KUVEMPU UNIVERSITY

Syllabus for Bachelor of Computer Applications

(B.C.A – V & VI Semester)

NEP-2020

Under Graduate Board of Studies

In

COMPUTER SCIENCE

w.e.f Academic Year 2023-24 onwards

Curriculum Design / Syllabus Framing Committee

Sl. No.	Name	Designation
1.	**Dr. Suresha M** Associate Professor, Department of P.G Studies and Research in Computer Science, Kuvempu University, Shankaraghatta – 577541, Shimoga(D).	**Chairman**
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6.	**Mr. Prajwal Kumar P** Assistant Professor, Department of Computer Science, Government First Grade College, Kadur – 577548.	**Member**

Program: B.C.A **Subject: Computer Science**

Curriculum Structure for B.C.A

Semester	Course No.	Theory/ Practical	Credits	Teaching Hours per week (L+T+P)	Paper Title	Marks	
						S.A.	I.A.
V	DSC13	Theory	4	4+0+0	Design & Analysis of Algorithms	60	40
	DSC13-Lab	Practical	2	0+0+4	Design & Analysis of Algorithms Lab	25	25
	DSC14	Theory	4	4+0+0	Statistical Computing and R Programming	60	40
	DSC14-Lab	Practical	2	0+0+4	R Programming Lab	25	25
	DSC15	Theory	4	4+0+0	Software Engineering	60	40
	DSE-E1	Theory	3	3+0+0	A. Cloud Computing B. Business Intelligence	60	40
	Voc-1	Theory	3	3+0+0	Digital Marketing	60	40
	SEC-4	Theory& Practical	2	1+0+2	Cyber Security	25	25
VI	DSC16	Theory	4	4+0+0	Artificial Intelligence and Applications	60	40
	DSC17	Theory	4	4+0+0	PHP and MySQL	60	40
	DSC17-Lab	Practical	2	0+0+4	PHP and MySQL Lab	25	25
	DSC18	Theory	4	4+0+0	Data Mining and Data Warehouse	60	40
	DSC19-Lab	Practical	2	0+0+4	Project Lab	25	25
	DSE-E2	Theory	3	3+0+0	**A.** Digital Image Processing **B.** Mobile Application Development	60	40
	Voc-2	Theory	3	3+0+0	Web Content Management System	60	40
	SEC-5	Theory & Practical	2	1+0+2	Logical Reasoning	25	25

Program Name	**B.C.A**	Semester	**V**
Course Title	**Design and Analysis of Algorithm (Theory)**		
Course Code	**DSC 13**	No. of Credits	**04**
Contact hours	**52 Hours/4 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**52 Hrs**
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.	**10**
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.	**10**
Brute Force & Exhaustive Search: Introduction to Brute Force approach, Selection Sort and Bubble Sort, Sequential search, Exhaustive Search- Travelling Salesman Problem and Knapsack Problem, Depth First Search, Breadth First Search	**14**
Divide-and-Conquer: Introduction, Merge Sort, Quick Sort, Binary Search, Binary Tree traversals and related properties.	**8**
Decrease-and-Conquer: Introduction, Insertion Sort, Topological Sorting**.** **Greedy Technique:** Introduction, Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm.	**10**

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

Program Name	**B.C.A**	Semester	**V**
Course Title	**Design and Analysis of Algorithms Laboratory (Practical)**	No. of Credits	**02**
Course Code	**DSC 13 - Lab**	Contact Hours	**4 Hours/wk**
Formative Assessment	**25 Marks**	Summative Assessment	**25 Marks**

Practical Content

1. Write a program to sort a list of N elements using Selection Sort Technique.
2. Write a program to perform Travelling Salesman Problem.
3. Write a program to perform Knapsack Problem using Greedy Solution.
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. Implement function to print In-Degree, Out-Degree and to display that adjacency matrix.
9. Write program to implement Greedy Algorithm for job sequencing with deadlines.
10. Write program to implement Dynamic Programming algorithm for the Optimal Binary Search Tree Problem.
11. Write a program that implements Prim's algorithm to generate minimum costs panning Tree.
12. Write a program that implements Kruskal's algorithm to generate minimum costs panning Tree.

