VIVEKANANDHA

COLLEGE OF ARTS AND SCIENCES FOR WOMEN

ELAYAMPALAYAM, TIRUCHENGODE (Tk.), NAMAKKAL (Dt.).

(Affiliated to Periyar University, Approved by AICTE & Re-Accredited with A Grade by NAAC)

AUTONOMOUS

PG AND RESEARCH DEPARTMENT OF

COMPUTER SCIENCE & APPLICATIONS

B.Sc. COMPUTER SCIENCE

SYLLABUS & REGULATIONS

FOR CANDIDATES ADMITTED FROM 2022-23 ONWARDS

UNDER AUTONOMOUS & OBE PATTERN

VIVEKANANDHA EDUCATIONAL INSTITUTIONS
Angammal Educational Trust
Elayampalayam, Tiruchengode (Tk.), Namakkal (Dt.)

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN

(AUTONOMOUS)

B.Sc CS

(BACHELOR OF COMPUTER SCIENCE)

(Candidates admitted from 2022-2023 onwards)

REGULATIONS

I. SCOPE OF THE PROGRAMME

Bachelor of Computer science can be considered to be one of the most prominent UG level programs in our country. This program mainly deals with the development of computer applications for the purpose of updating computer programming languages. B.Sc.[CS] also aims at creating strong knowledge of theoretical Information Technology subjects who can be employed in software development and testing units of industries. The course has a time period of 3 years with 6 semesters.

II. SALIENT FEATURES

- Regular conduct of guest lectures and seminars
- Campus recruitment
- Provides facilities such as Internet Access and In-House Library
- Provides Career Guidance for Post Graduate Courses like M.Sc, and the Certifications in programming languages
- Conduct of Personality Development Program
- Visiting Faculties from Industries

III. OBJECTIVES OF THE PROGRAMME

The Course Objective of the B.Sc. Computer Science program is to provide advanced and in-depth knowledge of Computer Science and its applications to enable students pursue a professional career in Information and Communication Technology in related industry, business and research. The course designed to impact professional knowledge and practical skills to the students.

IV. ELIGIBILITY FOR ADMISSION

A Candidates seeking admission to the first year Degree course (B.Sc. Computer Science) shall be required to have passed Higher Secondary Examination with Mathematics or Business Mathematics or Computer Technology or Statistics (Academic Stream or Vocational Stream) as one of the subject under Higher Secondary Board of Examination, conducted by the Government of Tamilnadu or an examination accepted as equivalent thereto by the syndicate, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the B.Sc. Computer Science Degree Examination of Periyar University after a course of study of three academic years.

V. DURATION OF THE PROGRAMME

- The course shall extend over a period of three academic years consisting of six semesters. Each academic year will be divided into two semesters. The First semester will consist of the period from July to November and the Second semester from December to April.
- The subjects of the study shall be in accordance with the syllabus prescribed from time to time by the Board of Studies of Vivekanandha College of Arts and Sciences for Women with the approval of Periyar University.

VI. CONTINUOUS INTERNAL ASSESSMENT (CIA)

The performance of the students will be assessed continuously and the Internal ASSESSMENT MARKS WILL BE AS UNDER:

FOR THEORY PAPERS

1	Average of Two Tests		-	05
2	Model Exam		-	10
3	Assignment		-	05
4	Attendance		-	05
		Total	-	25

FOR PRACTICAL PAPERS

1	Model Exam		-	20
2	Observation Note		-	10
3	Attendance		-	10
		Total	-	40

PASSING MINIMUM - EXTERNAL

THEORY	In the End Semester Examinations, the passing minimum shall be 40% out of 75 Marks. (30 Marks)
PRACTICAL / MINI PROJECT	In the End Semester Examinations, the passing minimum shall be 40% out of 60 Marks. (24 Marks)

VII. ELIGIBILITY FOR EXAMINATION

A candidate will be permitted to appear for the University Examination only on learning 75 % of attendance and only when her conduct has been satisfactory. It shall be open to grant exemption to a candidate for valid reasons subject to conditions prescribed.

