



BCA (Bachelor of Computer Application)
Semester-VII (Without Research)

Course Code	US07HMABCA01	Title of the Course	Basics of Generative AI
Total Credits Of the Course	4	Hours per Week	4

Course Objectives:	1. To understand the basic concepts and evolution of Generative Artificial Intelligence and foundation models. 2. To study the architecture and working principles of transformer-based models and large language models. 3. To explore open AI ecosystems, including model repositories, datasets, and collaborative development practices. 4. To understand techniques for model training, fine-tuning, optimization, and evaluation. 5. To learn the design and deployment concepts of intelligent AI applications with ethical and responsible AI practices.
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Course Content		
Unit	Description	Weightage (%)
1.	Foundations of Generative AI and Transformer Models • Machine Learning vs Deep Learning vs Generative AI • Foundation Models - Concept • Large Language Models (LLMs) • Transformer Architecture (Conceptual Study) • Attention Mechanism • Tokenization and Embeddings • Pretraining and Fine-Tuning Concepts • Multimodal AI Overview	25
2.	Open AI Ecosystems and Model Development • Open-source AI Movement • Collaborative AI Development • Model Repositories and Model Sharing Concepts • Model Cards and Documentation Standards • Dataset Management Concepts • Tokenizers and Model Pipelines • Experiment Tracking and Versioning • Ethical Issues in Open AI Systems	25





3.	Model Training, Optimization and Evaluation • Transfer Learning Concepts • Fine-tuning Strategies • Parameter Efficient Training Methods • Hyperparameter Optimization • Model Evaluation Metrics • Bias and Overfitting • Model Compression Concepts • Performance Benchmarking	25
4.	Intelligent AI System Design and Deployment • Inference Systems and Model Serving • Prompt Engineering Principles • Retrieval Augmented Generation (RAG) Concept • Conversational AI Architecture • AI Application Integration Models • System Architecture Design for AI Applications • AI Governance, Safety and Responsible AI • Future Trends in Foundation Models	25

Teaching- Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Explain concepts of foundation models and generative AI.
2.	Analyze architecture and workflow of modern AI systems.
3.	Evaluate open AI development ecosystems and model repositories.
4.	Apply concepts of fine-tuning and optimization strategies.
5.	Design scalable intelligent AI application architectures.
6.	Assess ethical and responsible AI deployment practices.





Suggested References:

Sr.No.	References
1.	Lewis Tunstall, Leandro von Werra, Thomas Wolf, Natural Language Processing with Transformers, O'Reilly Media, 2022.
2.	Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, MIT Press, 2016.
3.	Daniel Jurafsky, James H. Martin, Speech and Language Processing, Stanford University, 2023.
4.	Chip Huyen, AI Engineering: Building Applications with Foundation Models, O'Reilly Media, 2025.
5.	Stuart Russell, Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson, 2021.

On-line resources to be used if available as reference material

On-line Resources

1. <https://huggingface.co/learn>
2. <https://huggingface.co/docs/transformers>
3. <https://www.deeplearning.ai/short-courses/generative-ai/>
4. <https://developers.google.com/machine-learning/crash-course>
5. <https://www.geeksforgeeks.org/artificial-intelligence/generative-ai/>
6. https://www.tutorialspoint.com/artificial_intelligence/index.htm
7. https://www.w3schools.com/python/python_ai.asp





BCA (Bachelor of Computer Application)
Semester-VII (Without Research)

Course Code	US07HMABCA02	Title of the Course	Fundamentals of Cyber Security
Total Credits Of the Course	4	Hours per Week	4

Course Objectives:	1. To develop a foundational understanding of cyberspace to effectively identify and mitigate cyber threats. 2. To gain proficiency to identify vulnerabilities and mitigation strategies to handle malware and ransomware. 3. To understand classification of cyber-crime, legal framework provided by IT Act 2000 and enabling organization to handle incidence of crime. 4. To evaluate security risk in social media and digital payment. 5. To implement essential security services through digital signature, digital certificate and SSL
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Course Content		
Unit	Description	Weightage (%)
1.	Introduction to Cyber Security • Introduction to Cyberspace • Architecture (Components) and regulations of Cyberspace • Comparison of cyberspace with physical space • Concept, issues, and challenges of Cybersecurity • Attacks: Browser attacks, Web attacks, e-mail attacks, • Unauthorized access of user or Website data • Network Vulnerabilities: Overview of vulnerabilities of scanning, Open port / Service identification, Banner / Version • check, Example related to vulnerabilities • Network sniffers and Injection tools: classification, Working • mechanism, Overview of Wireshark and SQLi	25
2.	Cyber-crime and Foundation of cyber law • Classification of cyber-crime • Common cyber-crime: Cyber-crime targeting computers and mobiles, cyber-crime against society, financial frauds, malware and ransomware attacks • Modus Operandi of Cyber criminals • Remedials and mitigation measures for cyber-crimes • Introduction to IT Act 2000 • Deal with cyber-crime by an organization	25





