



KARNATAK UNIVERSITY, DHARWAD
ACADEMIC (S&T) SECTION

ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ



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'A' Grade 2014

website: kud.ac.in

No. KU/Aca(S&T)/JS/MGJ(Gen)/2023-24/59

Date: 04/09/2023

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2023-24ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಪದವಿಗಳಿಗೆ 5 ಮತ್ತು 6ನೇ ಸೆಮಿಸ್ಟರ್
NEP-2020 ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

- ಉಲ್ಲೇಖ: 1. ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿಗಳು(ವಿಶ್ವವಿದ್ಯಾಲಯ 1) ಉನ್ನತ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ
ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 104 ಯುಎನ್‌ಇ 2023, ದಿ: 20.07.2023.
2. ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂಖ್ಯೆ: 2 ರಿಂದ 7, ದಿ: 31.08.2023.
3. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 04/09/2023

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2023-24ನೇ
ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ, ಎಲ್ಲ B.A./ BPA (Music) /BVA / BTTM / BSW/ B.Sc./B.Sc. Pulp &
Paper Science/ B.Sc. (H.M)/ BCA/ B.A.S.L.P./ B.Com/ B.Com (CS) / BBA & BA ILRD ಸ್ನಾತಕ ಪದವಿಗಳ 5
ಮತ್ತು 6ನೇ ಸೆಮಿಸ್ಟರ್‌ಗಳಿಗೆ NEP-2020ರ ಮುಂದುವರಿದ ಭಾಗವಾಗಿ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ
ಕೋರ್ಸಿನ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ www.kud.ac.in ದಲ್ಲಿ ಭಿತ್ತರಿಸಲಾಗಿದೆ. ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ.
ಅಂತರ್ಜಾಲದಿಂದ ಡೌನ್‌ಲೋಡ್ ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತ ವಿದ್ಯಾರ್ಥಿಗಳ ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ
ತಂದು ಅದರಂತೆ ಕಾರ್ಯಪ್ರವೃತ್ತರಾಗಲು ಕವಿವಿ ಅಧೀನದ/ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ
ಸೂಚಿಸಲಾಗಿದೆ.

ಅಡಕ: ಮೇಲಿನಂತೆ


ಕುಲಸಚಿವರು.

ಗೆ,

ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ
ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ. (ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ ಹಾಗೂ ಮಿಂಚಂಚೆ ಮೂಲಕ ಬಿತ್ತರಿಸಲಾಗುವುದು)

ಪ್ರತಿ:

1. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
2. ಕುಲಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
3. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
4. ಅಧೀಕ್ಷಕರು, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ / ಗೌಪ್ಯ / ಜಿ.ಎ.ಡಿ. / ವಿದ್ಯಾಂಡಳ (ಪಿ.ಜಿ.ಪಿ.ಎಚ್.ಡಿ) ವಿಭಾಗ, ಸಂಬಂಧಿಸಿದ
ಕೋರ್ಸುಗಳ ವಿಭಾಗಗಳು ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
5. ನಿರ್ದೇಶಕರು, ಕಾಲೇಜು ಅಭಿವೃದ್ಧಿ / ವಿದ್ಯಾರ್ಥಿ ಕಲ್ಯಾಣ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.



KARNATAKUNIVERSITY,DHARWAD

Bachelor of Computer Applications
BCA
SYLLABUS

With Effect from 2023-24

DISCIPLINE SPECIFIC CORE COURSE (DSCC) FOR SEM V & VI,
SKILL ENHANCEMENT COURSE(SEC)FOR SEMV & VI SEM

AS PER NEP-2020

Karnatak University, Dharwad

BCA

Effective from 2023-24

Sem.	Type of Course	Theory/Practical	Course Code	Course Title	Instruction hour/week	Total hours / sem	Duration Of Exam	Marks			Credits
								Formative	Summative	Total	
V	DSCC-9	Theory	055 BCA 011	Design and Analysis of Algorithms	04hrs	56	02hrs	40	60	100	04
	DSCC-10	Practical	055 BCA 012	Practical in Design and Analysis of Algorithms	04hrs	56	03hrs	25	25	50	02
	DSCC-11	Theory	055 BCA 013	Statistical Computing and R Programming	04hrs	56	02hrs	40	60	100	04
	DSCC-12	Practical	055 BCA 014	Practical in R Programming	04hrs	56	03hrs	25	25	50	02
	DSCC-13	Theory	055 BCA 015	Software Engineering	04hrs	56	02hrs	40	60	100	04
	DSE-1 (Any one)	Theory	055 BCA 021 055 BCA 022	Cloud Computing Business Intelligence	03hrs	42	02hrs	40	60	100	03
	Voc-1	Theory	055 BCA 101	Web Content Management System	03hrs	42	02hrs	40	60	100	03
	SEC-3	Practical	055BCA 061	Cyber Security	04hrs	56	03hrs	25	25	50	02
Total								275	375	650	24
VI	DSCC-14	Theory	056 BCA 011	Artificial Intelligence and Applications	04hrs	56	02hrs	40	60	100	04
	DSCC-15	Theory	056 BCA 012	PHP and MySQL	04hrs	56	02hrs	40	60	100	04
	DSCC-16	Practical	056 BCA 013	Practical in PHP and MySQL	04hrs	56	03hrs	25	25	50	02
	DSE-2 (Any one)	Theory	056 BCA 021 056 BCA 022	Fundamentals of Data Science Mobile Application Development	03hrs	42	02hrs	40	60	100	03
	Voc-2	Theory	056 BCA 101	Digital Marketing	03hrs	42	02hrs	40	60	100	03
	Internship-I	Project	056BCA 091	Project				150	--	150	08
Total								335	265	600	24

BCA Semester–V

Discipline Specific Course (DSCC-9)

Course Title: Design and Analysis of Algorithms

Course Code: 055BCA011

Type of Course	Theory /Practical	Credits	Instruction hour per week	Total No.of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative assessment Marks	Total Marks
DSCC-9	Theory	04	04	56hrs.	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course students will be able to:

CO1: Understand the fundamental concepts of algorithms and their complexity, including time and space complexity, worst-case and average-case analysis, and Big-O notation.

