video Lectures	1. https://www.youtube.com/watch?v=zwO5w0AVw4U 2. https://www.youtube.com/watch?v=pHMoPh6mzm4 3. https://www.youtube.com/watch?v=lvqPQSsr5h0 4. https://www.youtube.com/watch?v=EMDrqgepVhM&list=PL3r90O4yCRyTiKwrB6nQ30CFmlEqQ0jMS&index=2 5. https://www.youtube.com/watch?v=xTzvQkOIl2U 6. https://www.youtube.com/watch?v=IulghiX6TuI 7. https://www.youtube.com/watch?v=b5nseOEunjU 8. https://www.youtube.com/watch?v=_I8hqPrIsl0	22h 50 m
Web References	1. https://www.nobledesktop.com/learn/photoshop/creating-a-video-timeline 2. https://www.youtube.com/watch?v=j5_471mO14c 3. https://www.nobledesktop.com/learn/photoshop/creating-a-video-timeline 4. Editing Video in Photoshop Part 1: Getting Started 5. https://photographylife.com/how-to-edit-videos-in-photoshop	6h 56 m

LAB Course Code: BBKA0552				LAB Course Name: Software Engineering Lab				L	T	P	C
Course Offered in: BCA								0	0	4	2
Pre-requisite: Basic knowledge of Software and knowledge of any programming language.											
Course Objectives:											
To provide practical experience in software development processes such as requirements analysis, design, and coding. To develop skills in software testing and maintenance using modern tools and methodologies. To enable students to build high-quality software systems through hands-on project development.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Discuss ambiguities, inconsistencies, and incompleteness in the requirements specification and state functional and non-functional requirements.								K2		
CO2	Explain different actors and use cases from a given problem statement, and design a use case diagram to associate use cases with different types of relationships.								K3		
CO3	To develop skills in software testing and maintenance using modern tools and methodologies.								K3		
CO4	Demonstrate the modern tools for testing.								K3		
CO5	Demonstrate the modern engineering tools for project management								K3		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	3	3	3	2	2	3	3			
CO2	3	3	2	3	3	2	3	3			
CO3	2	3	3	3	3	2	2	3			
CO4	3	3	3	3	3	2	3	3			
CO5	3	3	3	3	3	2	3	3			
S.No.	Name of Practical/Experiment									CO	
1.	Assignment of mini project based on real world problem and create the requirement statement for assigned mini project									CO1	
2	Prepare an SRS document in line with the IEEE recommended standards on assigned project									CO2	
3.	Draw the use case diagram and DFD (0 level, 1 level, 2 level) for assigned project									CO2	
4.	Create Structural Diagram: Class diagram, Object diagram. Component diagram, Deployment diagram (assigned project)									CO3	
5.	Create Behavioral diagram: Activity diagram, State diagram (assigned project)									CO3	
6.	Create Interaction diagram: Sequence diagram, Timing diagram, Collaboration diagram (assigned project)									CO3	
7.	Write Test cases for LOGIN page for assigned project									CO4	
8.	Demo of JIRA software (Test case management & Agile software development).									CO5	
Total Hours: 30 hrs.											



Course Code: BBKA0555			Course Name: Competitive Programming skill			L	T	P	C
Course Offered in: BCA						0	0	6	3
Pre-requisite: Basic programming knowledge, problem-solving ability, and familiarity with one programming language.									
Course Objectives:									
- To develop students' problem-solving skills through structured algorithmic practice. - To strengthen computational thinking and logical reasoning. - To improve proficiency in coding through diverse competitive programming problems. - To expose students to common data structures, algorithms, and optimization techniques. - To prepare students for solving advanced programming challenges efficiently.									
Course Outcome: After completion of the course, the student will be able to									
CO1	Apply data structures and algorithms to solve array and string problems								K3
CO2	Implement linked list operations to solve data structure problems								K3
CO3	Analyze and solve tree and graph problems using advanced algorithms								K4
CO4	Design dynamic programming solutions for optimization problem								K4
CO5	Compare backtracking techniques to solve combinatorial problems.								K4
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	3	2	2	1	1	1	1	
CO2	2	3	2	2	1	1	1	1	
CO3	2	3	3	3	1	1	1	1	
CO4	2	3	3	3	1	1	1	1	
CO5	2	3	3	3	1	1	1	1	
Course Contents / Syllabus									
Unit 1	Foundations, Arrays, and Strings								6 hours
Introduction to competitive programming, algorithmic thinking, time and space complexity, problem-solving strategies, arrays, strings, hashing basics, sorting and searching fundamentals, and solving array/string-based coding problems.									
Unit 2	Linked Lists and Linear Structures								6 hours
Singly linked lists, doubly linked lists, linked list traversal and manipulation, insertion, deletion, reversal, merging, cycle detection, node rearrangement, and solving linked- list-based programming challenges.									
Unit 3	Trees and Graphs								6 hours
Binary trees, binary search trees, tree traversals, recursion, graph representation, DFS, BFS, shortest path, cycle detection, and solving tree/graph-based algorithmic problems.									
Unit 4	Dynamic Programming and Optimization								6 hours
Introduction to dynamic programming, memoization and tabulation, recurrence relations, optimal substructure, overlapping subproblems, and classical DP problems involving sequences, grids, subsets, and optimization.									
Unit 5	Backtracking and Combinatorics Problems								6 hours
Backtracking techniques, subset generation, permutations, combinations, constraint satisfaction problems, pruning, and solving combinatorial problems such as N-Queens, Sudoku, maze solving, and cryptarithmic.									
Total Lecture Hours								30 hours	
Textbook:									
1. Competitive Programming, 2013,						Steven Halim, Felix Halim			