Formative Assessment for Practical	
Assessment Occasion/type	**Marks**
Program Writing Any One Program	10 Marks
Execution	10 Marks
viva	05 Marks
Total	**25 Marks**

References

1	Introduction to the Design and Analysis of Algorithms, Anany Levitin: 2nd Edition, 2009, Pearson.
2	Computer Algorithms/C++, Ellis Horowitz, Satraj Sahniand Rajasekaran, 2nd Edition, 2014, Universities Press.
3	Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 3rd Edition, PHI.
4	Design and Analysis of Algorithms, S. Sridhar, Oxford (Higher Education)

Program Name	B.C.A	Semester	V
Course Title	**Statistical Computing & R Programming (Theory)**		
Course Code	**DSC14**	No. of Credits	**04**
Contact hours	**52 Hours/4 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**52 Hrs**
Introduction of R programming language: Introduction, Features of R, Data types in R: numeric, arithmetic, assignment, Operators, Data Objects in R :Arrays, Lists,vectors, Matrices and Data Frames, Factors Conditions and Loops: if, Switch, while, for ,repeatloops, Strings handling in R, Calling Functions, Writing Functions,Exceptions, Date&Timings and Visibility, Packaging in R.	**12**
Reading and writing files: Reading Tabular Data, Commands to Extract Rows and Columns, working with CSV files: reading, writing, analysis, working with JSON Files: reading, writing, Working with XML Files: reading, writing.	**12**
R as a set of statistical tables: Statistics And Probability, Process of Descriptive Analysis, Average, Variance, Standard Deviation in R, Mean, Median and Mode in R, Covariance and Correlation in R, Probability distributions in R:Normal distributions, binomial distributions.	**8**
Statistical testing and modeling in R: Hypothesis testing in R, components of hypothesis test, testing means, testing proportions, testing categorical variables, errors and power.	**8**
Advanced graphics in R: Plotting commands-high level and low level, Graphics parameters list, Device drivers, Dynamic graphics, plot customization, plotting regions and margin,R Histogram, Bar chart, Pie chart, Scatter plots examples.	**12**

Formative Assessment for Theory	
Assessment Occasion/type	**Marks**
Internal Assessment Test1	10 Marks
Internal Assessment Test2	10 Marks
Quiz / Assignment / Small Project	10 Marks
Seminar	10 Marks
Total	**40 Marks**

References	
1	Tilman M. Davies, "The book of R: A first course in programming and statistics", San Francisco,
2	Vishwas R. Pawgi, "Statistical computing using R software", Nirali prakashan publisher,1st edition, 2022.
3	https://www.youtube.com/watch?v=KlsYCECWEWEhttps:// www.geeksforgeeks.org/r-tutorial/https://www.tutorialspoint.com/r/index.html

Program Name	**B.C.A**	Semester	**V**
Course Title	**R Programming Lab (Practical)**		
Course Code	**DSC 14 - Lab**	No. of Credits	**02**
Contact hours	**04 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**25**	Summative Assessment Marks	**25**

Course Outcomes:

- 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.
- Describe key terminologies, concepts and techniques employed in Statistical Analysis.
- Define Calculate, Implement Probability and Probability Distributions to solve a wide variety of problems.
- Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.
- Understand, analyze and Interpret Correlation Probability and Regression to analyze the underlying relationships between different variables.

1. Write an R program for different types of data structures in R.
2. Write an R program that includes variables, constants, and data types.
3. Write an R program that includes different operators, control structures, default values for arguments, returning complex objects.
4. Write an R program for quick sort implementation.
5. Write a R program for calculating cumulative sums, and products minima,maxima
6. Write an R program for finding stationary distribution of markov chains.
7. Write an R program that includes linear algebra operations on vectors and matrices.
8. Write a R program for any visual representation of an object with creating graphs using graphic functions: Plot(), Hist(), Linechart(), Pie(), Boxplot(), Scatterplots().
9. Write an R program for with any dataset containing data frame objects, indexing and sub setting data frames, and employ manipulating and analyzing data.
10. Write a program to create an any application of Linear Regression in multivariate context for predictive purpose.

