VIKRAM UNIVERSITY, UJJAIN MP

(Session -2022-2023 onwards)

BCA (Hon's) FOUR YEARS (EIGHT SEMESTERS), CBCS SCHEME (NEP)

S.No.	Paper code	Course Component and Name of Course	Credits			Marks		Total
			T	P	Total	Max Marks CCE Internals	Max Marks Theory Externals	
1.	BCAH 601 Major-1	Programming in Phython	2	0	2	30	45	100
	BCAH P	Programming in Phython	0	1	1	10	15	
2.	BCAH 602 Major-2	Theory of Compiler Design	4	0	4	40	60	100
3.	BCAH 603 Major-3	Cloud Computing	4	0	4	40	60	100
4.	BCAH-604 Major -4	Cyber Security	4	0	4	40	60	100
5.	BCAH-605 Major-5	Major Project	4	0	4	80	120	200
Total Credits and marks					20			600

PART A: Introduction				
Program: Degree	Class: VI Sem	Year: III Year	Session: 2023-24	
Subject: Computer Application				
1.	Course Code	**BCAH – 601**		
2.	Course Title	**PROGRAMMING IN PYTHON**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major-1**		
4.	Pre-Requisite (if any)	Basic knowledge of programming		
5.	Course Learning Outcomes(CLO)	• Students will be able to design web applications using python • Students will be able to create GUI application • Students will be able to plot graphs • Students will be able to image processing • Student will able to access. • Student will able to learn working with database.		
6.	Credit Value	3 Credits		
7.	Total Marks	Max.Marks : 100	Min. Passing Marks:35	

PART B: Content of the Course		
Total No. of Lectures(in hours per week): 1 Hour per Day		
Total Lectures:60 Hours		
Unit	Topics	No. of Lectures
I	**Python Introduction:** History, Features, Python vs other languages, Python Installation path setup and running programme, Python IDE: Anaconda, Pycharm, Spider, Jupyter notebook, Google Colab. Python Syntax, comment, variable, literals, datatype, type casting, operators, Control Statements- If-else, Match-case, while loop, for loop, break, continue and pass statement.	12
II	**Python Function and Module:** Defining and calling function, Arguments- arbitrary arguments, keyword argument, Default arguments, return value, Pass by reference vs value, Recursion, Variable scope. **Modules-** Module creation, using import, from..import and, from..as statement, Math module, DateTime module.	12
III	**Python OOPs Concept-** Class & Object, Constructor, Inheritance and Polymorphism. String and string manipulation, **Python Collection-** List, tuple, set, dictionaries and Arrays. Python error and Exception Handling, File Handling, Read and Write CSV and Excel file, Python Multithreading.	12
IV	**Python Djengo / Flask**- Overview of HTML, CSS, JavaScript, installation of Djengo/Flask, create website with python code, Run website using Djengo/Flask Framework. **Python with MySQL / SQLite-** Installation, Creating database, connection and table, Data manipulation with Insert, Select, Update and Delete command.	12
V	**Python Miscellaneous:** Command line arguments, CGI programming, GUI programming using Tkinter, Image Processing using OpenCV, Plotting graph using Matplotlib, Overview of NumPy, Pandas, SciPy, Keras, Tensorflow and Pillow.	12

PART C: Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Readings: 1. Let Us Python, Yashavant Kanetkar and Aditya Kanetkar, BPB publication 2. Zero To Mastery In Python Programming, Monu Singh Rakesh K. Yadav, Srinivas Arukonda, Vayu Education Of India publication. 3. Python All-in-One for Dummies, John Shovic, Alan Simpson, Wiley publication
https://nptel.ac.in/courses/106106145 https://www.javatpoint.com/python-tutorial https://www.tutorialspoint.com/python/index.htm https://www.w3schools.com/python/

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40** Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A): Five Short Questions Section (B): Five Long Questions	04 × 05 = 20 08 × 05= 40 **Total Marks: 60**

Practical list:

1. Python program to add two numbers
2. Python Program to print maximum of two numbers
3. Python Program for factorial of a number
4. Python Program to check Armstrong Number
5. Python program to check whether a number is Prime or not
6. Python Program to print given n-th Fibonacci number
7. Python Program to print ASCII Value of a character
8. Python program to reverse words in a given String
9. Python Program to find sum of array
10. Python program to find sum of elements in list
11. Python program to find the sum of all items in a dictionary
12. Python program to Find the size of a Tuple
13. Python program to get Current Date and Time
14. Python program to write and read text file
15. Python program to read csv and excel file
16. Python Program for exception handling
17. Python Program for creating and running web pages using Djengo or flask
18. Python Program for insert, select, update and delete operation on MySQL / SQLite.
19. Python program for image processing
20. Python Program to plot graphs.