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2. Guide to Competitive Programming: Learning and Improving Algorithms Through Contests, 2024,		Antti Laaksonen
3. Competitive Programming The Lower Bound of Programming Contests in the 2020s, 2022,		Steven Halim, Felix Halim, Suhendry Effendy
Reference Books		
1. Introduction to Algorithms, 2009		, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein
2. Algorithm Design, 2005,		Jon Kleinberg, Éva Tardos
3. Data Structures and Algorithm Analysis in C++ , 2013,		Mark Allen Weiss
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0130944399140945922584_shared/overview	3 hr 12 m
Video Lectures	https://www.youtube.com/watch?v=BEpBGTAniVQ https://www.youtube.com/playlist?list=PLDV1Zeh2NRsB6SWUrDFW2RmDotAfPbeHu https://www.youtube.com/watch?v=Qmt0QwzEmh0 https://www.youtube.com/playlist?list=PLDV1Zeh2NRsB6SWUrDFW2RmDotAfPbeHu https://www.youtube.com/playlist?list=PLDV1Zeh2NRsB6SWUrDFW2RmDotAfPbeHu https://www.youtube.com/watch?v=BEpBGTAniVQ https://www.jsms.edu/nmeghanathan/files/2016/01/CSC323-Sp2016-QB-Module-4-Dynamic-Programming.pdf https://www.linkedin.com/posts/gaurish-baliga-443894131_%F0%9D%90%80-%F0%9D%90%86%F0%9D%90%AE%F0%9D%90%A2%F0%9D%90%9D%F0%9D%90%9... https://www.youtube.com/watch?v=BEpBGTAniVQ https://www.youtube.com/playlist?list=PLDV1Zeh2NRsB6SWUrDFW2RmDotAfPbeHu	17 hr 56 m



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Web References	1. https://www.geeksforgeeks.org/dsa/arrays/ 2. https://www.geeksforgeeks.org/dsa/strings-in-c/ 3. https://www.geeksforgeeks.org/dsa/linked-list-data-structure/ 4. https://www.geeksforgeeks.org/dsa/binary-tree-data-structure/ 5. https://www.geeksforgeeks.org/dsa/graph-data-structure-and-algorithms/ 6. https://cp-algorithms.com/ 7. https://www.geeksforgeeks.org/dynamic-programming/ 8. https://www.geeksforgeeks.org/backtracking-algorithms/ 9. https://usaco.guide/ 10. https://www.hackerearth.com/practice/algorithms/	4hr 50 m
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LAB Course Code: BBKA0555			LAB Course Name: Competitive Programming skill			L	T	P	C
Course Offered in: BCA						0	0	6	3
Pre-requisite: Knowledge of one programming language and mathematical concepts.									
Course Objectives:									
1. Given a computational problem, identify and abstract the programming task involved.									
2. Approach the programming tasks using techniques learned and write pseudo-code.									
3. Choosethe right data representation formats based on the requirements of the problem.									
4. Use comparisons and limitations of the various programming constructs and choose the right one for the task in hand.									
5. By learning the competitive programming constructs, students can easily switch over to any language in future.									
6. To develop students problem-solving skills, algorithmic thinking, and proficiency in coding by practicing diverse and challenging problems in competitive programming environments.									
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy	
CO1	Analyze and implement data structures and algorithms to efficiently solve diverse array and string programming challenges.						K4		
CO2	Develop skills in linked list operations to solve complex data structure challenges efficiently.						K3		
CO3	Develop skills in advanced algorithms for solving diverse challenges involving trees and graphs efficiently.						K3		
CO4	Develop skills in dynamic programming to efficiently solve complex optimization problems and challenges						K3		
CO5	Apply techniques in solving complex backtracking and combinatorial problems across diverse algorithmic scenarios efficiently						K3		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		3	3	2	2	1	-	-	1
CO2		3	3	2	2	1	-	-	1
CO3		3	3	3	3	1	-	-	2
CO4		3	3	3	3	1	1	-	2
CO5		3	3	3	3	1	1	-	2
S.No.	Program Name								CO
1	Find the largest sum contiguous subarray (Kadane's Algorithm).								CO1
2	Rotate an array by k steps.								CO1
3	Find the intersection of two arrays.								CO1



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4	Remove duplicates from a sorted array.	CO1
5	Find the longest common prefix among a set of strings.	CO1
6	Find the first non-repeating character in a string.	CO1
7	Check if a string is a valid palindrome.	CO1
8	Group anagrams together.	CO1
9	Implement strStr() (needle in a haystack).	CO1
10	Longest Substring Without Repeating Characters.	CO1
11	Find the maximum product subarray.	CO1
12	Find the majority element in an array.	CO1
13	Merge overlapping intervals.	CO1
14	Find all pairs in an array that sum up to a specific target.	CO1
15	Implement an algorithm to check if a string has all unique characters.	CO1
16	Find the minimum window substring.	CO1
17	Implement atoi (convert string to integer).	CO1
18	Multiply two large numbers represented as strings.	CO1
19	Find the longest palindromic substring.	CO1
20	Implement a function to find the median of two sorted arrays.	CO1
21	Reverse a linked list.	CO2
22	Detect a cycle in a linked list.	CO2
23	Merge two sorted linked lists.	CO2
24	Remove N-th node from the end of a linked list.	CO2
25	Find the intersection point of two linked lists.	CO2
26	Add two numbers represented by linked lists.	CO2
27	Flatten a multilevel doubly linked list.	CO2



