MANGALORE UNIVERSITY

National Education Policy – 2020 [NEP-2020]

BLOWNUP SYLLABUS AND PRACTICAL LIST

FOR

V SEMESTER BCA

CURRICULUM STRUCTURE FOR V AND VI SEMESTER BCA

Semester	Course No	Theory/Practical	Credits	Paper Title	S.A	L.A
V	DSC13	Theory	4	Design & Analysis of Algorithms	60	40
	DSC13-Lab	Practical	2	Design & Analysis of Algorithms Lab	25	25
	DSC14	Theory	4	Statistical Computing and R Programming	60	40
	DSC14-Lab	Practical	2	R Programming Lab	25	25
	DSC15	Theory	4	Software Engineering	60	40
	DSE-E1	Theory	3	A. Cloud Computing B. Business Intelligence	60	40
	Voc-1	Theory	3	Digital Marketing	60	40

Course Title	Design And Analysis of Algorithms(Theory)		
Course Code:	DSC 13	No.of Credits	04
Contact hours	52 Hours	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

Topics	Book	Chapter /Page No/Section
UNIT 1[13 HOURS]		
Introduction: What is an Algorithm? Fundamentals of Algorithmic problem solving, Important Problem Type Fundamentals of Data Structures, 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, and mathematical analysis of recursive algorithms.	BOOK-1	1.1(page No 3-5) 1.2(page No 9-16) 1.3(page No 17-22) 1.4(page No 24-35) 2.1(page No 40-47) 2.2(page No 49-52,55,56) 2.3(page No 57-60) 2.4(page No 65-72)
UNIT 2[13 HOURS]		
Brute Force & Exhaustive Search: Introduction to Brute Force approach, Selection Sort and Bubble Sort, Sequential search- -Closest-Pair and Convex-Hull Problems by Brute Force, Exhaustive Search -Travelling Salesman Problem and Knapsack Problem.	BOOK-1	3.1(page No 93-97) 3.2(page No 98-100) 3.3(page No 102-106) 3.4(page No 108-113)
UNIT 3[13 HOURS]		

Decrease-and-Conquer: Introduction, Insertion Sort, Depth First Search, Breadth First Search Topological Sorting. **Divide-and-Conquer:** Introduction, Max and Min, Merge Sort, Quick Sort, Binary Search, Binary Tree traversals and related properties, Multiplication of large Integers and Strassen's Matrix Multiplication.	BOOK-1	5.1(Page No 149-154) 5.2(Page No156-161) 5.3(Page No 163-165) 4.1 (Page No 117-121) 4.2 (Page No 123-127) 4.3 (Page No 128-131) 4.4 (Page No 132-135) 4.5 (Page No 137-141)
UNIT 4[13 HOURS]		
Greedy Technique: Introduction, Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm, Huffman Trees, Lower-Bound Arguments, Decision Trees, P Problems, NP Problems, Challenges of Numerical Algorithms.	BOOK-1	9.1(Page No 291-296) 9.2(Page No 298-304) 9.3(Page No 305-309) 9.4(Page No 311-314) 11.1(Page No 359-365) 11.2(Page No 366-371) 11.3(Page No 372-377) 11.4(Page No 382-390)

Text Books:

1. Introduction to the Design and Analysis of Algorithms, Anany Levitin: 2nd Edition, 2009, Pearson.

References:

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

gram Name	**BCA**	Semester	**V**
Course Title	**Design and Analysis of Algorithms Lab**		
Course Code:	DSC13-Lab	No.of Credits	**02**
Contact hours	04 Hours per week	Duration of SEA/Exam	**3 hours**
Formative Assessment Marks	**25**	Summative Assessment Marks	**25**

Note: Implementation using C, Java or Python

PART-A

1. Write a program to sort a list of N elements using Selection Sort Technique.
2. Write a program to read 'n' numbers, find minimum and maximum value in an array using divide and conquer.
3. Sort a given set of n integer elements using Merge Sort method and compute its time complexity. Run the program for varied values of n> 5000, and record the time taken to sort.
4. Sort a given set of n integer elements using Quick Sort method and compute its time complexity. Run the program for varied values of n> 5000 and record the time taken to sort.
5. Write a program to sort a list of N elements using Insertion Sort Technique.
6. Write program to implement the BFS algorithm for a graph.
7. Write program to implement the DFS algorithm for a graph.
8. Write a program to implement Strassen's Matrix Multiplication of 2*2 Matrixes.