PART A: Introduction				
Program: Degree		Class: VI SEM	Year: III Year	Session: 2023-24
Subject: Computer Application				
1.	Course Code	**BCAH-602**		
2.	Course Title	**Theory of Compiler Design**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Core course**		
4.	Pre-Requisite (if any)	To study this course, a student must have the basic knowledge of Theory Of Computation		
5.	Course Learning Outcomes(CLO)	• Basic knowledge of structure of compiler. • Ability to design cross compiler, finite automata and lexical analysis. • Ability to solve the derivation. • Knowledge and ability to devise, select, and use modern techniques and tools needed to design and implement compilers.		
6.	Credit Value	4 credits		
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 40	

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 01 Hour per day		
Total Lectures:60 Hours		
Unit	Topics	No. of Lectures
I	Introduction of Compiler, Major data Structure in compiler, BOOT Strapping & Porting, Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, Lexical analysis: Input buffering , Specification & Recognition of Tokens, LEX. The roll of lexical analyzer, design of lexical analyzer.	12
II	Syntax analysis: CFGs, Top down parsing, Brute force approach, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence parsing, LR parsers (SLR,LALR, LR),Parser generation.Syntax directed definitions: Construction of Syntax trees, Bottom up evaluation of S-attributed definition, L-attribute definition, Top down translation, Bottom Up evaluation of inherited attributes Recursive Evaluation, Analysis of Syntax directed definition.	12
III	Type checking: type system, specification of simple type checker, equivalence of expression, types, type conversion, overloading of functions and operations, polymorphic functions. Run time Environment: storage organization, Storage allocation strategies, parameter passing, dynamic storage allocation , Symbol table.	12
IV	Intermediate code generation: Declarations, Assignment statements, Boolean expressions, Case statements, Back patching, Procedure calls Code Generation: Issues in the design of code generator, Basic block and flow graphs, Register allocation and assignment, DAG representation of basic	12

	blocks, peephole optimization, generating code from DAG.	
V	Introduction to Code optimization: sources of optimization of basic blocks, loops in flow graphs, dead code elimination, loop optimization, Introduction to global data flow analysis, Code Improving transformations ,Data flow analysis of structure flow graph Symbolic debugging of optimized code.	12

PART C: Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Readings: 1. Aho, ullman : Principles of compiler design. 2. Raghavan, Compiler Design, TMH Pub. 3. Louden. Compiler Construction: Principles and Practice, Cengage Learning 4. A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993. 5. Mak, writing compiler & Interpreters, Willey Pub.

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40** Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 02.00 Hours	Section (A):Short Answer type questions Section (B): Long Answer Type Questions	04 × 05 = 20 08 × 05 = 40 **Total Marks: 60**

PART A: Introduction				
Program: Degree		Class: VI SEM	Year: III Year	Session: 2023-24
Subject: Computer Application				
1.	Course Code	**BCAH 603**		
2.	Course Title	**Cloud Computing**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Core course**		
4.	Pre-Requisite (if any)	To study this course, a student must have the basic knowledge of internet. This course will be studied by all the students of PG level under the Core Course category.		
5.	Course Learning Outcomes(CLO)	• Basic knowledge of internet. • DBMS • Computer Networking and Communication.		
6.	Credit Value	6 Credit		
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 40	

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 01 Hours per day		
Total Lectures: 60 Hours		
Unit	Topics	No. of Lectures
I	**Basics of Cloud Computing:** Definition, History of Cloud Computing, Characteristics of cloud computing, Advantages and Disadvantages, Principles of cloud computing. Cloud Computing Architecture**,** How does cloud computing works, Real world applications of Cloud computing, Cloud Storage.	12
II	**Cloud Deployment Models:** Types of Cloud- Public, Private, Hybrid, Community, Public Cloud vs Private Cloud vs Hybrid Cloud. **Cloud Service Model:** Cloud Based Services, Software as a Service (SaaS), Platform as a Service (PaaS). Infrastructure as a Service (IaaS): differences among SaaS, PaaS and IaaS.	12
III	**Cloud Virtualization:** Virtualization in Cloud Computing, characteristics, Difference between Cloud Computing and Virtualization, Pros and Cons of Virtualization in Cloud Computing, Data Virtualization.	12
IV	**Hardware Virtualization & Software Virtualization**: Server Virtualization, Operating system based Virtualization, Network Virtualization. **Cloud Service Provider:** Amazon Web Services (AWS) vs Azure vs (GCP), Security risks and Privacy challenges of Cloud Computing.	12
V	**Grid Computing:** Definition, Differences between Grid and Cloud Computing, Differences between Fog and Cloud Computing, IoT and Cloud Computing, Media streaming, advantages of streaming in cloud, Overview of Multi Cloud.	12