DISTRIBUTION OF MARKS FOR ATTENDANCE:

ATTENDANCE PERCENTAGE	MARKS	
	THEORY	PRACTICAL
75-80	1	2
81-85	2	4
86-90	3	6
91-95	4	8
96-100	5	10

VIII. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Successful candidates passing the Examination of Core Courses (Main & Allied Subjects) & Securing Marks.

a) 75 % and above shall be declared to have passed the examination in First Class with Distinction provided they pass all the examinations prescribed for the course at first appearance itself.
b) 60% and above but below 75 % shall be declared to have passed the Examinations in First Class..
c) 50% & above but below 60% shall be declared to have passed the examinations in Second Class.
d) All the remaining successful candidates shall be declared to have passed the examinations in Third Class.
e) Candidates who pass all the examinations prescribed for the course at the First appearance itself and within a period of three Consecutive Academic years from the year of admission only will be eligible for University Rank.

IX. ELIGIBILITY FOR AWARD OF THE DEGREE

A candidate shall be eligible for the award of the Degree only if she has undergone the above Degree for a period of not less than Three Academic years comprising of six semesters and passed the Examinations prescribed and fulfilled such conditions has have been prescribed therefore.

X. PROCEDURE IN THE EVENT OF FAILURE

If a candidate fails in a particular subject, she may reappear for the university examination in the concerned subject in subsequent semesters and shall pass the examination.

XI. COMMENCEMENT OF THESE REGULATIONS

These regulations shall take effect from the academic year 2021-2022 (i.e.,) for the students who are to be admitted to the First year of the course during the Academic year 2021-22 and thereafter.

XII. TRANSITORY PROVISIONS

Candidates who were admitted to the UG course of study before 2019-2020 shall be permitted to appear for the examinations under those regulations for the period of Three years ie., upto and inclusive of the Examinations of 2021-2022. Thereafter, they will be permitted to appear for the examinations only under the regulations then in force.

EVALUATION OF EXTERNAL EXAMINATIONS (EE)

QUESTION PAPER PATTERN – Theory	
Time duration: 3 Hours	**Max. Marks: 75**
PART- A: **(20 x 1= 20)**	Answer all the Questions Four Questions from each Unit
PART- B: **(5 x 5 = 25)**	Answer all the questions One Question from each Unit (Either or Type)
PART- C: **(3 x 10 = 30)**	Answer any **THREE** of the questions One Question from each Unit (3 Out of 5)
IN THE END SEMESTER EXAMINATIONS, THE PASSING MINIMUM SHALL BE 40% OUT OF 75 MARKS. (30 MARKS)	

QUESTION PAPER PATTERN – Practical	
Time duration: 3 Hours	**Max. Marks: 60**
1. One compulsory question from the given list of objectives	**30 Marks**
2. One either/or type question from the given list of objectives	**30 Marks**
IN THE END SEMESTER EXAMINATIONS, THE PASSING MINIMUM SHALL BE 40% OUT OF 60 MARKS. (24 MARKS)	

