



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)/RPH-394A/2021-22/1155

Date: 29 OCT 2021

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2021-22ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸುಗಳಿಗೆ 1 ಮತ್ತು 2ನೇ ಸೆಮೆಸ್ಟರ್  
NEP-2020 ಮಾದರಿಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

- ಉಲ್ಲೇಖ: 1. ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿಗಳು(ವಿಶ್ವವಿದ್ಯಾಲಯ 1) ಉನ್ನತ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 260 ಯುಎನ್ಇ 2019(ಭಾಗ-1), ದಿ:7.8.2021.  
2. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ದಿನಾಂಕ: 19.08.2021  
3. ಈ ಕಚೇರಿ ಸುತ್ತೋಲೆ ಸಂ.No. KU/Aca(S&T)/RPH-394A/2021-22/18 ದಿ:21.08.2021.  
4. ಸರ್ಕಾರಿ ಆದೇಶ ಸಂ ಇಡಿ 260 ಯುಎನ್ಇ 2019(ಭಾಗ-1),ಬೆಂಗಳೂರು ದಿ. 15.9.2021.  
5. ಎಲ್ಲ ಅಭ್ಯಾಸಸೂಚಿ ಮಂಡಳಿ ಸಭೆಗಳ ನಡವಳಿಗಳು  
6. ಎಲ್ಲ ನಿಖಾಯಗಳ ಸಭೆಗಳು ಜರುಗಿದ ದಿನಾಂಕ: 24,25-09-2021.  
7. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂಖ್ಯೆ: 01 ದಿನಾಂಕ: 28.9.2021.  
8. ಈ ಕಚೇರಿ ಸುತ್ತೋಲೆ ಸಂ.No. KU/Aca(S&T)/RPH-394A/2021-22/954 ದಿ:30.09.2021.  
9. ಎಲ್ಲ ನಿಖಾಯದ ಡೀನರು / ಸಂಪನ್ಮೂಲ ತಜ್ಞರ ಸಭೆ ದಿನಾಂಕ 21.10.2021.  
10. ಎಲ್ಲ ಸ್ನಾತಕ ಅಭ್ಯಾಸಸೂಚಿ ಮಂಡಳಿ ಅಧ್ಯಕ್ಷರುಗಳ ಸಭೆ ದಿನಾಂಕ 22.10.2021.  
11. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂಖ್ಯೆ: 01 ದಿನಾಂಕ: 27.10.2021.  
12. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 29-10-2021

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2021-22ನೇ 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 ಸ್ನಾತಕ ಕೋರ್ಸುಗಳ 1 ಮತ್ತು 2ನೇ ಸೆಮೆಸ್ಟರ್‌ಗಳಿಗೆ NEP-2020 ರಂತೆ ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಈಗಾಗಲೇ ಪ್ರಕಟಪಡಿಸಿದ್ದು, ಮುಂದೆ ದಿನಾಂಕ 04.10.2021 ವರೆಗೆ ಸರಕಾರವು ಕಾಲಕಾಲಕ್ಕೆ ನೀಡಿದ ನಿರ್ದೇಶನಗಳನ್ನು ಅಳವಡಿಸಿಕೊಂಡು ದಿನಾಂಕ 27.10.2021 ರಂದು ಜರುಗಿದ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯಲ್ಲಿ ಅನುಮೋದನೆ ಪಡೆದು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ [www.kud.ac.in](http://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  
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.

*Handwritten signature*  
ಕುಲಸಚಿವರು.



**KARNATAK UNIVERSITY, DHARWAD**

# **04 - Year BCA (Hons.) Program**

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## **SYLLABUS**

**[Effective from 2021-22]**

**DISCIPLINE SPECIFIC CORE COURSE (DSCC) FOR SEM I & II,**

**OPEN ELECTIVE COURSE (OEC) FOR SEM I & II and**

**SKILL ENHANCEMENT COURSE (SEC) FOR SEM I**

**AS PER N E P - 2020**

**Karnatak University, Dharwad**  
**Four Years Under Graduate Program in Computer Applications for BCA (Hons.)**  
**Effective from 2021-22**

Sem	Type of Course	Theory/ Practical	Paper Code	Paper Title	Instruction hour per week	Total hours of Syllabus / Sem	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks	Credits
I	DSCC 1	Theory	BCA-1.1	Introduction to Algorithms	04hrs	56	02 hrs	40	60	100	04
		Practical	BCA-1.2	Algorithms Lab	04 hrs	52	03 hrs	25	25	50	02
	DSCC 2	Theory	BCA-1.3	Introduction to Linux	04hrs	56	02 hrs	40	60	100	04
		Practical	BCA-1.4	Linux Lab	04 hrs	52	03 hrs	25	25	50	02
	OEC-1	Theory	BCA-1.5	Statistical Data Analysis using SPSS	03 hrs	42	02 hrs	40	60	100	03
	SEC-1	Practical	BCA-1.6	Fundamentals of Digital Logic	03 hrs	30	02 hrs	25	25	50	02
II	DSCC 3	Theory	BCA-2.1	Data Structures	04 hrs	56	02 hrs	40	60	100	04
		Practical	BCA-2.2	Data Structures Lab	04 hrs	52	03 hrs	25	25	50	02
	DSCC 4	Theory	BCA-2.3	Discrete Mathematical Structure	04hrs	56	02 hrs	40	60	100	04
		Practical	BCA-2.4	DMS Lab	04 hrs	52	03 hrs	25	25	50	02
	OEC-2	Theory	BCA-2.5	Introduction to Financial Accounting using Tally	03 hrs	42	02 hrs	40	60	100	03
<b>Details of the other Semesters will be given later</b>											

**Name of Course (Subject): Computer Applications**

**Programme Specific Outcome (PSO):**

On completion of the 03/ 04 years Degree in **BCA** students will be able to:

- PSO 1** : To provide young men and women with required knowledge and necessary skills to get rewarding careers into the changing world of information technology.
- PSO 2** : To provide a foundation of computing principles and business practices for effectively using/managing information systems and enterprise software.
- PSO 3** : To specialize in legacy applications, system software or mobile application.
- PSO 4** : Think of new approaches for solving problem in different domains.
- PSO 5** : To caters the needs of managing the business application.
- PSO 6** : Be in a position to develop industrial applications.

# BCA Semester – I

**Subject: Computer Applications**  
**Discipline Specific Course (DSC)**

The course DSCC 1 in I semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

**Course No.1 (Theory): Title of the Course (Theory) : Introduction to Algorithms**

Course No.	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
<b>Course-01</b>	DSCC	Theory	04	04	56 hrs	2hrs	40	60	100

### Course Outcome (CO):

After completion of course (Theory), students will be able to:

- CO 1** : Familiarize with fundamental concepts and computer programming.
- CO 2** : Learn fundamental concepts of programming by developing and executing programs in C.
- CO 3** : Focuses on the structured program.
- CO 4** : Various constructs and their syntax.

Syllabus- Course 1(Theory): Introduction to Algorithms	Total Hrs: 56
<b>Unit-I</b>	<b>14 hrs</b>
<p><b>Basics of Programming-</b> Definition and Characteristics of Computer, Block diagram of Computer, Compiler, Interpreter, Linker, Loader, Algorithm, Flowchart, Testing and Execution. Examples of flow charts and algorithms Largest of three numbers, reversing the digits of an integer, GCD of two integers, generating prime numbers, computing nth Fibonacci numbers, finding Even and Odd numbers.</p> <p><b>Programming Tokens:</b> Keywords, Identifiers, Constants, Variables, Data types, defining symbolic constants, Simple Programs.</p>	
<b>Unit-II</b>	<b>14 hrs</b>
<p><b>Programming Concepts:</b> Operators &amp; Expression: Arithmetic, relational, logical, bitwise, unary, assignment, shorthand assignment operators, conditional operators and increment and decrement operators, Special operators, Type Conversion in expressions, Operator precedence, Mathematical functions.</p> <p><b>Input/output Functions:</b> Unformatted &amp; formatted I/O functions.</p> <p><b>Branching and Looping:</b> Simple 'if' statement, Nested if Statement, Ladder 'if-else' statement. The 'Switch' statement, GOTO statement. Looping: for, while, do-while loop, Nested loops and jumps in loops - break, continue statement.</p>	

<b>Unit-III</b>	<b>14 hrs</b>
<b>Arrays, Strings and Functions:</b> Definition, types, initialization, processing an array, passing arrays to functions, Array of Strings. Strings: String constant and variables, Declaration and initialization of string, Input/output of string data, String Handling Functions: strlen, strcat, strcmp, strcpy, strev. Functions: Definition, types of user defined functions, prototype, Local and global variables, passing parameters, recursion.	
<b>Unit-IV</b>	<b>14 hrs</b>
<b>Advanced Algorithms:</b> Introduction, the problem solving aspects, Top-down design, Implementation of Algorithms. Exchanging the values of two variables, Counting, Summation of set of Numbers, Factorial Computation, Generation of Fibonacci Sequence, Array Order Reversal, Array Counting, Finding the Maximum Number in a Set, Removal of Duplicates from an Ordered Array, Partitioning an Array, Finding the $k^{\text{th}}$ Smallest Element.	

Books recommended.

#### **Text Books**

1. Balaguruswamy: Programming in ANSI C, Tata Mc Graw-Hill.
2. Brain W.Karningham and Dennis Ritchie: The C Programming Language, PHI.
3. R.G.Dromey: How to Solve it by Computer, Pearson Education, ISBN 978-81-317-0562-9.

#### **References**

1. V. Rajaraman: Fundamentals of Computers, PHI (EEE).
2. Kamthane, Programming with ANSI and Turbo C, Pearson Education, Asia.
3. Herbert Schildt: C. The complete reference, 4<sup>th</sup> edition.
4. Yeshwant Kanetkar: Let us C, BPB.

# BCA Semester – I

**Subject: Computer Applications**  
**Discipline Specific Course (DSC)**

## Course No.1 (Practical): Title of the Course (Practical) : Algorithm Lab

Course No.	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
Course-01	DSCC	Practical	02	04	52 hrs	3hrs	25	25	50

### Course Outcome (CO):

After completion of course (Practical), students will be able to:

CO 1 : Understand the basics of programming by executing the simple programming

CO 2 : Be able to design & execution of code.

CO 3 : Have practical knowledge of arrays, strings & functions

### List of the Experiments for 52 hrs / Semesters

1. Find the area of a circle and area of a triangle given three sides.
2. Largest of three numbers.
3. Reversing the digits of an integer.
4. GCD of two integers.
5. Generating prime numbers.
6. Computing nth Fibonacci numbers.
7. Finding Even and Odd numbers.
8. Exchanging the values of two variables.
9. Counting: Print number from 100 to 200 which are divisible by 7 and display their sum and count using for loop.
10. Summation of set of Numbers.
11. Factorial Computation.
12. Generation of Fibonacci sequence.
13. Array Order Reversal.
14. Finding the Maximum Number in a Set.
15. Removal of Duplicates from an Ordered Array.
16. Partitioning an Array.
17. Finding the Smallest Element.
18. Read N (minimum 5) students marks and find number of students passed and fail depending on the marks.
19. Count the number of vowels, consonants and special characters in a given sentence.
20. To find the addition and subtraction of two matrices using function.

