

**GOVT. HOLKAR (MODEL , AUTONOMOUS)
SCIENCE COLLEGE INDORE
(CENTER FOR EXCELLENCE)**

Academic Year: 2023-2024



Affiliated to Devi Ahilya Vishwavidyalaya, Indore

Syllabus for B.C.A. VI Semester

Computer Applications

(Faculty of Computer Applications)

DEPARTMENT OF COMPUTER SCIENCE

B.C.A. VI Semester Department of Computer Science, GHSC, Indore

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Department of Computer Science
Govt. Holkar Science College
INDORE (M.P.)



Government Holkar (Model, Autonomous) Science College, Indore (M.P.)

Computer Science Department

Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. VI Semester	Year-2023	Session- 2023-24
Course Type (Computer Applications) – Major			
1	Course Code	-S6-BCA1T	
2	Course Title	Cloud Computing	
3	Pre – requisite (if any)		
4	Course Learning Outcomes (CLO)	<p>On successful completion of this course, the students will be able to:</p> <ol style="list-style-type: none"> Recall and state the definition of Cloud Computing, as well as distinguish between private, public, and hybrid clouds. Understand the benefits of using cloud computing, such as cost-efficiency, scalability, and accessibility, and explain how it compares to traditional IT infrastructure. Apply your knowledge to create and manage virtual machines (VMs) within a cloud environment, using platforms like Amazon EC2 or Microsoft Azure. Analyze and evaluate the security features and practices of different cloud service providers, considering factors like data encryption, access controls, and compliance standards. Create a comprehensive cloud architecture for a scalable web application, incorporating components like load balancers, databases, and auto-scaling mechanisms. Evaluate and critique the impact of cloud computing on traditional IT infrastructure, considering aspects such as workforce skills, cost implications, and security concerns. 	
5	Credit Value	4 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35

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Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Major			
Course Code	S6-BCA1T		
Course Title	Cloud Computing		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	Topics	No. of Lectures
I	Cloud Computing Fundamental: Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds. Cloud computing platforms – IaaS: Amazon EC2, S3 Bucket, PaaS: Google App Engine, Microsoft Azure, SaaS: AWS IAM (Identity and Access Management).	8
II	Basics Of Service Management in Cloud Computing, Data Management in Cloud Computing. Cloud Computing Architecture: Cloud Reference Model, Layer and Types of Clouds, Architectural design of Compute and Storage Clouds.	12
III	Overview of cloud management & Virtualization: Fundamental concepts of compute storage, networking, desktop and application virtualization, role of virtualization in enabling the cloud Virtualization benefits, server virtualization, Block and file level storage virtualization. Virtualization management, Virtualization technologies and architectures, virtual machine, Measurement and profiling of virtualized applications. Hypervisors: KVM, Xen, VMware hypervisors and their features. Introduction to Containerization Technology, Virtualization vs Containerization. Container Engine Tools: Docker/Podman.	14
IV	Cloud Security: Cloud Information security 18 fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.	14

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V	Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition, Cloud Federation Stack, Third Party Cloud Services Case study: Google App Engine, Microsoft Azure, Hadoop, Amazon, Aneka.	12
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Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Major			
Course Code	S6-BCA1T		
Course Title	Cloud Computing		

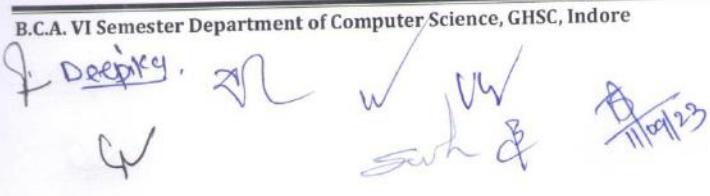
Part C- Learning Resources			
Textbooks, References Books, Other resources			
Suggested Readings:			
Text Books:			
1. A. Srinivasan, J.Suresh, Cloud Computing A Practical approach for learning and implementation, Pearson India, [ISBN-978131776513] 2. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN:978-0521137355] 3. Kumar Saurabh "Cloud Computing insights in to New-Era Infrastructure", Wiley India, 2011 4. मध्य प्रदेश हिंदी ग्रंथ अकादमी की पुस्तकें			
Reference Books:			
1. Dimitris N. Chorafas, Cloud Computing Strategies [ISBN: 1439834539] 2. Buyya, Selvi, Mastering Cloud Computing, TMH Pub 3. Krutz, Vnes, Cloud Security, Wiley Pub 4. Anthony T Velte, "Cloud Computing: A Practical Approach", McGraw Hill 5. Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online". 6. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers.			
Suggested Digital Platforms Web Links:			
1. https://onlinecourses.nptel.ac.in/noc22cs20/preview 2. https://nptel.ac.in/courses/106105223 3. https://nptel.ac.in/courses/106104182 4. https://www.tutorialspoint.com/cloud_computing/index.htm 5. https://www.classcentral.com/course/swayam-cloud-computing-10027			
Suggested Equivalent Online Courses:			
1. https://www.mygreatlearning.com/cloud_iot/certification 2. https://www.intellipaat.com/cloud-computing/certification 3. https://www.edureka.co/ 4. https://www.coursera.org/browse/information-technology/cloud-computing			

Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Major			
Course Code	S6-BCA1T		
Course Title	Cloud Computing		

Part – D Assessment and Evaluation			
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks		External Evaluation (Summative Assessment): End Semester Exam: 60 Marks Time: 03 hours	
Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc.			
The division of marks is as follows:			
Test I	20 Marks	Section (A): 5 Objective Questions (1 mark each)	$5 \times 1 = 5$
Test II	20 Marks	Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each)	$5 \times 7 = 35$
Test III	20 Marks	Section (C): Two long questions out of four questions (500 Words each) (10 Marks each)	$2 \times 10 = 20$
Total Internal Assessment (CCE) Marks	40 Marks	Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Note:	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.	
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.	