B.Sc CS CURRICULUM FOR ACADEMIC YEAR 2021 – 2022

COURSE PATTERN AND SCHEME OF EXAMINATIONS UNDER AUTONOMOUS, OBE PATTERN

FOR THE CANDIDATES ADMITTED FROM THE YEAR 2021 – 2022 ONWARDS

SEMESTER: I & II

SEM	PART	COURSE CODE	COURSE TITLE	Hrs	CREDIT	MARKS		
						CIA	EE	TOT
I	I	21UILT01	Foundation Tamil – I	5	3	25	75	100
	II	21U1CE01	Communicative English – I	5	3	25	75	100
	III	18U1MAA03	Numerical Methods	4	4	25	75	100
	III	21U1CSC01	Programming in C	4	3	25	75	100
	III	21U1CSCP01	Programming in C Lab	3	2	40	60	100
	III	21U1CSCP02	Office Automation Lab	3	2	40	60	100
	IV	21U1PEPS01	Professional English for Physical Science I	4	4	25	75	100
	IV	18U1VE01	Value Education	2	2	25	75	100
	Total			30	23	230	570	800
II	I	21U2LT02	Foundation Tamil – II	5	3	25	75	100
	II	21U2CE02	Communicative English – II	5	3	25	75	100
	III	18U2MAA06	Discrete Mathematics	4	4	25	75	100
	III	21U2CSC02	Programming in C++	4	3	25	75	100
	III	21U2CSCP03	Programming in C++ Lab	3	2	40	60	100
	III	21U2CSC03	Data Structures and Algorithms	3	3	25	75	100
	IV	21U2PEPS02	Professional English for Physical Science II	4	4	25	75	100
	IV	20U2ES01	Environmental Studies	2	2	25	75	100
	Total			30	24	215	585	800

SEMESTER: III & IV

SEM	PART	COURSE CODE	COURSE TITLE	Hrs	CREDIT	MARKS		
						CIA	EE	TOT
III	I	21U3LT03	Foundation Tamil – III	5	3	25	75	100
	II	21U3CE03	Communicative English – III	5	3	25	75	100
	III	18U3CMA03	Financial Accounting	4	4	25	75	100
	III	21U3CSC04	Java Programming	5	5	25	75	100
	III	21U3CSCP04	Java Programming Lab	3	2	40	60	100
	IV	21U3CSS01	HTML & Web Designing	3	3	25	75	100
	III	21U3CSCP05	HTML & Web Designing Lab	3	2	40	60	100
	IV	21U3MAN01	NMEC – I:	2	2	25	75	100
			Total	30	24	230	570	800
IV	I	21U4LT04	Foundation Tamil – IV	5	3	25	75	100
	II	21U4CE04	Communicative English – IV	5	3	25	75	100
	III	18U4CMA04	Cost & Management Accounting	4	4	25	75	100
	III	21U4CSC05	Relational Database Management System	5	4	25	75	100
	III	21U4CSC06	Computer Networks	4	4	25	75	100
	III	21U4CSCP06	Relational Database Management System Lab	3	2	40	60	100
	IV	21U4CSS02	SBEC:II Internet of Things	2	2	25	75	100
	IV	21U4MAN02	NMEC – II	2	2	25	75	100
			Total	30	24	215	585	800

SEMESTER: V & VI

SEM	Part	COURSE CODE	COURSE TITLE	Hrs	CREDIT	MARKS		
						CIA	EE	TOT
V	III	21U5CSC07	Dot Net Programming	5	5	25	75	100
	III	21U5CSC08	PHP Programming	5	5	25	75	100
	III	21U5CSE_	Elective	5	3	25	75	100
	III	21U5CSCP07	Dot Net Programming Lab	4	2	40	60	100
	III	21U5CSCP08	PHP Programming Lab	4	2	40	60	100
	III	21U5CSCPR01	Mini Project	5	3	40	60	100
	IV	21U5CSS03	Soft Skill	2	2	25	75	100
			Total	30	22	220	480	700
VI	III	21U6CSC09	Python Programming	5	4	25	75	100
	III	21U6CSC10	R Programming	5	4	25	75	100
	III	21U6CSE__	Elective	5	4	25	75	100
	III	21U6CSCP09	R ProgrammingLab	4	2	40	60	100
	III	21U6CSCP10	Python Programming Lab	4	2	40	60	100
	III	21U6CSC13	Data Mining	5	4	25	75	100
	IV	21U6CSS04	Ethical Hacking	2	2	25	75	100
	V	21U6EX01	Extension Activities	-	1	-	-	-
			Total	30	23	205	495	700
			Grand Total	180	140	1330	3270	4600

ELECTIVE – I			ELECTIVE – II		
Sem	**Course Code**	**Title**	**Sem**	**Course Code**	**Title**
V	21U5CSE01	Cryptography	VI	21U6CSE04	Compiler Design
	21U5CSE02	Client/ Server Technologies		21U6CSE05	Mobile Computing
	21U5CSE03	Artificial Intelligence		21U6CSE06	Big Data Analytics