**General instructions:**

**Implement all the programs using C Language**

**Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination**

- 1. 7 Marks (Program 1 + Execution without error)**
- 2. 7 Marks (Program 2 + Execution without error)**
- 3. Viva 6Marks**
- 4. Journal 5 Marks**

**Total 25 marks**

**Note: Same Scheme may be used for IA ( Formative Assessment) examination**



# BCA Semester – I

**Subject: Computer Applications**  
**Discipline Specific Course (DSC)**

The course DSCC 2 in I semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

**Course No.2 (Theory): Title of the Course (Theory) : Introduction to Linux**

Course No.	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
Course-02	DSCC	Theory	04	04	56 hrs	2hrs	40	60	100

### Course Outcome (CO):

After completion of course (Theory), students will be able to:

- CO1** : Be familiar with fundamentals of Linux operating system.
- CO2** : To learn the concepts of files and file organization.
- CO3** : To learn the mechanisms involved in ownership of files and file attributes
- CO4** : To gain the knowledge on vi editor and regular expressions
- CO 5** : To know the techniques of shell programming.

<b>Syllabus- Course 2(Theory): Introduction to Linux</b>	<b>Total Hrs: 56</b>
<b>Unit-I</b>	<b>14 hrs</b>
<b>Introduction to Unix:</b> Brief History, What is Unix?, Unix Components, Using Unix, Commands in Unix, Some Basic Commands, Getting Help, Command Substitution, Giving Multiple Commands, Aliases. <b>Files and File Organization:</b> Unix Files, Categories of Files, Hidden Files, File System, Path Names, Home Directory, Directory Commands, File Related Commands, Wild Cards, Displaying the Contents of a File, Printing of Files, Comparing Files.	
<b>Unit-II</b>	<b>14 hrs</b>
<b>File Attributes and Permissions:</b> Ownership of Files, File Attributes, File Command, Changing File Permission, Changing the Owner of a File, Changing the group of a File, Times Associated with a File, umask Command. <b>Standard I/O, Redirection Pipes and Filters:</b> Standard I/O, Redirection, Pipe and Pipeline, Filter, tee command, Terminal files, Sample Database, Handling Columns and Fields, sort command, uniq command, tr command.	
<b>Unit-III</b>	<b>14 hrs</b>
<b>The vi Editor:</b> vi Editor, Editing with vi, Moving the Cursor, Editing, Copying and Moving Text, Pattern Searching, Repeating the Last Editor Command, Undoing Commands, Joining Lines, Writing Selected Lines onto a Separate File, Using the Shell from vi, Configuring the vi Environment. <b>Regular Expressions :</b> grep Family of Commands and sed : Regular Expressions, grep Family, egrep Command, fgrep Command, Stream Editor-sed.	

<b>Unit-IV</b>	<b>14 hrs</b>
<b>Shell Programming</b> : Shell Variables, export Command, .profile File – A Script Run during Starting, The First Shell Script, read Command, Positional Parameters, The \$? Variable – Knowing the Exit Status, More about the set Command, exit Command, Branching Control Structures, Loop-Control Structures, continue and break Statements, expr Command, Real Arithmetic in Shell Programs, The here Document (<<), sleep Command, Debugging Scripts, script Command, eval Command, exec Command.	

Books recommended.

#### **Text Books**

1. M.G.Venkateshmurthy: Introduction to Unix & Shell Programming, Pearson Education.

#### **References**

1. John Goerzen: Linux Programming Bible, IDG Books, New Delhi.
2. Sumitabha Das: Your Unix - The Ultimate Guide, TMH.
3. Richard Petersen: The Complete Reference – Linux, McGraw-Hill
4. Yashwant Kanetkar: Unix & Shell programming – BPB

## BCA Semester – I

**Subject: Computer Applications**  
**Discipline Specific Course (DSC)**

### Course No.2 (Practical): Title of the Course (Practical): **Linux Lab**

Course No.	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
Course-02	DSCC	Practical	02	04	52 hrs	3hrs	25	25	50

#### Course Outcome (CO):

After completion of course (Practical), students will be able to:

**CO 1 : Use basics of fundamental ability which are required again & again on daily basis to work on modern operating system.**

**CO 2 : Write useful shell scripts, which enhance the usefulness of computers**

**CO 3 : Understand basics of various OS related concept like files, directories, Kernel etc.,**

#### List of the Experiments for 52 hrs / Semesters

1. Study Experiment- UNIX basics
2. Basic Shell Programming (Fibonacci Series generation, Factorial of a given number, Checking for Armstrong number)
3. Designing a Arithmetic calculator
4. Generation of Multiplication table
5. Base Conversion (Decimal to Binary, Binary to Decimal)
6. Finding the information about the Login name and File name.
7. Write a shell script to exchange the contents of two variables.
8. Write a shell script, which accepts three subject marks scored by a student and declare the result.
9. Write a shell script program to find area of a square, rectangle, circle and triangle.
10. Write a shell script to print integer numbers from 1 to 20.
11. Write a shell script to perform arithmetic operation on two number depending on +, -, \* and /.
12. Write an interactive shell script to display a menu and perform the following task:
  - i. Renaming a file
  - ii. Deleting a file
  - iii. Copying a file
  - iv. Exit
13. Write a shell script which counts the number of lines in a file.
14. Write a shell script to accept three command line arguments and display each one of them.
15. Write a c program to a. Display the PID of parent and PID of child. b. Copy the contents of one file into the other using command line arguments.
16. Write a shell script program to check whether the given file is present in a directory and check what is all the permission given for the owner.
17. Write a shell script program to read 2 filenames and check which 1 is newer and which is older.
18. Write a shell script program to find the number of directory files and ordinary files in the current directory.
19. Write a shell script program to delete zero sized file from current directory.
20. Write a shell script program to calculate Gross salary from basic, DA=20% and HRA=10%.

**General instructions:**

**Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination**

- 1. 7 Marks ( Program 1 + Execution without error)**
- 2. 7 Marks ( Program 2 + Execution without error)**
- 3. Viva 6 Marks**
- 4. Journal 5 Marks**

**Total 25 marks**

**Note: Same Scheme may be used for IA ( Formative Assessment) examination**

## BCA Semester – I

**Subject: Computer Applications  
Open Elective Course (OEC-1)**

**(OEC for other Degree students and the students of BCA where exclusive BCA Programme working as single faculty)**

**OEC-1: Title of the Course : STATSTICAL DATA ANALYSIS USING SPSS**

Course No.	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
OEC-1	OEC	Theory	03	03	42 hrs	2hrs	40	60	100

### Course Outcome (CO):

After completion of course, students will be able to:

- CO 1** : To develop data handling ability of students.
- CO 2** : To develop diagrammatic representation of the data.
- CO 3** : To create awareness of descriptive statistics.
- CO 4** : To acquire practical skills related to regression analysis.

Syllabus- OEC: STATSTICAL DATA ANALYSIS USING SPSS	Total Hrs: 42
<b>Unit-I</b>	<b>14 hrs</b>
<b>Data handling:</b> open SPSS data file – save – import from other data source – data entry – labeling for dummy numbers - recode in to same variable – recode in to different variable – transpose of data – insert variables and cases – merge variables and cases. <b>Data handling:</b> Split – select cases – compute total scores – table looks – Changing column - font style and sizes.	
<b>Unit-II</b>	<b>14 hrs</b>
<b>Diagrammatic representation:</b> Simple Bar diagram – Multiple bar diagram – Sub-divided Bar diagram - Percentage diagram - Pie Diagram – Frequency Table – Histogram – Scatter diagram – Box plot.	
<b>Unit-III</b>	<b>14 hrs</b>
<b>Descriptive Statistics:</b> Mean, Median, Mode, SD- Skewness- Kurtosis. Correlation – Karl Pearson’s and Spearman’s Rank Correlation, Regression analysis: Simple and Multiple Regression Analysis [ Enter and stepwise methods].	

Books recommended.

### **Text Books**

1. Clifford E.Lunneborg (2000). Data analysis by resampling: concepts and applications. Dusbury Thomson learning. Australia.
2. Everitt, B.S and Dunn, G (2001). Applied multivariate data analysis. Arnold London.

### **References**

1. Jeremy J. Foster (2001). Data analysis using SPSS for windows. New edition. Versions 8-10. Sage publications. London.
2. Michael S. Louis – Beck (1995). Data analysis an introduction, Series: quantitative applications in the social sciences. Sage. Publications. London.

# BCA Semester - I

**Subject: Computer Applications**

**SKILL ENHANCEMENT COURSE (SEC)-I**

**Title of Paper: FUNDAMENTALS OF DIGITAL LOGIC**

Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Mode of Examination	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
SEC-I	Theory + Practical	02	03hrs	30	Practical	2hr	25	25	50

### Course Outcome (CO):

After completion of Skill Enhancement course, students will be able to:

**CO 1** : To teach the basics involved in data representation and digital logic circuit.

**CO 2** : It includes the general concept in digital logic design.

**CO 3** : To make better understanding of logic used in combinational circuit design.

<b>Syllabus- SEC-1: Title-FUNDAMENTALS OF DIGITAL LOGIC</b>	<b>30 Hrs</b>
<b>Unit –1</b>	10
<b>Number Representation:</b> Positional representation of numbers, decimal, binary, octal, Hexadecimal number systems, general radix system, numbers, conversions, complements, binary codes, Fixed point representation, floating point representation, representation for numeric data , arithmetic with signed unsigned numbers, addition, subtraction. Introduction to array correction and array detection. Introduction to logic circuits-variables and functions, truth tables, logic gates and networks, Boolean algebra, synthesis using AND, OR and NOT gates, NAND and NOR logic networks.	
<b>Unit – 2</b>	10
Optimized implementation of logic functions-karnaugh map, strategy for minimization, minimization of product of sums forms, incompletely specified functions, multiple output circuits, multilevel synthesis, a tabular method for minimization, cubical technique for minimization, practical considerations.	
<b>Unit – 3</b>	10
Combinational logic- design procedures, adders, subtractors, design of arithmetic circuits, multiplexers, demultiplexers, encoders, decoders, code converters, verilog for combinational circuits.	

## List of the Experiments for 52 hrs / Semesters

### 1. Introduction to digital Electronics lab (Simulators)

#### i. Nomenclature of digital I/C's, Specifications

#### ii. Tools required-Simulators

Gates:

2. AND

3. NOT

4. OR

5. NAND

6. NOR

7. XOR

Implement of given Boolean function using logic gates

8. SOP:  $A.B+A.B$

9. POS:  $(A+B) (B+C) (A+C)$

Draw the logic circuit diagram & truth table, test the output in the simulator

General instructions:

Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination

1. 7 Marks ( Program 1 + Execution without error)

2. 7 Marks ( Program 2 + Execution without error)

3. Viva 6 Marks

4. Journal 5 Marks

**Total 25 marks**

**Note: Same Scheme may be used for IA( Formative Assessment) examination**

Books recommended.