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Computer Science Department

Part A- Introduction (Practical)				
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24	
Course Type (Computer Applications) – Major				
1. Course Code	S6-BCA1TP			
2. Course Title	Cloud Computing Lab			
3. Pre-requisite (if any)	-			
4. Course Learning Outcomes (CLO)	<p>On successful completion of this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Recall steps to download and install virtualization software and create an AWS free tier account. 2. Understand virtual machine control processes, the concept of AWS Custom AMI, and the key features and use cases of cloud platforms such as Google App Engine, Microsoft Azure, Hadoop, Amazon, and Aneka. 3. Apply knowledge to edit virtual machine hardware configurations, share a custom AMI with AWS accounts, and utilize case study methodology to explore practical applications of cloud platforms in real-world scenarios. 4. Analyze the importance of image snapshots for virtual machines and assess benefits of containerized applications using Docker. 5. Design procedures for importing/exporting virtual machine images and creating custom Docker images. 6. Evaluate the significance of software updates in virtual machines and the impact of pulling/pushing Docker images from Docker Hub. 			
5. Credit Value	2 Credits			
6. Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35		

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Part B- Content of the Course	
Total no. of lectures – As per UGC rules	
Suggestive List of Practicals	
Note - The students shall explore development of web applications in cloud. They must practically design and develop processes involved in creating a cloud-based application and programming using Hadoop.	
1.	Download and Install Virtual Machine (Virtual Box, VMware and KVM).
2.	Installing Virtual Machine
3.	Controlling Virtual Machine (Start, restart, power off)
4.	Editing Virtual Machine Hardware
5.	Creating and Using Image snapshot
6.	Importing and Exporting Virtual Machine images
7.	Installing and updating Software packages
8.	Create AWS free tier account
9.	Create AWS Custom AMI
10.	Share AMI with AWS account
11.	Containerized Application Using Docker container
12.	Install docker on EC2 Instance
13.	Creating and managing Docker containers
14.	Pull and push docker images from docker hub
15.	Creating Docker custom Images
16.	Case Study on The following : 1. Google App Engine 2. Microsoft Azure 3. Hadoop 4. Amazon 5. Aneka

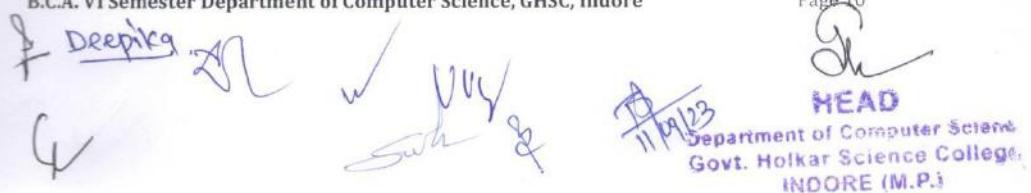
Part C- Learning Resources	
Textbooks, References Books, Other resources	
Suggested Readings:	
Text Books:	
1. A. Srinivasan, J.Suresh, Cloud Computing A Practical approach for learning and implementation, Pearson India, [ISBN-978)31776513]	
2. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN:978-052113755]	
3. Kumar Saurabh "Cloud Computing insights in to New-Era Infrastructure", Wiley India, 2011	
4. मथ्य प्रदेश हिंदी ग्रंथ अकादमी की पुस्तकें	
Reference Books:	
1. Dimitris N. Chorafas, Cloud Computing Strategies [ISBN: 1439834539]	
2. Buyya, Selvi, Mastering Cloud Computing, TMH Pub	
3. Krutz, Vnes, Cloud Security, Wiley Pub	
4. Anthoy T Velte, "Cloud Computing: A Practical Approach", McGraw Hill	
5. Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online".	
6. James E Smith, Ray Nair, "Virtual Machines", Morgan Kaufmann Publishers.	
Suggested Digital Platforms Web Links:	
1. https://onlinecourses.nptel.ac.in/noc22cs20/preview	
2. https://nptel.ac.in/courses/106105223	
3. https://nptel.ac.in/courses/106104182	
4. https://www.tutorialspoint.com/cloud_computing/index.htm	
5. https://www.classcentral.com/course/swayam-cloud-computing-10027	
Suggested Equivalent Online Courses:	
1. https://www.mygreatlearning.com/cloud_iot/certification	
2. https://www.intellipaat.com/cloud-computing/certification	
3. https://www.edureka.co/	
4. https://www.coursera.org/browse/information-technology/cloud-computing	

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Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 =100 Marks)

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Computer Science Department

Part A - Introduction			
Programme – B.C.A. (Computer Application - DSE)	Class – B.C.A VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application): Discipling Specific Elective (DSE)			
1 Course Code	S6-BCA2T-A		
2 Course Title	Introduction to Data Science		
3 Pre – requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Levels		
4 Course Learning Outcomes (CLO)	<p>On successful completion of this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Students will develop relevant programming abilities. 2. Students will demonstrate proficiency with statistical analysis of data. 3. Students will develop the ability to build and assess data-based models. 4. Students will execute statistical analyses with professional statistical software. 5. Students will demonstrate skill in data management. 		
5 Credit Value	3 Credits		
6 Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35	