Formative Assessment for Practical	
Assessment Occasion/type	**Marks**
Program Writing Any One Program	10 Marks
Execution	10 Marks
viva	05 Marks
Total	**25 Marks**

Program Name	**B.C.A**	Semester	**V**
Course Title	**Software Engineering (Theory)**		
Course Code	**DSC - 15**	No. of Credits	**04**
Contact hours	**52 Hours/4 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**52 Hrs**
OVERVIEW: Introduction, Software engineering ethics; Software process models; Process activities; Coping with change; Agile software development: Agile methods; Plan-driven and agile development.	**10**
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.	**10**
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.	**10**
ARCHITECTURALDESIGN: Architectural design decisions; Architectural views; Architectural patterns- Layered architecture, Repository architecture, Client–server 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.	**12**
SOFTWARETESTING: Development testing-Unit testing, Choosing unit test cases, Component testing, System testing, Test-driven development; Release testing; User testing- Alpha, Beta, Acceptance testing.	**10**

Formative Assessment for Theory	
Assessment Occasion/type	**Marks**
Internal Assessment Test1	10 Marks
Internal Assessment Test2	10 Marks
Quiz / Assignment / Small Project	10 Marks
Seminar	10 Marks
Total	**40 Marks**

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

Program Name	**B.C.A**	Semester	**V**
Course Title	**Cloud Computing (Theory)**		
Course Code	**DSE - E1**	No. of Credits	**03**
Contact hours	**42 Hours /3 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**42 Hrs**
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.	**8**
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, Pros and Cons of Virtualization, Technology Examples- Xen: Para virtualization, VMware: Full Virtualization, Microsoft Hyper-V.	**10**
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.	**8**
Cloud Platforms in Industry: Amazon Web Services- Compute Services, Storage Services, Communication Services, Additional Services; Google AppEngine- Architecture and Core Concepts, Application Life-Cycle. **Microsoft Azure**- Azure Core Concepts: Compute, Storage, Core Infrastructure and Other Services, Windows Azure Platform Appliance.	**8**
Cloud Applications: Scientific Applications-Healthcare (ECG Analysis in the Cloud) Geo science (Satellite Image Processing); Business and Consumer Applications - CRM and ERP, Social Networking, Media Applications, Multiplayer Online Gaming.	**8**

Formative Assessment for Theory	
Assessment Occasion/type	**Marks**
Internal Assessment Test1	10 Marks
Internal Assessment Test2	10 Marks
Quiz / Assignment / Small Project	10 Marks
Seminar	10 Marks
Total	**40 Marks**

Text Books:	
1	Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi: "Mastering Cloud Computing-Foundations and Applications Programming", Elsevier, 2013.
2	Barrie Sosinsky: "Cloud Computing Bible", Wiley-India, 2010.
3	K Chandrashekaran: "Essentials of Cloud Computing", CRC Press, 2015.
4	Derrick Rountree, Ileana Castrillo: "The Basics of Cloud Computing", Elsevier, 2014.

Program Name	**B.C.A**	Semester	**V**
Course Title	**Business Intelligence (Theory)**		
Course Code	**DSE-E1**	No. of Credits	**03**
Contact hours	**42 Hours /3 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**42 Hrs**
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	**8**
Introduction and Definitions, Phases of the Decision Making Process, The Intelligence Phase, Design Phase, Choice Phase, Implementation Phase, Decision Support Systems Capabilities, Classification, Components.	**8**
Basic Concepts of Neural Networks: Developing Neural Network-Based Systems, Illuminating the Black Box of ANN with Sensitivity, Support Vector Machines, And A Process Based Approach to the Use of SVM, Nearest Neighbor Method, Sentiment Analysis Overview, Sentiment Analysis Applications, and Sentiment Analysis Process.	**10**
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 Pair wise Comparisons.	**8**
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.	**8**

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

Text Books:	
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 Paperback–12 November 2017 by Edward Miz

Additional Reading:	
1.	https://shorturl.at/iuAT0
2.	https://www.coursera.org/courses?query=business%20intelligence

Program Name	**B.C.A**	Semester	**V**
Course Title	**Digital Marketing (Theory)**		
Course Code	**Voc-2**	No. of Credits	**03**
Contact hours	**42 Hours /3 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**42 Hrs**
Introduction to Digital Marketing: Overview of digital marketing, Evolution of digital marketing, Importance and benefits of digital marketing, Digital marketing channels and platforms. **Digital Marketing Strategy and Planning:** Developing a digital marketing strategy, Setting goals and objectives, Budgeting and resource allocation.	**8**
Campaign planning and execution, Monitoring and adjusting digital marketing campaigns **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	**8**
Email Marketing: Introduction to email marketing, Building an email list, Creating effective email campaigns, Email automation and segmentation, Email marketing metrics and analytics. **Content Marketing:** Understanding content marketing, Content strategy and planning,	**8**
Content creation and distribution, Content promotion and amplification, Content marketing metrics and analytics. **Mobile Marketing:** Mobile marketing overview, Mobile advertising strategies, Mobile app marketing, Location-based marketing, Mobile marketing analytics.	**8**
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),Conversiontrackingandoptimization,Reportinganddatavisualization	**10**