**Text Books**

1. Fundamental of digital logic with Verilog Design by Stephen Brown & ZVONKO VRANESIC, Tata McGrawHill.

2. Digital Design by M. Morris Mano, Pearson.

**References**

1. Computer System Architecture, M. Morris Mano, Third edition, Pearson Education.

2. Computer Organization and Architecture, W. Stallings, Pearson Education.



**Details of Formative assessment (IA) for DSCC theory/OEC: 40% weight age for total marks**

Type of Assessment	Weight age	Duration	Commencement
Written test-1	10%	1 hr	8 <sup>th</sup> Week
Written test-2	10%	1 hr	12 <sup>th</sup> Week
Seminar	10%	10 minutes	--
Case study / Assignment / Field work / Project work/ Activity	10%	-----	--
Total	40% of the maximum marks allotted for the paper		

**Faculty of Science  
04 - Year UG Honors programme:2021-22**

**GENERAL PATTERN OF THEORY QUESTION PAPER 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 : 10marks

**Part-B**

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

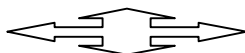
**Part-C**

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 sub questions for 7+3 or 6+4 or 5+5 if necessary)

**Total: 60 Marks**

**Note: Proportionate weight age shall be given to each unit based on number of hours prescribed.**



# BCA Semester – II

**Subject: Computer Applications  
Discipline Specific Course (DSC)**

The course DSCC 3 in II semester has two papers (Theory Paper –I for 04 credits & Practical paper-II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

## Course No.3 (Theory): Title of the Course (Theory) : DATA STRUCTURES

Course No.	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
Course-03	DSCC	Theory	04	04	56 hrs	2hrs	40	60	100

### Course Outcome (CO):

After completion of course (Theory), students will be able to:

- CO 1** : To impart the basic concepts of data structures and algorithms.
- CO 2** : To familiar with data structural algorithms such as sorting & searching, stack & queue, linked list and trees.
- CO 3** : To be familiar with some graph algorithms such as binary tree representation of tree and operations on trees.
- CO 4** : To understand the basic concepts of tree traversal.
- CO 5** : How to use basic data structure for program implementation.

<b>Syllabus- Course 2(Theory): DATA STRUCTURES</b>	<b>Total Hrs: 56</b>
<b>Unit-I</b>	<b>14 hrs</b>
<b>Introduction to Data Structure:</b> Structure Definition, Initialisation, Array as structure, Array within structure, Union. Understanding pointers, Declaring and initializing pointers, accessing a variable through its pointer, static and dynamic memory allocation. Definition of Data Structure, Classification of Data Structure: Primitive and Non-Primitive, Operations on Data Structure, Review of Array.	
<b>Unit-II</b>	<b>14 hrs</b>
<b>Searching and Sorting:</b> Searching Definition, Searching Techniques: Sequential search, Binary search. Comparison Between sequential and binary searching. Sorting Definition, Sorting Techniques: Bubble sort, Merge sort, Selection sort, Quick sort, Insertion Sort.	
<b>Unit-III</b>	<b>14 hrs</b>
<b>Stack and Queue:</b> Definition of stack, Array Representation of Stack, Linked List Representation of stack, Operation Performed on Stack, Infix, Prefix, Postfix notations, Conversion of arithmetic expressions, Application of stack. Definition of Queue, Array Representation of Queue, Types of Queue: Simple queue, Circular queue, Double ended queue, Priority queue, Operations on all types of queue.	

<b>Unit-IV</b>	<b>14 hrs</b>
<p><b>Linked List:</b> Definition, Representation of linked lists in Memory, Types of linked list: Singly linked list, Doubly linked list and Circular linked list. Operations on linked list: Creation, Insertion, Deletion, Search, Display and Traversing. Advantages and disadvantages of linked list.</p> <p><b>Trees:</b> Definitions, Tree terminology, Binary tree, Complete binary tree. Operations on Binary Trees, Representation of binary tree.</p>	

Books recommended.

#### Text Books

1. Kamthane: Introduction to Data Structure in C. Pearson education 2005.
2. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.

#### References

1. Data Structures using C, A.M.Tanenbaum, Y. Langsam, M.J.Augenstein, Pearson.
2. Data structures and Program Design in C, 2<sup>nd</sup> edition, R.Kruse, C.L.Tondo and B.Leung, Pearson.
3. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.
4. E. Balaguruswamy, Programming in ANSI C, Tata Mc Graw-Hill.

## BCA Semester – II

**Subject: Computer Applications**  
**Discipline Specific Course (DSC)**

Course No.3 (Practical): Title of the Course (Practical) : **Data Structure Lab**

Course No.	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
Course-03	DSCC	Practical	02	04	52 hrs	3hrs	25	25	50

### Course Outcome (CO):

After completion of course (Practical), students will be able to:

**CO 1 : Be able to design & implement list data structure using**

- i. **Stack & Queue**
- ii. **Linked list**
- iii. **Singly & doubly linked list**

**CO 2 : Design & implement searching and sorting by applying various operations.**

**CO 3 : Design & implement basic operation on trees.**

### List of the Experiments for 52 hrs / Semesters

1. Write a Program to create, Initialize and access a pointer variable.
2. Write a Program to Calculate the length of the string using a pointer.
3. Write a Program to swap numbers using pointer.
4. Write a program in C to print all permutations of a given string using pointers.
5. Write a Program to store n students information using structure.
6. Write Program to implement Push, Pop and Traverse operation on STACK.
7. Write Program to convert infix notation to postfix notation.
8. Write Program to convert Infix notation to prefix notation.
9. Write a program to convert Prefix notation to postfix notation.
10. Write Program to perform the operation Insert, Delete and Display on Queue.
11. Write Program to implement Circular queue.
12. Write Program to implement Double ended queue.
13. Write Program to implement Priority queue.
14. Write a Program to search an element using Linear search.
15. Write a Program to sort given Array using Insertion sort technique.
16. Write a Program to sort given Array using Bubble sort technique.
17. Write a Program to sort given Array using Quick sort technique.
18. Write a Program to sort given Array using selection sort technique.
19. Write Program to implement Singly Linked List.
20. Write Program to implement Double Linked List.

**General instructions:**

**Implement all the programs using C Language**

**Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination**

- 1. 7 Marks ( Program 1 + Execution without error)**
- 2. 7 Marks ( Program 2 + Execution without error)**
- 3. Viva 6 Marks**
- 4. Journal 5 Marks**

**Total 25 marks**

**Note: Same Scheme may be used for IA( Formative Assessment) examination**

# BCA Semester – II

**Subject: Computer Applications  
Discipline Specific Course (DSC)**

The course DSCC 4 in II semester has two papers (Theory Paper –I for 04 credits & Practical paper-II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

**Course No.4 (Theory): Title of the Course (Theory) : DISCRETE MATHEMATICAL STRUCTURE**

Course No.	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
Course-04	DSCC	Theory	04	04	56 hrs	2hrs	40	60	100

### Course Outcome (CO):

After completion of course (Theory), students will be able to:

- CO 1** : Define basic concepts of preposition logic and proofs.
- CO 2** : Define sets, sequences, sum and summation.
- CO 3** : Solve problems using counting techniques.
- CO 4** : Solve problems using advance counting technique.
- CO 5** : Introduction to induction & recursion and writing algorithms using recursion.
- CO 6** : Studying the properties of relations.
- CO 7** : Describe the origin of graph theory, illustrate different types of graphs.
- CO 8** : Categorize trees.

Syllabus- Course 2(Theory): DISCRETE MATHEMATICAL STRUCTURE	Total Hrs: 56
<b>Unit-I</b>	<b>14 hrs</b>
<b>The Foundations:</b> Logic and proofs: Propositional Logic, Applications of Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy. <b>Basic Structures:</b> Sets, Functions, Sequences, Sums, and Matrices: Sets, Set operations, Functions, Sequences and Summations, matrices.	
<b>Unit-II</b>	<b>14 hrs</b>
<b>Counting: Basics</b> of counting, Pigeonhole principle, Permutation and Combination, Binomial Coefficient and Combinations, Generating Permutation and Combination. <b>Advanced Counting Techniques:</b> Applications of Recurrence Relations, Solving Linear Recurrence, Relations, Divide and Conquer Algorithms and Recurrence Relations, Generating functions , Inclusion-Exclusion , Applications of Inclusion-exclusion.	

<b>Unit-III</b>	<b>14 hrs</b>
<p><b>Induction and Recursion:</b> Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Corrections.</p> <p><b>Relation:</b> Properties of relation, Composition of relation, Closer operation on relation, Equivalence relation and partition. Operation on relation, Representing relation.</p>	
<b>Unit-IV</b>	<b>14 hrs</b>
<p><b>Graphs:</b> Graphs and Graph models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths , Shortest-Path Problems, Planar Graphs, Graph Coloring.</p> <p><b>Trees:</b> Introduction to Trees , Applications of Trees, Tree traversal , Spinning Trees, Minimum Spanning Trees.</p>	

Books recommended.

#### **Text Books**

1. Discrete Mathematics and Its Applications, Kenneth H. Rosen: Seventh Edition, 2012.

#### **References**

1. Discrete Mathematical Structure , Bernard Kolman, Robert C , Busby, Sharon Ross, 2003.
2. Graph Theory with Applications to Engg and Comp. Sci: Narsingh Deo-PHI 1986.
3. Discrete and Combinatorial Mathematics Ralph P. Grimaldi, B. V . Ramatta, Pearson, Education , 5 Edition.
4. Discrete Mathematical Structures, Trembley and Manobar.

## BCA Semester – II

**Subject: Computer Applications**  
**Discipline Specific Course (DSC)**

Course No.4 (Practical): Title of the Course (Practical) : **DMS Lab**

Course No.	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
Course-04	DSCC	Practical	02	04	52 hrs	3hrs	25	25	50

### Course Outcome (CO):

After completion of course (Practical), students will be able to:

**CO 1 : Design & implement quantification & arithmetic series.**

**CO 2 : Design & implement of sets by applying various operations.**

**CO 3 : Implement the recursion operation on Factorial, Fibonacci series, tower of Honai, Binary search & Merge sort.**

### List of the Experiments for 52 hrs / Semesters

1. Write program to implement universal quantification.
2. Write a program to find sum of arithmetic series.
3. Write a program to find sum of the first 10 terms of the sequence  $1/n^2$ .
4. Write a Program to find intersection of two sets.
5. Write a Program to find power set of a given set.
6. Write a Program to find Factorial of a number using recursion.
7. Write a Program to find Fibonacci series using recursion.
8. Write a Program to solve Tower of Hanoi problem using recursion.
9. Write a Program to search an element using Binary search technique.
10. Write a Program to sort given Array using Merge sort technique.
11. Write a Program to find the minimum and maximum number in a set of N number using Divide and Conquer method.
12. Write a Program to solve Travelling sales man problem.
13. Write a Program to find the shorted path from the specific vertex to all other vertices(Single Source shorted path)
14. Write Program to Create Binary tree.
15. Write Program to implement In-order, Pre-order and Post- order Traversing on Tree.



