



પરિપત્ર:

ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટીની કોમ્પ્યુટર સાયન્સ વિદ્યાશાખાનાં અભ્યાસક્રમ ચલાવતી તમામ સંલગ્ન કોલેજોનાં આચાર્યશ્રીઓને સવિનય જણાવવાનું કે કોમ્પ્યુટર સાયન્સ વિદ્યાશાખા હેઠળનો NEP-૨૦૨૦ અંતર્ગત એબીલીટી એન્હાંસમેન્ટ કોર્સ સેમેસ્ટર-૬નો અભ્યાસક્રમ આ સાથે સામેલ છે.

માનનીય કુલપતિશ્રીની મંજૂરી અનુસાર સદર અભ્યાસક્રમ શૈક્ષણિક વર્ષ જુન, ૨૦૨૫ થી અમલવારી કરવાની રહે છે. કોમ્પ્યુટર સાયન્સ વિદ્યાશાખાનાં અભ્યાસક્રમ ચલાવતી તમામ સંલગ્ન કોલેજો ધ્વારા તેની અમલવારી કરવા જણાવવામાં આવે છે.




ખાસ ફરજ પરના અધિકારી
(એકેડેમિક)

ક્રમાંક/બીકેએનએમયુ/ એકેડેમિક/૭૫૨/૨૦૨૫

ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી,

સરકારી પોલીટેકનિક કેમ્પસ,

ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી રોડ,

ખડીયા, જૂનાગઢ-૩૬૨૨૬૩

તા.૦૩/૧૧/૨૦૨૫

પ્રતિ,

- ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી સંલગ્ન કોમ્પ્યુટર સાયન્સ વિદ્યાશાખાનાં અભ્યાસક્રમો ચલાવતી તમામ કોલેજોના આચાર્યશ્રીઓ તરફ....

નકલ સાદર રવાના:-

- માન.કુલપતિશ્રી/ કુલસચિવશ્રીનાં અંગત સચિવશ્રી.
- પરીક્ષા નિયામકશ્રી, ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી, જૂનાગઢ

નકલ રવાના જાણ તથા યોગ્ય કાર્યવાહી અર્થે:

- સીસ્ટમ મેનેજરશ્રી, આઇ.ટી.સેલ વિભાગ (વેબસાઇટ ઉપર પ્રસિદ્ધ થવા અર્થે.)



BHAKTA KAVI NARSINH MEHTA UNIVERSITY
JUNAGADH



BOARD OF STUDIES
FACULTY OF COMPUTER SCIENCE
SYLLABUS FOR
ABILITY ENHANCEMENT COURSE
PROGRAMME (SEMESTER- VI)

BHAKTA KAVI NARSINH MEHTA UNIVERSITY
Ability Enhancement Skill
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SEMESTER- VI

SUMMARY OF THE SYLLABUS

Sem	Sr. No.	Category of Course	Course Title	Course Level	Credit	Teaching Hrs.	SEE Marks	CCE Marks	Total Marks	Exam Duration
Sem- 6	1	AEC-5 (Select Any One)	Introduction to Cloud Computing	5.5	2	30	25	25	50	1:00 Hrs.
	2		Introduction to Cyber Security	5.5	2	30	25	25	50	1:00 Hrs.
			Total		02					

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Course Level	5.5	Internal Marks	25
Programme	BCA And B.Sc. (IT)	External Marks	25
Semester	VI	Practical Internal	0
Category of Course	AEC-5	Practical External	0
Course Credit	02	Prac. External Exam Duration	-
Teaching Hours	Theory- 30 Practical-00	Total	50
Course Code		Exam Duration	1:00 Hrs.
Course Title	Introduction to Cloud Computing		

Course Objectives:

- Provide a foundational understanding of cloud computing.
- Explain cloud computing evolution, characteristics, and benefits.
- Introduce service models (IaaS, PaaS, SaaS) and deployment models.
- Describe cloud architecture and virtualization concepts.
- Familiarize students with major cloud service providers.
- Illustrate real-world applications of cloud across domains.
- Highlight the role of virtualization and containers in cloud.
- Explore current and emerging cloud trends (serverless, edge computing).
- Equip students with a conceptual base for advanced cloud courses.
- Enhance awareness of cloud's impact on business and society.