PART-B

1. Write program to implement backtracking algorithm for solving problems like N queens.
2. Design and implement in to find a subset of a given set S = {Sl, S2,.....,Sn} of n positive integers whose SUM is equal to a given positive integer d. For example, if S={1, 2, 5, 6, 8} and d= 9, there are two solutions {1,2,6}and {1,8}. Display a suitable message, if the given problem instance doesn't have a solution.
3. Write a program find shortest paths to other vertices using Dijkstra's algorithm.
4. Write a program to perform Knapsack Problem using Greedy Solution.

5. Write program to implement greedy algorithm for job sequencing with deadlines.
6. Write a program to perform Travelling Salesman Problem
7. Write a program that implements Prim's algorithm to generate minimum cost spanning Tree.
8. Write a program that implements Kruskal's algorithm to generate minimum cost spanning tree.

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	PART-A Writing:4 Marks Execution:4Marks	8 Marks
Program-2	PART-B Writing:6 Marks Execution:6Marks	12 Marks
Practical Record		05 Marks
Total		25 Marks

Program Name	BCA	Semester	V
Course Title	**Statistical Computing & R Programming (Theory)**		
Course Code:	**DSC 14**	No.of Credits	**04**
Contact hours	**52 Hours**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Topics	Book	Chapter /Page No/Section
UNIT 1[13 HOURS]		
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.	BOOK-1	Chapter 1, Chapter 2 Chapter 3, Chapter 4, Chapter 5, Chapter 6, Chapter 7 (3-14), (17-36), (39-57), (59-85), (89-101), (103-125), (127-145)
UNIT 2[13 HOURS]		
Reading and writing files, Programming, Calling Functions, Conditions and Loops:	BOOK-1	Chapter 8, Chapter 9, Chapter10, Chapter11,

stand- alone statement with illustrations in exercise, stacking statements, coding loops, Writing Functions, Exceptions, Timings, and Visibility. Basic Data Visualization.		Chapter12, Chapter 14 (147-161), (165-176), (180-213), (216-238), (241-257), (290-304)

UNIT 3[13 HOURS]

Descriptive Statistics: Types of Data, Nominal, Ordinal, Scale and Ratio, Measures of Central Tendency, Mean, Mode and Median, Percentiles, Quartiles, Measures of Variability, Mean Absolute Deviation Range, Inter-Quartile-Range, Standard Deviation,Z-Scores.Cofficient of Variation, Measure of shape-Skewness and Kurtosis, Bar Chart, Pie Chart and Box Plot, Histogram, Frequency Polygon, Stem and Leaf Diagram. **Probability, Probability and Sampling Distribution:** Methods of assigning probability, Structure of probability, Marginal, union, joint and conditional probabilities. Discrete Probability Distributions: Binomial, Poisson, Continuous Probability Distribution, Normal Distribution, Uniform Distribution. Estimating the population mean using the and t-distribution	BOOK-2	1.3(Page No 8-11) 3.1(Page No 48-54) 3.2(Page No 55-61,66-67) 3.4(Page No 76-79) 2.2(Bar Chart, Pie Chart and Box Plot, Histogram, Frequency Polygon, Stem and Leaf Diagram) 4.1,4.2,4.3,4.4,4.5,4.6,4.7(Page No 98-123) 5.1,5.2,5.3 (Page No142-150) 5.4(Page No 158-160) 6.1(Page No 183-187) 6.2(Page No 188-196) 8.2(Page No 263-266) OR **Material supplied by BOS**