**General instructions:**

**Implement all the programs using C Language**

**Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination**

- 1. 7 Marks (Program 1 + Execution without error)**
- 2. 7 Marks (Program 2 + Execution without error)**
- 3. Viva 6 Marks**
- 4. Journal 5 Marks**

**Total 25 marks**

**Note: Same Scheme may be used for IA( Formative Assessment) examination**

## BCA Semester – II

### Subject: Computer Applications Open Elective Course (OEC-2)

(OEC for other Degree students and the students of BCA where exclusive BCA Programme working as single faculty)

#### OEC-2: Title of the Course : INTRODUCTION TO FINANCIAL ACCOUNTING USING TALLY

Course No.	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
OEC-2	OEC	Theory	03	03	42 hrs	2hrs	40	60	100

#### Course Outcome (CO):

After completion of course, students will be able to:

- CO 1** : To develop accounting ability of students.
- CO 2** : To teach the basics involved in creating book of account, ledgers, voucher system.
- CO 3** : To make better understanding of bank reconciliation statement and trail balance.
- CO 4** : To explore the basics of stock groups.
- CO 5** : To study the preparation of final accounts of trading, loss account and balance sheet.
- CO 6** : To make the better understanding of provisions of companies act.

Syllabus- OEC: Introduction to Financial Accounting using Tally	Total Hrs: 42
<b>Unit-I</b>	<b>14 hrs</b>
<b>Introduction:</b> Financial Accounting-definition and Scope, objectives of Financial Accounting, Accounting v/s Book Keeping Terms used in accounting, Users of accounting information and limitations of Financial Accounting. Accounting Concepts, Types of Accounts, Accounting Principles or concepts, mode of Accounting, Rules of Accounting, Double entry system of book keeping. Conceptual Frame work, Accounting Standards in India-concept, objectives, benefits Accounting Policies, Accounting as a measurement discipline, valuation Principles, accounting estimates.	
<b>Unit-II</b>	<b>14 hrs</b>
Recording of transactions Company Creation, Alter, Backup & Restore, Creating book of account, Group, subsidiary Group, Ledgers Voucher system; Accounting Process, Journals, Subsidiary Books, Ledger, Cash Book, Bank Reconciliation Statement, Trial Balance. Depreciation: Meaning, need & importance of depreciation, methods of charging depreciation.(WDV & SLM) Stock Groups : Multiple Stock Groups , Stock Categories , Multiple Stock Categories , Units of Measure, Godowns, Stock Items.	

<b>Unit-III</b>	<b>14 hrs</b>
Preparation of final accounts Preparation of Trading and Profit & Loss Account and Balance Sheet of sole proprietary business Introduction to Company Final Accounts: Important provisions of Companies Act, 1956 in respect of preparation of Final Accounts. Understanding of final accounts of a Company.	

Books recommended.

**Text Books**

1. Fundamentals of Accounting & Financial Analysis: By Anil Chowdhry (Pearson Education)
2. Mastering Tally ERP 9: Basic Accounts, Invoice, Inventory by Asok K. Nadhani(BPB Publication)

**References**

1. Financial accounting: By Jane Reimers (Pearson Education)
2. Accounting Made Easy By Rajesh Agarwal & R Srinivasan (Tata McGraw –Hill)

**Details of Formative assessment (IA) for DSCC theory/OEC: 40% weight age for total marks**

Type of Assessment	Weight age	Duration	Commencement
Written test-1	10%	1 hr	8 <sup>th</sup> Week
Written test-2	10%	1 hr	12 <sup>th</sup> Week
Seminar	10%	10 minutes	--
Case study / Assignment / Field work / Project work/ Activity	10%	-----	--
Total	40% of the maximum marks allotted for the paper		

**Faculty of Science  
04 - Year UG Honors programme:2021-22**

**GENERAL PATTERN OF THEORY QUESTION PAPER 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 : 10marks

**Part-B**

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

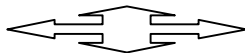
**Part-C**

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 sub questions for 7+3 or 6+4 or 5+5 if necessary)

**Total: 60 Marks**

**Note: Proportionate weight age shall be given to each unit based on number of hours prescribed.**





KARNATAK UNIVERSITY, DHARWAD  
ACADEMIC (S&T) SECTION  
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ  
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ



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No. KU/Aca(S&T)/SSL-394A/2022-23/1056

Date: 23 SEP 2022

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2022-23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸುಗಳಿಗೆ 3 ಮತ್ತು 4ನೇ ಸೆಮೆಸ್ಟರ್  
NEP-2020 ಮಾದರಿಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

- ಉಲ್ಲೇಖ: 1. ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿಗಳು(ವಿಶ್ವವಿದ್ಯಾಲಯ 1) ಉನ್ನತ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ  
ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 260 ಯುಎನ್ಇ 2019(ಭಾಗ-1), ದಿ:7.8.2021.  
2. ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ ನಿಖಾಯ ಸಭೆಯ ಠರಾವುಗಳ ದಿನಾಂಕ: 06.09.2022  
3. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂ. 01, ದಿನಾಂಕ: 17.09.2022  
4. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 22-09-2022

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2022-23ನೇ  
ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ, ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ ನಿಖಾಯದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸುಗಳ ರಾಷ್ಟ್ರೀಯ ಶಿಕ್ಷಣ ನೀತಿ  
(NEP)-2020 ರಂತೆ 3 ಮತ್ತು 4ನೇ ಸೆಮೆಸ್ಟರ್‌ಗಳಿಗಾಗಿ ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ  
ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಪ್ರಕಟಪಡಿಸಿದ್ದು, ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. [www.kud.ac.in](http://www.kud.ac.in) ಅಂತರ್ಜಾಲದಿಂದ ಡೌನ್‌ಲೋಡ  
ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತಾ, ವಿದ್ಯಾರ್ಥಿಗಳು ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ  
ಕಾರ್ಯಪ್ರವೃತ್ತಿಗಳು ಕವಿವಿ ಅಧೀನದ / ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಅಡಕ: ಮೇಲಿನಂತೆ

*Kud-2022/9/22*  
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. / ವಿದ್ಯಾಮಂಡಳ (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.



**KARNATAK UNIVERSITY, DHARWAD**

# **04 - Year BCA Program**

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## **SYLLABUS**

### **Bachelor of Computer Applications**

**With Effect from 2021-22**

**DISCIPLINE SPECIFIC CORE COURSE (DSCC) FOR SEM III & IV,**

**OPEN ELECTIVE COURSE (OEC) FOR SEM III & IV and**

**SKILL ENHANCEMENT COURSE (SEC) FOR SEM III**

**Corrected Title and distribution of Marks for  
SEC-II  
Semester-III**

**AS PER NE P - 2020**

**Karnatak University, Dharwad**  
**Four Years Under Graduate Program in BCA.(Hons.) as per NEP-2020**  
**With Effect from 2022-23**

Semester	Course	Course Code	Paper Code	Paper Title Theory/Practical	Credits	No. of Hrs/ Week Theory/ Practical	Total Hours	Duration of Exam in Hrs Theory/ Practical	Internal Assessment Marks Theory/ Practical	Marks for Final Exam Theory/ Practical	Total Marks
III	DSCC-09	BCA-3.1	053BCA011	Database Management Systems	4	4	52	2 hrs.	40	60	100
	DSCC-10	BCA-3.2	053BCA012	DBMS Lab	2	4	52	3 hrs.	25	25	50
	DSCC-11	BCA-3.3	053BCA013	Object Oriented Programming using JAVA	4	4	52	2 hrs.	40	60	100
	DSCC-12	BCA-3.4	053BCA014	JAVA Lab	2	4	52	3 hrs.	25	25	50
	OEC-3	BCA-3.6	003BCA051	Python Programming Concepts	3	3	52	2 hrs.	40	60	100
	SEC -2	BCA-3.7	053BCA061	Open Source Tools (SEC-Model 2)	2	1T + 2P	39	2 hrs.	25	25	50
IV	DSCC-13	BCA-4.1	054BCA011	Python Programming	4	4	52	2 hrs.	40	60	100
	DSCC-14	BCA-4.2	054BCA012	Python Programming Lab	2	4	52	3 hrs.	25	25	50
	DSCC-15	BCA-4.3	054BCA013	Computer Multi Media and Animation	4	4	52	2 hrs.	40	60	100
	DSCC-16	BCA-4.4	054BCA014	Computer Multi Media and Animation Lab	2	4	52	3 hrs.	25	25	50
	OEC-4	BCA-4.5	004BCA051	Electronic Commerce	3	3	52	2 hrs.	40	60	100

**Name of Course (Subject): Computer Science**

**Programme Specific Outcome (PSO):**

On completion of the 03/ 04 years Degree in Computer Science students will be able to:

**PSO 1** : Understand basic concepts involved in computing.

**PSO 2** : Apply the knowledge in computer techniques to solve real world problems.

**PSO 3** : Think of new approaches for solving problems in different domains.

**PSO 4** : Follow ethics in designing software with team members.

**PSO 5** : Develop research oriented skills

**PSO 6** : Understand good lab practices



# BCA Semester –III

## Discipline Specific Course (DSC)

The course DSCC in III semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

**Course No.3 (Theory): Database Management Systems (DBMS)**

**Course Code: 053BCA011**

Course No.	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
Course-03	DSCC-9	Theory	04	04	52 hrs.	2 hrs.	40	60	100

### Course Outcomes (COs):

**At the end of the course, students will be able to:**

- CO 1: Explain the various database concepts and the need for database systems.
- CO 2: Identify and define database objects, enforce integrity constraints on a database using DBMS.
- CO 3: Demonstrate a Data model and Schemas in RDBMS.
- CO 4: Identify entities and relationships and draw ER diagram for a given real-world problem.
- CO 5: Convert an ER diagram to a database schema and deduce it to the desired normal form.
- CO 6: Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.
- CO 7: Explain the transaction processing and concurrency control techniques.

### DSCC 5: Database Management System (DBMS)

Unit I	<b>Database Architecture:</b> Introduction to Database system applications. Characteristics and Purpose of database approach. People associated with Database system. Data models. Database schema. Database architecture. Data independence. Database languages, interfaces, and classification of DBMS.	13 hrs.
Unit II	<b>E-R Model:</b> Entity-Relationship modeling: E – R Model Concepts: Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute, and domain of an attribute. Relationships between the entities. Relationship types, roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E -R diagram.	13 hrs.