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28	Copy a linked list with random pointers.	C02
29	Sort a linked list.	C02
30	Swap nodes in pairs.	C02
31	Partition a linked list around a value x.	C02
32	Clone a linked list with next and random pointers.	C02
33	Rotate a linked list.	C02
34	Reverse nodes in k-group.	C02
35	Find the middle of a linked list.	C02
36	Flatten a linked list.	C02
37	Remove duplicates from an unsorted linked list.	C02
38	Implement a function to add two numbers without using arithmetic operators.	C02
39	Convert a binary search tree to a sorted doubly linked list.	C02
40	Check if a linked list is a palindrome.	C02
41	Invert a binary tree.	C02
42	Find the lowest common ancestor of a binary tree.	C02
43	Level order traversal of a binary tree.	C02
44	Check if a binary tree is balanced.	C02
45	Serialize and deserialize a binary tree.	C02
46	Check if two binary trees are identical.	C02
47	Find the maximum path sum in a binary tree.	C02
48	Implement a tree (prefix tree).	C02
49	Find the shortest path in a graph (Dijkstra's algorithm).	C02
50	Detect a cycle in a graph.	C02
51	Check if a binary tree is a binary search tree.	C02



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52	Print all paths from the root to leaf nodes.	C02
53	Find the diameter of a binary tree.	C02
54	Construct a binary tree from preorder and in order traversal.	C02
55	Find the kth smallest element in a binary search tree.	C02
56	Implement an algorithm to check if a tree is symmetric.	C02
57	Find the deepest node in a binary tree.	C02
58	Implement a depth-first search (DFS) algorithm.	C02
59	Implement a breadth-first search (BFS) algorithm.	C02
60	Find all bridges in a graph (Tarjan's algorithm).	C02
61	Climbing Stairs problem.	C03
62	Longest Increasing Subsequence.	C03
63	0/1 Knapsack problem.	C03
64	Coin Change problem.	C03
65	Longest Common Subsequence.	C03
66	Minimum Path Sum in a grid.	C03
67	Edit Distance (Levenshtein distance).	C03
68	House Robber problem.	C03
69	Maximum Product Subarray.	C03
70	Palindromic Substrings.	C03
71	Longest Palindromic Subsequence.	C03
72	Partition Equal Subset Sum.	C03
73	Best Time to Buy and Sell Stock with Cooldown.	C03
74	Word Break problem.	C04
75	Maximum Sum of 3 Non-Overlapping Subarrays.	C04



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76	Count of Subset Sum problem.	C04
77	Maximum Length of Repeated Subarray.	C04
78	Minimum Cost to Merge Stones.	C04
79	Decode Ways.	C04
80	Longest Arithmetic Subsequence.	C04
81	Solve the N-Queens problem.	C05
82	Generate all subsets of a set.	C05
83	Word Search problem.	C05
84	Sudoku Solver.	C05
85	Permutations of a string or array.	C05
86	Combination Sum problem.	C05
87	Generate Parentheses.	C05
88	Rat in a Maze problem.	C05
89	Hamiltonian Path problem.	C05
90	Subset Sum problem.	C05
91	Solve the Word Ladder problem.	C05
92	Find all possible combinations of k numbers that add up to n.	C05
93	Lexicographical permutations of a string.	C05
94	Find all unique combinations of numbers that sum up to a target.	C05
95	Implement a function to solve the Knight's Tour problem.	C05
96	Find all possible solutions for the m-coloring problem.	C05
97	Generate all permutations of a string or array with duplicates.	C05
98	Implement an algorithm for the Eight Queens puzzle.	C05
99	Solve the Cryptarithmic puzzle.	C05



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100	Find the Kth permutation sequence.	CO5
Total Hours: 45 hrs.		



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LAB Course Code: BBKA0556	LAB Course Name: Workplace Communication Lab V	L	T	P	C
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Course Offered in: BCA	0	0	4	2
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Pre-requisite: The students should have completed the course Workplace Communication Lab IV

Course Objectives:

1. To demonstrate competence in the end-to-end recruitment process
2. To integrate aptitude with effective communication competencies
3. To articulate domain-specific language aligned with IT industry standards
4. To develop resilience for performance in multi-stage selection processes

Course Outcome: After completion of the course, the students will be able to

CO	Course Outcome	Bloom's Taxonomy
CO1	Design an ATS-friendly professional portfolio (resume and LinkedIn).	K6
CO2	Employ advanced verbal aptitude strategies within various placement contexts.	K3
CO3	Perform effectively in technical, HR, and managerial interviews.	K3
CO4	Analyse group dynamics to strategically steer and contribute to group discussions.	K4
CO5	Demonstrate professional etiquette for corporate workplace readiness.	K3

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

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	-	-	-	3	-	1	2
CO2	-	1	1	1	3	-	-	2
CO3	-	-	-	-	3	1	1	2
CO4	-	1	-	-	3	1	1	2
CO5	-	-	-	-	3	-	2	2

List of Practical

S. No.	Name of Experiments/ Programs	CO
1.	Introduction to the Course and Evaluation Scheme Students will gain a comprehensive understanding of the course, syllabus, course expectations, and evaluation scheme. The Master Resume (ATS Optimization Lab) Students develop an ATS-optimized resume, LinkedIn profile, and targeted cover letter aligned with job roles.	CO1
2	Digital Presence & Personal Branding Audit Students evaluate and refine their professional digital identity to align with industry expectations.	CO1
3	Critical Reasoning & Reading Intelligence Lab Students solve advanced comprehension passages and justify responses using structured reasoning and analytical articulation.	CO1
4	Contextual Vocabulary & Corporate Language Lab Students interpret nuanced workplace language, idioms, and tone used in corporate communication.	CO1
5	Listening Under Pressure (Advanced Listening Trap) Students process layered information in distraction-heavy scenarios to improve accuracy and retention.	CO2



