No.KU/Aca(S&T)/RPH-394A/2021-22/ *954*   Date: **3 0 SEP 2021**

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2021–22ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸಗಳಿಗೆ 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 ಸಂಖ್ಯೆ ಇಡಿ 260 ಯುಎನ್‌ಇ 2019(ಭಾಗ–1), ಬೆಂಗಳೂರು
ದಿನಾಂಕ: 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. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 30.09.2021.

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 ಕೋರ್ಸಗಳ 1 ಮತ್ತು 2ನೇ
ಸೆಮೆಸ್ಟರಗಳಿಗೆ NEP-2020 ರಂತೆ ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ ಕೋರ್ಸಿನ ಪಠ್ಯಕ್ರಮಗಳನ್ನು
ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ www.kud.ac.in ದಲ್ಲಿ ಭಿತ್ತರಿಸಲಾಗಿದೆ. ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲದಿಂದ
ಡೌನಲೋಡ ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತ ವಿದ್ಯಾರ್ಥಿಗಳ ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ
ಕಾರ್ಯಪ್ರವೃತ್ತರಾಗಲು ಕವಿವಿ ಅಧೀನದ/ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಅಡಕ: ಮೇಲಿನಂತೆ

(ಡಾ. ಹನುಮಂತಪ್ಪ ಕೆ.ಟಿ.)
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.ಪಿಎಚ್.ಡಿ) ವಿಭಾಗ, ಸಂಬಂಧಿಸಿದ
ಕೋರ್ಸಗಳ ವಿಭಾಗಗಳು ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
5. ನಿರ್ದೇಶಕರು, ಕಾಲೇಜು ಅಭಿವೃದ್ಧಿ / ವಿದ್ಯಾರ್ಥಿ ಕಲ್ಯಾಣ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

KARNATAK UNIVERSITY DHARWAD

B.Sc. (Hons.) Program

Syllabus

B.Sc (Hons)
Computer Science
(Effective from 2021-22)

KARNATAK UNIVERSITY, DHARWAD

4-Year B.Sc. (Hons.) Program

***

SYLLABUS

B.Sc 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 B,Sc Computer Science for B.Sc. (Hons.)
Effective from 2021-22

Sem	Type of Course	Theory/ Practical	Instruction hour per week	Total hours of Syllabus / Sem	Duration of Exam	Internal Assessment Marks	Sem End Exam. Marks	Total Marks	Credits
I	DSCC-1T	Theory	04 hrs	56	03 hrs	30	70	100	04
	DSCC-1P	Practical	04 hrs	52	03 hrs	15	35	50	02
	OEC-1	Theory	03 hrs	42	03 hrs	30	70	100	03
	*SEC-1	Practical	02 hrs	22-30	03 hrs	15	35	50	02
II	DSCC-2T	Theory	04 hrs	56	03 hrs	30	70	100	04
	DSCC-2P	Practical	04 hrs	52	03 hrs	15	35	50	02
	OEC-2	Theory	03 hrs	42	03 hrs	30	70	100	03
	Details of the other Semesters will be given later								

*Student can opt digital fluency as SEC or the SEC of his/ her any one DSCC selected it will be evaluated as pr the guidelines issued by the University time to time.

Karnatak University, Dharwad

Four Years Under Graduate Program in B.Sc Computer Science for B.Sc.(Hons.) as per NEP-2020

Effective form 2021-22

<u>SEMESTER -I</u>

Course	Subject Code	Subject 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
DSCC-1	CS –T -1.1	Problem solving techniques and Algorithms	4	4	56	3	30	70	100
	CS –P- 1.2	Algorithm Lab-I	2	4	52	3	15	35	50
OEC-1	CSOEC -1.3	Fundamentals of Computer Concepts	3	3	42	3	30	70	100
SEC -1	CSSEC. -1.4	Fundamentals of digital Logic	2	2	33	1.5	15	35	50
		Total	11	13			90	210	300

SEMESTER -II

Course	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
DSCC-3	CS -2.1	Data Structures	4	4	56	3	30	70	100
	CS.-2.2	Data Structure Lab-II	2	4	52	3	15	35	50
OEC-2	CSOEC. -2.4	Fundamentals of Computer Network and Mobile Communications	3	3	42	3	30	70	100
		Total	09	11			75	175	250

Curriculum

Name of the Degree Program   **: B.Sc.**

Discipline Core   **: Computer Science**

Total Credits for the Program   **: 188**

Starting year of implementation   **: 2021-22**

Program Outcomes:
By the end of the program the students will be able to:

1. Understand basic concepts involved in computing.

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

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

4. Follow ethics in designing software with team members.

5. Develop research oriented skills

6. Understand good lab practices

Assessment:
Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	30	100
Practical	15	35
Projects		
Experiential Learning (Internshipsetc.)		

Curriculum Structure for the Undergraduate Degree Program B.Sc.