CO2: Design algorithms for solving various types of problems, such as Sorting, Searching, Graph Traversal, Decrease-and-Conquer, Divide-and-Conquer and Greedy techniques.

CO3: Analyze and compare the time and space complexity of algorithms with other algorithmic techniques.

CO3: Evaluate the performance of Sorting, Searching, Graph traversal, Decrease-and-Conquer, Divide-and-Conquer and Greedy Techniques using empirical testing and benchmarking, and identify their limitations and potential improvements.

CO4: Apply various algorithm design to real-world problems and evaluate their effectiveness and efficiency in solving them.

Unit	Contents	56 hrs/sem
Unit I	Introduction: What is an Algorithm? Fundamentals of Algorithmic problem solving, Fundamentals of the Analysis of Algorithm Efficiency, Analysis Framework, Measuring the input size, Units for measuring Running time, Orders of Growth, Worst-case, Best-case and Average-case efficiencies. Asymptotic Notations and Basic Efficiency classes, Informal Introduction, O notation, Ω -notation, θ -notation, mathematical analysis of non-recursive algorithms, mathematical analysis of recursive algorithms.	14
Unit II	Brute Force & Exhaustive Search: Introduction to Brute Force approach, Selection Sort and Bubble Sort, Sequential search, Exhaustive Search- Travelling Sales man Problem and Knapsack Problem, Depth First Search, Breadth First Search.	14
Unit III	Decrease-and-Conquer: Introduction, Insertion Sort, Topological Sorting. Divide-and-Conquer: Introduction, Merge Sort, Quick Sort, Binary Search, Binary Tree traversals and related properties.	14
Unit IV	Greedy Technique: Introduction, Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm, Lower-Bound Arguments, Decision Trees, P Problems, NP Problems, NP-Complete Problems, Challenges of Numerical Algorithms.	14

References:

1. Introduction to the Design and Analysis of Algorithms, AnanyLevitin: 2nd Edition, 2009, Pearson.
2. Computer Algorithms/C++, Ellis Horowitz, SatrajSahni and Rajasekaran, 2nd Edition, 2014, Universities Press.
3. IntroductiontoAlgorithms,ThomasH.Cormen,CharlesE.Leiserson,RonalL.Rivest,CliffordStein,3rdEdition,P HI.
4. DesignandAnalysisofAlgorithms,S.Sridhar,Oxford(HigherEducation)
5. Weblinks and Video Lectures (e-Resources):
<http://elearning.vtu.ac.in/econtent/courses/video/CSE/06CS43.html><https://nptel.ac.in/courses/106/101/106101060/>
<http://elearning.vtu.ac.in/econtent/courses/video/FEP/ADA.html>
<http://cse01-iiith.vlabs.ac.in/>
<http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=IntroToAlgorithms>

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal AssessmentTest1	10
Internal AssessmentTest2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

BCA Semester–V

Discipline Specific Course (DSCC-10)

Course Title: Practical in Design and Analysis of Algorithms

Course Code: 055BCA012

Type of Course	Theory /Practical	Credits	Instruction hour per week	Total No.of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative assessment Marks	Total Marks
DSCC-10	Practical	02	04	56hrs.	3hrs.	25	25	50

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Able to calculate complexity of an algorithm.

CO2: Select appropriate design techniques to solve real world problems.

CO3: Apply the dynamic programming technique to solve the problems.

Program Nos	Programs	56.hrs/sem
1	Write a program to sort a list of N elements using Selection Sort Technique.	
2	Write a program to perform Travelling Sales man Problem	
3	Write program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.	
4	Write program to implement the DFS and BFS algorithm for a graph.	
5	Write a program to find minimum and maximum value in an array using divide and conquer.	
6	Write a test program to implement Divide and Conquer Strategy. Eg: Quick sort algorithm for sorting list of integers in ascending order.	
7	Write a program to implement Merge sort algorithm for sorting a list of integers in ascending order.	
8	Write C program that accepts the vertices and edges for a graph and stores it as an adjacency matrix.	
9	Implement function to print In-Degree, Out-Degree and to display that adjacency matrix	
10	Write a program to perform Knapsack Problem using Greedy Solution	
11	Write program to implement backtracking algorithm for solving problems like N queens.	
12	Write a program to implement the backtracking algorithm for the sum of subsets problem	
13	Write program to implement greedy algorithm for job sequencing with deadlines.	
14	Write program to implement Dynamic Programming algorithm for the Optimal Binary Search Tree Problem.	
15	Write a program that implements Prim's algorithm to generate minimum cost spanning Tree.	
16	Write a program that implements Kruskal's algorithm to generate minimum cost spanning tree.	

Instruction to the Examiners:

Formative Assessment for Practical	
Assessment/Occasion/type	Marks
Writing Program 1 + Execution without error	10
Writing Program 2 + Execution without error	10
Viva	03
Journal	02
Total	25
Formative Assessment as per guidelines.	

Note: The same shall be used for semester end Examination

BCA Semester–V

Discipline Specific Course (DSCC-11)

Course Title: Statistical Computing & R Programming

Course Code: 055BCA013

Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures / Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSCC-11	Theory	04	04	56hrs	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course, students will be able to:

CO1. Explore fundamentals of statistical analysis in R environment.

CO2. Describe key terminologies, concepts and techniques employed in Statistical Analysis.

CO3. Define Calculate, Implement Probability and Probability Distribution to solve a wide variety of problems.

CO4. Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.

CO5. Understand, Analyse, and Interpret Correlation Probability and Regression to analyse the underlying relationships between different variables.