6	Case-Based Group Discussion Simulation Students participate in business case discussions demonstrating structured thinking and solution-oriented communication.	CO2
7	Strategic Intervention & GD Leadership Lab Students practice entering, steering, and concluding discussions using persuasive and diplomatic strategies.	CO2
8	Abstract Topic Handling Drill Students respond to unconventional topics, showcasing creativity, clarity, and structured spontaneous thinking.	CO2
9	The TMAY (Tell Me About Yourself) Masterclass Students craft and deliver structured self-introductions of varying durations aligned with recruiter expectations.	CO3
10	STAR Technique Application Lab Students respond to behavioral interview questions using structured storytelling techniques based upon —Situation, Task, Action and Result.	CO3
11	Technical Interview Articulation Lab Students explain coding logic and problem-solving approaches clearly in simulated technical interviews.	CO3
12	HR Question Handling & Persuasion Lab Students respond to complex HR questions with clarity, confidence, and alignment to organizational values.	CO3
13	Corporate Grooming & Non-Verbal Intelligence Lab Students practice professional appearance, posture, and non-verbal cues essential for workplace success.	CO3
14	Email & Workplace Documentation Lab Students draft onboarding emails, escalation responses, and formal workplace communication with clarity and tone control.	CO4
15	Gender-Neutral & Inclusive Communication Lab Students practice using gender-neutral language and inclusive expressions in professional communication to ensure clarity, respect, and workplace sensitivity.	CO4
16	Interpersonal Intelligence & Conflict Resolution Simulation Students manage workplace conflicts and navigate hierarchical communication using assertiveness and empathy.	CO4
17	Professional Disagreement & Feedback Lab Students practice expressing disagreement and receiving feedback constructively while maintaining professionalism.	CO4
18	Crisis Communication & Response Drill Students analyze crisis scenarios and draft clear, responsible, and time-sensitive communication responses.	CO4
19	Think Fast: Real-Time Response Challenge Students respond to unpredictable workplace scenarios to enhance spontaneity and clarity under pressure.	CO5
20	Advanced Boardroom Presentation Lab Students deliver executive-style presentations focusing on clarity, brevity, and persuasive impact.	CO5
21	Pitch Without Slides (Executive Communication Drill) Students present ideas without visual aids to strengthen structured thinking and confident delivery.	CO5
22	Full-Scale Placement Simulation (Capstone Activity) Students undergo a complete mock recruitment process (Aptitude Test → Group Discussion → Technical Interview → HR Interview) to demonstrate end-to-end placement readiness.	CO5
Total Hours: 30 hrs		



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LAB Course Code:BBCA0511P	LAB Course Name: Deep Learning Lab	L	T	P	C
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Course Offered in: BCA	0	0	2	1
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Pre-requisite: Basic knowledge of Python programming, fundamentals of Machine Learning and mathematics.

Course Objectives:

1. To introduce students to the basic concepts of Artificial Intelligence, Machine Learning, and Deep Learning along with their practical applications using Python.
2. To develop understanding of artificial neural networks, convolutional neural networks, recurrent neural networks, and autoencoders through implementation-oriented learning.
3. To provide hands-on experience in image processing, image classification, object detection, sequence prediction, and sentiment analysis using deep learning frameworks and tools.
4. To enable students to design and implement basic deep learning models and mini-projects using TensorFlow/Keras for solving real-world problems.

Course Outcome: After completion of the course, the student will be able to

		Bloom's Taxonomy
CO1	Explain the fundamental concepts of Artificial Intelligence, Deep Learning, neural networks, and performance evaluation metrics through Python implementations.	K2
CO2	Apply artificial neural network concepts and activation functions to implement basic deep learning models using Python and TensorFlow/Keras.	K3
CO3	Implement CNNs and image processing techniques for image classification and object detection applications.	K3
CO4	Analyze sequence data and implement RNN/LSTM models for text prediction and sentiment analysis tasks.	K4
CO5	Apply autoencoders and regularization techniques to develop mini-projects and solve practical deep learning problems.	K3

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

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	2	1	1	1	2
CO2	3	3	2	3	2	1	1	2
CO3	3	3	3	3	2	1	1	2
CO4	2	3	2	3	2	1	1	3
CO5	3	2	3	3	2	1	2	3

List Of Practical's (Indicative & Not Limited To)

		CO
1	Write a Python program to calculate accuracy, precision, recall and F1-score using sample predicted values.	CO1
2	Write a Python program to draw Sigmoid and ReLU activation function graphs.	CO1
3	Write a Python program to implement a simple artificial neuron using NumPy.	CO1
4	Write a Python program to implement AND gate using a perceptron.	CO1



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5	Write a Python program to implement OR gate using a perceptron.	CO1
6	Write a Python program to build a simple ANN model using TensorFlow/Keras on sample data.	CO1
7	Write a Python program to classify handwritten digits using MNIST dataset.	CO3
8	Write a Python program to display an image and show its pixel values.	CO3
9	Write a Python program to convert an RGB image into grayscale image.	CO3
10	Write a Python program to resize and normalize an image using OpenCV.	CO3
11	Write a Python program to apply a simple convolution filter on an image.	CO3
12	Write a Python program to demonstrate max pooling operation on a small matrix.	CO3
13	Write a Python program to build a basic CNN model for MNIST image classification.	CO3
14	Write a Python program to perform edge detection using Canny edge detector.	CO3
15	Write a Python program to demonstrate image classification using a pre-trained model.	CO3
16	Write a Python program to create a simple sequence dataset and predict next number using RNN.	CO3
17	Write a Python program to perform basic sentiment classification using sample text data.	CO3
18	Write a Python program to build a simple LSTM model for sequence prediction.	CO3
19	Write a Python program to build a simple autoencoder for MNIST image reconstruction.	CO3
20	Write a Python program to demonstrate dropout regularization in a simple neural network	CO4
Total Hours: 15 hrs.		