COMPUTER SCIENCE DEPARTMENT OFFERED PAPERS

NMEC I			NMEC II		
Sem	**Course Code**	**Title**	**Sem**	**Course Code**	**Title**
III	22U3CSN01	Office Automation	**VI**	22U4CSN02	Internet Applications

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**1**
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
21U1CSC01	Programming in C	4	0	0	3	25	75	100
COURSE OBJECTIVES	Programming basics and the fundamentals of CData types in CMathematical and logical operationsUsing if statement and loopsArranging data in arraysImplementing pointers							
POs	PROGRAMME OUTCOME							
PO 1	To understand the fundamental concepts of computer system, including hardware and software							
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior							
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science							
PO 4	To analyze impacts of computing on individuals, organization and society							
PO 5	Train students in professional skills related to Software Industry							
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline							
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks							
COs	COURSE OUTCOME							
CO 1	To interpret the basic elements like variables, data types and operators in C Language							
CO 2	To implement the C Program Decision making and Branching Statements							
CO 3	Execute Character Arrays and Strings by using String handling functions and User defined functions in CLanguage							
CO 4	Organize Structures, Unions and Pointers in C Language							
CO 5	Generate Array of Pointers and Files in C Language							
Pre-requisites	Basic Computer Knowledge							

Knowledge Levels
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	1	PO 1	2
		PO 2	4
		PO 3	3
CO 2	2	PO 4	4
		PO 5	5
		PO 6	6
CO 3	3	PO 7	1

CO 4	4
CO 5	5

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	1	1	1	1
CO2	3	1	2	1	1	1	2
CO3	2	2	3	2	1	1	1
CO4	1	3	2	3	2	1	1
CO5	1	2	1	2	3	2	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Overview of C	Periods	08
	Overview of C :History - Importance - Basic structure of C programs. Constants, variables and data types . Operators and Expressions.Managing Input and Output Operations		
Unit - II	Decision making Statements and Arrays	Periods	08
	Decision making and branching - Decision making and looping- Arrays- Character Arrays and Strings: Introduction-Declaring and Initializing String Variables-Comparison of Two Strings-String Handling Functions.		
Unit - III	User Defined Functions	Periods	09
	User Defined functions: Elements of User Defined Functions - Definition of Functions - Return valuesand their types - Function calls - Function declaration - Categories of Functions-Nesting of Functions-Recursion		
Unit - IV	Structures and Unions	Periods	10
	Defining a Structure-Declaring Structure Variables-Accessing Structure Members-Structure Initialization-Unions.Understanding pointers - Accessing the address of a variable - Declaring Pointer Variables-Initializing of pointer variables.		
Unit - V	File Management	Periods	10
	File Management :Defining and Opening a File-Closing a File-I/O operation on files - Error handling during I/O operations -Dynamic Memory Allocation and Linked List:- Malloc - Calloc - Free - Realloc -Linked list: Concept - Types- Advantages- Creating a linked list – Applications		
	Total Periods		45

Text Books	
1	"Programming in ANSI C", E. Balagurusamy Tata McGraw Hill, New Delhi, 4th Edition
References	
1	"C: The Complete Reference", Herbert Schildt, Mc Graw Hill, New Delhi, 4th Edition
2	"Programming In C", B.L.JUNEJA, Cengage Learning India
3	"Programming In ANSI C", E. Balagurusamy TMG Hill, New Delhi, 5th Edition.
E-References	
1	https://www.programiz.com/c-programming
2	https://www.tutorialspoint.com/cprogramming/index.htm
3	https://en.wikipedia.org/wiki/C_(programming_language)