UNIT 4[13 HOURS]

Statistical Inference and Hypothesis Testing: Types of Hypothesis, and Sample, Null and Alternate Hypothesis, Level of Significance, Type I and Type II Errors, One Sample t-Test, One Sample Proportion Test, Paired Sample t-Test, Independent Samples t-Test, Two Sample Proportion Tests, One Way Analysis of Variance and Chi Square Test. **Correlation and Regression:** Analysis of Relationship, Positive and Negative Correlation, Perfect Correlation, Karl Pearson Coefficient of Correlation, Correlation Matrix, Scatter Plots, Simple Regression Analysis.	BOOK-2	9.1(Page No 292-296,300-301) 9.3(Page No 310-313) 9.4(Page No 317-320) 10.2(Page No 357-362) 10.3(Page No 368-372) 10.4(Page No 377-380) 11.2(Page No 409-413) 12.1(Page No 468-472) **Material supplied by BOS**

Text Books:

1. Tilman M. Davies, "The book of R: A first course in programming and statistics", San Francisco, 2016.
2. Ken Black, Business Statistics, New Delhi, Wiley, 2013.

References:

1. Vishwas R. Pawgi, "Statistical computing using R software", Nirali prakashan publisher, e1 edition, 2022.
2. https://www.youtube.com/watch?v=KlsYCECWEWE
3. https://www.geeksforgeeks.org/r-tutorial/
4. https://www.tutorialspoint.com/r/index.html

Program Name	BCA		Semester	V
Course Title	R Programming Lab			
Course Code:	DSC14-Lab		No.of Credits	**02**
Contact hours	04 Hours per week		Duration of SEA/Exam	**3 hours**
Formative Assessment Marks	**25**		Summative Assessment Marks	**25**

PART-A

1. Write a program to create a 3 X 3 matrices A and B and perform the following operations
a. $A^T.B$
b. $B^T.(A.A^T)$
c. $(A.A^T).B^T$
d. $[(B.B^T)+(A.A^T)-100I_3]^{-1}$
2. **Write R program to find roots of quadratic equation using user defined function. Test the program user supplied values for all possible cases.**
3. Write R script to generate prime numbers between two numbers using loops
4. Write an R program to create a list containing strings, numbers, vectors and logical values and do the following manipulations over the list
   a. Access the first element in the list
   b. Give the names to the elements in the list
   c. Add element at some positions in the list
   d. Remove the element
   e. print the first and third element
   f. Update the third element
5. The following table shows the time taken (in minutes) by 100 students to travel to school on a particular day.

Time	0-5	5-10	10-15	15-20	20-25
No. of students	5	25	40	17	13

   a. Draw the histogram
   b. Draw frequency polygon

6. Write an R program to create a Data Frame with following details and do the following operations.

ItemCode	itemCategory	ItemPrice
1001	Electronics	700
1002	Desktop Supplies	300
1003	Office Supplies	350
1004	USB	400
1005	CD Drive	800

    a. Subset the Data frame and display the details of only those items whose price is greater than or equal to 350.
    b. Subset the Data frame and display only the items where the category is either "Office Supplies" or "Desktop Supplies"
    c. Subset the Data frame and display the items where the Itemprice between 300 and 700
    d. Compute the sum of all ItemPrice
    e. Create another Data Frame called "item-details" with three different fields itemCode, ItemQtyonHand and ItemReorderLvl and merge the two frames.