LAB Course Code: BBKA0512P		LAB Course Name: Robotics Process Automation Lab (RPA)			L	T	P	C
Course Offered in: BCA					0	0	2	1
Pre-requisite: basic understanding of computers, programming fundamentals, and business processes will be beneficial.								
Course Objectives:								
To equip students with practical skills in designing, developing, and deploying RPA solutions, focusing on automating business processes using industry-standard RPA tools and technologies.								
Course Outcome: After completion of the course, the student will be able to								
CO1	Develop a real-world workflow automation project.							K6
CO2	Apply concepts and methods of RPA							K3
CO3	Implement control flow structures in programming languages							K3
CO4	Apply the knowledge of RPA tools, functions in various industries and perform							K3
CO5	Demonstrate and build a structured business automation process							K4
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)								
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	-	1	-	-	1	1
CO2	2	3	1	3	-	1	2	1
CO3	2	3	2	3	-	1	2	1
CO4	2	2	2	3	1	1	2	1
CO5	2	2	3	3	1	1	3	1
List Of Practical's								
S. No.	Name of Experiments/ Programs							CO
1.	Install UiPath Studio, create a new project, and display "Hello RPA" using a Message Box							CO1
2	Create variables of different data types (String, Integer, Boolean) and display their values							CO2
3	Take input from the user using an Input Dialog and display the entered data							CO2
4	Create a program to perform addition, subtraction, and multiplication of two numbers							CO2
5	Write a workflow to check whether a number is even or odd using If-Else							CO2
6	Print numbers from 1 to 10 using a loop (For Each or While)							CO2
7	Take a string input and display its length and uppercase form							CO2
8	Read data from an Excel file and display it using Message Box							CO3
9	Write user input data into an Excel file							CO3
10	Read data from an Excel sheet into a Data Table and display all rows using a loop							CO3
11	Extract text data from a website or application using screen scraping							CO3
12	Extract text from a PDF file and display the content							CO3
13	Create, copy, move, and delete files using automation activities							CO4
14	Implement error handling using Try-Catch in a workflow							CO4
15	Debug a workflow using breakpoints and step execution							CO4
16	Create a small automation project such as student result processing or invoice generation							CO5
Total Hours: 15 hrs.								

LAB Course Code: BBKA0513P			LAB Course Name: Video Editing with Photoshop/Capcut					L	T	P	C
Course Offered in: BCA								0	0	2	1
Pre-requisite: Basic Knowledge of computer											
Course Objectives:											
1. To familiarize students with the video timelines, workspace interfaces, and asset management systems of both Adobe Photoshop and CapCut. 2. To enable students to perform precise multi-track video editing, cutting, splicing, and pacing techniques. 3. To build practical skills in keyframing, motion tracking, audio synchronization, and color grading. 4. To encourage digital creativity through advanced transitions, visual special effects, AI tools, and composite video generation. 5. To prepare students to format, render, and export high-quality video content optimized for distinct web and social media platforms.											
Course Outcome: After completion of the course, the student will be able to										Bloom's Taxonomy	
CO1	Navigate, customize, and configure video project workspaces in both Photoshop and CapCut										K2
CO2	Execute core video modifications, multi-track splicing, and precise timeline management										K3
CO3	Implement dynamic motion design using keyframes, masking, and non-destructive layering										K4
CO4	Design cinematic assets by integrating custom audio, advanced typography & AI-driven special effects.										K5
CO5	Automate video elements, format platform-specific aspect ratios, and assemble a professional video portfolio.										K6
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	2	1	2	1	1	-	1		
CO2		3	3	2	2	1	1	-	1		
CO3		3	3	3	3	2	2	1	2		
CO4		3	3	3	3	3	2	-	2		
CO5		3	3	3	3	3	3	-	3		
S. No.	Name of Experiments/ Programs									CO	
1.	Introduction to Video Interfaces: Setting up video documents in Photoshop, managing CapCut desktop workspace, project initialization, and understanding frame rates									CO1	
2	Timeline Essentials & Multi-Track Editing: Importing video assets, rough cuts, using the split/trim tools, arranging tracks, and managing layers versus video groups.									CO2	
3	Working with Keyframes: Animating position, scale, opacity, and rotation of video clips and graphics over time in both applications.									CO3	
4	Cinematic Transitions & Speed Ramping: Applying standard cross-fades, utilizing CapCut's dynamic transition library, and mastering speed adjustments (slow-mo, fast-forward, and customized velocity curves).									CO3	
5	Advanced Masking & Overlays: Utilizing layer masks in Photoshop video timelines and implementing video masking, chroma keying (green screen), and picture-in-picture (PIP) modes in CapCut.									CO4	
6	Smart Objects & Non-Destructive Filters: Using Photoshop Smart Objects to apply camera raw filters and video effects non-destructively across video clips.									CO4	



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7	Typography & Dynamic Motion Titles: Creating lower thirds, designing text masks in Photoshop, and using CapCut's automated captions, text templates, and text tracking.	CO4
8	Color Correction & Grading: Adjusting exposure, contrast, levels, and saturation using Photoshop adjustment layers and applying LUTs, filters, and color matching in CapCut.	CO5
9	Audio Synchronization & Design: Importing audio tracks, splitting audio from video, volume leveling, adding background scores, fade-in/out effects, and voiceover recording.	CO5
10	CapCut AI & Smart Features: Experimenting with auto-reframe, AI body effects, background removal, and smart tracking tools for rapid content generation.	CO5
Total Hours: 15 hrs.		