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

References	
1	"Digital Marketing Strategy: An Integrated Approach to Online Marketing" by Simon Kings north.
2	"Email Marketing Rules: How to Wear aWhite Hat, Shoot Straight, and Win Hearts" by Chad S. White
3	"Content Inc.: 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 Analytics2.0: The Art of Online Accountability and Science of Customer Centricity" by Avinash Kaushik

Program Name	**B.C.A**	Semester	**V**
Course Title	**Cyber Security (Theory)**		
Course Code	**SEC-4**	No. of Credits	**02**
Contact hours	**30 Hrs /3 Hours per week**	Duration of SEA/Exam	**01 hrs**
Formative Assessment Marks	**25**	Summative Assessment Marks	**25**

Contents	**30 Hrs**
Module-I. Introduction to Cyber security: Defining Cyberspace and Overview of Computer and Web-technology, Architecture of cyberspace, Communication and web technology, Internet, World wide web, Advent of internet, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security.	**10**
Module-II. Cyber-crime and Cyber law: Classification of cyber-crimes, Common cyber-crimes- cyber-crime targeting computers and mobiles, cyber-crime against women and children, financial frauds, social engineering attacks, malware and ransom ware attacks, zero day and zero click attacks, Cybercriminals modus-operandi, Reporting of cyber-crimes, Remedial and mitigation measures, Legal perspective of cyber-crime, IT Act 2000 and its amendments, Cyber-crime and offences, Organizations' dealing with Cyber-crime and Cyber security in India.	**10**
Module III. Social Media Overview and Security: Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hash tag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media.	**10**

Formative Assessment for Theory	
Assessment Occasion/type	**Marks**
Internal Test 1	10 Marks
Assignment / Surprise Test	15 Marks
Total	**25 Marks**

References	
1	Cyber Crime Impact in the New Millennium, by R. C Mishra, Auther Press. Edition 2010
2	Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3	Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
4	Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
5	Fundamentals of Network Security by E. Maiwald, McGraw Hill.
6	Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.

Program Name	**B.C.A**	Semester	**VI**
Course Title	**Artificial Intelligence and Applications (Theory)**		
Course Code	**DSC16**	No. of Credits	**04**
Contact hours	**52 Hours /4 Hours per week**	Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**52 Hrs**
Introduction- What is Artificial Intelligence, Foundations of AI, 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.	**10**
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, Bi directional search	**10**
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.	**12**
Learning– Forms of Learning, Supervised Learning- Artificial Neural Networks (ANN), Support Vector Machines (SVM), Unsupervised Learning: Clustering, Association. Advantages and disadvantages of Unsupervised Learning, Hill Climbing Algorithm	**10**
Applications of AI- Natural Language Processing, Text Classification and Information Retrieval, Speech Recognition, Image processing and computer vision, Robotics.	**10**

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

Text Books:	
1	Stuart Russel, Peter Norvig: Artificial Intelligence A Modern Approach, 2nd Edition,
2	Tom Mitchell, "Machine Learning", 1st Edition, McGraw-Hill, 2017
3	Elaine Rich, Kevin Knight, Shivashankar B Nair: Artificial Intelligence, Tata McGraw Hill 3rd edition, 2013

Program Name	**B.C.A**	Semester	**VI**
Course Title	**PHP and MySQL (Theory)**		
Course Code	**DSC 17**	No. of Credits	**04**
Contact hours	**52 Hours /4 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**52 Hrs**
Introduction to PHP: Introduction to PHP, History and Features, Installation & Configuration of PHP, Embedding PHP code in Web Pages, HTML and Whitespaces, Writing Comments, Sending Data to the Web Browser, Data types, Keywords, Using Variables, Constants, Expressions, Operators.	**10**
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.	**12**
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.	**10**
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	**8**
Database handling using PHP with MySQL: Introduction to MySQL: Database terms, Data Types, Using MySQL Client and Using phpMyAdmin, MySQL Commands, PHP MySQL Functions, Connecting to MySQL and Selecting the Database, Executing Simple Queries, Retrieving Query Results.	**12**

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

Text Books:	
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 Rasmus Lerdorf, Kevin Tatroe, Peter Mac Intyre.