3.	Social Media and Digital Payments • Social media platforms, its monitoring and viral contents • Social media privacy • Challenges, opportunities and Security issues in social media network • Introduction to Digital payments • Modes of Digital payments: Banking cards, UPI (Unified Payment Interface), e-wallets • Common frauds and preventives measures for digital payment • RBI guidelines on Digital payment • Customer protection by cyber-cell	25
4.	Cryptography • Cryptography: Origins and evolution • Importance and challenges of cryptography • Security services: Confidentiality, Integrity, Availability, • Authentication, Non-repudiation, Access-control • Digital signature and authentication procedure - Digital certificate • Web security: SSL (Secure Socket Layer), Firewall	25

Teaching- Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination, Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Analyze cyberspace architecture and use of tools like Wireshark and SQLi to detect network and web vulnerabilities.
2.	Categorize cyber-crimes and apply the IT Act 2000 to manage digital offences in an organizational setting.
3.	Manage social media privacy and secure digital payments (UPI, cards, e-wallets) in compliance with RBI guidelines and cyber-cell protocols.
4.	Understand the evolution of cryptography and applying cryptographic principles— including digital signatures, certificates, and SSL.





SARDARPATELUNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA3.11))
Syllabus with effect from the Academic Year 2026-2027

Suggested References:

Sr.No.	References
1.	Sumit Belapure and Nina Godbole, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley India Pvt. Ltd., Revised edition, 2025.
2.	Prof. (Dr.) Jyoti Rattan, Cyber Laws, Information Technology & Artificial Intelligence, Bharat Law House Pvt. Ltd., 11th edition, 2026.
3.	Dr. Santosh Kumar & Dr. Gagandeep Kaur, Cyber Crimes & Laws, Whitesmann Publication, Revised 3rd edition, 2024.
4.	Atul Kahate, Cryptography and Network Security, McGraw Hill, 4th edition, 2019.
5.	Cyber Crime Impact in the New Millennium, by R. C Mishra , Author Press. Edition 2010.
6.	Cryptography and Network Security: Principles and Practice, by William Stallings, Pearson Education, 8th edition, 2022.
7.	Electronic Commerce: From vision to fulfilment by Elias M. Awad, Prentice Hall of India Pvt Ltd. 3rd edition, 2012.
8.	Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers, 2011.
9.	Network Security: A Beginner's Guide, by E. Maiwald, McGraw Hill, 3rd edition Web References, 2013.

On-line resources to be used if available as reference material

1. <https://www.sentinelone.com/cybersecurity-101/cybersecurity/what-iscyberspace/>





BCA (Bachelor of Computer Application)
Semester-VII (Without Research)

Course Code	US07HMABCA03	Title of the Course	Practical based on US07HMABCA01
Total Credits of the Course	4	Hours per Week	8

Course Objectives:	1. To provide hands-on experience with tools and platforms used in Generative AI and LLM development. 2. To implement basic workflows involving tokenization, embeddings, and model pipelines. 3. To explore and utilize open-source model repositories and datasets. 4. To practice experiment tracking, model versioning, and documentation techniques. 5. To understand and apply ethical guidelines while working with AI models and datasets.
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Course Content		
	Description	Weightage (%)
	Practical Based on Basics of Generative AI	100%

Teaching-Learning Methodology	Practical-based learning in small groups and Hands-on training through required ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Practical Examination, Internal Continuous Assessment in the form of Practical, Viva-voce, Attendance	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to
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1.	Apply pretrained foundation models to perform various natural language processing tasks such as text generation, sentiment analysis, summarization, translation, and question answering.
2.	Prepare and manage datasets, perform tokenization, fine-tune models on custom datasets, and evaluate model performance using appropriate metrics.
3.	Design, develop, and deploy intelligent AI applications using prompt engineering, retrieval-augmented generation (RAG), and the Hugging Face ecosystem.