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LAB Course Code: BBKA0559		LAB Course Name: Mini project using Internet of Things				L	T	P	C
Course Offered in: BCA						0	0	4	2
Pre-requisite: Basic knowledge of electronics, computer networks, and programming									
Course Objectives:									
Describe the functionality of computing, sensing, and actuating components of the Internet of Things.									
Develop IoT applications using Arduino IDE.									
Design, develop, and deploy real-time mini projects of IoT Applications.									
Describe the importance of Technology in the life of common men.									
Design and develop real-time IoT-based solutions for societal needs using appropriate hardware and communication protocols.									
Course Outcome: After completion of the course, the student will be able to									
CO1	Describe the functionality of computing, sensing, and actuating components of the Internet of Things.							K2	
CO2	Develop IoT applications using Arduino IDE.							K4	
CO3	Design, develop, and deploy real-time mini projects of IoT Applications.							K4	
CO4	Describe the importance of Technology in the life of common men.							K2	
CO5	Design and develop real-time IoT-based solutions for societal needs using appropriate hardware and communication protocols.							K5	
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		3	3	1	1	2	1	1	1
CO2		3	3	1	2	2	1	1	1
CO3		3	3	1	2	2	1	1	1
CO4		3	3	2	2	2	1	1	1
CO5		3	3	2	2	2	1	1	1
List Of Practical's (Indicative & Not Limited To)									CO
S. No.	Name of Experiments/ Programs								CO
1.	Installation of Arduino IDE and introduction to tools, assembly, and libraries.								CO1
2	Getting Programming board Info and configuring boot loader settings using Arduino IDE								CO1
3	Study Hardware Architecture and Pin Out of Arduino UNO Board. Compare Arduino Uno Arduino Nano and Arduino Mega. Identification of their use case according to a given scenario								CO2
4	Study type of Sensors in IOT. a. Study Pin out Architecture of Sensors and actuators b. DHT 11 Sensor c. MQ 135 Sensor d. MQ 7 Sensor e. MQ 3 Sensor f. Ultrasonic Sensor HC-04 g. Rain Sensor h. Soil moisture Sensor								CO2

	I. PIR Sensor j. LDR Sensor k. Line Sensor l. Colour Sensor m. Servo Motor n. Relay	
5	Working with structures using Arduino IDE a. Working with Variables using Arduino IDE b. Working with Flow control using Arduino IDE c. Working with Digital i/o using Arduino IDE d. Working with Analog i/o using Arduino IDE e. Working with the Time function using Arduino IDE f. Working with Math functions using Arduino IDE g. Working with Random functions using Arduino IDE h. Working with Serial communication using Arduino IDE i. Working with analog Read, analog Write, digital Read, digital Write using Arduino IDE, Blinking LED. Program using Arduino Uno	CO3
6	Write a program using Arduino Uno to generate a random number between 0 to 25. Use 4 LEDs (Red, Green, Blue, and Yellow) and design LED patterns as a. if the random number is less than 5 then only the Red LED should glow. b. if the random number is between 5-10 then only Blue LED should glow. if the random number is between 11-20 then only Yellow LED should glow. if the random number is greater than 20 then only Green LED should glow	CO3
7	Write a program using interfacing: a. Interfacing of DHT 11 Sensor with Arduino Uno. Implement an LED mechanism for notifying rise in temperature. b. Interfacing of MQ 135/MQ7 Sensor with Arduino Uno. Implement alarm mechanism for notifying rise in amount of hazardous gases in the air. c. Interfacing of MQ 3 Sensor with Arduino Uno. Implement alarm mechanism for checking amount of alcohol in the air	CO4
8	Detection of LPG Gas using MQ6 and Node MCU. Notify Thingspeak server that "LPG gas Leakage has been detected".	CO4
9	Controlling LED with Node MCU using Blynk cloud App.	CO5
10	Development of Mini Project Sample Projects: Introduction to IoT Projects.xlsx Controlling bulb from Mobile . a. Smart Dustbin using ultrasonic sensor. b. Automatic Parking Gate. Rain Detector	CO5
Total Hours: 30 hrs.		



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Course Code: BBKA0601	Course Name: CLOUD COMPUTING	L	T	P	C
Course Offered in: BCA		3	1	0	4

Pre-requisite: Adequate Basic knowledge of computers, programming, networking, and databases.

Course Objectives:

- To introduce the basic concepts and fundamentals of cloud computing.
- To examine virtualization and its role in cloud environments.
- To explain different cloud service models (IaaS, PaaS, SaaS) and architectures.
- To develop skills for managing cloud resources like compute, storage, and networking.
- To examine cloud security, privacy, monitoring, and auditing mechanisms.

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

Bloom's Taxonomy

CO1	Define the fundamentals of cloud computing and computing techniques.	K1
CO2	Describe the concepts of virtualization and its role in cloud service delivery.	K2
CO3	Discuss various services and architecture of cloud.	K2
CO4	Analyze the management of various cloud resources like instances, storage and network.	K4
CO5	Analyze the importance of cloud security solutions with monitoring and auditing.	K4

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

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	-	-	-	-	1
CO2	3	2	2	1	-	-	-	1
CO3	3	3	2	2	1	-	-	1
CO4	2	3	3	3	2	1	1	2
CO5	2	3	2	3	3	1	3	2

Course Contents / Syllabus

Unit 1	Introduction	12 hours
Introduction: Definition of Cloud, History of Cloud Computing, Evolution of Cloud Computing, Cloud Architecture, Types of Clouds: Deployment models & Service models, Major Players in Cloud Computing, issues in Clouds.		
Unit 2	Cloud Services & Cloud Service Provider	12 hours
Cloud Services: (IaaS, PaaS, SaaS) Software as a Service, Platform as a Service, Infrastructure as a Service. Service providers: GCP, AWS, Microsoft Azure, IBM, Sales force.		
Unit 3	Virtualization	12 hours
Virtualization for Cloud: Basics and need of Virtualization, Pros and cons of Virtualization, Types of Virtualizations: Hardware Virtualization, Operating System Virtualization, Server Virtualization, Storage Virtualization, Network Virtualization, Desktop Virtualization, Application Virtualization, Data Virtualization, Memory Virtualization, CPU Virtualization. Virtual Machines & its types, System VM, Process VM, Virtual machine properties, VMM and its types.		
Unit 4	Resource Management in cloud	12 hours
Managed and Unmanaged resources in cloud, Instance Management, EC2, Azure Virtual Machine, Google Compute Engine, Storage Services: Block Storage, Elastic File Storage, Object Storage, S3, RDS, Dynamo DB, Backup, disaster recovery and storage migration.		
Unit 5	Cloud Security, Monitoring and Auditing	12 hours



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Challenges and Objectives, Cloud data life cycle, Common Attacks in Cloud, **Security Standard:** Confidentiality, Integrity, and Availability (CIA), Authentication and Authorization, **Access controls:** Role based access controls, multifactor authentication, Security policy management, Identity and Access Management (**IAM**), Security Governance and Open Security Architecture, Monitoring and Auditing.