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Part A - Introduction			
Programme – B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application): Discipline Specific Elective (DSE)			
Course Code	S6-BCA2T-A		
Course Title	Introduction to Data Science		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		No. of Lectures
S. No.	Topics	
I	Introduction: What is Data Science? The Data Science Process, Different Types of Data: Quantitative, Categorical. Graphical Summaries of Data: Pie Chart, Bar Graph, Pareto Chart, Histogram. Measuring the Center of Quantitative Data: Mean, Median, Mode. Measuring the Variability of Quantitative Data: Range, Standard Deviation, and Variance.	9
II	Overview of R: History, features and Application of R, R data types, Variable, Operator, Data Structure: Vectors, Lists , Array, Matrices, Factors, Data Frames. Reading and Writing data, Control structures, Loops, functions, scoping rules, dates and times. Reading and Writing CSV Files in R.	9
III	Introduction to Data Cleansing: objective of Data Cleaning, Data Cleaning Process, Common Data Quality issue, Advantages and benefits of data cleaning , Missing and Repeated Values, Feature Engineering, Outliers and Errors, Finding Outliers, Cleaning Data with R.	9
IV	Machine Learning: Definition and overview, Regression, Simple Linear Regression, Multiple Regression, Assessing Performance, Ridge Regression, Feature Selection, Lasso Regression, Nearest Neighbors & Kernel Regression.	9
V	Machine Learning: Classification, Linear Classifiers & Logistic Regression, Learning Linear Classifiers, Overfitting & Regularization in Logistic Regression, Decision Trees, Handling Missing Data, Boosting.	9

Part A - Introduction			
Programme – B.C.A. (Computer Application - DSE)	Class – B.C.A VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application): Discipline Specific Elective (DSE)			
Course Code	S6-BCA2T-A		
Course Title	Introduction to Data Science		

Part – C Learning Resources			
Text Books, Reference Books, Other Resources			
Suggested Readings:			
Text Books:			
1. Allan G. Bluman, Elementary Statistics: A Step By Step Approach, 10th Edition, McGraw-Hill, 2017.			
2. Paul Teator, R Cookbook, First Edition, O'Reilly Media, 2011.			
3. Tom Mitchell, Machine Learning, First Edition, McGraw Hill, 1997			
Reference Books:			
1. Hadley Wickham and Garrett Grolemund, "R for Data Science," O'Reilly Media, 2016.			
2. Nina Zumel and John Mount, "Practical Data Science with R," Manning Publications, 2014.			
3. Brett Lantz, "Machine Learning with R," Packt Publishing, 2013.			
Suggested Digital Platforms Web Links:			
1. https://www.udemy.com/course/the-data-science-course-complete-data-science-bootcamp/			
2. https://www.coursera.org/learn/introduction-to-r-programming-data-science			
3. https://www.coursera.org/learn/data-analysis-with-r			
4. https://www.edx.org/learn/r-programming/ibm-r-programming-basics-for-data-science			
Suggested Equivalent Online Courses:			
1. https://nptel.ac.in/courses/111104147			

Part A - Introduction			
Programme – B.C.A. (Computer Application - DSE)	Class – B.C.A VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application): Discipline Specific Elective (DSE)			
Course Code	S6-BCA2T-A		
Course Title	Introduction to Data Science		

Part – D Assessment and Evaluation					
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks			External Evaluation (Summative Assessment): End Semester Exam:60 Marks Time: 03 hours		
Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc.					
The division of marks is as follows:					
Test I (Written Test)	20 Marks	Best two test Marks = (20 + 20)	Section (A): 5 Objective Questions (1 mark each)	$5 \times 1 = 5$	
Test II (Written Test)	20 Marks		Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each)	$5 \times 7 = 35$	
Test III	20 Marks		Section (C): Two long questions out of four questions (500 Words each) (10 Marks each)	$2 \times 10 = 20$	
Total Internal Assessment (CCE) Marks	40 Marks		Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks	
Note:-	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.			
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.			



Government Holkar (Model, Autonomous) Science College, Indore (M.P.)

Computer Science Department

Part A- Introduction (Practical)			
Programme – B.C.A. (Computer Application - DSE)		Class – B.C.A VI Semester	Year- 2023
Session- 2023-24			
Course Type (Computer Science): Discipline Specific Elective (DSE)			
1	Course Code	S6-BCA2TP-A	
2	Course Title	Data Science Lab	
3	Pre – requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Levels	
4	Course Learning Outcomes (CLO)	<p>On successful completion of this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Create and enhance relevant programming abilities. 2. Demonstrate mastery in conducting statistical data analysis. 3. Develop the capacity to formulate and evaluate data-based models. 4. Apply professional statistical software to execute statistical analyses effectively. 5. Exhibit competence in data management practices. 	
5	Credit Value	1 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35

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Part B- Content of the Course	
Total no. of lectures – As per UGC rules: 15 lectures	
Suggestive list of Practical:	
1.	Write a R program to take input from the user (name and age) and display the values. Also print the version of R installation.
2.	Write a R program to get the details of the objects in memory.
3.	Write a R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91.
4.	Write a R program to create a vector which contains 10 random integer values between -50 and +50.
5.	Write a R program to get the first 10 Fibonacci numbers.
6.	Load the built in warpbreaks data set . Find out, in a single command, which columns of warpbreaks are either numeric or integer.
7.	a. Load the state datasets. b. Convert the state.x77 dataset to a dataframe. c. Rename the Life Exp variable to Life.Exp, and HS Grad to HS.Grad
8.	Suppose we wanted to enter all the variables in a first-order linear regression model with Life Expectancy as the dependent variable. Fit this model.
9.	Suppose we wanted to remove the Income, Illiteracy, and Area variables from the model in Exercise 2. Use the update function to fit this model.
10.	Let's assume that we have settled on a model that has HS.Grad and Murder as predictors. Fit this model.
11.	Write a R program to create a Data Frames which contain details of 5 employees and display summary of the data
12.	Write a R program to create the system's idea of the current date with and without time.
13.	To prepare data for analysis in R
14.	To find missing data in R?
15.	To exclude missing data in R?
16.	To remove rows with 0 in R?
17.	Create a list of 80% of the rows in the original dataset to use for training.
18.	Select 20% of the data for validation.
19.	Use the remaining 80% of data to train and test the models.
20.	Find the dimensions of the "iris" dataset.
21.	Find the type of each attribute in your dataset.
22.	Take a look at the first 5 rows of your dataset.
23.	Display the summary of the "iris" dataset.
24.	What happens to missing values in a histogram? What happens to missing values in a bar chart? Why is there a difference?

Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. Allan G. Bluman, Elementary Statistics: A Step By Step Approach, 10th Edition, McGraw-Hill, 2017.
2. Paul Teator, R Cookbook, First Edition, O'Reilly Media, 2011.
3. Tom Mitchell, Machine Learning, First Edition, McGraw Hill, 1997

Reference Books:

1. Hadley Wickham and Garrett Grolemund, "R for Data Science," O'Reilly Media, 2016.
2. Nina Zumel and John Mount, "Practical Data Science with R," Manning Publications, 2014.
3. Brett Lantz, "Machine Learning with R," Packt Publishing, 2013.

Suggested Digital Platforms Web Links:

1. <https://www.udemy.com/course/the-data-science-course-complete-data-science-bootcamp/>
2. <https://www.coursera.org/learn/introducton-r-programming-data-science>
3. <https://www.coursera.org/learn/data-analysis-with-r>
4. <https://www.edx.org/learn/r-programming/ibm-r-programming-basics-for-data-science>

Suggested Equivalent Online Courses:

1. <https://nptel.ac.in/courses/111104147>

Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 =100 Marks)



**Government Holkar (Model, Autonomous) Science
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Computer Science Department

Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class - B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
1 Course Code	S6-BCA2T-B		
2 Course Title	Internet and Web Technology Using PHP		
3 Pre – requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Levels. This course can be opted by the students of Computer Science.		
4 Course Learning Outcomes (CLO)	<p>After completing this course student shall be able to:</p> <ol style="list-style-type: none"> 1. Recall and understand fundamental concepts of Internet, HTML, CSS, JavaScript, PHP, and MySQL, including their histories, syntax, and key components. 2. Apply knowledge to create well-structured HTML documents, style web content with CSS, develop interactive web pages with JavaScript, embed dynamic PHP code, and interact with MySQL databases for web applications. 3. Analyze HTML structure, CSS styles, JavaScript code, PHP scripts, and MySQL queries for proper design, functionality, and troubleshooting. 4. Evaluate the efficiency and security of web development practices, including data handling, user interactions, and the use of different technologies. 5. Create cohesive web solutions by combining HTML, CSS, JavaScript, PHP, and MySQL to develop interactive and dynamic web applications while adhering to best practices in design and functionality. 		
5 Credit Value	3 Credits		
6 Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35	

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Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
Course Code	S6-BCA2T-B		
Course Title	Internet and Web Technology Using PHP		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		No. of Lectures
S. No.	Topics	
I	Introduction - Introduction to internet & World Wide Web, Internet Addressing, Browsers, URL and Domain Names, Web Development. HTML - History of HTML, HTML working, Structure of HTML documents. Tags and attributes, Tag vs. element. HTML Basic tags, Basic formatting tags, HTML color coding, Lists, Images, Tables and Hyperlink. Grouping -Using Div and Span tags for grouping. HTML Forms -input, textarea, button, select, label. HTML Headers - Title, Meta, Base, Link, Style, Script.	9
II	CSS - Basic Concept of CSS, Benefits of CSS, CSS Syntax. CSS Selectors Based on tag name, Id, Class. CSS Types - Inline, Internal, External. Client Side vs. Server Side. JavaScript: introduction, Syntax review, keywords, variable declaration. Interacting with users - Creating alert dialogs, prompts, getting confirmations from users. BASICS OF PHP: A Brief History of PHP, PHP Characteristics, Installing and Configuring PHP on Windows, installation of XAMPP/LAMP.	9
III	PHP Language Basics: Lexical Structure, Data Types, Variables & Constant, Comments, Expressions and Operators, Decision Statements, Flow Control Statements, including html code in PHP, Embedding PHP in Web Pages. FUNCTIONS in PHP: Defining a function, Calling a function, variable scope, function parameters, return values, predefined functions.	9

	STRINGS in PHP: Creating & accessing string, searching and replacing strings, encoding and escaping, comparing strings, formatting strings, regular expression.	
IV	Data & File Handling: PHP Forms: \$_GET, \$_POST, \$_REQUEST, \$FILES, \$SERVER, \$GLOBALS, \$_ENV, input/output controls, validation. Cookies: creating, setting values, accessing cookies values, session cookie, persistent cookie, redirecting page. Sessions: Session handling, creating session, storing values in session, accessing values from session, destroying session. File Handling: File and directory, open, close, read, write, append, delete, uploading and downloading files. File exists, File Size, Rename. Reading and display all/selected files present in a directory.	9
V	MYSQL AN OVERVIEW: Introduction, phpMyAdmin, Entering queries, Creating and using a database, Creating and selecting a database, creating a table, loading data into a table, Retrieving information from a table, selecting all data, selecting particular rows, selecting particular columns, sorting, date, calculations, working with NULL values, pattern matching, counting rows, using more than one tables. MYSQL DATABASES IN PHP: Introduction, connecting to a MySQL database, querying the database, Retrieving and displaying the results, modifying data and deleting data through front end. Designing applications using PHP & MySQL.	9

Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
Course Code	S6-BCA2T-B		
Course Title	Internet and Web Technology Using PHP		