Unit	Contents	56hrs/sem
Unit I	Introduction of the language, numeric, arithmetic, assignment, and vectors, Matrices and Arrays, Non-numeric Values, Lists and Data Frames, Special Values, Classes, and Coercion, Basic Plotting. Reading and writing files, Programming, Calling Functions, Conditions and Loops: stand-alone statement with illustrations, stacking statements, coding loops, Writing Functions, Exceptions, Timings, and Visibility.	14
Unit II	Statistics and Probability , basic data visualisation, probability, common probability distributions: common probability mass functions, bernoulli, binomial, poisson distributions, common probability density functions, uniform, normal, student's t-distribution.	14
Unit III	Statistical testing and modelling , sampling distributions, hypothesis testing, components of hypothesis test, testing means, testing proportions, testing categorical variables, error and power, Analysis of variance.	14
Unit IV	Simple linear regression, multiple linear regression, linear model selection and diagnostics. Advanced graphics: plot customization, plotting regions and margins, point and click coordinate interaction, customizing traditional R plots, specialized text and label notation. Defining color and plotting in higher dimensions, representing and using color, 3D scatter plots.	14

References:

1. Tilman M. Davies, "The book of R: A first course in programming and statistics", San Francisco, 2016.
2. Vishwas R. Pawgi, "Statistical computing using R software", Nirali Prakashan Publisher, e1 edition, 2022.
3. <https://www.youtube.com/watch?v=KlsYCECWEWE>
<https://www.geeksforgeeks.org/r-tutorial/>
<https://www.tutorialspoint.com/r/index.htm>

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal Assessment Test 1	10
Internal Assessment Test 2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

BCA Semester–V

Discipline Specific Course (DSCC-12)

Course Title: Practical in R Programming

Course Code: 055BCA014

Type of Course	Theory / Practical	Credits	Instruction hours per week	Total No. of Lectures / Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSCC-12	Practical	02	04	56hrs.	3hrs.	25	25	50

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Install, Code and Use R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices and Data frames. Explore fundamentals of statistical analysis in R environment.

CO2: Describe key terminologies, concepts and techniques employed in Statistical Analysis.

CO3: Define Calculate, Implement Probability and Probability Distributions to solve a wide variety of problems.

CO4: Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.

CO5: Understand, Analyze, and Interpret Correlation Probability and Regression to analyse the underlying relationships between different variables.

Program No	Programs	56hrs/sem
1	Write R program for different types of data structures in R.	
2	Write R program that includes variables, constants, data types.	
3	Write R program that includes different operators, control structures, default values for arguments, returning complex objects.	
4	Write R program for quicksort implementation, binary search tree.	
5	Write R program for calculating cumulative sums, and products, minima, maxima and calculus.	
6	Write R program for finding stationary distribution of Markov chains.	
7	Write R program that includes linear algebra operations on vectors and matrices.	
8	Write R program for any visual representation of an object with creating graphs using graphic functions: Plot(), Hist(), Linechart(), Pie(), Boxplot(), Scatterplots().	
9	Write R program for any dataset containing data frame objects, indexing and subsetting data frames, and employ manipulating and analyzing data.	
10	Write a program to create any application of Linear Regression in multivariate context for predictive purpose.	

Instruction to the Examiners

Formative Assessment for Practical	
Assessment/Occasion/type	Marks
Writing Program 1 + Execution without error	10
Writing Program 2 + Execution without error	10
Viva	03
Journal	02
Total	25
Formative Assessment as per guidelines.	

Note: The same shall be used for semester end Examination

BCA Semester–V

Discipline Specific Course (DSCC-13)

Course Title: Software Engineering
Course Code: 055BCA015

Type of Course	Theory /Practical	Credits	Instruction hours per week	Total No. of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSCC-13	Theory	04	04	56hrs.	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.

CO2: An ability to work in one or more significant application domains.

CO3: Work as an individual and as part of a multidisciplinary team to develop and deliver quality software.

CO4: Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle.

CO5: Demonstrate an ability to use the techniques and tools necessary for engineering practice.

Unit	Contents	56hrs/sem
Unit I	Overview: Introduction; Software engineering ethics; Software process models; Process activities; Coping with change; Agile software development: Agile methods; Plan-driven and agile development. Requirements Engineering: Functional and non-functional requirements; Software requirements document; Requirement's specification; Requirements engineering processes; Requirement's elicitation and analysis; Requirement's validation; Requirements management.	14
Unit II	System Modeling: Context models; Interaction models- Use case modeling, Sequence diagrams; Structural models- Class diagrams, Generalization, Aggregation; Behavioral models- Data-driven modeling, Event-driven modeling; Model-driven engineering.	14
Unit III	Architectural Design: Architectural design decisions; Architectural views; Architectural patterns- Layered architecture, Repository architecture, Client-server architecture Pipe and filter architecture. Design and Implementation: Object-oriented design using the UML- System context and interactions, Architectural design, Object class identification, Design models, Interface specification; Design patterns; Implementation issues.	14
Unit IV	Software Testing: Development testing – Unit testing, Choosing unit test cases, Component testing, System testing. Test-driven development; Release testing; User testing- Alpha, Beta, Acceptance testing.	14

References:

1. Ian Somerville, "Software Engineering" 8th Edition, Pearson Education, 2009.
2. Waman S Jawadekar, "Software Engineering Principles and Practice", Tata Mc Graw Hill, 2004.
3. Roger S. Pressman, "A Practitioners Approach", 7th Edition, McGraw-Hill, 2007.
4. P Jalote, "An Integrated Approach to software Engineering ", Narosa Publication.