Total Lecture Hours **60 hours**

Textbook

1. ,Cloud Computing: Implementation, Management And Security, CRC Press, 2017.	Ritting house, John W., And James F. Ransome
2. —Distributed And Cloud Computing, From Parallel Processing To The Internet Of Thingsl, Morgan Kaufmann Publishers, 2013.	Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra,
3. Mastering Cloud Computing, Tata Mcgraw Hill, 2013.	Raj kumar Buyya, Christian Vecchiola, S. Thamaraiselvi,

Reference Books

1. , —Cloud Computing – A Practical Approach, Tata Mcgraw Hill, 2009.	Toby Velte, Anthony Velte, Robert Elsenpeter
2. , —Cloud Application Architectures: Building Applications and Infrastructure In The Cloud: Transactional Systems For EC2 And Beyond (Theory In Practice), O'Reilly, 2009.	George Reese

Self-Study Content Links: Duration (in Hrs)

MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_2924501508992_2640000_shared/overview	5 hr 44 m
Video Lectures	1. https://www.youtube.com/watch?v=ynPjd9TKLc4 2. https://www.youtube.com/watch?v=b1b6JTYnbjU 3. https://www.youtube.com/watch?v=ab036IW3ASw 4. https://www.youtube.com/watch?v=HTb_VYOE4WM 5. https://www.youtube.com/watch?v=9CoMa2D7LwI	11 hr 44 m
Web References	1. https://www.geeksforgeeks.org/cloud-computing/cloud-computing-tutorial/ 2. https://www.w3schools.com/aws/aws_cloudessentials_cloudcomputing.php	3hr 56m

Course Code: BBKA0602				Course Name: Software Testing				L	T	P	C
Course Offered in: BCA								3	1	0	4
Pre-requisite: Basic Knowledge of Computer and MS Excel.											
Course Objectives:											
1. To identify defects and errors in software before delivery. 2. To verify and validate requirements to ensure the software works as expected. 3. To improve software quality and reliability and provide confidence to users.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Describe the fundamentals of Software Development Life Cycle (SDLC), Software Testing concepts, testing principles, roles and responsibilities, and identify defects, test cases, and testing life cycle (STLC) components								K2		
CO2	Apply different functional testing methods such as unit, integration, system, acceptance, regression, and other functional testing types to validate software functionality.								K4		
CO3	Analyze various non-functional testing techniques including performance, security, reliability, usability, and compatibility testing to evaluate software quality attributes.								K5		
CO4	Demonstrate the use of black box testing techniques such as equivalence partitioning, boundary value analysis, decision tables, and state transition testing to design effective test cases.								K4		
CO5	Implement white box testing techniques such as statement coverage, branch coverage, path coverage, and data flow testing to verify internal program logic.								K4		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	1	1	1	1	1	2			
CO2	3	3	2	2	1	1	1	2			
CO3	2	3	2	3	1	1	2	2			
CO4	3	3	3	2	1	1	1	2			
CO5	3	3	2	3	1	1	1	2			
Course Contents / Syllabus											
Unit 1		Introduction									
Software Testing , Importance of testing, Roles and Responsibilities, Testing Principles, Attributes of Good Test, Test Case, Test Scenario, Bug, Failure, Defect, Fault, STLC.											
Unit 2		Functional Testing									
Unit Testing, Integration Testing, System Testing, Acceptance Testing, Regression Testing, Smoke Testing, Sanity Testing, Interface Testing, User Acceptance Testing (UAT), Alpha Testing, Beta Testing, API Testing, GUI Testing, Database Testing, Ad-hoc Testing, Exploratory Testing, Usability Testing, Compatibility Testing, Localization Testing, Internationalization Testing, Recovery Testing, Configuration Testing, Security Functional Testing, Install/Uninstall Testing, Accessibility Testing											
Unit 3		Non-Functional Testing							12 hours		



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Performance Testing, Load Testing, Stress Testing, Volume Testing, Scalability Testing, Security Testing, Usability Testing, Compatibility Testing, Reliability Testing, Recovery Testing, Maintainability Testing, Portability Testing, Availability Testing, Configuration Testing, Endurance Testing (Soak Testing), Spike Testing, Installation Testing, Localization Testing, Internationalization Testing, Accessibility Testing, Compliance Testing, Documentation Testing, Backup and Recovery Testing, Failover Testing, Interoperability Testing, Efficiency Testing.

Unit 4 **Black box Testing Technique** **12 hours**

Equivalence Partitioning, Boundary Value Analysis, Decision Table Testing, State Transition Testing, Use Case Testing, Cause-Effect Graphing, and Error Guessing.

Unit 5 **White box Testing Technique & Automation Testing** **12 hours**

White box Testing Technique: - Statement Coverage, Branch Coverage (Decision Coverage), Condition Coverage, Path Coverage, Loop Testing, Control Flow Testing, Data Flow Testing.

Automation Testing: - Introduction, Advantages, Reasons to adopt Automation Testing, Tests Suitable for Automation, Types of Automation Testing, Automation Testing Process, Criteria to Select Automation Tools, Popular Automation Tools, Best Practices for Test Automation.