7. Create a factor marital_status with levels Married, single, divorced. Perform the following operations on this factor
    a. Check the variable is a factor
    b. Access the 2nd and 4th element in the factor
    c. Remove third element from the factor
    d. Modify the second element of the factor
    e. Add new level widowed to the factor and add the same level to the factor marital_status

8. Write a R language Script for following operation on Iris Data Set
    1. Load the Iris Dataset
    2. View first six rows of iris dataset
    3. Summarize iris dataset
    4. Display number of rows and columns
    5. Display column names of dataset.
    6. Create histogram of values for sepal length
    7. Create scatterplot of sepal width vs. sepal length
    8. Create boxplot of sepal width vs. sepal length
    9. Find Pearson correlation between Sepal.Length and Petal.Length
    10. Create correlation matrix for dataset

Note: Implement Using R Script and Solve Manually

1. Write a R program to create a Vector containing following 8 values and perform the following operations.

   4   3   0   5   2   9   4   5

   a. Find mean, median, mode.
   b. Find the range.
   c. Find the 35th and 78th percentile.
   d. Find the variance and standard deviation
   e. Find the interquartile range.
   f. Find the z-score for each value.

   [R Script: 5 Marks   Solution: 7 Marks]

2. Write R script to find the correlation coefficient and type of correlation between advertisement expenses and sales volume using Karl Pearson's coefficient of correlation method (Direct Method).

Firm	1	2	3	4	5	6	7	8	9	10
Advertisement Exp. (Rs. In Lakhs)	11	13	14	16	16	15	15	14	13	13
Sales Volume (Rs. In Lakhs)	50	50	55	60	65	65	65	60	60	50

   [R Script: 5 Marks   Solution: 7 Marks]

3. Write R script to compute the regression equation of y on x from the following data. Predict the value of y when x=7

X	2	4	5	6	8	11
Y	18	12	10	8	7	5

   [R Script: 5 Marks   Solution: 7 Marks]

4. The times taken by a large group of students to complete a piece of homework, T minutes, are Normally distributed with a mean of 57 minutes and standard deviation of 6.5. Find the probability that the time taken by a random student from the group to complete this homework will be less than 60 minutes.

   Write R script to Find the probability that the time taken by a random student from the group to complete this homework

   a) Will be less than 60 minutes

b) Between 50 and 80 minutes
   [R Script: 6 Marks   Solution: 6 Marks]

5. Write R script to perform the following using binomial distribution
   i.   If n=4 and p=0.10, find P(x=3)
   ii.   If n=12 and p=0.45, find P(5<=x<=7)
   [R Script: 6 Marks   Solution: 6 Marks]

6. Perform the following using uniform distribution between 200 and 240
   i.   P(x>230)
   ii.   P(205≤x≤220)
   [R Script: 6 Marks   Solution: 6 Marks]

7. Following are the scores of max vertical jumps before and after the training program. Test whether the training program is helpful to the students (Use Paired t-test).

Player	Max Vertical Jump Before Training Program	Max Vertical Jump After Training Program
Player 1	22	24
Player 2	20	22
Player 3	19	19
Player 4	24	22
Player 5	25	28
Player 6	25	26
Player 7	28	28
Player 8	22	24
Player 9	30	30
Player 10	27	29
Player 11	24	25
Player 12	18	20
Player 13	16	17
Player 14	19	18
Player 15	19	18
Player 16	28	28
Player 17	24	26
Player 18	25	27
Player 19	25	27
Player 20	23	24

   [R Script: 4 Marks   Solution: 8 Marks]

8. A company has three manufacturing plants, and company officials want to determine whether there is difference in the average age of workers at the three locations. The following data are the ages of five randomly selected workers at each plant. Perform a one-way ANOVA to determine whether there is a significant difference in the mean ages of the workers at three plants. Use $\alpha=0.01$. Write R script for the above problem.
   Plant(Employee Ages)

1	2	3
29	32	25
27	33	24
30	31	24
27	34	25
28	30	25

[R Script: 4 Marks   Solution: 8 Marks]

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	**PART-A** **Writing:4 Marks Execution:4Marks**	**8 Marks**
Program-2	**PART-B** **Refer Practical List**	**12 Marks**
Practical Record		**05 Marks**
Total		**25 Marks**