Program Name	**B.C.A**	Semester	**VI**
Course Title	**PHP and MySQL Lab**		
Course Code	**DSC 17 - Lab**	No. of Credits	**02**
Contact hours	**04 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**25**	Summative Assessment Marks	**25**

Practical Assignments for PHP Programming

Sl. No	Title of the Experiment
1	Write a PHP script to swap two numbers.
2	Write a PHP script to find the factorial of a number.
3	Write a PHP script to reverse a given number and calculate its sum.
4	Write a PHP script to generate a Fibonacci series using Recursive function.
5	Write a PHP script to implement constructor and destructor.
6	Write a PHP script to implement form handling using get method.
7	Write a PHP script to implement form handling using post method.
8	Write a PHP script that receives form input by the method post to check the number is prime or not.
9	Write a PHP script that receives string as a form input.
10	Write a PHP script to compute addition of two matrices as a form input.
11	Write a PHP script to show the functionality of date and time function.
12	Write a PHP program to upload a file.
13	Write a PHP script to implement database creation.
14	Develop a PHP program to design a college admission form using MYSQL database.

Formative Assessment for Practical	
Assessment Occasion/type	**Marks**
Program Writing Any One Program	10 Marks
Execution	10 Marks
viva	05 Marks
Total	**25 Marks**

Program Name	**B.C.A**	Semester	**VI**
Course Title	**Data Mining and Data Warehouse (Theory)**		
Course Code	**DSC 18**	No. of Credits	**03**
Contact hours	**42 Hours / 3 Hours per week**	Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**42 Hrs**
Data Mining: Introduction, Data Mining Definitions, Knowledge Discovery in Databases (KDD) Vs. Data Mining, DBMS Vs. Data Mining, Data Mining techniques, Problems, Issues and Challenges in DM, DM Applications.	**8**
Mining Frequent Patterns: Basic Concept – Frequent Item Set Mining Methods – Apriori and Frequent Pattern Growth (FP-Growth) algorithms - Mining Association Rules.	**8**
Classification: Basic Concepts, Issues, And 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.	**8**
Clustering: Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering.	**10**
Data Warehouse: Data Warehouse basic concepts, Data Warehouse Modeling, Data Cube and OLAP : Characteristics of OLAP systems, Multidimensional view and Data cube, Data Cube Implementations, Data Cube operations, Implementation of OLAP and overview on OLAP Software.	**8**

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

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

Program Name	**B.C.A**	Semester	**VI**
Course Title	**Project Lab**		
Course Code	**DSC 19 - Lab**	No. of Credits	**02**
Contact hours	**04 Hours per week**	Duration of SEA/Exam	**03 hours**
Formative Assessment Marks	**25**	Summative Assessment Marks	**25**

Guidelines: -

1. The project is of **4 Hours per week** for one (Semester VI) Semester duration.
2. The synopsis approval will be given by the project Guides.
3. The Project work should be a group of not more than five members.
4. The project labs will focus on survey, planning, designing, coding and testing of the project.

Report:

The project proposal should include the following:

- Title
- Introduction
- Literature survey
- Objectives
- Design Details of modules and process logic
- Development/Implementation stages
- Testing Report
- Results

(Any Other Components as per project requirements can be added by Project guide.)

Internal Assessment for Theory	
Assessment Occasion/type	**Marks**
Internal, Attendance, documentation, development work, Report	25Marks
Total	**25Marks**
Summative Assessment for Theory	
Assessment Occasion/type	**Marks**
Demo – Presentation	05 Marks
Report	15 Marks
Viva	05 Marks
Total	**25 Marks**

Program Name	**B.C.A**	Semester	**VI**
Course Title	**Digital Image Processing (Theory)**		
Course Code	**DSE - E2**	No. of Credits	**03**
Contact hours	**42 Hours / 3 Hours per week**	Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**42 Hrs**
DIGITAL IMAGE FUNDAMENTALS: Steps in Digital Image Processing – Components –Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models.	**8**
IMAGE ENHANCEMENT: Introduction, Definition, Multidimensional Data Model, Data Cleaning, Data Integration and transformation, Data reduction, Discretization.	**8**
IMAGE RESTORATION: Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters.	**8**
IMAGE SEGMENTATION: Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation.	**10**
IMAGE COMPRESSION AND RECOGNITION: Need for data compression, Boundary representation, Boundary description, Texture - Patterns and Pattern classes - Recognition based on matching.	**8**

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

Text Books:	
1	Rafael C. Gonza Lez and Richard E. Woods. 4th Edition, Pearson Publications.
2	Understanding Digital Image Processing, Vipin Tyagi, 1st Edition, CRC Press.