BCA (Bachelor of Computer Application)
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Course Code	US07HMIBCA04	Title of the Course	Scripting with PHP - II
Total Credits Of the Course	2	Hours per Week	2

Course Objectives:	1. To manage complex data manipulation and state management using advance functions. 2. To implement protected multi-format file uploads, file locking to ensure data integrity and apply Object Oriented Programming (OOP) principles to build reusable architectures. 3. To develop secure, data-driven applications, error handling, and report generation. 4. To evaluate the technical architecture of CMS frameworks and the WordPress request lifecycle to develop, troubleshoot, and scale dynamic PHP-based websites.
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Course Content		
Unit	Description	Weightage (%)
1.	Advanced PHP • Working with Numbers, Dates and Time • String Functions (substr, explode, implode, preg_match, preg_replace, mb_strlen, htmlspecialchars) • State Management: Types of state management, Session, Cookie, Comparison of session and cookie, • Core functions of session and Cookie • File handling: Modes of file handling, Basic file operations, file uploading, file locking and Handling file format • OOP with PHP: Class, Object, Inheritance, Encapsulation, Polymorphism, Abstraction • OOP keywords, Access Modifiers, Constructor, Destructor	50
2.	Database programming and PHP • Introduction to MySQLi: Features, Merits and Demerits • MySQLi Data types and Constraints • Basic SQL Commands (Insert, Update, Delete, Select) • MySQLi functions • Error Handling • Integration of PHP Form and Database • Generating reports using PHP and MySQLi (Table format, PDF exports, Visual charts, Excel / CSV format) • Content Management System: Concept, Components of CMS • Introduction to WordPress: Features, Merits and Drawbacks • WordPress Life cycle and example	50





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Teaching- Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.
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Evaluation Pattern		
Sr.No.	Details of the Evaluation	Weightage
1.	Internal Written Examination, Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to		
1.	Apply Object-Oriented Programming (OOP) and advanced PHP functions to develop secure, modular architectures capable of complex data and file processing.	
2.	Build professional, data-driven websites by mastering MySQLi database operations and CMS frameworks with automated reporting features.	

Suggested References:	
Sr.No.	References
1.	Steve Suehring Tim Converse Joyce Park: PHP6 and MySQL Bible - Wiley Publication, 1 st edition, 2009.
2.	Larry Ullman: PHP and MySQL for Dynamic Web Sites: Visual QuickPro Guide - Peachpit Press, 5 th edition, 2018.
3.	Joel Murach and Ray Harris: Murach's PHP and MySQL, Mike Murach & Associates, 4 th edition, 2014.
4.	Ivan Baryons: Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, PHP, BPB Publication, 4 th Revised edition, 2010.

On-line resources to be used if available as reference material	
On-line Resources	
1.	https://www.w3resource.com/php/classes-objects/php-object-oriented-programming.php
2.	https://www.tutorialspoint.com/php/php_strings.htm
3.	https://www.geeksforgeeks.org/php/php-classes/
4.	https://www.w3schools.com/php/php_intro.asp





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Course Code	US07HMIBCA05	Title of the Course	Practical based on US07HMIBCA04
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	Scripting with PHP - II
	1. To develop hands-on skills in advanced PHP programming, including string handling, date-time functions, and file operations. 2. To implement state management techniques using sessions and cookies in web applications. 3. To apply object-oriented programming concepts in PHP for building modular and reusable applications. 4. To design and execute database operations and error handling. 5. To integrate PHP applications with databases and generate dynamic reports.

Course Content		
	Description	Weightage (%)
	Practical Based on Advanced PHP	100%

Teaching-Learning Methodology	Practical-based learning in small groups and Hands-on training through required ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Practical Examination, Internal Continuous Assessment in the form of Practical, Viva-voce, Attendance	50%
2.	University Examination	50%





Course Outcomes: Having completed this course, the learner will be able to	
1.	Create PHP programs utilizing advanced features such as string manipulation, file handling, and date-time functions.
2.	Implement session and cookie-based state management in dynamic web applications.
3.	Develop PHP applications using OOP concepts like classes, inheritance, and encapsulation.
4.	Build complete database-driven web applications and generate reports in various formats, including CMS-based solutions like WordPress.





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Course Code	US07HSEBCA06	Title of the Course	On Job Training
Total Credits of the Course	6	Hours per Week	12

Course Objectives:	To enhance employability through industry exposure.
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Course Content		
	Description	Weightage (%)
	Practical experience in an industry by applying theoretical knowledge to real-world tasks and projects.	100

Teaching-Learning Methodology	Project-based learning and hands-on training through required ICT tools.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Project Examination Internal Continuous Assessment in the form of Practical, Viva-voce, Attendance	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	Technical proficiency (e.g., coding, networking), Problem-solving, Teamwork, Professional ethics etc.