Unit III	<p><b>Relational Data Model:</b> Relational model concepts. Characteristics of relations. Relational model constraints: Domain constraints, key constraints, primary &amp; foreign key constraints, integrity constraints and null values. Relational Algebra: Basic Relational Algebra operations. Set theoretical operations on relations. JOIN operations Aggregate Functions and Grouping. Nested Sub Queries-Views. Introduction to PL/SQL &amp; programming of above operations in PL/SQL</p>	13 hrs.
Unit IV	<p><b>Data Normalization:</b> Anomalies in relational database design. Decomposition. Functional dependencies. Normalization. First normal form, Second normal form, Third normal form. Boyce-Codd normal form.</p> <p><b>Query Processing Transaction Management:</b> Introduction Transaction Processing. Single user &amp; multiuser systems. Transactions: read &amp; write operations. Need of concurrency control: The lost update problem, Dirty read problem. Types of failures. Transaction states. Desirable properties (ACID properties) of Transactions. Concurrency Control Techniques: Locks and Time stamp Ordering. Deadlock &amp; Starvation.</p>	13 hrs.

**References:**

1. Fundamentals of Database Systems, Ramez Elamassri, Shankant B. Navathe, 7th Edition, Pearson, 2015
2. An Introduction to Database Systems, Bipin Desai, Galgotia Publications, 2010.
3. Introduction to Database System, C J Date, Pearson, 1999.
4. Database Systems Concepts, Abraham Silberschatz, Henry Korth, S.Sudarshan, 6<sup>th</sup> Edition, McGraw Hill, 2010.
5. Database Management Systems, Raghurama Krishnan and Johannes Gehrke, 3<sup>rd</sup> Edition, McGraw Hill, 2002

# BCA Semester –III

## Discipline Specific Course (DSC)

### Course No.3 (Practical): Database Management Systems (DBMS) Lab

Course Code: 053BCA012

Course No.	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
Course-03	DSCC-10	Practical	02	04	52 hrs.	3 hrs.	25	25	50

### Course Outcomes (COs):

At the end of the course, (Practical), students will be able to:

**CO:** Student would be able to create a table, execute queries and PL/SQL programs.

#### Programs:

1. A) Create the following relation for the student:

**Student(regno:string,name:string,class:string,bdate:date,marks1:int,marks2:int,marks3:int)**

Create the above tables by properly specifying the primary keys & foreign keys.

- i. Enter at least five tuples of the above relation
- ii. Demonstrate the usage of following clauses for the above relation
  - a. Where
  - b. Order By
  - c. Having
  - d. GroupBy
- iii. Demonstrate the usage of following clauses for the above relation
  - a. Sum
  - b. Avg
  - c. Count
  - d. Like
  - e. Between
  - f. Max & Min
- iv. Demonstrate the rollback and commit command for the above relation

- B) Consider the following database that maintain information about employees & Departments.

**Employee(empid:int,ename:string,age:int,salary:int,#deptno:int)Department(deptno:int,dname:string,#manager-id:int)**

Create the above tables by properly specifying the primary keys & foreign keys.

- i. Enter at least 5 tuples for each relation.
  - ii. Display emp-id & emp name whose salary lies between 10,000 and 50,000.
  - iii. List emp name & salary for all the employee working for CS Dept.
  - iv. Display emp name & dept name for all the manager
- Write PL/SQL program to insert a new row (INSERT INTO command).

2. Consider the following schema for Order Database:

**SALESMAN(Salesman\_id,Name,City,Commission)CUSTOMER(Customer\_id,Cust\_Name, City, Grade, Salesman\_id)**

**ORDERS(Ord\_No, Purchase\_Amt, Ord\_Date, #Customer\_id, Salesman\_id)**

Create the above tables by properly specifying the primary keys & foreign keys. Enter at least five tables for each relation.

### Write SQL queries to

- i. Count the customers with grades above Bangalore's average.
- ii. Find the name and numbers of all salesmen who had more than one customer.
- iii. List all salesmen and indicate those who have and don't have customers in their cities (Use UNION operation.)
- iv. Create a view that finds the sales man who has the customer with the highest order of a day.
- v. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.

Write PL/SQL program to demonstrate %ROWCOUNT attribute.

3. Consider the Insurances database given below. The primary keys are underlined and the data types are specified.

**PERSON**(**D#**:string, name:string, address:string) **CAR** (**Regno**: string, model:string,year:int) **ACCIDENT**(**report-number**: int, date:date, location:string)  
**OWNS**(#driver-id:string, #Regno: string) **PARTICIPATED** (#driver-id:string, #Regno:string, #report-number: int, Damage amount:int)

Create the above tables by properly specifying the primary keys and the foreign keys.  
Enter at least five tuples for each relation.

### Write SQL queries to

- i. Demonstrate how you
  - a. Update the damage amount for the car with a specific Reg. no in the accident with report number 12 to 25000.
  - b. Add a new accident to the database.
- ii. Find the total number of people who owned cars that were involved in accident sin 2002.
- iii. Find the total number of accidents in which cars belonging to a specific model were involved.

Write PL/SQL program demonstrate exception handling for the above query v.

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4. The following tables are maintained by a book dealer.

**AUTHOR**(**author-id**:int,name:string,city:string,country:string)**PUBLISHER**(**publisher-id**:int,name:string,city:string,country:string)**CATALOG**(**book-id**:int,title:string,author-id#:int,publisher-id#:int,category-id#:int,year:int,price:int)  
**CATEGORY**(**category-id**:int, description: string)  
**ORDER-DETAILS**(**order-no**:int, #book-id:int, quantity:int)

Create the above tables by properly specifying the primary keys and the foreign keys.  
Enter at least five tuples for each relation.

### Write SQL queries to

- i. Give the details of the authors who have 2or more books in the catalog and the price of the books is greater than the average price of the books in the catalog.

- ii. Find the author of the book, which has maximum sales.
- iii. Demonstrate how you increase the price of books published by a specific publisher by 10%.

Write PL/SQL program illustrates how to create and call a function.

5. Consider the following database of student enrolment in courses and books adopted each course.

**STUDENT**(regno: string, name:string, major: string, bdate: date)

**COURSE** (course: int, cname: string, dept: string)

**ENROLL** (#regno: string, course#:int, sem: int marks:int)

**TEXT**(book-ISBN: int,book-title: string, publisher: string, author:string) **BOOK\_ADOPTION**  
(course#:int, sem:int, book-ISBN#:int)

Create the above tables by properly specifying the primary keys and the foreign Keys

Enter at least five tuples for each relation.

### Write SQL queries to

- i. Demonstrate how you add a textbook to the database and make this book be adapted by some department.
- ii. Produce list of textbooks (include Course#, Book-ISBN, Book-title) in the alphabetical order for courses offered by the CS department that use more than two books.
- iii. List any department that has its adopted books published by a specific publisher.

Write PL/SQL program to demonstrate user defined exception handling.

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6. Consider the following database for library management system

**BOOK**(Book\_id,Title,Publisher\_Name,Pub\_Year)**BOOK\_AUTHORS**(#Book\_id,Author\_Name)  
**PUBLISHER**(Name,Address,Phone)

**BOOK\_COPIES**(#Book\_id,#Branch\_id,No-

of\_Copies)**BOOK\_LENDING**(#Book\_id,#Branch\_id,Card\_No,Date\_Out,Due\_Date)

**LIBRARY\_BRANCH**(Branch\_id,Branch\_Name,Address)

Create the above tables by properly specifying the primary keys and the foreign Keys

Enter at least five tuples for each relation.

### Write SQL queries to

- i. Retrieve details of all books in the library—id, title, name of publisher, authors, number of copies in each branch, etc.
- ii. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun2017
- iii. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.
- iv. Create a view of all books and its number of copies that a recurrently available in the Library.

Write PL/SQL program to demonstrate implicit **cursor**.

7. Consider the schema for Company Database:

**EMPLOYEE**(SSN,Name,Address,Sex,Salary,#SuperSSN,DNo)**DEPARTMENT**(

DNo, DName, MgrSSN, MgrStartDate) **DLOCATION**(#DNo, DLoc)

**PROJECT** (PNo, PName, PLocation, #DNo)**WORKS\_ON**(#SSN, #PNo, Hours)

**Create the above tables by properly specifying the primary keys and the foreign Keys  
Enter at least five tuples for each relation.**

**Write SQL queries to**

- i. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.
- ii. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.
- iii. Find the sum of the salaries of all employees of the 'Accounts' department,  
**as well as the maximum salary, the minimum salary, and the average salary in this department.**
- iv. Create a view with columns dept name and dept location. Display name of dept located in 'Dharwad' on this view.

Write PL/SQL program to demonstrate explicit cursor.

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Note: Draw E R diagram and Schema diagram for each database application.

**Evaluation Scheme for Lab Examination:**

**General instructions:**

**Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination**

- 1. 7 Marks ( Program 1 + Execution without error)**
- 2. 7 Marks ( Program 2 + Execution without error)**
- 3. Viva 6 Marks**
- 4. Journal 5 Marks**

**Total 25 marks**

**Note: Same Scheme may be used for IA ( Formative Assessment) examination**

# BCA Semester –III

## Discipline Specific Course (DSC)

The course DSCC in III semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

### Course No.3 (Theory): Object Oriented Programming using JAVA

Course Code: 053BCA013

Course No.	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
Course-03	DSCC-11	Theory	04	04	52 hrs	2 hrs.	40	60	100

### Course Outcomes (COs):

At the end of the course,(Theory) students will be able to:

- CO 1: Explain the object-oriented concepts using JAVA.
- CO 2: Write JAVA programs using OOP concepts like Abstraction, Encapsulation,
- CO 3: Inheritance and Polymorphism.
- CO 4: Implement Classes and multithreading using JAVA.
- CO 5: Demonstrate the basic principles of creating Java applications with GUI.

### DSC2: Object Oriented Programming using JAVA

Unit I	<b>Introduction to Java:</b> Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java. <b>Objects and Classes:</b> Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference.	13 hrs.
Unit II	<b>Inheritance and Polymorphism:</b> Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.	13 hrs.
Unit III	<b>Event and GUI programming:</b> Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing, Exceptional handling mechanism.	13 hrs.

Unit IV	<b>I/O programming:</b> Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. Multithreading in java: Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try catch-finally, Collections in java, Introduction to JavaBeans and Network Programming	13 hrs.
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**References:**

1. Programming with Java, By E Balagurusamy – A Primer, 4<sup>th</sup> Edition, McGraw Hill Publication.
2. [Core Java Volume I – Fundamentals](#), By Cay S. Horstmann, Prentice Hall.
3. Object Oriented Programming with Java: Somashekara M.T., Guru, D.S., Manjunatha K.S, 1<sup>st</sup> Edition, PHI Learning 2017.
4. Java 2 - The Complete Reference, Herbert Schildt, 5<sup>th</sup> Edition, McGraw Hill Publication, 2017.
5. Java - The Complete Reference, Herbert Schildt, 7<sup>th</sup> Edition, McGraw Hill Publication, 2017.



# BCA Semester –III

## Discipline Specific Course (DSC)

### Course No.3 (Practical): JAVA Lab

Course Code: 053BCA014

Course No.	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
Course-03	DSCC-12	Practical	02	04	52 hrs.	3 hrs.	25	25	50

### Course Outcomes (COs):

#### Operators, Decision making and Loops:

1. Write a Java program to read the radius of a circle and to find the area and circumference.
2. Write a program to demonstrate String Operators
3. Write a Java program to find N prime numbers reading N as command line argument.
4. Write a program to find factorial of N numbers reading N as command line argument.
5. Write a program to read N numbers and sort them using one-dimensional arrays.