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**							
Programme	**B.Sc**	Programme Code	**UCS**			Regulations		**2021-2022**
Department	**Computer Science**		Semester					**1**
Course Code	Course Name		Periods per Week			Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
21U1CSC01	Programming in C		4	0	0	3	25	75	100
COURSE OBJECTIVES	Programming basics and the fundamentals of CData types in CMathematical and logical operationsUsing if statement and loopsArranging data in arraysImplementing pointers							
POs	PROGRAMME OUTCOME							
PO 1	To understand the fundamental concepts of computer system, including hardware and software							
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior							
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science							
PO 4	To analyze impacts of computing on individuals, organization and society							
PO 5	Train students in professional skills related to Software Industry							
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline							
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks							
COs	COURSE OUTCOME							
CO 1	To interpret the basic elements like variables, data types and operators in C Language							
CO 2	To implement the C Program Decision making and Branching Statements							
CO 3	Execute Character Arrays and Strings by using String handling functions and User defined functions in CLanguage							
CO 4	Organize Structures, Unions and Pointers in C Language							
CO 5	Generate Array of Pointers and Files in C Language							
Pre-requisites	Basic Computer Knowledge							

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1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing			
CO / PO / KL Mapping (3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)			
COs	KLs	POs	KLs
CO 1	1	PO 1	2
		PO 2	4
		PO 3	3
		PO 4	4

CO 2	2	PO 5	5
		PO 6	6
CO 3	3	PO 7	1
CO 4	4		
CO 5	5		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	1	1	1	1
CO2	3	1	2	1	1	1	2
CO3	2	2	3	2	1	1	1
CO4	1	3	2	3	2	1	1
CO5	1	2	1	2	3	2	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Overview of C	Periods	08
	Overview of C :History - Importance - Basic structure of C programs. Constants, variables and data types . Operators and Expressions.Managing Input and Output Operations		
Unit - II	Decision making Statements and Arrays	Periods	08
	Decision making and branching - Decision making and looping- Arrays- Character Arrays and Strings: Introduction-Declaring and Initializing String Variables-Comparison of Two Strings-String Handling Functions.		
Unit - III	User Defined Functions	Periods	09
	User Defined functions: Elements of User Defined Functions - Definition of Functions - Return valuesand their types - Function calls - Function declaration - Categories of Functions-Nesting of Functions-Recursion		
Unit - IV	Structures and Unions	Periods	10
	Defining a Structure-Declaring Structure Variables-Accessing Structure Members-Structure Initialization-Unions.Understanding pointers - Accessing the address of a variable - Declaring Pointer Variables-Initializing of pointer variables.		
Unit - V	File Management	Periods	10
	File Management :Defining and Opening a File-Closing a File-I/O operation on files - Error handling during I/O operations -Dynamic Memory Allocation and Linked List:- Malloc - Calloc - Free - Realloc -Linked list: Concept - Types- Advantages- Creating a linked list – Applications		
	Total Periods		45

Text Books	
1	"Programming in ANSI C", E. Balagurusamy Tata McGraw Hill, New Delhi, 4th Edition
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1	"C: The Complete Reference", Herbert Schildt, Mc Graw Hill, New Delhi, 4th Edition
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E-References	
1	https://www.programiz.com/c-programming
2	https://www.tutorialspoint.com/cprogramming/index.htm
3	https://en.wikipedia.org/wiki/C_(programming_language)

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**1**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U1CSCP01	Programming in C Lab	0	0	3	2	40	60	100

List of Experiments

1	Write a C program to Swap two numbers without using third Number.
2	Write a C program to print multiplication of 2 matrices.
3	Write a C program to convert decimal number to binary.
4	Write a C program to reverse given number using for loop.
5	C program to find sum of array elements using Dynamic Memory Allocation.
6	Write a program for accessing union members.
7	Write a program for access data members of a structure using a struct variable.
8	C Program to create, initialize, assign and access a pointer variable.
9	Write a C program for copy one file to another file.
10	Write a C program to Employee record system using file.