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal Assessment Test1	10
Internal Assessment Test2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

BCA Semester–V

Discipline Specific Elective (DSE-1A)

Course Title: Cloud Computing

Course Code: 055 BCA021

Type of Course	Theory /Practical	Credits	Instruction hours per week	Total No. of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSE-1A	Theory	03	03	42 hrs.	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course, students will be able to:

- CO1:** Explain the core concepts of the cloud computing paradigms such as how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
- CO2:** Apply the fundamental concepts in data centre to understand the trade-offs in power, efficiency and cost.
- CO3:** Identify resource management fundamentals like resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.
- CO4:** Analyze various cloud programming models and apply them to solve problems on the cloud.

Unit	Title	42hrs/sem
Unit I	<p>Introduction: Different Computing Paradigms- Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing etc., Comparison of various Computing Technologies; Cloud Computing Basics- What is Cloud Computing? History, Characteristic Features, Advantages and Disadvantages, and Applications of Cloud Computing; Trends in Cloud Computing; Leading Cloud Platform Service Providers.</p> <p>Cloud Architecture: Cloud Service Models- Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS), Comparison of different Service Models; Cloud Deployment Models- Public Cloud; Private Cloud, Hybrid Cloud, Community Cloud; Cloud Computing Architecture- Layered Architecture of Cloud. Virtualization- Definition, Features of Virtualization; Types of Virtualizations- Hardware Virtualization, Server Virtualization, Application Virtualization, Storage Virtualization, Operating System Virtualization; Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples- Xen: Paravirtualization, VMware: Full Virtualization, Microsoft Hyper-V.</p>	14
Unit II	<p>Cloud Application Programming and the Aneka Platform: Aneka Cloud Application Platform- Framework Overview, Anatomy of the Aneka Container; Building Aneka Clouds (Infrastructure Organization, Logical Organization, Private Cloud Deployment Mode, Public Cloud Deployment Mode, Hybrid Cloud Deployment Mode); Cloud Programming and Management- Aneka SDK (Application Model and Service Model); Management Tools (Infrastructure, Platform and Application management).</p>	14
Unit III	<p>Cloud Platforms in Industry: Amazon Web Services- Compute Services, Storage Services, Communication Services, Additional Services; Google App Engine- Architecture and Core Concepts, Application Life-Cycle, Cost Model, Observations; Microsoft Azure- Azure Core Concepts (Compute, Storage, Core Infrastructure and Other Services), SQL Azure, Windows Azure Platform Appliance.</p> <p>Cloud Applications: Scientific Applications- Healthcare (ECG Analysis in the Cloud) Biology (Protein Structure Prediction and Gene Expression Data Analysis for Cancer Diagnosis), Geoscience (Satellite Image Processing); Business and Consumer Applications- CRM and ERP, Productivity, Social Networking, Media Applications, Multiplayer</p>	14

	Online Gaming.	
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References:

1. RajkumarBuyya, Christian Vecchiola,S. ThamaraiSelvi:"Mastering Cloud Computing-FoundationsandApplicationsProgramming",Elsevier,2013
2. Barrie Sosinsky:"Cloud ComputingBible", Wiley-India, 2010
3. KChandrashekar: "EssentialsofCloudComputing",CRCPress,2015
4. Derrick Rountree, Ileana Castrillo: "The Basics of Cloud Computing",Elsevier,2014

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal AssessmentTest1	10
Internal AssessmentTest2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

BCA Semester–V

Discipline Specific Elective (DSE-1B)

Course Title: Business Intelligence

Course Code: 055BCA022

Type of Course	Theory /Practical	Credits	Instruction hours per week	Total No of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSE-1B	Theory	03	03	42 hrs.	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Describe the Decision Support systems and Business Intelligence framework.

CO2: Explore knowledge management, explain its activities, approaches and its implementation.

CO3: Describe business intelligence, analytics, and decision support systems

Unit	Contents	42hrs/sem
Unit I	Information Systems Support for Decision Making, An Early Framework for Computerized Decision Support, The Concept of Decision Support Systems, A Framework for Business Intelligence, Business Analytics Overview, Brief Introduction to Big Data Analytics. Introduction and Definitions, Phases of the Decision, Making Process, The Intelligence Phase, Design Phase, Choice Phase, Implementation Phase, Decision Support Systems Capabilities, Decision Support Systems Classification, Decision Support Systems Components.	14
Unit II	Basic Concepts of Neural Networks, Developing Neural Network-Based Systems, Illuminating the Black Box of ANN with Sensitivity, Support Vector Machines, A Process Based Approach to the Use of SVM, Nearest Neighbor Method for Prediction, Sentiment Analysis Overview, Sentiment Analysis Applications, Sentiment Analysis Process, Sentiment Analysis, Speech Analytics.	14
Unit III	Decision Support Systems modeling, Structure of mathematical models for decision support, Certainty, Uncertainty, and Risk, Decision modeling with spreadsheets, Mathematical programming optimization, Decision Analysis with Decision Tables and Decision Trees, Multi-Criteria Decision Making With Pairwise Comparisons. Automated Decision Systems, The Artificial Intelligence field, Basic concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, Knowledge Engineering, and Development of Expert Systems.	14

References:

1. Ramesh Sharda, Dursun Delen, Efraim Turban, J.E. Aronson, Ting-Peng Liang, David King, "Business Intelligence and Analytics: System for Decision Support", 10th Edition, Pearson Global Edition.
2. Data Analytics: The Ultimate Beginner's Guide to Data Analytics, 2017 by Edward Miz.
3. <https://shorturl.at/iuAT0>
4. <https://www.coursera.org/courses?query=business%20intelligence>

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal Assessment Test1	10
Internal Assessment Test2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

Note: Student will select any one of **DSE** either **1A** or **1B** for 3 credits.