#### Classes and Methods:

6. Write a Java program to illustrate Method Overloading.
7. Write a Java program to illustrate Operator Overloading.
8. Write a program to demonstrate Single Inheritance.
9. Write a program to illustrate Constructor Overloading
10. Write a program to illustrate Method Overriding

#### Packages, Threads and Exception Handling:

11. Write a Java program demonstrating Multithreading.
12. Write a Java program demonstrating Exception Handling.
13. Write a Java program to demonstrate user defined package program.

#### Java Applet Programming

14. Write an Applet program to display Geometrical Figures using objects.
15. Write an Applet program which illustrate Scroll bar object.
16. Write an Applet program to change the background color randomly.
17. Write an Applet program to change the color of applet using combo box.
18. Write an Applet program to implement Digital Clock using thread.

#### Event Handling:

19. Write an Applet program to implement Mouse events.
20. Write an Applet program to implement Keyboard events.

**Evaluation Scheme for Lab Examination:**

**General instructions:**

**Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination**

1. 7 Marks ( Program 1 + Execution without error)
2. 7 Marks ( Program 2 + Execution without error)
3. Viva 6 Marks
4. Journal 5 Marks

**Total 25 marks**

**Note: Same Scheme may be used for IA (Formative Assessment) examination**

**BCA Semester – III**  
**Open Elective Course (OEC-3)**  
**(OEC for other students)**

**OEC-3: Title of the Course: Python Programming Concepts**  
**Course Code: 003BCA051**

Course No.	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
OEC-3	OEC-3	Theory	03	03	52 hrs	2 hrs	40	60	100

**Course Outcomes (COs):**

- CO 1: Explain the fundamentals of Computers.  
 CO 2: Explain the basic concepts of Python Programming.  
 CO 3: Demonstrate proficiency in the handling of loops and the creation of functions.  
 CO 4: Identify the methods to create and store strings.

<b>Unit I</b>	<p><b>Fundamentals of Computers:</b>            Introduction to Computers - Computer Definition, Characteristics of Computers, Evolution and History of Computers, Types of Computers, Basic Organization of a Digital Computer; Number Systems – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level &amp; High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples.</p>	<b>13 hrs.</b>
<b>Unit II</b>	<p><b>Python Basics:</b> Introduction to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode and Python IDEs; Simple Python Program. Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples; Illustrative programs.</p>	<b>13 hrs.</b>
<b>Unit III</b>	<p><b>Python Control Flow:</b> Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range() and exit () functions; Illustrative programs.</p>	<b>13 hrs.</b>

<b>Unit IV</b>	<p><b>Python Functions Strings:</b> Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Illustrative programs.</p> <p>Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods; Illustrative programs.</p>	<b>13 hrs.</b>
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### References

1. Computer Fundamentals (BPB), P. K. Sinha & Priti Sinha
2. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition, Green Tea Press. Freely available online 2015.  
@<https://www.greenteapress.com/thinkpython/thinkCSPy.pdf>
3. Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019.
4. <http://www.ibiblio.org/g2swap/byteofpython/read/>
5. [http://scipy-lectures.org/intro/language/python\\_language.html](http://scipy-lectures.org/intro/language/python_language.html)
6. <https://docs.python.org/3/tutorial/index.html>

**BCA Semester – III**  
**Skill Enhancement Course (SEC-2)**

**SEC-2: Title of the Course: Open Source Tools**  
**Course Code: 053BCA061**

Course No.	Type of Course	Mode of Exam	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
SEC	SEC-2	Practical	02	1T +2P	30 hrs	2 hrs	25	25	50

**Course Outcomes (COs):**

- CO 1: Recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves
- CO 2: Use appropriate open source tools based on the nature of the problem
- CO 3: Write code and compile different open-source software.

**Course Content (Open Source Tools)**

Module	Details of topic	Duration
<b>Module 1: Open Source Softwares</b>	<ul style="list-style-type: none"> <li>i. Introduction to Open sources, Need of Open Sources, Open Source –Principles, Standard Requirements, Advantages of Open Sources –</li> <li>ii. Free Software – FOSS</li> <li>iii. Licenses – GPL, LGPL, Copyrights, Patents, Contracts &amp; Licenses and Related Issues</li> <li>iv. Application of Open Sources. Open Source Operating Systems : FEDORA, UBUNTU</li> </ul>	05 hours
<b>Module 2: Programming Tools And Techniques</b>	<ul style="list-style-type: none"> <li>i. Usage of design Tools like Argo UML or equivalent</li> <li>ii. Version Control Systems like Git or equivalent</li> <li>iii. Bug Tracking Systems (Trac, BugZilla)</li> <li>iv. Boot Strap</li> </ul>	04 hours
<b>Module 3: Case Studies</b>	<ul style="list-style-type: none"> <li>i. Apache</li> <li>ii. Berkeley Software Distribution</li> <li>iii. Mozilla (Firefox)</li> <li>iv. Wikipedia</li> <li>v. Joomla</li> <li>vi. GNU Compiler Collection</li> <li>vii. Libre Office</li> </ul>	04 hours

**SEC-2 Lab Programs : 30Hrs.**

1. Demonstrate Basic File Commands In Ubuntu.
2. Demonstrate Basic Networking Commands in Ubuntu.
3. How to check for a File Existence in the file System using Ubuntu.
4. Demonstrate the Vi Editor & its Mods in Ubuntu.

5. Installation and Configuration of Apache server in Ubuntu.
6. Demonstrate the usage of Design Tool Argo UML.
7. Install Git on Ubuntu and write the each steps of installation
8. Demonstrate how to track Bugs using Bugzilla
9. Demonstrate how to track Bugs using trac.
10. Create your college website using Boot Strap Components
11. Write the steps to Create Wikipedia Account and create a Wikipedia Page for Yourself/Organization/ Biography
12. Demonstrate setting updatation of Mozilla Firefox
13. Build a Website With Joomla 4
14. Demonstrate how to use the libre office.
  - a) Writer (Word processing)
  - b) Calc (spreadsheets)
  - c) Impress (presentations),
  - d) Draw (vector graphics and flowcharts),
  - e) Base (databases),
  - f) Math (formula editing).
15. Write the steps to install GNU Compiler to Ubuntu.

**Text Book:**

1. KailashVadera, Bhavyesh Gandhi, “Open Source Technology”, Laxmi Publications Pvt. Ltd 2012, 1<sup>st</sup> Edition.

**Reference Book:**

1. Fadi P. Deek and James A. M. McHugh, “Open Source: Technology and Policy”, Cambridge Universities Press 2007.

**Implement Laboratory activities as specified tools in the SEC-2.**

**Scheme of Practical Examination (distribution of marks): 25 marks for the Semester end examination**

1. 7 Marks (Writing Activity 1 + Execution without error)
  2. 7 Marks (Writing Activity 2 + Execution without error)
  3. Viva 6 marks
  4. Journal 5 Marks
- Total 25 Marks**

**Note: Same scheme may be used for IA (Formative Assessment) examination.**

# BCA Semester –IV

## Discipline Specific Course (DSC)

The course DSCC in IV semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

### Course No.4 (Theory): Python Programming

Course Code: 054BCA011

Course No.	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
Course-04	DSCC-13	Theory	04	04	52 hrs	2 hrs.	40	60	100

### Course Outcomes (COs):

**At the end of the course, students will be able to:**

- CO 1: Explain the basic concepts of Python Programming.
- CO 2: Demonstrate proficiency in the handling of loops and creation of functions.
- CO 3: Identify the methods to create and manipulate lists, tuples and dictionaries.
- CO 4: Discover the commonly used operations involving file handling.
- CO 5: Interpret the concepts of Object-Oriented Programming as used in Python.
- CO 6: Develop the emerging applications of relevant fields using Python.

### DSC10: Python Programming

Unit I	<p><b>Introduction</b> to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode and Python IDEs; Simple Python Program.</p> <p><b>Python Basics:</b> Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples.</p> <p>Python Control Flow: Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range () and exit () functions.</p>	13 hrs.
Unit II	<p><b>Exception Handling:</b> Types of Errors; Exceptions; Exception Handling using try, except and finally.</p> <p><b>Python Functions:</b> Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Recursive Functions; Scope and Lifetime of Variables in Functions.</p> <p><b>Strings:</b> Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods.</p>	13 hrs.

Unit III	<p><b>Lists:</b> Creating Lists; Operations on Lists; Built-in Functions on Lists; Implementation of Stacks and Queues using Lists; Nested Lists.</p> <p><b>Dictionaries:</b> Creating Dictionaries; Operations on Dictionaries; Built-in Functions on Dictionaries; Dictionary Methods; Populating and Traversing Dictionaries.</p> <p><b>Tuples and Sets:</b> Creating Tuples; Operations on Tuples; Built-in Functions on Tuples; Tuple Methods; Creating Sets; Operations on Sets; Built-in Functions on Sets; Set Methods.</p> <p><b>File Handling:</b> File Types; Operations on Files– Create, Open, Read, Write, Close Files; File Names and Paths; Format Operator.</p> <p><b>Object Oriented Programming:</b> Classes and Objects; Creating Classes and Objects; Constructor Method; Classes with Multiple Objects; Objects as Arguments; Objects as Return Values; Inheritance- Single and Multiple Inheritance, Multilevel and Multipath Inheritance; Encapsulation- Definition, Private Instance Variables; Polymorphism- Definition, Operator Overloading.</p>	13 hrs.
Unit IV	<p><b>GU Interface:</b> The tkinter Module; Window and Widgets; Layout Management- pack, grid and place.</p> <p><b>Python SQLite:</b> The SQLite3 module; SQLite Methods- connect, cursor, execute, close; Connect to Database; Create Table; Operations on Tables- Insert, Select, Update. Delete and Drop Records.</p> <p><b>Data Analysis:</b> NumPy- Introduction to NumPy, Array Creation using NumPy, Operations on Arrays; Pandas- Introduction to Pandas, Series and DataFrames, Creating DataFrames from Excel Sheet and .csv file, Dictionary and Tuples. Operations on DataFrames.</p> <p><b>Data Visualisation:</b> Introduction to Data Visualisation; Matplotlib Library; Different Types of Charts using Pyplot- Line chart, Bar chart and Histogram and Pie chart.</p>	13 hrs.
<p><b>References:</b></p> <ol style="list-style-type: none"> <li>1. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2<sup>nd</sup> Edition, Green Tea Press. Freely available online @ <a href="https://www.greenteapress.com/thinkpython/thinkCSpy.pdf">https://www.greenteapress.com/thinkpython/thinkCSpy.pdf</a>, 2015.</li> <li>2. Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019.</li> <li>3. Python Data Analytics: Data Analysis and Science Using Pandas, matplotlib, and the Python Programming Language, Fabio Nelli, Apress®, 2015</li> <li>4. Advance Core Python Programming, Meenu Kohli, BPB Publications, 2021.</li> <li>5. Core PYTHON Applications Programming, Wesley J. Chun, 3<sup>rd</sup> Edition, Prentice Hall, 2012.</li> <li>6. Automate the Boring Stuff, Al Sweigart, No Starch Press, Inc, 2015.</li> <li>7. Data Structures and Program Design Using Python, D Malhotra et al., Mercury Learning and Information LLC, 2021.</li> <li>8. <a href="http://www.ibiblio.org/g2swap/byteofpython/read/">http://www.ibiblio.org/g2swap/byteofpython/read/</a></li> <li>9. <a href="https://docs.python.org/3/tutorial/index.html">https://docs.python.org/3/tutorial/index.html</a></li> </ol>		