Course Learning Outcomes:

- Define cloud computing and explain its core characteristics.
- Differentiate between service models (IaaS, PaaS, SaaS).
- Compare deployment models and their applications.
- Describe cloud computing architecture and virtualization basics.
- Identify leading cloud service providers and their major offerings.
- Explain the role of cloud computing in various domains.
- Discuss emerging trends shaping the future of cloud computing.

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Course Contents:

Sem	UNIT	CONTENT	Hours
6	1	Fundamentals of Cloud Computing • Introduction to Cloud Computing ○ Definition, characteristics (on-demand, scalability, elasticity, measured service). ○ Evolution of cloud computing. ○ Benefits and limitations of cloud computing. • Cloud Service Models ○ Infrastructure as a Service (IaaS). ○ Platform as a Service (PaaS). ○ Software as a Service (SaaS). ○ Practical examples and case studies. • Cloud Deployment Models ○ Public Cloud, Private Cloud. ○ Hybrid Cloud, Community Cloud. ○ Comparison and use cases. • Cloud Computing Architecture ○ Front-end and back-end. ○ Virtualization and resource pooling. ○ Data center infrastructure in cloud.	15
	2	Cloud Ecosystem, Providers & Applications 1. Virtualization Concepts ○ Hypervisors (Type 1 & Type 2). ○ Virtual Machines vs Containers. ○ Role of virtualization in cloud efficiency. 2. Major Cloud Providers ○ Amazon Web Services (AWS). ○ Microsoft Azure. ○ Google Cloud Platform (GCP). ○ Key services and unique features. 3. Applications of Cloud Computing ○ Cloud in business (e-commerce, finance, startups). ○ Cloud in education, healthcare, and government. ○ Cloud in everyday life (Google Drive, OneDrive, Dropbox). 4. Future Trends in Cloud ○ Serverless computing. ○ Edge computing. ○ Multi-cloud and hybrid strategies.	15

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Reference Books:

1. Rajkumar Buyya, James Broberg, and Andrzej Goscinski, Cloud Computing: Principles and Paradigms, Wiley, 2011.
2. Arshdeep Bahga and Vijay Madisetti, Cloud Computing: A Hands-On Approach, Universities Press, 2014.
3. Thomas Erl, Zaigham Mahmood, and Ricardo Puttini, Cloud Computing: Principles and Paradigms, Pearson, 2013.
4. Thomas Erl, Cloud Computing: Concepts, Technology & Architecture, Pearson, 2013.
5. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, 2008.

Web Site References:

1. TutorialsPoint – *Cloud Computing Tutorial*: https://www.tutorialspoint.com/cloud_computing/
2. GeeksforGeeks – *Cloud Computing Basics*: <https://www.geeksforgeeks.org/cloud-computing/>

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Course Level	5.5	Internal Marks	25
Programme	BCA And B.Sc. (IT)	External Marks	25
Semester	VI	Practical Internal	0
Category of Course	AEC-5	Practical External	0
Course Credit	02	Prac. External Exam Duration	-
Teaching Hours	Theory- 30 Practical-00	Total	50
Course Code		Exam Duration	1:00 Hrs.
Course Title	Introduction to Cyber Security		

Course Objectives:

- Provide foundational knowledge of information security and cybersecurity concepts.
- Familiarize students with the roles of hackers, penetration testers, and cybersecurity professionals.
- Introduce ethical hacking methodologies and common cybersecurity terminology.
- Explain key cryptographic techniques and their importance in securing data.
- Develop understanding of hashing algorithms, integrity verification, and password security.
- Demonstrate practical tools such as CyberChef and Wireshark for real-world cybersecurity applications.
- Provide networking fundamentals essential for analyzing and securing communication systems.
- Enable students to monitor, analyze, and interpret network traffic using packet analysis techniques.

Course Learning Outcomes:

- Differentiate between information security and cybersecurity, explaining their scope and applications.
- Identify types of hackers, major attack methods, and common cybersecurity terms (payload, exploit, malware, etc.).
- Apply ethical hacking processes and penetration testing principles in simulated environments.
- Demonstrate cryptographic methods (AES, DES, RSA) and evaluate their role in data protection.
- Analyze network traffic and detect suspicious/malicious activities using Wireshark.
- Relate learned concepts to potential cybersecurity career roles and certifications.