Total Lecture Hours **60 hours**

Textbook:

1. —Software engineering- A practitioner's Approach, McGraw-Hill International 7 Editions, 2010	Roger S. Pressman
2.—Software Testing: Principles and Practices, 2017	Srinivasan Desikan,

Reference Books:

1. —Effective Software Testing: A Developer's Guide" 1st Edition 2022.	Maurício Aniche,
2. —The Complete Guide to Software Testing: A Complete Guide to Software Testing" by Edition: 3rd Year: 2019.	William C. Hetzel

Self-Study Content Links:

		Duration (in Hrs)
MOOCs	1. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384179286131507_24254_shared/overview	7H 59M
Video Lectures	1. https://www.youtube.com/watch?v=sbW4RThXNL8 2. https://www.youtube.com/watch?v=T0TynxN77oY&t=46s 3. https://www.youtube.com/watch?v=Qc-a0tBpdQQ 4. https://www.youtube.com/watch?v=BSjRmiYP7vg 5. https://www.youtube.com/watch?v=NiDe8lj-wGs	15 hr 44 m
Web References	1. https://www.geeksforgeeks.org/software-testing/software-testing-basics/ 2. https://www.ibm.com/think/topics/software-testing 3. https://katalon.com/resources-center/blog/software-testing	2hr 56m

LAB Course Code: BBKA0651			LAB Course Name: CLOUD COMPUTING LAB			L	T	P	C
Course Offered in: BCA						0	0	4	2
Pre-requisite: Basic knowledge of computer networks, operating systems, and cloud computing concepts.									
Course Objectives:									
1. To provide practical knowledge of cloud platforms and AWS services. 2. To develop skills in creating and managing virtual cloud resources. 3. To analyze cloud storage, security, and IAM concepts in AWS. 4. To enable students to design and manage virtual private cloud environments. 5. To familiarize students with serverless computing and OpenStack installation.									
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy	
CO1	Discuss about the use AWS management console, create, and manipulate Amazon instances.							K2	
CO2	Discuss the encrypting and controlling of S3.							K2	
CO3	Describe how to create private and virtual private cloud.							K3	
CO4	Create IAM group in cloud.							K2	
CO5	Discuss the steps of Installation of Open Stack.							K2	
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	2	-	1	-	-	-	2	
CO2	3	3	2	2	1	-	-	2	
CO3	3	3	2	3	1	-	-	2	
CO4	2	3	2	3	1	-	-	2	
CO5	2	3	3	2	2	-	1	3	
S. No.	Name of Experiments/ Programs								CO
1.	Navigate the AWS Management Console.								CO1
2	Create and manipulate Elastic Compute Cloud instances.								CO1
3	Create AWS EC2 Virtual Machine Using AWS Console.								CO1
4	.Monitoring Virtual Resources in AWS.								CO1
5	Getting Started with S3 in Cloud.								CO2
6	Working with EBS in AWS								CO2
7	.Build a relational database server.								CO2
8	Create private cloud, Designing a Custom VPC (Virtual Private Cloud).								CO3
9	Create an IAM Group in Cloud.								CO4
10	.Built a RESTful serverless API on AWS.								CO5
Total Hours: 30 hrs.									



LAB Course Code: BBKA0652	LAB Course Name: Software Testing Lab	L	T	P	C
Course Offered in: BCA		0	0	4	2

Pre-requisite: Basic Knowledge of Computer and MS Excel.

Course Objectives:

1. To develop practical skills in designing and executing test cases using functional, black box, and white box testing techniques.
2. To apply software testing methods such as unit, integration, GUI, and boundary-based testing for validating software applications.
3. To enhance analytical and problem-solving abilities through systematic testing of real-world software scenarios.

Course Outcome: After completion of the course, the student will be able to		Bloom's Taxonomy
CO1	Design and execute basic test cases for software applications such as login pages using valid and invalid input conditions.	K3
CO2	Perform functional testing methods including Unit Testing, Integration Testing, and GUI Testing for validating software modules and interfaces	K3
CO3	Construct test scenarios using Decision Table and State Transition Testing techniques for real-world systems such as ATM and online order processing.	K4
CO4	Apply black box testing techniques such as Equivalence Partitioning and Boundary Value Analysis to develop effective test cases.	K4
CO5	Develop white box test cases using Statement Coverage and Branch Coverage techniques to verify internal program logic.	K4

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

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	1	2	1	1	2
CO2	3	3	2	2	1	1	1	2
CO3	2	3	3	2	1	1	1	2
CO4	3	3	2	3	2	1	1	2
CO5	3	3	2	3	1	1	1	2

List Of Practical's (Indicative & Not Limited To)

S. No.	Name of Experiments/ Programs	CO
1.	Write test cases for a Login Page that includes username and password fields using valid and invalid inputs.	CO1
2	Perform Unit Testing for a simple calculator program that performs addition, subtraction, multiplication, and division.	CO2
3	Design Integration Testing scenarios for a student management system integrating login, registration, and result modules.	CO2
4	Create test cases for GUI Testing of an online registration form including text boxes, radio buttons, and dropdown menus.	CO2
5	Prepare a Decision Table for an ATM withdrawal system considering conditions such as valid PIN, sufficient balance, and daily withdrawal limit.	CO3
6	Design test cases using State Transition Testing for an online order system with states such as Order Placed, Shipped, Delivered, and Cancelled.	CO3



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7	Design test cases using Equivalence Partitioning technique for a program that accepts marks between 0 and 100.	CO4
8	Apply Boundary Value Analysis to test an input field that accepts numbers from 1 to 50.	CO4
9	Design White Box test cases to achieve Statement Coverage and Branch Coverage for a given conditional program.	CO5
Total Hours: 30 hrs.		