**BCA Semester –IV**  
**Discipline Specific Course (DSC)**

**Course No.4 (Practical): Python Programming Lab**  
**Course Code: 054BCA012**

Course No.	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
Course-04	DSCC-14	Practical	02	04	52 hrs.	3 hrs.	25	25	50

**Programs for Practical Component:**

**Part-A**

1. Check if a number belongs to the Fibonacci Sequence
2. Solve Quadratic Equations
3. Find the sum of n natural numbers
4. Display Multiplication Tables
5. Check if a given number is a Prime Number or not
6. Implement a sequential search
7. Create a calculator program
8. Explore string functions
9. Implement Selection Sort
10. Implement Stack
11. Read and write into a file

**Part-B**

1. Demonstrate usage of basic regular expression
2. Demonstrate use of advanced regular expressions for data validation.
3. Demonstrate use of List
4. Demonstrate use of Dictionaries
5. Create SQLite Database and Perform Operations on Tables
6. Create a GUI using Tkinter module
7. Demonstrate Exceptions in Python
8. Drawing Line chart and Bar chart using Matplotlib
9. Drawing Histogram and Pie chart using Matplotlib
10. Create Array using Num Py and Perform Operations on Array
11. Create Data Frame from Excel sheet using Pandas and Perform Operations on Data Frames

**Evaluation Scheme for Lab Examination:**

**General instructions:**

**Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination**

1. 7 Marks ( Program 1 + Execution without error)
2. 7 Marks ( Program 2 + Execution without error)
3. Viva 6 Marks
4. Journal 5 Marks

**Total 25 marks**

**Note: Same Scheme may be used for IA (Formative Assessment) examination**

## BCA Semester –IV

### Discipline Specific Course (DSC)

The course DSCC in IV semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

#### Course No.4 (Theory): Computer Multimedia and Animation

Subject Code: 054BCA013

Course No.	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
Course-04	DSCC-15	Theory	04	04	52 hrs	2 hrs.	40	60	100

#### Course Outcomes (COs):

At the end of the course, students will be able to:

- CO 1: Write a well-designed, interactive Web site with respect to current standards and practices.
- CO 2: Demonstrate in-depth knowledge of an industry-standard multimedia development tool and its associated scripting language.
- CO 3: Determine the appropriate use of interactive versus standalone Web applications.

#### DSC15: Computer Multimedia & Animation

Unit I	Web Design: Origins and evolution of HTML, Basic syntax, Basic text markup, Images, Lists, Tables, Forms, Frame, Overview and features of HTML5. CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The <span> and <div> tags; Overview and features of CSS3. JavaScript: Object orientation and JavaScript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input.	13 hrs.
Unit II	Animation: Introduction to Animation. The Start and End States, Interpolation, Animations in HTML. All About CSS Animations, Creating a Simple Animation, Detailed Look at the CSS Animation Property, Key frames, Declaring Multiple Animations, Wrap-up. All About CSS Transitions, Adding a Transition, Looking at Transitions in Detail, The Longhand Properties, Longhand Properties vs. Shorthand Properties, Working with Multiple Transitions.	13 hrs.
Unit III	HTML5 – SVG: Viewing SVG Files, Embedding SVG in HTML5, HTML5 – SVG Circle, HTML5 – SVG Rectangle, HTML5 – SVG Line, HTML5 – SVG Ellipse, HTML5 – SVG Polygon, HTML5 – SVG Polyline, HTML5 – SVG Gradients, HTML5 – SVG Star.	13 hrs.

Unit IV	HTML5 – CANVAS: The Rendering Context, Browser Support, HTML5 Canvas Examples, Canvas - Drawing Rectangles, Canvas - Drawing Paths, Canvas - Drawing Lines, Canvas - Drawing Bezier Curves, Canvas - Drawing Quadratic Curves, Canvas - Using Images, Canvas - Create Gradients, HTML5 - Styles and Colors, Canvas - Text and Fonts, Canvas - Pattern and Shadow, Canvas - Save and Restore States, Canvas - Translation, Canvas - Rotation, Canvas - Scaling, Canvas - Transforms, HTML5 Canvas - Composition, Canvas – Animations.	13 hrs.
<p style="text-align: center;"><b>References:</b></p> <ol style="list-style-type: none"> <li>1. The Complete Reference HTML and CSS, 5<sup>th</sup> Edition, Thomas A Powell, 2017.</li> <li>2. Animation in HTML, CSS, and JavaScript, Kirupa Chinnathambi, 1<sup>st</sup> Edition, Createspace Independent Pub, 2013.</li> <li>3. <a href="https://www.w3.org/Style/CSS/current-work#CSS3">https://www.w3.org/Style/CSS/current-work#CSS3</a></li> <li>4. <a href="http://bedford-computing.co.uk/learning/cascading-style-sheets-css/">http://bedford-computing.co.uk/learning/cascading-style-sheets-css/</a></li> </ol>		

## BCA Semester –IV

### Discipline Specific Course (DSC)

**Course No.4 (Practical): Computer Multimedia and Animation**

**Subject Code: 054BCA014**

Course No.	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
Course-04	DSCC-16	Practical	02	04	52 hrs.	3 hrs.	25	25	50

#### Course Outcome (CO):

After completion of course (Practical), students will be able to:

**CO: Students will learn HTML/DHTML, CSS, SVG, Canvas and JavaScript programming codes.**

#### List of the Experiments for 52 hrs / Semesters

##### HTML Programs

1. Print the numbers 1 - 10, each number being a different color.
2. Use table tag to format web page. Also create the Time Table of your class using table tag.
3. Print a paragraph that is a description of a book, include the title of the book as well as its author. Names and titles should be underlined, adjectives should be italicized and bolded.
4. Print the squares of the numbers 1 - 20. Each number should be on a separate line, next to it the number 2 superscripted, an equal sign and the result. (Example:  $10^2= 100$ )
5. Create links to five different pages on five different websites that should all open in a new window.

##### CSS Programs

6. Setting a background image for a page and setting text, background color Using CSS
7. Setting the font type of text Setting the font size of text Setting the font color of text Setting the font style of text Using CSS
8. Create a webpage with two images which alternately changes on mouse over using CSS.

##### Java Script

9. Write a JavaScript program to display the current day and time
10. Write a JavaScript program to convert temperatures to and from Celsius, Fahrenheit.

### **HTML5-SVG**

11. Write a program to create a Line and Rectangle using.
12. Write a program to create a polygon, polyline.
13. Write a program to create a star .

### **HTML5-Canvas**

14. Write a program to create a Line and Rectangle
15. Write a program to create Bezier Curves
16. Write a program to create Draw Linear Gradient
17. Write a program to rectangle translation .
18. Write a program to rectangle rotation .
19. Write a program to rectangle scaling using canvas.

### **Canvas-Animation**

20. Write a program to rotate a small image repeatedly.

## **Evaluation Scheme for Lab Examination:**

### **General instructions:**

### **Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination**

1. 7 Marks ( Program 1 + Execution without error)
2. 7 Marks ( Program 2 + Execution without error)
3. Viva 6 Marks
4. Journal 5 Marks

**Total 25 marks**

**Note: Same Scheme may be used for IA (Formative Assessment) examination**

**BCA Semester – IV**  
**Open Elective Course (OEC-4)**  
**(OEC for other students)**

**OEC-4: Title of the Course: ELECTRONIC COMMERCE**  
**Subject Code: 004BCA051**

Course No.	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
OEC-4	OEC-4	Theory	03	03	52 hrs	2hrs	40	60	100

**Course Outcomes (COs):**

- CO 1: Compare how internet and other information technologies support business processes.
- CO 2: Demonstrate an overall perspective of the importance of application of internet technologies in business administration
- CO 3: Explain the basic business management concepts.
- CO 4: Demonstrate the basic technical concepts relating to E-Commerce.
- CO 5: Identify the security issues, threats and challenges of E-Commerce.

<b>UNIT I</b>	<b>Introduction to E-Commerce and Technology Infrastructure:</b> Working of Web - HTML Markup for Structure - Creating simple page - Marking up text - Adding Links - Adding Images - Table Markup - Forms - HTML5	<b>13 Hrs</b>
<b>UNIT II</b>	<b>Building an E-Commerce Website, Mobile Site and Apps:</b> Systematic approach to build an E-Commerce: Planning, System Analysis, System Design, Building the system, Testing the system, Implementation and Maintenance, Optimize Web Performance – Choosing hardware and software – Other E-Commerce Site tools – Developing a Mobile Website and Mobile App	<b>13 Hrs</b>
<b>UNIT III</b>	<b>E-Commerce Security and Payment Systems:</b> E-Commerce Security Environment – Security threats in E-Commerce – Technology Solutions: Encryption, Securing Channels of Communication, Protecting Networks, Protecting Servers and Clients – Management Policies, Business Procedure and Public Laws - Payment Systems	<b>13 Hrs</b>

<b>UNIT IV</b>	<p><b>Business Concepts in E-Commerce:</b> Digital Commerce Marketing and Advertising strategies and tools – Internet Marketing Technologies – Social Marketing – Mobile Marketing – Location based Marketing – Ethical, Social, Political Issues in E-Commerce</p> <p><b>Project Case Study:</b> Case Study: Identify Key components, strategy, B2B, B2C Models of E-commerce Business model of any e-commerce website - Mini Project : Develop E-Commerce project in any one of Platforms like Woo-Commerce, Magento or Opencart</p>	<b>13 Hrs</b>
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**Text Book:**

1. Kenneth C. Laudon, Carol Guercio Traver - E-Commerce, Pearson, 10th Edition, 2016

**References:**

1. <http://docs.opencart.com/>
2. <http://devdocs.magento.com/>
3. <http://doc.prestashop.com/display/PS15/Developer+tutorials>
4. Robbert Ravensbergen, —Building E-Commerce Solutions with Woo Commerce, PACKT, 2nd Edition

**Details of Formative assessment (IA) for DSCC theory/OEC: 40% weight age for total marks**

Type of Assessment	Weight age	Duration	Commencement
Written test-1	10%	1 hr	8 <sup>th</sup> Week
Written test-2	10%	1 hr	12 <sup>th</sup> Week
Seminar	10%	10 minutes	--
Case study / Assignment / Field work / Project work/ Activity	10%	-----	--
Total	40% of the maximum marks allotted for the paper		