Part – C Learning Resources			
Text Books, Reference Books, Other Resources			
Suggested Readings:			
Text Books:			
1. Jon Duckett, Html And Css Design And Build Websites, Wiley 2. Jenifer Niederst Robbins, Learning Web Design: A Beginner's Guide to Html, CSS, Javascript, and Web Graphics, O'Reilly. 3. Steven M. Schafer, HTML, XHTML, and CSS Bible, Wiley 4. Felke-Morris, Basics of Web Design: HTML5 & CSS3, Pearson Education. 5. Felke-Morris , WebDevelopment & Design Foundations with HTML5, Addison-Wesley.			
Reference Books:			
1. Steven M. Schafer, HTML, XHTML, and CSS Bible, Wiley India. 2. Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets for Web Design, Wiley India. 3. Thomas A Powell, The complete Reference to HTML, Paperback. 4. Lee Anne Philips, Using HTML, PHI 5. C. Xavier, World Wide Web Design with HTML, New Age International. 6. Laura Lemay, Mastering HTML, CSS & Javascript Web Publishing. 7. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, DT Editorial Services, Paperback			
Suggested Digital Platforms Web Links:			
1. https://www.udemy.com/course/web-design-secrets/ 2. https://www.udemy.com/course/php-mysql-course-for-absolute-beginners 3. https://www.simplilearn.com/learn-php-basics-free-course-skillup 4. https://www.coursera.org/learn/web-applications-php			
Suggested Equivalent Online Courses:			
1. https://onlinecourses.swayam2.ac.in/aic20_sp32/preview 2. https://www.udemy.com/course/php-mysql-tutorial/			

Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
Course Code		S6-BCA2T-B	
Course Title		Internet and Web Technology Using PHP	

Part – D Assessment and Evaluation			
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks		External Evaluation (Summative Assessment): End Semester Exam:60 Marks Time: 03 hours	
Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc.			
The division of marks is as follows:			
Test I	20 Marks		Section (A): 5 Objective Questions (1 mark each) $5 \times 1 = 5$
Test II	20 Marks	Best two test Marks = (20 + 20)	Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each) $5 \times 7 = 35$
Test III	20 Marks		Section (C): Two long questions out of four questions (500 Words each) (10 Marks each) $2 \times 10 = 20$
Total Internal Assessment (CCE) Marks	40 Marks		Total External Evaluation (Theory) Marks (A+B+ C) 60 Marks
Note:-		1. For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given. 2. The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.	



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Part A- Introduction (Practical)			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
1. Course Code	S6-BCA2TP-B		
2. Course Title	Internet and Web Technology Using PHP		
3. Pre-requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Levels. This course can be opted by the students of Computer Science.		
4. Course Learning Outcomes (CLO)	After completing this course student shall be able to: <ol style="list-style-type: none">1. Apply fundamental concepts related to the Internet, HTML, CSS, JavaScript, PHP, and MySQL.2. Build web content, including HTML documents, CSS styles, and interactive pages using JavaScript, to develop web solutions.3. Examine and resolve issues in web-related code (HTML, CSS, JavaScript, PHP, MySQL) to enhance problem-solving skills.4. Assess the performance, security, and usability of web applications created during exercises, and make improvements.5. Collaborate with peers to implement web development projects, integrating various technologies (HTML, CSS, JavaScript, PHP, MySQL) to create functional and dynamic web solutions.		
5. Credit Value	1 Credits		
6. Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35	

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Part B- Content of the Course	
Total no. of lectures – As per UGC rules: 15	
Suggestive List of Practicas	
1.	Create an HTML file (e.g. first_page.html) that specifies a page that contains a heading and two paragraphs of text. As the texts in the heading and paragraphs you can use any texts you like.
2.	Design a home page which displays information about your college department using paragraph and list tags. Insert images also.
3.	Create 3 Hyperlinks in home page connecting it to 3 different pages.
4.	Create 3 hyperlinks in a page, which jumps to 3 different headings on same page.
5.	Design a Registration form in HTML using HTML forms. Apply CSS on web page and various form controls.
6.	Implement javascript validation on a sign-up form. Organize the text and form controls within <table>, apply rowspan and colspan attributes.
7.	Design a web-page whose content can be changed using JavaScript events.
8.	Implement CSS backgrounds and borders in a web-page.
9.	Create a simple HTML form and accept the user name and display the name through PHP echo statement.
10.	Write a PHP script to demonstrate arithmetic operators, comparison operator, and logical operator.
11.	Write PHP Script to input marks, generate result and display grade.
12.	Write PHP Script for addition of two 2x2 matrices.
13.	Write PHP script to obtain factorial of a number using function.
14.	Write PHP script to demonstrate string, date and math function.
15.	Create student registration form using text box, check box, and radio button, select. Submit button. And display user inserted value in new PHP page.
16.	Write two different PHP script to demonstrate passing variables through a URL.
17.	Write two different PHP script to demonstrate passing variables with sessions.
18.	Write PHP script to demonstrate passing variables with cookies.
19.	Write a program to keep track of how many times a visitor has loaded the page.
20.	Write PHP script to demonstrate exceptional handling.
21.	Write a PHP script to connect MySQL server from your website.
22.	Write a program to read customer information like cust_no, cust_name, Item_purchase, and mob_no, from customer table and display all these information in table format on output screen.
23.	Write a program to edit name of customer to "Bob" with cust_no=1, and to delete record with cust_no=3.
24.	Write a program to read employee information like emp_no, emp_name, designation and salary from EMP table and display all this information using table format.
25.	Create a dynamic web site using PHP and MySQL.

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Part – C Learning Resources
Text Books, Reference Books, Other Resources
Suggested Readings:
Text Books:
<ol style="list-style-type: none"> 1. Jon Duckett, Html And Css Design And Build Websites, Wiley 2. Jenifer Niederst Robbins, Learning Web Design: A Beginner's Guide to Html, CSS, Javascript, and Web Graphics, O'Reilly. 3. Steven M. Schafer, HTML, XHTML, and CSS Bible, Wiley 4. Felke-Morris, Basics of Web Design: HTML5 & CSS3, Pearson Education. 5. Felke-Morris , WebDevelopment & Design Foundations with HTML5, Addison-Wesley.
Reference Books:
<ol style="list-style-type: none"> 1. Steven M. Schafer, HTML, XHTML, and CSS Bible, Wiley India. 2. Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets for Web Design. Wiley India. 3. Thomas A Powell, The complete Reference to HTML, Paperback. 4. Lee Anne Philips, Using HTML, PHI 5. C. Xavier, World Wide Web Design with HTML, New Age International. 6. Laura Lemay, Mastering HTML, CSS & Javascript Web Publishing. 7. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, DT Editorial Services, Paperback
Suggested Digital Platforms Web Links:
<ol style="list-style-type: none"> 1. https://www.udemy.com/course/web-design-secrets/ 2. https://www.udemy.com/course/php-mysql-course-for-absolute-beginners 3. https://www.simplilearn.com/learn-php-basics-free-course-skillup 4. https://www.coursera.org/learn/web-applications-php
Suggested Equivalent Online Courses:
<ol style="list-style-type: none"> 1. https://onlinecourses.swayam2.ac.in/aic20_sp32/preview 2. https://www.udemy.com/course/php-mysql-tutorial/

Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 =100 Marks)

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**Government Holkar (Model, Autonomous) Science
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Computer Science Department

Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
1 Course Code	S6-BCA3T-A		
2 Course Title	Linux/Unix Operating System		
3 Pre – requisite (if any)			
4 Course Learning Outcomes (CLO)	<p>On successful completion of this course, the students will be able to:</p> <ol style="list-style-type: none">1. Learn UNIX structure, commands, and utilities.2. Describe and understand the UNIX file system.3. Write shell scripts in order to perform shell programming.4. Acquire knowledge about text processing utilities, process management and system operation of UNIX.5. Installation of software's and hardware's on Unix operating system.		
5 Credit Value	03 Credits		
6 Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35	

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Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
Course Code	S6-BCA3T-A		
Course Title	Linux/Unix Operating System		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	Topics	No. of Lectures
I	Unix operating system: Background, Evolution of Unix OS. Unix implementations, Features of Unix operating system. Linux operating system: Development of Linux. Applications of Linux, Linux architecture, file system of Linux - boot block, super block, inode table and data blocks, structure of file system, Structure of unix kernel.	9
II	General utility commands: banner, cal, date, who, who am I, echo, printf, bc, uname, tty, stty, passwd. Help: --help, man command. Basic commands related to file system: pwd, cd, ls, mkdir, rmdir, cp, mv, rm; cat, more, file, od, wc, cmp, comm, diff, tar commands. I/O redirection. The Bourne shell: sh preceding a command by its own combining commands, pattern matching, echo, pipes, tee, shell variables and shell scripts. Basic file attributes chmod command.	9
III	Simple filters: pr, head, tail, cut, paste, sort, uniq, nl commands. Advanced filters: grep, egrep, fgrep, tr. join, sed, awk, filtering. The process: shell process, parent and children process status, system processes, multiple jobs, foreground and background, wait commands, premature termination of process, job execution with low priority, multiple jobs in foreground, shell layers, timing processes.	9
IV	System Administration: installing hardware and software, super user, security, user services, administration backups. Managing user accounts- Sudo, users: useradd, usermod, userdel, passwd. Group: Primary & Secondary Group, chgrp, chown, groupadd, groupdel Permissions: adding and removing permissions.	9

V	<p>Shell Programming: Types of Shells, Shell Meta Characters - \$#, \$*, \$?, Shell Variables, Shell Scripts, Debugging scripts, echo, read, operators, keywords, Integer Arithmetic and String Manipulation, Functions.</p> <p>Decision Making: if-else-elif-fi, case-esac.</p> <p>Loop Control: while, for, until, break & continue.</p> <p>Automation and Exception Handling: Creating shell programs for automating tasks, file handling, trapping signals etc.</p> <p>Android Operating System: Introduction, Development Framework, Application Architecture, Process Management and File System, Small Application Development using Android Development Framework.</p> <p>Indian contribution to the field - Growth of LINUX, Aryabhata Linux, contributions of innovators Rajen Sheth, Sunder Pichai etc.</p>	9
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Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
Course Code	S6-BCA3T-A		
Course Title	Linux/Unix Operating System		

Part – C Learning Resources			
Text Books, Reference Books, Other Resources			
Suggested Readings:			
Text Books:			
1. UNIX Operating Systems: Sumitabh Das, Tata McGraw Hills publication.			
Reference Books:			
1. UNIX System Administration Handbook(Second edition): Evi Nemeth, Garth Synder, Scott Seebass, Trent R Hein, Pearson Education - Asia, 2000.			
2. C: Design of UNIX Operating System: Maurice J. Back, Pearson Education – Asia			
3. ISRD Group, Basics of OS, UNIX and SHELL Programming" TMH (2006).			
4. A User guide to unix system", Thomas Rebecca yate, Second Edition, 2002. Tata McGraw Hill.			
5. Stephen Prata "Advanced Unix -A programmer's Guide".			
Suggested Digital Platforms Web Links:			
1. https://www.udemy.com/course/unix-linux-operating-system			
2. https://onlinecourses.swayam2.ac.in/aic20_sp24/preview			
Suggested Equivalent Online Courses:			
1. https://nptel.ac.in/courses/117106113			
2. https://archive.nptel.ac.in/courses/117/106/117106113/			

Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
Course Code		S6-BCA3T-A	
Course Title		Linux/Unix Operating System	

Part – D Assessment and Evaluation			
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks		External Evaluation (Summative Assessment): End Semester Exam:60 Marks Time: 03 hours	
Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc.			
The division of marks is as follows:			
Test I	20 Marks		Section (A): 5 Objective Questions (1 mark each) $5 \times 1 = 5$
Test II	20 Marks	Best two test Marks = $(20 + 20)$	Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each) $5 \times 7 = 35$
Test III	20 Marks		Section (C): Two long questions out of four questions (500 Words each) (10 Marks each) $2 \times 10 = 20$
Total Internal Assessment (CCE) Marks	40 Marks		Total External Evaluation (Theory) Marks (A+B+C) 60 Marks
Note:-	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.	
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.	



