



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



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NAAC Accredited  
'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/ BTM/ 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 ಸರ್ಕಾರವು ಕಾಲಕಾಲಕ್ಕೆ ನೀಡಿದ ನಿರ್ದೇಶನಗಳನ್ನು ಅಳವಡಿಸಿಕೊಂಡು  
ದಿನಾಂಕ 27.10.2021 ರಂದು ಜರುಗಿದ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯಲ್ಲಿ ಅನುಮೋದನೆ ಪಡೆದು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ  
www.kud.ac.in ದಲ್ಲಿ ಭಿತ್ತರಿಸಲಾಗಿದೆ. ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲದಿಂದ ಡೌನ್‌ಲೋಡ್ ಮಾಡಿಕೊಳ್ಳಲು  
ಸೂಚಿಸುತ್ತ ವಿದ್ಯಾರ್ಥಿಗಳ ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ ಕಾರ್ಯಪ್ರವೃತ್ತರಾಗಲು ಕವಿವಿ  
ಅಧೀನದ/ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಆಡಕ: ಮೇಲಿನಂತೆ  
ಗೆ.

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

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 B.Sc. (Hons.) Program**

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## **SYLLABUS**

**Subject: Computer Science**

**[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 Science for B.Sc. (Hons.)**  
**Effective from 2021-22**

Sem	Type of Course	Theory/ Practical	Course Code	Subject 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	CS -T -1.1	Problem solving techniques and Algorithms	04hrs	56	02 hrs	40	60	100	04
		Practical	CS -P- 1.2	Algorithm Lab-I	04 hrs	52	03 hrs	25	25	50	02
	OEC-1	Theory	CSOEC -1.3	Fundamentals of Computer Concepts	03 hrs	42	02 hrs	40	60	100	03
	*SEC-1	Practical	CSSEC. -1.4	Fundamentals of digital Logic	03 hrs	30	02 hrs	25	25	50	02
II	DSCC2	Theory	CS -2.1	Data Structures	04 hrs	56	02 hrs	40	60	100	04
		Practical	CS.-2.2	Data Structure Lab-II	04 hrs	52	03 hrs	25	25	50	02
	OEC-2	Theory	CSOEC-2.4	Fundamentals of Computer Network and Mobile Communications	03 hrs	42	02 hrs	40	60	100	03
<b>Details of the other Semesters will be given later</b>											

\* Student can opt digital fluency as SEC or the SEC of his/ her any one DSCC selected

**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

# B.Sc. Semester – I

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

The course Computer Science 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): Problem solving techniques and 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
Course-01	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): Title- Problem solving techniques and 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>	

<b>Branching and Looping:</b> Simple 'if' statement, Nested if Statement, Ladder 'if-else' statement. The 'Switch' statement, GOTO statement. <b>Looping:</b> for, while, do-while loop, Nested loops and jumps in loops - break, continue statement.	
<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. <b>Strings:</b> String constant and variables, Declaration and initialization of string, Input/output of string data, String Handling Functions: strlen, strcat, strcmp, strcpy, strcmp. <b>Functions:</b> 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.

# B.Sc. Semester – I

Subject: Computer Science  
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 6 Marks**
- 4. Journal 5 Marks**

**Total 25 marks**

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



## B.Sc. Semester – I

**Subject:** Computer Science  
**Open Elective Course (OEC-1)**  
**(OEC for other students)**

OEC-1: Title of the Course : **FUNDAMENTALS OF COMPUTER CONCEPTS**

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** : Understanding the basic concepts Computer.
- CO 2** : Paperless environment.
- CO 3** : To develop word processor abilities of students.
- CO 4** : To develop numerical abilities of students using electronic spread sheet.
- CO 5** : To acquire practical skills related to Presentation Software.

<b>Syllabus- OEC: Title- FUNDAMENTALS OF COMPUTER CONCEPTS</b>	<b>Total Hrs: 42</b>
<b>Unit-I</b>	<b>14 hrs</b>
<b>Introduction To Computer:</b> Definition of Computer, History, Characteristics of Computer, Basic Applications of Computer, Components of Computer System: Central Processing Unit: Keyboard, mouse and VDU, Input devices, Output devices, Computer Memory, Concept of Hardware and Software, Application Software, Systems software, Programming Languages, Representation of Data/Information, Concept of Data processing, Multimedia and Entertainment, Introduction to Operating System: Definition, Basics of popular operating systems: Windows & Linux, User Interface: Task Bar, Icons, Start Menu, Running an Application, Changing System Date And Time, Changing Display Properties, To Add Or Remove A Windows Component, Changing Mouse Properties, Adding and removing Printers, File and Directory Management, Types of files.	
<b>Unit-II</b>	<b>14 hrs</b>
<b>Word Processors:</b> Definition of Word Processing, Examples of Word Processors, Opening Word Processing Package, Menu Bar, Using the Help, Using the Icons below Menu Bar, Opening and closing Documents, Save and Save As, Page Setup, Print Preview, Printing of Documents, Text Creation and manipulation, Document Creation, Editing Text, Text Selection, Cut, Copy and Paste, Font and Size selection, Alignment of Text, Formatting the Text, Paragraph, Indenting, Bullets and Numbering, Changing case, Table Manipulation, Draw Table, Changing cell width and height, Alignment of Text in cell, Delete / Insertion of row and column, Border and shading, Short-cut keys wherever applicable.	