BCA Semester–V

Vocational Course (Voc-1)

Course Title: Web Content Management System

Course Code: 055BCA101

Type of Course	Theory /Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Voc-1	Theory	03	03	42 hrs.	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course, students will be able to:

CO 1: Understand content development basics;

CO 2: Gain Knowledge of tools for multimedia content development for audio/video, graphics, animations, presentations, screen casting

CO 3: Host websites and develop content for social media platforms such as wiki and blog

CO 4: Understand e-publications and virtual reality

CO 5: Use of e-learning platform Moodle and CMS applications Drupal and Joomla

Unit	Contents	42hrs/sem
Unit I	Web Content Development and Management, Content Types and Formats, Norms and Guidelines of Content Development, Creating Digital Graphics, Audio Production and Editing,	14
Unit II	Web Hosting and Managing Multimedia Content, Creating and Maintaining a Wiki Site. Presentation Software Part I, Presentation Software Part II, Screencasting Tools and Techniques, Multilingual Content Development. Planning and Developing Dynamic Web Content Sites, Website Design Using CSS Creating and Maintaining a Wiki Site, Creating and Managing a Blog Site,	14
Unit III	E-Publication Concept, E-Pub Tools, Simulation and Virtual Reality Applications, Creating 2D and 3D Animations. Introduction to Moodle, Creating a New Course and Uploading, Create and Add Assessment, Add and Enroll User and Discussion Forum, Content Management System: Joomla, Content Management System: Drupal	14

References:

1. Web Content Management: Systems, Features, and Best Practices 1st Edition by Deane Barker.
2. Content Management Bible (2nd Edition) 2nd Edition by Bob Boiko.
3. Moodle for Learning Management System (LMS): A Practical and Visual Guide book of Administrator and Instructor for Distance Education, 2020 by James Koo
4. Using Joomla!: Efficiently Build and Manage Custom Websites 2nd Edition by Ron Severdia
5. https://onlinecourses.swayam2.ac.in/cec20_lb09/preview

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal Assessment Test 1	10
Internal Assessment Test 2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

BCA Semester–V

Skill Enhancement Course: SEC-3

Course Title: Cyber Security

Course Code: 015CSC061

Type of Course	Theory /Practical	Credits	Instruction hour/week	Total No. of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
SEC-3	Practical	02	04	56hrs.	--	25	25	50

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Analyze and evaluate the cyber security needs of an organization.

CO2: Conduct a cyber security risk assessment.

CO3: Measure the performance and troubleshoot cyber security systems.

CO4: Implement cyber security solutions.

Unit	Contents	42hrs/sem
Unit I	<p>Introduction – Cybersecurity: Definition, Types of Cyber Attacks, Defence Strategies and Techniques, Guiding Principles, Cryptography; Mathematical Background for Cryptography: Modulo Arithmetic, The Greatest Common Divisor.</p> <p>Computer Security Concepts - Definition, The Challenges of Computer Security; Security Attacks: Passive Attacks, Active Attacks; Security Services: Authentication, Access Control, Data Confidentiality, Data Integrity, Nonrepudiation, Availability Service; Security Mechanisms ; Attack Surfaces and Attack Trees; A Model for Network Security.</p> <p>Symmetric Ciphers: Symmetric Cipher Model: Cryptography, Cryptanalysis and Brute-Force Attack; Substitution Techniques: Caesar Cipher, Hill Cipher, One-Time Pad, Simple XOR, Transposition Techniques, Steganography</p>	14
Unit II	<p>Asymmetric Ciphers: Principles Of Public-Key Cryptosystems, Public-Key Cryptosystems, Applications for Public-Key Cryptosystems, Requirements for Public-Key Cryptography, RSA.</p> <p>Cryptographic Hash Functions: Applications of Cryptographic Hash Functions: Message Authentication, Digital Signatures, Other Applications; Requirements and Security: Security Requirements for Cryptographic Hash Functions, Brute-Force Attacks, Cryptanalysis, ; Secure Hash Algorithm (SHA).</p>	14

Program No	Programs	56hrs/sem
1	Write a Python program that defines a function and takes a password string as input and returns its SHA-256 hashed representation as a hexadecimal string.	
2	Write a Python program that defines a function to generate random passwords of a specified length. The function takes an optional parameter length, which is set to 8 by default. If no length is specified by the user, the password will have 8 characters.	

3	Write a Python program to check if a password meets the following criteria: a. At least 8 characters long, b. Contains at least one uppercase letter, one lowercase letter, one digit, and one special character (!, @, #, \$, %, or &), c. If the password meets the criteria, print a message that says "Valid Password." If it doesn't meet the criteria, print a message that says "Password does not meet requirements."	
4	Write a Python program that reads a file containing a list of passwords, one per line. It checks each password to see if it meets certain requirements (e.g. at least 8 characters, contains both uppercase and lowercase letters, and at least one number and one special character). Passwords that satisfy the requirements should be printed by the program.	
5	Write a Python program that creates a password strength meter. The program should prompt the user to enter a password and check its strength based on criteria such as length, complexity, and randomness. Afterwards, the program should provide suggestions for improving the password's strength.	
6	Write a Python program that reads a file containing a list of usernames and passwords, one pair per line (separated by a comma). It checks each password to see if it has been leaked in a data breach. You can use the "Have I Been Pwned" API (https://haveibeenpwned.com/API/v3) to check if a password has been leaked.	
7	Write a Python program that simulates a brute-force attack on a password by trying out all possible character combinations.	
8	Python program for implementation symmetric encryption using Caesar cipher algorithm	
9	Python program implementation for hacking Caesar cipher algorithm	
10	Python program to implement asymmetric encryption using rsa python library	
11	Python program for encoding and decoding using Base64	
12	Python program to implement symmetric encryption using python library	

References:

1. W. Stallings. Cryptography and Network Security: Principles and Practices (7th edition). Prentice Hall, 2016, ISBN-13: 978-0134444284.
2. Bruce Schneier, Applied Cryptography, John Wiley & Sons, Second Edition, 2007, ISBN 978-1-119-09672-6.
3. William Stallings & Lawrie Brown, Computer Security: Principles and Practice, Pearson 2008, Indian Edition 2010.