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Part A- Introduction (Practical)			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
1. Course Code	S6-BCA3TP-A		
2. Course Title	Linux/Unix Operating System		
3. Pre-requisite (if any)			
4. Course Learning Outcomes (CLO)	On successful completion of this course, the students will be able to: <ol style="list-style-type: none">Recall essential Linux commands for file and directory management, permissions, text editing, and networking.Understand how and when to use Linux commands for various tasks, including file operations, text manipulation, and system maintenance.Use Linux commands to perform tasks like creating, deleting, and managing files, setting permissions, and troubleshooting network issues.Examine and evaluate file content, permissions, and system information using Linux commands to identify and resolve issues.Create and run simple shell scripts to automate tasks, demonstrating a practical understanding of Linux commands and scripting.		
5. Credit Value	01 Credits		
6. Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35	

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Part B- Content of the Course	
Total no. of lectures – As per UGC rules: 15	
Suggestive List of Practiclas	
1.	Linux Directory Commands: pwd, mkdir, rm -rf, ls, cd, cd/ cd ~
2.	Linux File Commands: touch, cat, cat >, cat >>, rm, cp, mv, rename
3.	Linux Permission Commands: su, id, useradd, passwd, groupadd, chmod, groupdel, chown, chgrp
4.	Linux File Content & Filter Commands: head, tail, tac, more, less, grep, cat, cut, grep, comm, sed, tee, tr, uniq, wc, od, sort, diff.
5.	Linux Utility Commands: find, bc, locate, date, cal, sleep, time, df, mount, exit, clear, gzip, gunzip.
6.	Linux Networking Commands: ip, ssh, mail, ping, host
7.	Edit Crontab file: to wall message on system on particular time automatically.
8.	Vi editor: Create file, edit, save and quit. Highlighting the searched term within a file, cut, yank, undo.
9.	Write a shell script to print a message.
10.	Write a shell script to access arguments passed on command line.
11.	Write a shell script to create files with the names passed on command line.
12.	Write a shell script to input number from user and display its factorial.
13.	Write a shell script to input file name and create multiple directories individually for the name in the file given.
14.	Write a shell script to input number from user and display whether it is prime number or not.
15.	Write a shell script to list all the files in any directory given by the user
16.	Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory.

Part – C Learning Resources
Text Books, Reference Books, Other Resources
Suggested Readings:
Text Books:
1. UNIX Operating Systems: Sumitabh Das, Tata McGraw Hills publication.
Reference Books:
1. UNIX System Administration Handbook(Second edition): Evi Nemeth, Garth Synder, Scott Seebass, Trent R Hein, Pearson Education - Asia, 2000.
2. C: Design of UNIX Operating System: Maurice J. Back, Pearson Education – Asia
3. ISRD Group, Basics of OS, UNIX and SHELL Programming" TMH (2006).
4. A User guide to unix system", Thomas Rebecca yate, Second Edition, 2002. Tata McGraw Hill.
5. Stephen Prata "Advanced Unix -A programmer's Guide".
Suggested Digital Platforms Web Links:
1. https://www.udemy.com/course/unix-linux-operating-system
2. https://onlinecourses.swayam2.ac.in/aic20_sp24/preview
Suggested Equivalent Online Courses:
1. https://nptel.ac.in/courses/117106113
2. https://archive.nptel.ac.in/courses/117/106/117106113/

Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 = 100 Marks)



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Computer Science Department

Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
1	Course Code	S6-BCA3T-B	
2	Course Title	Computer Oriented Numerical Methods (Using "C++" language)	
3	Pre – requisite (if any)		
4	Course Learning Outcomes (CLO)	On successful completion of this course, the students will be able to: <ol style="list-style-type: none">1. To develop the mathematical skills of the students in the areas of numerical methods.2. To teach theory and applications of numerical methods in a large number of engineering subjects which require solutions of linear systems.3. Finding Eigen values, eigenvectors, interpolation and applications, solving ODEs, PDEs.4. To lay foundation of computational mathematics for post-graduate courses specialized studies and research.5. Dealing with statistical problems like testing of hypotheses.	
5	Credit Value	03 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35

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Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class - B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
Course Code	S6-BCA3T-B		
Course Title	Computer Oriented Numerical Methods (Using “C++” language)		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	Topics	No. of Lectures
I	Numerical Computations: Computer Arithmetic: Floating Point Number Operations, Normalization and their consequences. Iterative Methods: Bisection Method, False Position Method, Newton Raphson Method, Secant Method, Graffes Root Squaring Method, Convergence of Solution.	9
II	Simultaneous Liner Equation: Solution of Simultaneous Liner Equation-Gauss Elimination Method, Gauss-Seidal Method, Gauss- Jordan Elimination Method. Triangularization Method & Pivoting Condensation, ill Conditioned Equation & Refinement of solution. Curve Fitting: Curve Fitting Method, Least Curve Fitting, Non Linear Curve Fitting.	9
III	Difference Operators And Interpolation: Definition Of Forward, Backward, Shifting, Divided, Difference Central and Averaging Operators and their Relationships. Newton's Forward Interpolation Formula. Newton's backward Interpolation Formula, Newton's divided Interpolation Formula. Lagrange's Interpolation Formula.	9
IV	Numerical Differentiation: Numerical Differentiation using Newton's Forward Interpolation Formula. Newton's Backward Interpolation Formula, Newton's divided Interpolation Formula. Numerical Integration: General Quadrature Formula, Newton-Cote's Formula. Trapezoidal Rule. Simpson's one Third Rule, Simpson's Three Eighth Rule.	9
V	Numerical Solutions of Ordinary Differential Equations: Euler's Method, Euler's Modifies Method. Tailor's Series Method, Picard's Method, Runga Kutta Second Order and Fourth orders Method.	9

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Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
Course Code	S6-BCA3T-B		
Course Title	Computer Oriented Numerical Methods (Using "C++" language)		