**Faculty of Science  
04 - Year UG Honors programme: 2022-23**

**GENERAL PATTERN OF THEORY QUESTION PAPER 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 : 10marks

**Part-B**

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

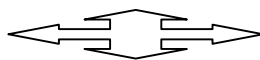
**Part-C**

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 sub questions for 7+3 or 6+4 or 5+5 if necessary)

**Total: 60 Marks**

**Note: Proportionate weight age shall be given to each unit based on number of hours prescribed.**







KARNATAK UNIVERSITY, DHARWAD  
ACADEMIC (S&T) SECTION

ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ  
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ



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'A' Grade 2014

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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](http://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
<b>Total</b>								<b>275</b>	<b>375</b>	<b>650</b>	<b>24</b>
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
<b>Total</b>								<b>335</b>	<b>265</b>	<b>600</b>	<b>24</b>

# 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
<b>DSCC-9</b>	<b>Theory</b>	<b>04</b>	<b>04</b>	<b>56hrs.</b>	<b>2hrs.</b>	<b>40</b>	<b>60</b>	<b>100</b>

### 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	<b>Introduction:</b> 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. <b>Asymptotic Notations</b> and Basic Efficiency classes, Informal Introduction, O notation, $\Omega$ -notation, $\theta$ -notation, mathematical analysis of non-recursive algorithms, mathematical analysis of recursive algorithms.	14
Unit II	<b>Brute Force &amp; Exhaustive Search:</b> 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	<b>Decrease-and-Conquer:</b> Introduction, Insertion Sort, Topological Sorting. <b>Divide-and-Conquer:</b> Introduction, Merge Sort, Quick Sort, Binary Search, Binary Tree traversals and related properties.	14
Unit IV	<b>Greedy Technique:</b> 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: 2<sup>nd</sup> 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,3<sup>rd</sup>Edition,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>

<b>Formative Assessment for Theory</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Internal AssessmentTest1	10
Internal AssessmentTest2	10
Quiz/Assignment/Small Project	10
Seminar	10
<b>Total</b>	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
<b>DSCC-10</b>	<b>Practical</b>	<b>02</b>	<b>04</b>	<b>56hrs.</b>	<b>3hrs.</b>	<b>25</b>	<b>25</b>	<b>50</b>

**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 Nqueens.	
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:

<b>Formative Assessment for Practical</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Writing Program 1 + Execution without error	10
Writing Program 2 + Execution without error	10
Viva	03
Journal	02
<b>Total</b>	<b>25</b>
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
<b>DSCC-11</b>	<b>Theory</b>	<b>04</b>	<b>04</b>	<b>56hrs</b>	<b>2hrs.</b>	<b>40</b>	<b>60</b>	<b>100</b>

**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	<b>Introduction</b> 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	<b>Statistics and Probability</b> , 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	<b>Statistical testing and modelling</b> , 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>



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

<b>Formative Assessment for Practical</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Writing Program 1 + Execution without error	10
Writing Program 2 + Execution without error	10
Viva	03
Journal	02
<b>Total</b>	<b>25</b>
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
<b>DSCC-13</b>	<b>Theory</b>	<b>04</b>	<b>04</b>	<b>56hrs.</b>	<b>2hrs.</b>	<b>40</b>	<b>60</b>	<b>100</b>

**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	<b>Overview:</b> Introduction; Software engineering ethics; Software process models; Process activities; Coping with change; Agile software development: Agile methods; Plan-driven and agile development. <b>Requirements Engineering:</b> 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	<b>System Modeling:</b> 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	<b>Architectural Design:</b> Architectural design decisions; Architectural views; Architectural patterns- Layered architecture, Repository architecture, Client-server architecture Pipe and filter architecture. <b>Design and Implementation:</b> 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	<b>Software Testing:</b> 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.

<b>Formative Assessment for Theory</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Internal Assessment Test1	10
Internal Assessment Test2	10
Quiz/Assignment/Small Project	10
Seminar	10
<b>Total</b>	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><b>Introduction:</b> 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><b>Cloud Architecture:</b> 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><b>Cloud Application Programming and the Aneka Platform:</b> 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><b>Cloud Platforms in Industry:</b> 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><b>Cloud Applications:</b> 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

<b>Formative Assessment for Theory</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Internal AssessmentTest1	10
Internal AssessmentTest2	10
Quiz/Assignment/Small Project	10
Seminar	10
<b>Total</b>	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", 10<sup>th</sup> 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>



<b>Formative Assessment for Theory</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Internal Assessment Test1	10
Internal Assessment Test2	10
Quiz/Assignment/Small Project	10
Seminar	10
<b>Total</b>	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 1<sup>st</sup> Edition by Deane Barker.
2. Content Management Bible (2<sup>nd</sup> Edition) 2<sup>nd</sup> 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 2<sup>nd</sup> Edition by Ron Severdia
5. [https://onlinecourses.swayam2.ac.in/cec20\\_lb09/preview](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
<b>Total</b>	<b>40</b>
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><b>Introduction – Cybersecurity:</b> Definition, Types of Cyber Attacks, Defence Strategies and Techniques, Guiding Principles, Cryptography; Mathematical Background for Cryptography: Modulo Arithmetic, The Greatest Common Divisor.</p> <p><b>Computer Security Concepts</b> - 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><b>Symmetric Ciphers:</b> 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><b>Asymmetric Ciphers:</b> Principles Of Public-Key Cryptosystems, Public-Key Cryptosystems, Applications for Public-Key Cryptosystems, Requirements for Public-Key Cryptography, RSA.</p> <p><b>Cryptographic Hash Functions:</b> 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 ( <a href="https://haveibeenpwned.com/API/v3">https://haveibeenpwned.com/API/v3</a> ) 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

<b>Formative Assessment for Practical</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Writing Program 1 + Execution without error	10
Writing Program 2 + Execution without error	10
Viva	03
Journal	02
<b>Total</b>	<b>25</b>
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	<b>Introduction-</b> 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	<b>Problem Solving by Searching-</b> 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	<b>Knowledge Representation</b> -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	<b>Learning</b> –Forms of Learning, Supervised Learning, Machine Learning-Decision Trees, Regression and Classification with Linear Models, Artificial Neural Networks, Support Vector Machines. <b>Applications of AI</b> -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, 2<sup>nd</sup> Edition, Pearson
2. Tom Mitchell, “Machine Learning”, 1<sup>st</sup> Edition, McGraw-Hill, 2017
3. Elaine Rich, KevinKnight, Shivashankar B Nair: Artificial Intelligence, Tata McGraw Hill 3<sup>rd</sup>edition,2013.

<b>Formative Assessment for Theory</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Internal Assessment Test1	10
Internal Assessment Test2	10
Quiz/Assignment/Small Project	10
Seminar	10
<b>Total</b>	<b>40</b>
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	<b>Introduction to PHP:</b> 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	<b>Programming with PHP:</b> Conditional statements: if, if-else, switch, The ? Operator, Looping statements: while Loop, do-while Loop, for Loop <b>Arrays in PHP:</b> 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	<b>Using Functions, Class- Objects, Forms in PHP:</b> 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 <b>Strings in PHP:</b> What is String?, Creating and Declaring String, String Functions <b>Class &amp; Objects in PHP:</b> What is Class & Object, Creating and accessing a Class & Object, Object properties, object methods, Overloading, inheritance, Constructor and Destructor <b>Form Handling:</b> Creating HTML Form, Handling HTML Form data in PHP <b>Database Handling Using PHP with MySQL:</b> Introduction to MySQL: Database terms, Data Types.	14
Unit IV	<b>Accessing MySQL</b> –Using MySQL Client and Using PHP MyAdmin, MySQL Commands, <b>Using PHP with MySQL:</b> 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

<b>Formative Assessment for Theory</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Internal AssessmentTest1	10
Internal AssessmentTest2	10
Quiz/Assignment/Small Project	10
Seminar	10
<b>Total</b>	<b>40</b>
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

<b>Formative Assessment for Practicals</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Writing Program 1 + Execution without error	10
Writing Program 2 + Execution without error	10
Viva	03
Journal	02
<b>Total</b>	<b>25</b>
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	<b>Data Mining:</b> 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. <b>Data Warehouse:</b> Introduction, Definition, Multidimensional Data Model, Data Cleaning, Data Integration and transformation, Data reduction, Discretization.	14
Unit II	<b>Mining Frequent Patterns:</b> Basic Concept–Frequent Item Set Mining Methods–A priori and Frequent Pattern Growth (FP Growth) algorithms–Mining Association Rules <b>Classification:</b> 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	<b>Clustering:</b> 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

<b>Formative Assessment for Theory</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Internal Assessment Test 1	10
Internal Assessment Test 2	10
Quiz/Assignment/Small Project	10
Seminar	10
<b>Total</b>	<b>40</b>
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
<b>DSE-2B</b>	<b>Theory</b>	<b>03</b>	<b>03</b>	<b>42 hrs.</b>	<b>2hrs.</b>	<b>40</b>	<b>60</b>	<b>100</b>

**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	<b>Android OS design and Features:</b> 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. <b>Android Application Design Essentials:</b> 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	<b>Android User Interface Design Essentials:</b> 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	<b>Using Common Android APIs:</b> 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

<b>Formative Assessment for Theory</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Internal Assessment Test1	10
Internal Assessment Test2	10
Quiz/Assignment/Small Project	10
Seminar	10
<b>Total</b>	<b>40</b>
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><b>Introduction to Digital Marketing:</b> Overview of digital marketing, Evolution of digital marketing, Importance and benefits of digital marketing, Digital marketing channels and platforms</p> <p><b>Digital Marketing Strategy and Planning:</b> 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><b>Social Media Marketing:</b> 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><b>Email Marketing:</b> Introduction to email marketing, Building an email list, Creating effective email campaigns, Email automation and segmentation, Email marketing metrics and analytics</p> <p><b>Content Marketing:</b> 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><b>Mobile Marketing:</b> Mobile marketing overview, Mobile advertising strategies, Mobile app marketing, Location-based marketing, Mobile marketing analytics</p> <p><b>Analytics and Reporting:</b> 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:**

1. "Digital Marketing Strategy: An Integrated Approach to Online Marketing" by Simon Kingsnorth.
2. "Email Marketing Rules: How to Wear a White Hat, Shoot Straight, and Win Hearts" by Chad S. White.
3. "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

<b>Formative Assessment for Theory</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
Internal AssessmentTest1	10
Internal AssessmentTest2	10
Quiz/Assignment/Small Project	10
Seminar	10
<b>Total</b>	<b>40</b>
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
<b>Internship-1</b>	<b>Project</b>	<b>08</b>				<b>150</b>	<b>0</b>	<b>150</b>

**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.

<b>Formative Assessment for Internship-1</b>	
<b>Assessment/Occasion/type</b>	<b>Marks</b>
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
<b>Total</b>	<b>150</b>
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**