Instruction to the Examiners

Formative Assessment for Practical	
Assessment/Occasion/type	Marks
Writing Program 1 + Execution without error	10
Writing Program 2 + Execution without error	10
Viva	03
Journal	02
Total	25
Formative Assessment as per guidelines.	

Bachelor of Computer Applications

BCA

VI Semester

W. e. f.: 2023-24

BCA Semester–VI

Discipline Specific Course (DSCC-14)

Course Title: Artificial Intelligence and Applications

Course Code:056BCA011

Type of Course	Theory /Practical	Credits	Instruction hour per week	Total No.of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative assessment Marks	Total Marks
DSCC-14	Theory	04	04	56hrs.	2hrs.	40	60	100

Course Outcomes (COs):At the end of the course students will be able to:

CO1:Gain a historical perspective of AI and its foundations.

CO2:Become familiar with basic principles and strategies of AI towards problem solving

CO3:Understand and apply approaches of inference, perception, knowledge representation, and learning.

CO4:Understand the various applications of AI

Unit	Contents	56hrs/sem
UnitI	Introduction- What is Artificial Intelligence, Foundations of AI, History, AI - Past, Present and Future. Intelligent Agents- Environments- Specifying the task environment, Properties of task environments, Agent based programs-Structure of Agents, Types of agents-Simple reflex agents, Model-based reflex agents, Goal-based agents; and Utility-based agents.	14
UnitII	Problem Solving by Searching- Problem-Solving Agents, Well-defined problems and solutions, examples Problems, Searching for Solutions, Uninformed Search Strategies-Breadth-first search, Uniform-cost search, Depth-first search, Depth-limited search, Iterative deepening depth-first search, Bidirectional search, Greedy best-first search, A*Search, AO*search Informed(Heuristic) Search Strategies, Heuristic Functions.	14
UnitIII	Knowledge Representation -Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving, Effective Propositional Model Checking, Agents Based on Propositional Logic, First-Order Logic-Syntax and Semantics of First-Order Logic, Using First-Order Logic, Unification and Lifting Forward Chaining, Backward Chaining	14
UnitIV	Learning –Forms of Learning, Supervised Learning, Machine Learning-Decision Trees, Regression and Classification with Linear Models, Artificial Neural Networks, Support Vector Machines. Applications of AI -Natural Language Processing, Text Classification and Information Retrieval, Speech Recognition, Image processing and computer vision, Robotics	14

References:

1. Stuart Russel, Peter Norvig: Artificial Intelligence A Modern Approach, 2nd Edition, Pearson
2. Tom Mitchell, “Machine Learning”, 1st Edition, McGraw-Hill, 2017
3. Elaine Rich, KevinKnight, Shivashankar B Nair: Artificial Intelligence, Tata McGraw Hill 3rdedition,2013.

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal Assessment Test1	10
Internal Assessment Test2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

BCA Semester–VI

Discipline Specific Course (DSCC-15)

Course Title: PHP and MySQL

Course Code: 056BCA012

Type of Course	Theory /Practical	Credits	Instruction hour per week	Total No.of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative assessment Marks	Total Marks
DSCC-15	Theory	04	04	56hrs.	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course students will be able to:

CO1: Design dynamic and interactive web pages and websites.

CO2: Run PHP scripts on the server and retrieve results.

CO3: Handle databases like MySQL using PHP in websites.

Unit	Contents	56hrs/sem
Unit I	Introduction to PHP: Introduction to PHP, History and Features of PHP, Installation & Configuration of PHP, Embedding PHP code in Your Web Pages, Understanding PHP, HTML and White Space, Writing Comments in PHP, Sending Data to the Web Browser, Data types in PHP, Keywords in PHP, Using Variables, Constants in PHP, Expressions in PHP, Operators in PHP.	14
Unit II	Programming with PHP: Conditional statements: if, if-else, switch, The ? Operator, Looping statements: while Loop, do-while Loop, for Loop Arrays in PHP: Introduction- What is Array?, Creating Arrays, Accessing Array elements, Types of Arrays: Indexed v/s Associative arrays, Multidimensional arrays, Creating Array, Accessing Array, Manipulating Arrays, Displaying array, Using Array Functions, Including and Requiring Files- use of Include() and Require(), Implicit and Explicit Casting in PHP.	14
Unit III	Using Functions, Class- Objects, Forms in PHP: Functions in PHP, Function definition, Creating and invoking user-defined functions, Formal parameters versus actual parameters, Function and variable scope, Recursion, Library functions, Date and Time Functions Strings in PHP: What is String?, Creating and Declaring String, String Functions Class & Objects in PHP: What is Class & Object, Creating and accessing a Class & Object, Object properties, object methods, Overloading, inheritance, Constructor and Destructor Form Handling: Creating HTML Form, Handling HTML Form data in PHP Database Handling Using PHP with MySQL: Introduction to MySQL: Database terms, Data Types.	14
Unit IV	Accessing MySQL –Using MySQL Client and Using PHP MyAdmin, MySQL Commands, Using PHP with MySQL: PHP MySQL Functions, Connecting to MySQL and Selecting the Database, Executing Simple Queries, Retrieving Query Results, Counting Returned Records, Updating Records with PHP	14

References:

- 1 PHP & MySQL for Dynamic Web Sites-Fourth Edition By Larry Ullman.
- 2 Learning PHP, MySQL and JavaScript By Robin Nixon–O'REILLY Publications

- 3 Programming PHP By RasmusLerdorf, Kevin Tatroe, Peter MacIntyre
- 4 SAMS Teach Yourself PHP in 24 hours, Author: Matt Zandstra, SamsPublishing

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal AssessmentTest1	10
Internal AssessmentTest2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

BCA Semester–VI

Discipline Specific Course (DSCC-16)