Total Credits for the Program   : 188
Starting year of implementation   : 2021-22
Name of the Degree Program   : B.Sc.
Discipline/Subject   : Computer Science

Program Articulation Matrix:

Semester	Title /Name Of the course	Program outcomes that the course addresses(not more than3 per course)	Pre-requisite course(s)	Pedagogy##	Assessment$
1	Problem Solving Techniques and Algorithms	1. Understand basic concepts involved in computing. 2. Apply the knowledge in computer techniques to solve real world problems.	--	Seminar	IA
2	Data Structures	1. Think of new approaches for solving problems in different domains. 2. Understand good lab practices	--	Seminar	IA
3					
4					
5					
6					
7					
8.					
9					
10					

\#

Pedagogy for student engagement is predominantly lectures. However, other pedagogies enhancing better student engagement to be recommended for each course. The list includes active learning/ course projects/ problem or project based learning/ case studies/self study like seminar, term paper or MOOC

$ Every course needs to include assessment for higher order thinking skills (Applying/ Analyzing/ Evaluating/ Creating). However, this column may contain alternate assessment methods that help formative assessment (i.e. assessment for learning).

Course Title: **CS-1.1(DSCC-1): PROBLEM SOLVING TECHNIQUES AND ALGORITHMS**	
Total Contact Hours: 56 + 52	Course Credits: 4+2
Formative Assessment Marks: 30 + 15	Duration of ESA/Exam: 3
Model Syllabus Authors:	Summative Assessment Marks: 70 +35

Course Pre-requisite(s): --

Course Outcomes (COs):

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

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
1		X										
2						X						
3		X				X						
4		X				X						
5												
6												
7												
8												

Title of the Course: CS -1.1(DSCC-1): PROBLEM SOLVING TECHNIQUES AND ALGORITHMS

Number of Theory Credits	Number of lecture hours/semester	Number of practical Credits	Number of practicalhours/semester
4	56	2	52

Content of Theory Course 1: B.Sc. -1.1(DSCC-1): Problem Solving Techniques and Algorithms	56 Hrs
Unit –1	14
Basics of Programming- 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. **Programming Tokens:** Keywords, Identifiers, Constants, Variables, Data types, defining symbolic constants, Simple Programs	
Unit – 2	14
Programming Concepts: Operators & 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. **Input/output Functions:** Unformatted & formatted I/O functions. **Branching and Looping:** 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**.**	
Unit – 3	14
Arrays, Strings and Functions: 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, strrev. Functions: Definition, types of user defined functions, prototype, Local and global variables, passing parameters, recursion.	
Unit – 4	14
Advanced Algorithms: 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 kth Smallest Element.	

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, 4th edition.
4. Yeshwant Kanetkar: Let us C, BPB.

Pedagogy : Seminar

Content of Practical Course 1: CS-1.2 : Algorithm Lab

List of Programs (Implement all the programs using C Language)

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 kth 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.

B.Sc.

Semester 1

Course Title: **CSOEC -1.3 (OEC-1): FUNDAMENTALS OF COMPUTER CONCEPTS**	
Total Contact Hours: 42	Course Credits: 3
Formative Assessment Marks: 30	Duration of ESA/Exam: 3
Model Syllabus Authors:	Summative Assessment Marks: 70

Course Pre-requisite(s): --

Course Outcomes (COs):

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

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
1	X											
2		X										
3				X								
4			X									
5						X						
6												
7												
8												

Title of the Course: CSOEC -1.3 (OEC-1): FUNDAMENTALS OF COMPUTER CONCEPTS	
Number of Theory Credits	**Number of lecture hours/semester**
3	**42**

B.Sc. -1.4 (OEC-1): FUNDAMENTALS OF COMPUTER CONCEPTS	**42**
Unit –1	14
Introduction To Computer: 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.	
Unit – 2	14
Word Processors: 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.	
Unit – 3	14
Electronic Spreadsheet: 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. **Presentation Software:** 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:	

| Working with Color and Line Style, Adding Movie and Sound, Adding Headers and Footers, Presentation of Slides: Viewing A Presentation, Choosing a Set Up for Presentation, Printing Slides and Handouts, Running a Slide Show, Transition and Slide Timings, Automating a Slide Show, Short-cut keys wherever applicable. | |

Text Books

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

References

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

Pedagogy : Seminar

B.Sc.
Semester 1

Course Title: **CSSEC – 1.4(SEC-1): FUNDAMENTALS OF DIGITAL LOGIC**	
Total Contact Hours: 33	Course Credits: 2
Formative Assessment Marks: 15	Duration of ESA/Exam: 3
Model Syllabus Authors:	Summative Assessment Marks: 35

Course Pre-requisite(s): --

Course Outcomes (COs):