PART C: Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Readings: 1. Tomar Saurabh, Cloud Computing, Wiley Pub. 2. Selvi : Mastermind Cloud Computing, TMH, Pub.
Suggestive digital platform web links: **https://www.simplilearn.com/tutorials/cloud-computing-tutorial** https://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf https://www.simplilearn.com/cloud-computing-basics-guide-pdf
Suggested equivalent online courses: **https://onlinecourses.nptel.ac.in/noc21_cs14/preview** **https://www.youtube.com/watch?v=2LaAJq1lB1Q** **https://www.mygreatlearning.com/cloud-computing/free-courses**

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40** Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 02.00 Hours	Section (A):Short Answer type questions Section (B): Long Answer Type Questions (50 Words Each)	04 × 05 = 20 08 × 05 = 40 **Total Marks: 60**

PART A: Introduction				
Program: BCA		Class: VISEM	Year: III Year	Session: 2023-24
Subject: Computer Application				
1.	Course Code	BCAH 604		
2.	Course Title	**Cyber Security**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	Vocational		
4.	Pre-Requisite (if any)			
5.	Course Learning Outcomes(CLO)	**After the successful completion of the course, the student shall be able to-**: ➢ To grasp the fundamental principles, concepts, and terminology of cyber security, including various types of cyber threats, attacks, and vulnerabilities. ➢ To be able to design, implement, and manage network security measures, including firewalls, intrusion detection systems, and secure wireless networks.. ➢ To understand the principles of cryptography and be able to apply cryptographic techniques to secure communication channels, such as encrypting data and verifying digital signatures. ➢ To understand the legal and ethical aspects of cyber security, including privacy laws, intellectual property rights, and ethical hacking practices. ➢ To develop a continuous learning mindset, keeping up-to-date with emerging trends, new threats, and evolving technologies in the field of cyber security.		
6.	Expected job role /career opportunities	➢ Security Analyst ➢ Ethical Hacker/Penetration Tester ➢ Security Consultant ➢ Digital Forensics Analyst		
7.	Credit Value	4		
8.	Total Marks	Max. Marks : 100	Min. Passing Marks: 35	

PART B: Content of the Course		
Total No. of Lectures(6 hours per week): 01 Hours per day		
Total Lectures: 60 Hours		
Unit	Topics	No. of Lectures
I	Introduction to Cyber Security, Need for security, Concept of Cyber Space, CyberCrimes and Cyber-attack.Fundamental security principles – threats, attacks andvulnerability.Key Security triad – Confidentiality, Integrity and Availability.Introduction to different classes of security attacks - active and passive.Impact ofattacks on an organization and individuals. Principles of Cybersecurity– Applycybersecurity architecture principles. Cybersecurity	12

	models	
II	History, what is Information Security? Critical Characteristics of Information, NSTISSCSecurity Model, Components of an Information System, Securing the Components,Balancing Security and Access, The Security SDLC, The Computer Security Problem - Targets and Attacks.Approaches to Computer Security, Basic Security Terminology - Security Models.Legal, Ethical and Professional Issues.	12
III	Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk.Risk Identification, Techniques for Identifying risks, Risk Analysis: Types of Risk Analysis, Probability and impact assessment, Risk Matrix, Prioritizing Risks.Risk Evaluation: Accepting, Transferring, Mitigating or Avoiding Risks, Risk Treatment, Monitoring and Review.	12
IV	Introduction Cyber Threat, Definition of Cyber Crime, Classification – Current Threats and Trends, Diversity of Cyber Crime, Cyber Hate Crimes, Cyber Terrorism. Cyber Strategy– National Security Strategy – Cyber Security Strategy – Organized Crime Strategy –Cyber Crime Strategy, Policy Cyber Crime, International Response – National Cyber Security Structure, Strategic Policy Requirements.	12
V	Preventing Cyber Crime, Password Protection, Get Safe Online, Cyber Security, Guidance for Business, Cyber Crime Investigation Skills, Criminal Investigation, Code of Ethics, Hi-Tech Investigations, Capturing and Analyzing Digital Evidence, Cyber security testing – Penetration testing. System Level Solutions –Introduction to IntrusionDetection System (IDS) and Intrusion Protection System (IPS). Basic Concept of Ethical, Hacking. Protecting against Cyber Crime	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

1. Textbooks:

- "Principles of Information Security" by Michael E. Whitman and Herbert J. Mattord, 6th Edition (2021), Publisher: Cengage Learning
- "Computer Security: Principles and Practice" by William Stallings and Lawrie Brown, 4th Edition (2018), Publisher: Pearson
- "Cryptography and Network Security: Principles and Practice" by William Stallings, 8th Edition (2020), Publisher: Pearson
- "Security Engineering: A Guide to Building Dependable Distributed Systems" by Ross J. Anderson, 2nd Edition (2008). Publisher: Wiley

2. Suggestive digital platforms web links: https://owasp.org/ https://www.sans.org/ https://www.nist.gov/cybersecurity https://thehackernews.com/
Suggested equivalent online courses: https://onlinecourses.swayam2.ac.in

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40**Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
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