Course Title: Practical in PHP and MySQL

Course Code: 056 BCA 013

Type of Course	Theory / Practical	Credits	Instruction hours per week	Total No. of Lectures / Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSCC-16	Practical	02	04	56hrs.	3hrs.	25	25	50

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Using PHP MyAdmin to work with MySQL

CO2: Different ways of connecting to MySQL through PHP

CO3: Creating tables, entering data, selecting data, changing data, and deleting data

CO4: Learning or advancing existing knowledge of PHP

Program Nos	Programs	56hrs/sem
1	Write a PHP script to print "hello world".	
3	Write a PHP script to find odd or even number from given number.	
4	Write a PHP script to find maximum of three numbers.	
5	Write a PHP script to swap two numbers.	
6	Write a PHP script to find the factorial of a number.	
7	Write a PHP script to check whether given number is palindrome or not.	
8	Write a PHP script to reverse a given number and calculate its sum	
9	Write a PHP script to generate Fibonacci series using Recursive function	
10	Write a PHP script to implement at least seven string functions.	
11	Write a PHP program to insert new item in array on any position in PHP.	
12	Write a PHP script to implement constructor and destructor	
13	Write a PHP script to implement form handling using get method	
14	Write a PHP script to implement form handling using post method.	
15	Write a PHP script that receive form input by the method post to check the number is prime or not	
16	Write a PHP script that receive string as a form input	
17	Write a PHP script to compute addition of two matrices as a form input.	
18	Write a PHP script to show the functionality of date and time function.	
19	Write a PHP program to upload a file	
20	Write a PHP script to implement database creation	
21	Write a PHP script to create table	
22	Develop a PHP program to design college admission form using MySQL database.	

Instruction to the Examiners

Formative Assessment for Practicals	
Assessment/Occasion/type	Marks
Writing Program 1 + Execution without error	10
Writing Program 2 + Execution without error	10
Viva	03
Journal	02
Total	25
Formative Assessment as per guidelines.	

Note: The same shall be used for semester end Examination

BCA Semester–VI

Discipline Specific Elective (DSE-2A)

Course Title: Fundamentals of Data Science

Course Code: **056 BCA 021**

Type of Course	Theory / Practical	Credits	Instruction hours per week	Total No. of Lectures / Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSE-2A	Theory	03	03	42 hrs.	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Understand the concepts of data and pre-processing of data.

CO2: Know simple pattern recognition methods

CO3: Understand the basic concepts of Clustering and Classification

CO4: Know the recent trends in Data Science

Unit	Contents	42hrs/sem
Unit I	Data Mining: Introduction, Data Mining Definitions, Knowledge Discovery in Databases (KDD) Vs Data Mining, DBMS Vs Data Mining, DM techniques, Problems, Issues and Challenges in DM, DM applications. Data Warehouse: Introduction, Definition, Multidimensional Data Model, Data Cleaning, Data Integration and transformation, Data reduction, Discretization.	14
Unit II	Mining Frequent Patterns: Basic Concept–Frequent Item Set Mining Methods–A priori and Frequent Pattern Growth (FP Growth) algorithms–Mining Association Rules Classification: Basic Concepts, Issues, Algorithms: Decision Tree Induction. Bayes Classification Methods, Rule-Based Classification, Lazy Learners (or Learning from your Neighbours), k Nearest Neighbour. Prediction - Accuracy- Precision and Recall	14
Unit III	Clustering: Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering.	14

References:

1. Jiawei Han and Micheline Kambar – “Data Mining Concepts and Techniques” Second Edition Elsevier Publications.
2. Arun K Pujari – “Data Mining Techniques”, 4th Edition, Universities Press
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Pearson Education, 2012.
4. K.P. Soman, Shyam Diwakar, V. Ajay: Insight into Data Mining – Theory and Practice, PHI

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal Assessment Test 1	10
Internal Assessment Test 2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

BCA Semester–VI

Discipline Specific Elective (DSE-2B)

Course Title: Mobile Application Development

Course Code:056 BCA 022

Type of Course	Theory /Practical	Credits	Instruction hour per week	Total No.of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative assessment Marks	Total Marks
DSE-2B	Theory	03	03	42 hrs.	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course, students will be able to:

CO1:Create Servlets for server side programming. Create, test and debug Android application by Setting up Android development environment

CO2: Critique mobile applications on their design pro and cons,

CO3:Program mobile applications for the Android operating system and understand techniques for Designing and developing sophisticated mobile interfaces

CO4:Deploy applications to the Android market place for distribution.

Unit	Contents	42hrs/sem
Unit I	Android OS design and Features: Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools, Building your First Android application. Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.	14
Unit II	Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation. Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.	14
Unit III	Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Deploying Android Application to the World.	14

References:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)
2. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt. Ltd.
3. Mark L Murphy, "Beginning Android", Wiley India Pvt. Ltd.
4. Android Application Development All in one for Dummies by Barry Burd, Edition:I
5. Beginning Android4 Application Development, Wei-Meng Lee, Wiley India (Wrox),2013
6. Professional Android4 Application Development, Reto Meier, WileyIndia,(Wrox), 2012

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal Assessment Test1	10
Internal Assessment Test2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

Note: Student will select any one of DSE either **2A** or **2B** for 3 credits.

BCA Semester–VI

Vocational Course (Voc-2)

Course Title: Digital Marketing

Course Code: **056 BCA101**

Type of Course	Theory /Practical	Credits	Instruction hours per week	Total No. of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative assessment Marks	Total Marks
Voc-2	Theory	03	04	42 hrs.	2hrs.	40	60	100

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Understand the fundamental concepts and principles of digital marketing.

CO2: Develop practical skills to implement various digital marketing strategies and techniques.

CO3: Analyze and evaluate the effectiveness of digital marketing campaigns.

CO4: Apply critical thinking and problem-solving skills to real-world digital marketing scenarios.