1. To teach the basics involved in data representation and digital logic circuit.
2. It includes the general concept in digital logic design.
3. To make better understanding of logic used in combinational circuit design.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
1	X											
2			X									
3						X						
4												
5												
6												
7												
8												

Course : CSSEC -1.4 (SEC – 1): FUNDAMENTALS OF DIGITAL LOGIC	
Number of Theory Credits	**Number of lecture hours/semester**
2	**33**

B.SC. -1.5 (SEC – 1): FUNDAMENTALS OF DIGITAL LOGIC	33 Hrs
Unit –1	11
Number Representation: 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.	
Unit – 2	11
Optimized implementation of logic functions-karnaugh map, stragegy 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.	
Unit – 3	11
Combinational logic- design procedures, adders, subtractors, design of arithmetic circuits, multiplexers, demultiplexers, encoders, decoders, code converters, verilog for combinational circuits.	

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

Pedagogy : Seminar

Course Title: **CS -2.1 (DSCC-3): DATA STRUCTURES**	
Total Contact Hours: 56 + 52	Course Credits: 4+2
Formative Assessment Marks: 30 + 15	Duration of ESA/Exam: 3
Model Syllabus Authors:	Summative Assessment Marks: 70 +35

Course Pre-requisite(s): --

Course Outcomes (COs):

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

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
1	X											
2		X										
3			X									
4					X							
5						X						
6												
7												
8												

Title of the Course: B.Sc. -2.1 (DSCC-3): DATA STRUCTURES

Number of Theory Credits	Number of lecture hours/semester	Number of practical Credits	Number of practical hours/semester
4	56	2	52

Content of Theory Course 2: B.Sc. -2.1 (DSCC-3): Data Structures	56 Hrs
Unit –1	14
Structure and Pointers: 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. **Data Structures**: Definition, Classification of Data Structure: Primitive and Non-Primitive, Operations on Data Structure, Review of Array.	
Unit – 2	14
Searching and Sorting: 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.	
Unit – 3	14
Stack and Queue: 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.	
Unit – 4	14
Linked List: 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. **Trees:** Definitions, Tree terminology, Binary tree, Complete binary tree. Operations on Binary Trees, Representation of binary tree.	

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, 2nd 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.

Pedagogy : Seminar

Content of Practical Course 2: CS-2.2: Data Structures Lab

Program List (Implement using C Language)

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.

Course Title: **CSOEC -2.3 (OEC-2): FUNDAMENTALS OF COMPUTER NETWORK AND MOBILE COMMUNICATIONS**	
Total Contact Hours: 42	Course Credits: 3
Formative Assessment Marks: 30	Duration of ESA/Exam: 3
Model Syllabus Authors:	Summative Assessment Marks: 70

Course Pre-requisite(s): --

Course Outcomes (COs):

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

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
1		X										
2			X									
3					X							
4		X										
5												
6												
7												
8												

Title of the Course: CSOEC -2.3 (OEC-2): FUNDAMENTALS OF COMPUTER NETWORK AND MOBILE COMMUNICATIONS	
Number of Theory Credits	**Number of lecture hours/semester**
3	**42**

B.Sc. -2.4 (OEC-2): Fundamentals of Computer Network and Mobile Communications	**42 hrs**
Unit –1	14
Data Communications: Components, Data Representation, Data Flow. Networks: Distributed Processing, Network Criteria, Physical Structures, Network Models, Categories of Networks, Interconnection of Networks, Internetwork. The internet: A Brief History, The Internet Today. Protocols and standards: Protocols, Standards, Standards Organizations, Internet Standards.	
Unit – 2	14
Network Models: layered tasks, Sender, Receiver and Carrier, Hierarchy, the OSI model: Layered Architecture, Peer-to-Peer Processes, Encapsulation. Layers in the OSI model: Physical Layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer. TCP/IP protocol suite: Physical and Data Link Layers, Network Layer, Transport Layer, Application Layer. Addressing: Physical Addresses, Logical Addresses, Port Addresses, Specific Addresses.	
Unit – 3	14
Cellular Telephony: Frequency-Reuse Principle, Transmitting, Receiving, Roaming First Generation, Second Generation, Third Generation. **Satellite Networks**: Orbits, Footprint, Three Categories of Satellites, GEO Satellites, MEO Satellites, LEO Satellites.	

Text Books

1. Introduction to Data Communications & Networking, Behrouz Ferouzan, 4th 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, 7th edition, Pearson Education.

Pedagogy : Seminar

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

GENERAL PATTERN OF THEORY QUESTION PAPER FOR DSCC/ OEC
(70marks for semester end Examination with 3 hrs duration)
Part-A

1. Question number 1-6 carries 2 marks each. Answer any 05 questions   : 10 marks

Part-B

2. Question number 7- 14 carries 05Marks each, Answer any 06 questions   : 30 marks

Part-C

3. Question number 15-18 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: 70 Marks

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