Program Name	**BCA**	Semester	**V**
Course Title	**Software Engineering (Theory)**		
Course Code:	DSC15	No.of Credits	**04**
Contact hours	**52 Hours**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Topics	Book	Chapter /Page No/Section
UNIT 1[13 HOURS]		
Overview: Introduction, Professional and ethical responsibility.	Text book 1 Chapter No 1 (8th Edition)	1.1.1, 1.1.2, 1.1.4, 1.1.5, 1.1.9, 1.1.10, 1.1.11, 1.2.
Software process models: Process iteration, Process activities, The relational Unified Process.	Chapter No 4 (8th Edition)	4.1.1,4.1.2,4.1.3,4.2.1,4.2.2,4.3, 4.3.2(upto page 77), 4.4(upto page 83).
Agile Software Development: Agile methods, Plan driven and Agile development.	Text book-2 Chapter 3 (9th Edition)	3.1, 3.2
Requirement Engineering: Functional and non-functional requirements, Software requirements document, Requirement's specifications.	Chapter No 3 (8th Edition)	6.1, 6.1.1, 6.1.2, (pg upto 123) 6.3, 6.3.1 (Pg upto 133), 6.4, 6.5.

UNIT 2[13 HOURS]		
Requirements engineering processes: Requirement's elicitation and analysis, Requirement's validation, Requirements management.	Text book 1 Chapter 7 (8th Edition)	7.2 (Pg upto 148) (Excluding sub sections), 7.3,7.3.1, 7.4,7.4.2(upto page 163).
System Models: Context Models, Behavioral models, Data Flow models, State Machine models. Data models, Object models, Inheritance models, Object aggregation, Object behavior modelling, Structured methods.	Text book 1 Chapter 8	8.1,8.2,8.2.1,8.2.2, 8.3, 8.4,8.4.1,8.4.2,8.4.3, 8.5.
UNIT 3[13 HOURS]		
Architectural Design: Architectural design decisions, System organization, The repository model, The layered model, The client-server model, Modular decomposition styles.	Text book 1 Chapter 11	11.1, 11.2,11.2.1,11.2.2,11.2.3 ,11.3,11.3.1,11.3.2
Design and Implementation: An Object-oriented design process, System context and models of use, Architectural design, Object identification, Design models, Object interface specification,	Text book 1 Chapter 14	14.2,14.2.1,14.2.2,14.2.3 ,14.2.4,14.2.5
Design patterns.	Text book 2 (Edition 9th) Chapter 7	7.2
UNIT 4[13 HOURS]		
A Strategic approach to software	Text book 1	22.1

testing:	Chapter 22	
Verification and validation.		
Unit testing, Regression testing, Smoke testing, Alpha and Beta testing.	Text book 3 (7th Edition) Chapter 17	17.3.1, 17.3.2(only pages 462 & 463), 17.6.3(pages 468 & 469)
System testing, Integration testing, Release testing, Component testing, Test case design, Test Automation	Text book 1 Chapter 23	23.1,23.1.1,23.1.2,23.2,23.2.1, 23.3,23.3.3,23.3.4,23.4.

Text Books:

1. Ian Somerville – Software Engineering, 8th edition, Pearson Education, 2009.
2. Ian Somerville – Software Engineering, 9th edition, Pearson Education, 2009.
3. Roger S Pressman – A Practitioner's Approach, 7th edition, McGraw-Hill, 2007.

References Books:

1.Waman S Jawadekar-Software Engineering Principles and Practice, Tata McGrawHill,2004

2. 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**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Topics	Book	Chapter /Page No/Section
UNIT 1[10 HOURS]		
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.		**Material Supplied by BOS**
UNIT 2[10 HOURS]		
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.	**BOOK-1**	**Chapter 4** **4.1 ,4.2,4.2.1, 4.2.2,4.2.3,4.2.4 ,4.3 ,4.3.1 ,4.3.2 ,4.3.3,4.3.4** **Chapter 3** **3.1, 3.2,3.3.1 – 2,4,6 , 3.3.2 – 1,4 , 3.4,3.5 ,3.6, 3.6.1,3.6.2,3.6.3**

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.		