CO5: Create comprehensive digital marketing plans and strategies.

Unit	Contents	42hrs/sem
Unit I	<p>Introduction to Digital Marketing: Overview of digital marketing, Evolution of digital marketing, Importance and benefits of digital marketing, Digital marketing channels and platforms</p> <p>Digital Marketing Strategy and Planning: Developing a digital marketing strategy, Setting goals and objectives, Budgeting and resource allocation. Campaign planning and execution, Monitoring and adjusting digital marketing campaigns</p>	14
Unit II	<p>Social Media Marketing: Overview of social media marketing, Social media platforms and their features, Creating and optimizing social media profiles, Social media content strategy, Social media advertising and analytics</p> <p>Email Marketing: Introduction to email marketing, Building an email list, Creating effective email campaigns, Email automation and segmentation, Email marketing metrics and analytics</p> <p>Content Marketing: Understanding content marketing, Content strategy and planning, Content creation and distribution, Content promotion and amplification, Content marketing metrics and analytics.</p>	14
Unit III	<p>Mobile Marketing: Mobile marketing overview, Mobile advertising strategies, Mobile app marketing, Location-based marketing, Mobile marketing analytics</p> <p>Analytics and Reporting: Importance of analytics in digital marketing, Setting up web analytics tools (e.g., Google Analytics), Tracking and measuring key performance indicators (KPIs), Conversion tracking and optimization, Reporting and data visualization</p>	14

References:

- "Digital Marketing Strategy: An Integrated Approach to Online Marketing" by Simon Kingsnorth.
- "Email Marketing Rules: How to Wear a White Hat, Shoot Straight, and Win Hearts" by Chad S. White.
- "ContentInc.: How Entrepreneurs Use Content to Build Massive Audiences and Create Radically Successful Businesses" by Joe Pulizzi.

4. "Mobile Marketing: How Mobile Technology is Revolutionizing Marketing, Communications and Advertising" by Daniel Rowles.
5. "Web Analytics 2.0: The Art of Online Accountability and Science of Customer Centricity" by AvinashKaushik

Formative Assessment for Theory	
Assessment/Occasion/type	Marks
Internal AssessmentTest1	10
Internal AssessmentTest2	10
Quiz/Assignment/Small Project	10
Seminar	10
Total	40
Formative Assessment as per guidelines.	

BCA Semester–VI

Internship-1

Course Title: Internship-1

Course Code:056 BCA 091

Type of Course	Theory /Practical	Credits	Instruction hour/week	Total No. of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative assessment Marks	Total Marks
Internship-1	Project	08				150	0	150

Course Outcomes (COs): At the end of the course, students will be able to:

CO 1: The student will be able to analyse, specify, design, implement and test application software.

CO 2: Allows a student to demonstrate their capabilities while working independently.

CO 3: Design a project through technical knowledge to meet customer/End user needs.

CO 4: Acquire a deeper understanding of software industry trends, best practices, and current developments.

CO 5: Apply process of Project Development to analyze and design the real-world problem.

CO 6: Document the project report of various phases for future scope of the project development.

Formative Assessment for Internship-1	
Assessment/Occasion/type	Marks
Dissertation/Project Report evaluation :	60
Presentation/Demo of the application developed : (navigation of the application, features incorporated, data validation, UI, reports, etc.)	60
Viva-voce	30
Total	150
Formative Assessment as per guidelines.	

Execution of the Project:

1. The individual student is required to carry out the project under the guidance of course teacher.
2. Project work problem statement shall be identified by the students with the help of the course teachers and students shall submit the synopsis/project proposal of the same.
3. During project development students are expected to define a project problem, do requirements analysis, systems design, software development, apply testing strategies and do documentation with an overall emphasis on the development of a robust, efficient and reliable software systems.
4. The project development process has to be consistent and should follow standards identified by the guide monitoring the project work.
5. There is no restriction on use of hardware's and software's for carrying out the project work except that ready application packages are not allowed.
6. The students have to submit the project dissertation of the project work carried out in one hard copy along with soft copy written on compact disc.

Internship/Project:

A course requiring students to participate in a professional activity or work experience, or cooperative education activity with an entity external to the education institution, normally under the supervision of an expert of the given external entity. A key aspect of the internship is induction into actual work situations for 8 credits. Internships involve working with local industry, local governments or private organizations, business organizations, and similar entities to provide opportunities for students to actively engage in on-site experiential learning.

Note:

1. One credit internship is equal to 30 hrs.
2. Internship shall be Discipline Specific of 180-240 hours (8 credits) with duration 4-8weeks.
3. Internship may be full-time/part-time (full-time during last 4-8 weeks before closure of the semester or weekly 16 hrs in the academic session for 14-16 weeks). College shall decide the suitable method for programme wise but not subject wise.
4. Internship mentor/supervisor shall avail work allotment during 6th semester for a maximum of 180-240 hours.
5. The student should submit the final internship report (180-240 hours of Internship) to the mentor for completion of the internship.
6. Method of evaluation: Presentations/Report submission/Activity etc.

Whenever Internship is not feasible, the students can to choose the Project Work.

UG Programme: 2023-24

GENERAL PATTERN OF THEORY QUESTION COURSE FOR DSCC/ OEC

(60 marks for semester end Examination with 2 hrs duration)

Part-A

1. Question number 1-06 carries 2 marks each. Answer any 05 questions : 10 marks

Part-B

2. Question number 07- 11 carries 05Marks each. Answer any 04 questions : 20 marks

Part-C

3. Question number 12-15 carries 10 Marks each. Answer any 03 questions : 30 marks

(Minimum 1 question from each unit and 10 marks question may have subquestions for 7+3 or 6+4 or 5+5 if necessary)

Total: 60 Marks

Note: Proportionate weightage shall be given to each unit based on number of hours prescribed