Part – C Learning Resources			
Text Books, Reference Books, Other Resources			
Suggested Readings:			
Text Books:			
1. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India.			
2. S. S. Sastry: Introductory Methods of Numerical Analysis, Prentice Hall India Learning Private Limited, Fifth edition, 2012.			
3. E. Balagurusamy: Numerical Methods, Tata McGraw Hill Publication, 2017.			
4. मध्य प्रदेश हिन्दी ग्रंथ अकादमी से प्रकाशित विषय से संबंधित पुस्तकें।			
Reference Books:			
1. M. K. Jain, S.R.K. Iyengar & R. K. Jain, Numerical Methods for Scientific and Engineering Computation.			
2. H. C. Saxena, Finite Differences and Numerical Analysis.			
3. Modes A., Numerical Analysis for Computer Science.			
Suggested Digital Platforms Web Links:			
1. https://epgp.inflibnet.ac.in			
2. https://www.higereduction.mp.gov.in/?page=xhzlQmpZwkylQo2b%2Fy5G7w%3D			
Suggested Equivalent Online Courses:			
1. https://nptel.ac.in/courses/111106101/			
2. https://nptel.ac.in/courses/111107105/			
3. https://nptel.ac.in/courses/111107107/			
4. https://ugemoocs.inflibnet.ac.in/index.php/courses/view_pg/1476			

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Part A - Introduction			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
Course Code	S6-BCA3T-B		
Course Title	Computer Oriented Numerical Methods (Using "C++" language)		

Part – D Assessment and Evaluation			
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks		External Evaluation (Summative Assessment): End Semester Exam:60 Marks Time: 03 hours	
Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc.			
The division of marks is as follows:			
Test I	20 Marks	Section (A): 5 Objective Questions (1 mark each)	$5 \times 1 = 5$
Test II	20 Marks	Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each)	$5 \times 7 = 35$
Test III	20 Marks	Section (C): Two long questions out of four questions (500 Words each) (10 Marks each)	$2 \times 10 = 20$
Total Internal Assessment (CCE) Marks	40 Marks	Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Note:-	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.	
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.	

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**Government Holkar (Model, Autonomous) Science
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Computer Science Department

Part A- Introduction (Practical)			
Programme - B.C.A. (Computer Application - DSE)	Class – B.C.A. VI Semester	Year- 2023	Session- 2023-24
Course Type (Computer Application) – Discipline Specific Elective (DSE)			
1.	Course Code	S6-BCA3TP-B	
2.	Course Title	Computer Oriented Numerical Methods (Using "C++" language)	
3.	Pre-requisite (if any)	-	
4.	Course Learning Outcomes (CLO)	On successful completion of this course, the students will be able to: <ol style="list-style-type: none">1. Recall and list common numerical methods.2. Grasp the principles behind numerical methods.3. Use C++ to implement various numerical methods.4. Assess the behavior and effectiveness of numerical methods.5. Judge the accuracy and efficiency of implemented methods.6. Develop C++ programs for solving complex mathematical problems.	
5.	Credit Value	1 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total $40+60=100$ Marks	Minimum Pass Marks – 35

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Part B- Content of the Course	
Total no. of lectures – As per UGC rules	
Suggestive List of Practicas	
1.	Write a C++ program to implement Bisection Method.
2.	Write a C++ program to implement False Position Method.
3.	Write a C++ program to implement Newton Raphson Method.
4.	Write a C++ program to implement Secant Method.
5.	Write a C++ program to implement Newton's Forward Interpolation Formula
6.	Write a C++ program to implement Newton's backward Interpolation Formula
7.	Write a C++ program to implement Newton's divided Interpolation Formula
8.	Write a C++ program to implement Lagrange's Interpolation Formula.
9.	Write a C++ program to implement Simpson's one Third Rule
10.	Write a C++ program to implement Simpson's Three Eighth Rule
11.	Write a C++ program to implement Euler's method.
12.	Write a C++ program to implement Euler's modifies method.
13.	Write a C++ program to implement Tailor's Series method.
14.	Write a C++ program to implement Picard's Method
15.	Write a C++ program to implement Runge Kutta's Method.

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Part – C Learning Resources	
Text Books, Reference Books, Other Resources	
Suggested Readings:	
Text Books:	
1. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India. 2. S. S. Sastry: Introductory Methods of Numerical Analysis, Prentice Hall India Learning Private Limited, Fifth edition, 2012. 3. E. Balagurusamy: Numerical Methods, Tata McGraw Hill Publication, 2017. 4. मध्य प्रदेश हिन्दी ग्रंथ अकादमी से प्रकाशित विषय से संबंधित पुस्तकें।	
Reference Books:	
1. M. K. Jain, S.R.K. Iyengar & R. K. Jain, Numerical Methods for Scientific and Engineering Computation. 2. H. C. Saxena, Finite Differences and Numerical Analysis. 3. Modes A., Numerical Analysis for Computer Science.	
Suggested Digital Platforms Web Links:	
1. https://epgp.inflibnet.ac.in 2. https://www.higereducation.mp.gov.in/?page=xhzIQmpZwkylQo2b%2Fy5G7w%3D%3D	
Suggested Equivalent Online Courses:	
1. https://nptel.ac.in/courses/111106101/ 2. https://nptel.ac.in/courses/111107105/ 3. https://nptel.ac.in/courses/111107107/ 4. https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_pg/1476	

Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 =100 Marks)

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Computer Science Department

Part A - Introduction

Programme – B.C.A. (Computer Applications)	Class – B.C.A. V Semester	Year- 2023	Session- 2023-24
Course Type (Computer Applications) – Project / Internship			
Course Code	S6-BCA-Int		
Course Title	Project/ Internship		

ASSESSMENT AND EVALUATION

1	Field Training	50 Marks
2	Project Report	25 Marks
3	Presentation/Viva voce	15 Marks
4	Teacher Guide	10 Marks
Total Marks		100 Marks

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