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Sem	UNIT	CONTENT	Hours
6	1	1. Introduction to Information and Cybersecurity a. Definition of Information Security b. Definition of Cybersecurity Key objectives of security: Confidentiality, Integrity, Availability (CIA Triad) Difference between Information Security and Cybersecurity c. Importance and real-world applications of cybersecurity 2. Hackers and Cybersecurity Roles a. Definition of a Hacker b. Types of Hackers c. Overview of Cybersecurity Roles 3. Ethical Hacking Process and Penetration Testing a. Stages of Ethical Hacking b. Penetration Testing 4. Common Cybersecurity Terms a. Payload b. Malware c. Exploit d. Zero-day Exploit e. Vulnerability	15
	2	1. Introduction to Cryptography a. Importance in cybersecurity b. Symmetric vs Asymmetric Encryption c. Demonstration of AES, DES, RSA using CyberChef 2. Hashing & Integrity a. Definition and purpose b. Common algorithms: MD5, SHA family c. File integrity verification with hashes 3. Packet Analysis with Wireshark a. Introduction to Wireshark & packet capture b. Monitoring traffic and analyzing protocols (TCP, HTTP, ICMP)	15

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Suggested Practice:

1. Find the IP address of testphp.vulnweb.com with Nslookup.
2. Send ICMP echo requests (ping) from your machine to any IP address and use Wireshark to capture and analyze the ICMP traffic.
3. Visit “http://testphp.vulnweb.com/” from your browser and use Wireshark to capture and analyze the TCP three-way handshake between your machine and the web server.
4. Access testphp.vulnweb.com use Wireshark to capture the HTTP traffic. Analyze the server’s response headers to determine which server version is running on the web server.
5. Visit google.com in your browser and use Wireshark to capture and analyze the DNS query and response generated by your system.
6. AES Encryption and Decryption demo using CyberChef.

Note: The above practices are supported across Windows, macOS and Linux environments.

Tools:

1) Wireshark 2) CyberChef

1) Wireshark:

1. Download: Visit <https://www.wireshark.org/download.html>
2. Choose Your OS: Select the installer for Windows, macOS, or Linux.
3. Install: Run the installer and follow the default prompts.
 - Windows: Accept installing Npcap when prompted (needed for packet capture).
 - macOS: You may need to allow permissions in System Settings → Privacy & Security.
 - Linux: Use your package manager (e.g., `sudo apt install wireshark` on Debian/Ubuntu).
4. Verify: Open Wireshark and ensure your network interfaces are listed for capture.

2) CyberChef:

1. Access Online (Recommended): Go to <https://gchq.github.io/CyberChef/> —no installation required.
2. Run a Test: Drag-and-drop data or paste text, select an operation (e.g., Base64 Decode), and view the output instantly.

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Reference Books:

1. William Stallings, Network Security Essentials: Applications and Standards, Pearson, 2017.
2. Nina Godbole and Sunit Belapure, Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley, 2011.
3. Charles J. Brooks, Christopher Grow, Philip Craig, and Donald Short, Cybersecurity Essentials, Wiley, 2018.
4. Mark Ciampa, Security+ Guide to Network Security Fundamentals, Cengage Learning, 2018.
5. Behrouz A. Forouzan, Cryptography and Network Security, McGraw Hill, 2016.

Web site References:

1. CyberChef: <https://cyberchef.io/>
2. Wireshark: https://www.wireshark.org/docs/wsug_html_chunked/

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INTERNAL EVALUATION SCHEME		
NO	Particulars	Marks
1	Mid Semester Exam (Mandatory)	13
2	Class Test	03
3	Open book exam/test	03
4	Open note exam/test	03
5	Self-test/ Online test	03
6	Essay/Article writing	03
7	Quizzes/Objective test	03
8	Class assignment	03
9	Home assignment	03
10	Reports Writing	03
11	Research/Dissertation	03
12	Case Studies	03
13	Viva/Oral exam	03
14	Group Discussion	03
15	Role Play	03
16	Paper presentation/Seminar	03
17	Language Lab work	03
18	Interview	03
19	Craft work	03
20	Co-curricular work	03
21	Field Assignment	03
22	Poster Presentation	03
23	Attendance	03
24	Project Work	03
	Total	25

Note: Sr.No.1 is mandatory. Select any Four from Sr.No.2 to 24. Each Contains three marks. Student should secure 09 Marks for passing in internal Exam.

Paper Style:

Ques. No.	Particulars	From which Unit	Marks
1	Questions (Any Two Out Of Four)	1	10
2	Questions (Any Two Out Of Four)	2	10
3	Questions (Any One Out Of Two)	From Each Unit	5
		Total Marks	25