<b>Unit-III</b>	<b>14 hrs</b>
<p><b>Electronic Spreadsheet:</b> Elements of Electronic Spread Sheet, Examples of Electronic Spreadsheets, Workbook Vs Worksheet, Opening of Spread Sheet, Addressing of Cells, Printing of Spread Sheet, Saving Workbooks, Manipulation of Cells, Entering Text, Numbers and Dates, Creating Text, Number and Date Series, Editing worksheet Data, Inserting and Deleting Rows, Column, Changing Cell Height and Width, Using Formulas, Function, Charts, Short-cut keys wherever applicable.</p> <p><b>Presentation Software:</b> Opening A PowerPoint Presentation, Saving A Presentation, Creation of Presentation, Creating a Presentation, Using a Template, Creating a Blank Presentation, Entering and Editing Text, Inserting And Deleting Slides in a Presentation, Preparation of Slides, Inserting Word Table or An Excel Worksheet, Adding Clip Art Pictures, Inserting Other Objects, Resizing and Scaling an Object, Enhancing Text Presentation:</p>	

Books recommended.

#### **Text Books**

1. Computer Fundamentals - P K Sinha, BPB Publications.

#### **References**

1. Fundamentals of Computers, M. Abid, M. Amjad, Willey
2. Computer Fundamentals, D.P. Nagpal, S.Chand.

## B.Sc. Semester - I

Subject: Computer Science

### 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>B.SC. -1.5 (SEC – 1): 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

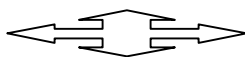
**Part-C**

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.**



## B.Sc. Semester – II

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

The course Computer Science 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.2 (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-02	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.

Syllabus- Course 2(Theory): Title- DATA STRUCTURES	Total Hrs: 56
<b>Unit-I</b>	<b>14 hrs</b>
<b>Structure and Pointers:</b> Structure Definition, Initialization, Array as structure, Array within structure, Union. Understanding pointers, Declaring and initializing pointers, accessing a variable through its pointer, static and dynamic memory allocation. <b>Data Structures:</b> Definition, 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>
<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. <b>Trees:</b> Definitions, Tree terminology, Binary tree, Complete binary tree. Operations on Binary Trees, Representation of binary tree.	

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.

## B.Sc. Semester – II

Subject: Computer Science  
Discipline Specific Course (DSC)

Course No.2 (Practical): Title of the Course (Practical): Data Structures 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 : 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 student's 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 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**

## B.Sc. Semester – II

**Subject:** Computer Science  
**Open Elective Course (OEC-2)**  
(OEC for other students)

OEC-2: Title of the Course : **FUNDAMENTALS OF COMPUTER NETWORK AND MOBILE COMMUNICATIONS**

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** : Understand broad range of computer networks and data communication technology.
- CO 2** : Introducing basic knowledge, basic communication fundamentals.
- CO 3** : Understand the network models such as OSI and TCP/IP.
- CO 4** : Understand cellular and satellite networks.

<b>Syllabus- OEC: Title- FUNDAMENTALS OF COMPUTER NETWORK AND MOBILE COMMUNICATIONS</b>	<b>Total Hrs: 42</b>
<b>Unit-I</b>	<b>14 hrs</b>
<b>Data Communications:</b> Components, Data Representation, Data Flow. <b>Networks:</b> Distributed Processing, Network Criteria, Physical Structures, Network Models, Categories of Networks, Interconnection of Networks, Internetwork. <b>The internet:</b> A Brief History, The Internet Today. <b>Protocols and standards:</b> Protocols, Standards, Standards Organizations, Internet Standards.	
<b>Unit-II</b>	<b>14 hrs</b>
<b>Network Models:</b> layered tasks, Sender, Receiver and Carrier, Hierarchy, the OSI model: Layered Architecture, Peer-to-Peer Processes, Encapsulation. <b>Layers in the OSI model:</b> Physical Layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer. <b>TCP/IP protocol suite:</b> Physical and Data Link Layers, Network Layer, Transport Layer, Application Layer. <b>Addressing:</b> Physical Addresses, Logical Addresses, Port Addresses, Specific Addresses.	
<b>Unit-III</b>	<b>14 hrs</b>
<b>Cellular Telephony:</b> Frequency-Reuse Principle, Transmitting, Receiving, Roaming First Generation, Second Generation, Third Generation. <b>Satellite Networks:</b> Orbits, Footprint, Three Categories of Satellites, GEO Satellites, MEO Satellites, LEO Satellites.	

Books recommended.

**Text Books**

1. Introduction to Data Communications & Networking, Behrouz Ferouzan, 4<sup>th</sup> edition. TMH.

**References**

1. Communication Networks- Fundamental Concepts & Key Architecture, Alberto Leon-Garcia & Indra Widjaja, Mc.Graw Hill.
2. Data and Computer Communications, W. Stalling, 7<sup>th</sup> edition, 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		

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