UNIT 3[10 HOURS]		
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).	**BOOK-1**	**Chapter 5** **5.1 ,5.2 ,5.2.1 ,5.2.2, 5.3** **(All sub sections)** **5.4** **(All sub sections)**

UNIT 4[12 HOURS]		
Cloud Platforms in Industry: Amazon Web Services- Compute Services, Storage Services, Communication Services, Additional Services; Google AppEngine- 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	**BOOK-1**	Chapter 9 **9.1 ,9.1.1,9.1.2(1,2,3),9.1.3, 9.1.4** **9.2 ,9.2.1,9.2.2,9.2.3** **9.3 ,9.3.1,9.3.2,9.3.3**

Appliance. **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 Online Gaming.		**Chapter 10** **10.1** **(All Sub Sections)** **10.2** **(All sub Sections)**

Text Books:

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi: "Mastering CloudComputing- Foundations and Applications Programming", Elsevier, 2013

References Books:

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi: "Mastering CloudComputing- Foundations and Applications Programming", Elsevier, 2013
2. 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	**BCA**	Semester	**V**
Course Title	**Business Intelligence (Theory)**		
Course Code:	**DSE-E1**	No.of Credits	**03**
Contact hours	**42 Hours**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Topics	Book	Chapter /Page No/Section
UNIT 1[10 HOURS]		
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	Book-1	1.4, 1.5, 1.6,1.7,1.8, 1.9 (Excluding Application Cases)
UNIT 2[10 HOURS]		
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.	Book-1	2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.9, 2.10, 2.11 (Excluding Application Cases)
UNIT 3[10 HOURS]		

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.	Book-1	6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 7.7, 7.8, 7.9, 7.10 (Excluding Application Cases)

UNIT 4[12 HOURS]

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.	Book-1	9.2 , 9.3, 9.4 , 9.5 , 9.6 , 9.8 , 9.9 , 11.2 , 11.3 , 11.4, 11.5 , 11.6 , 11.7 , 11.9 (Excluding Application Cases)

Text Books:
1. Ramesh Sharda, Dursum Delen, Efraim Turban, J.E. Aronson, Ting-Peng Liang, David King, "Bussiness Intellegence and Analytics: System for Decision Support", 10th Edition, Pearson Global Edition.

Reference books:
1. Data Analytics: The Ultimate Beginner's Guide to Data Analytics Paperback-12 November 2017 by Edward Miz

Program Name	**B.C.A**	Semester	**V**
Course Title	**Digital Marketing (Theory)**		
Course Code:	**Voc-1**	No.of Credits	**03**
Contact hours	**42 Hours**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Topics	Book	Chapter /Page No/Section
UNIT 1[10 HOURS]		
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. Campaign planning and execution, Monitoring and adjusting digital marketing campaigns		**Material Supplied by BOS**
UNIT 2[10 HOURS]		
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		**Material Supplied by BOS**
UNIT 3[11 HOURS]		

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, Content creation and distribution, Content promotion and amplification, Content marketing metrics and analytics		**Material Supplied by BOS**

UNIT 4[11 HOURS]		
Mobile Marketing: Mobile marketing overview, Mobile advertising strategies, Mobile app marketing, Location-based marketing, Mobile marketing analytics **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		**Material Supplied by BOS**

Text Books:

1. "Digital Marketing Strategy: An Integrated Approach to Online Marketing" by Simon Kingsnorth.

References

1. "Email Marketing Rules: How to Wear a White Hat, Shoot Straight, and Win Hearts" by Chad S. White
2. "Content Inc.: How Entrepreneurs Use Content to Build Massive Audiences and Create Radically Successful Businesses" by Joe Pulizzi
3. "Mobile Marketing: How Mobile Technology is Revolutionizing Marketing, Communications and Advertising" by Daniel Rowles
4. "Web Analytics 2.0: The Art of Online Accountability and Science of Customer Centricity" by Avinash Kaushik