Program Name	**B.C.A**	Semester	**VI**
Course Title	**Mobile Application Development (Theory)**		
Course Code:	**DSE - E2**	No. of Credits	**03**
Contact hours	**42 Hours / 3 Hours per week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**42 Hrs**
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.	**8**
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.	**8**
Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.	**8**
Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.	**8**
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 WebAPIs, Deploying Android Application to the World.	**10**

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

Text Books:	
1	Lauren Darcey and Shane Conder , "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)
2	Reto Meier, "Professional Android2 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 Android 4 Application Development, Wei-Meng Lee, Wiley India(Wrox) ,2013.

Program Name	**B.C.A**	Semester	**VI**
Course Title	**Web Content Management System (Theory)**		
Course Code	**Voc - 1**	No. of Credits	**03**
Contact hours	**42 Hours /3 Hours per week**	Duration of SEA/Exam	**02 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Contents	**42 Hrs**
Unit 1: Web Content Development and Management, Content Types and Formats, Norms and Guidelines of Content Development, Creating Digital Graphics, Audio Production and Editing,	**8**
Unit 2: Web Hosting and Managing Multimedia Content, Creating and Maintaining a WikiSite, Presentation Software Part I, Presentation Software Part II, Screen casting Tools and Techniques.	**8**
Unit 3: Planning and Developing Dynamic Web Content Sites, Website Design Using CSS Creating and Maintaining a WikiSite, Creating and Managing a Blog Site,	**8**
Unit 4: E- Publication Concept, E- Pub Tools, Simulation and Virtual Reality Applications, Introduction to Moodle, Creating a New Course, uploading new Course.	**10**
Unit 5: Create and Add Assessment, Add and Enroll User and Discussion Forum, Content, Management System: Joomla.	**8**

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

Text Books:	
1	Web Content Management: Systems, Features, and Best Practices 1st Edition by DeaneBarker.
2	Content Management Bible (2nd Edition) 2nd Edition by Bob Boiko.
3	Moodle for Learning Management System (LMS): A Practical and Visual Guidebook of Administrator and Instructor for Distance Education Paperback– October 12, 2020 by James Koo
4	Using Joomla!: Efficiently Build and Manage Custom Websites, 2nd Edition by Ron Severdia
Additional Reading:	
https://onlinecourses.swayam2.ac.in/cec20_lb09/preview	

Program Name	**B.C.A**	Semester	**VI**
Course Title	**Logical Reasoning (Theory)**		
Course Code	**SEC - 5**	No. of Credits	**02**
Contact hours	**30 Hrs /3 Hours per week**	Duration of SEA/Exam	**01hrs**
Formative Assessment Marks	**25**	Summative Assessment Marks	**25**

Contents	**30Hrs**
Arithmetic Reasoning: Analytical Thinking, Syllogistic Logic, Problem solving; Number System; LCM & HCF; Logarithms; Ratio, Proportions and Variations; Partnership; Time speed and distance; work time problems;	**10**
Data Interpretation: Numerical Data Tables; Line Graphs; Bar Charts and Pie charts; Mix Diagrams; Geometrical Diagrams, and other forms of Data Representation	**10**
Lateral Thinking, Reasoning & Logic: Verbal and Non-verbal Logic, Family Tree; Linear Arrangements; Circular and Complex Arrangement; Conditionality and Grouping; Sequencing and Scheduling; Venn Diagram in Logical Reasoning.	**10**

Formative Assessment for Theory	
Assessment Occasion/type	**Marks**
Internal Test 1	10 Marks
Assignment / Surprise Test	15 Marks
Total	**25 Marks**

Text Book	
1	R. S. Aggarwal - "A Modern Approach to Verbal and Non–Verbal Reasoning", Sultan Chand and Sons, New Delhi.
References	
1	R. S. Aggarwal – "Quantitative Aptitude", Sultan Chand and Sons, New Delhi.
2	Dr. Ravi Chopra – "Verbal and Non – Verbal Reasoning", Mac Millan India.
3	Dr. Edward De Bono– "Lateral Thinking", Penguin Books, New Delhi.