Signature of BOS Chairman

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Programme	**B.Sc**	Programme Code	**UCS**		Regulations	**2021-2022**	
Department	**Computer Science**		Semester			**1**	
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
21U1CSCP02	Office Automation lab		0	0	3	2	40	60	100

List of Experiments

MS Word

1. Creating a Document using MS Word:
   - Enter a text about your Institution with two Titles.
   - Set the paper size A4 and orientation of the paper to Portrait.
   - Make the titles to Center, Bold, Font size 20 and style in Arial.
   - Justify the entire Text. Set the margin left 1 . 5, Right 1 . 5, Top and Bottom5
   - Use Drop Cap in 1st paragraph 1st character for 3 lines.
   - Change the font size of the text to 12 size.
   - Use bulleted list and Highlight the important sentences.
   - Insert a picture, word art, Header and Footer.
   - Save the file.
2. Enhance the documents using Header, Footer, Page Setup, Border, Page number, watermarking, Orientation and Print Preview.
3. Prepare a student bio – data.
4. Create letters using Mail Merge in MS – Word

MS. Excel

5	Create a Statement in MS. Excel regarding particulars of 10 students of I Year MOP of your College using Ms. **Excel** (Fields : Roll No. , Name, Community, DOB, Age, Address, & 10th Mark. (Things to be Covered) • Enter Two Titles • Enter the 1st and 2ndTitles in first and second rows with different font size and styles. • Enter Roll No., Name, etc as Field names. • Enter the Roll Number using Fill Handle. • Enter 10 students particulars. • Centre the Titles. • Insert a New Row between 5th and 6thRow . • Enter a New Student's particulars in the new Row. • Delete the Last row. • Insert a New Column between 3rdt and 4th Column for Sex. • In the Sex column enter Sex = "M" or "F" • Align all the Data in Centre. • Save the File.

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Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**1**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U1CSCP02	Office Automation lab	0	0	2	2	40	60	100

6	• Create a worksheet, moving/ copying/ inserting/ deleting rows and columns (usage of cut, paste, commands, copying a single cell, copying a range of data, filling up a cell. Undo command, inserting a row, column, deleting rows and columns). • Formatting worksheets Bold, Italic, Font size changing, Auto fill, date format, Currency format.
7	Open an excel and create fields as follows S. No | Name of the student | M1 | M2 | M3 | M4 | M5 | Total | Avg | Result | Grade i. Enter S.No, Name, marks for 10 students ii. Find total and average using formula. iii. Find Result whether the student is pass or fail and also assign grade as per our university norms. iv. Insert a column chart showing the comparison of marks in different subjects of different students.
8	i. Creating and running a macro. ii. Assigning button to a defined macro. iii. Editing a macro.
MS. Powerpoint Presentation	
9	Create a power-point presentation with minimum 5 slides. a. The first slide must contain the topic of the presentation and name of the presentation. b. Must contain at least one table. c. Must contain at least 5 bullets, 5 numbers. d. The heading must be, font size:32, font-face: Arial Rounded MT Bold, font-color: blue. e. The body must be, font size: 24, font-face: Comic Sans MS, font-color: green. f. Last slide must contain „thank you“.
10	Create a presentation with apply background/Themes, apply custom animation on text, insert images/word art and animate the images with effects.
11	Create a presentation with minimum 5 slides a. Use custom animation option to animate the text; the text must move left to right one line at a time. b. Use proper transition for the slides.

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Programme	**B.Sc**	Programme Code	**UCS**			Regulations	**2021-2022**	
Department	**Computer Science**		Semester				**1**	
Course Code	Course Name		Periods per Week			Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
21U1CSCP02	Office Automation lab		0	0	2	2	40	60	100

Ms Access

12.	Create a database “Student” with, a. At least one table named “mark sheet” with field name “student name, roll number, mark1, mark2, mark3, mark4, total” b. The data types are, student name: text, roll number: number, mark1 to mark4: number, total: number. Roll number must be the primary key. c. Enter data in the table. The total must be calculated using update query. d. Use query for sorting the table according to the descending/ascending order of the total marks.
13.	With addition to the table above, a. Add an additional field “result” to the “mark sheet” table. b. Enter data for at least 10 students c. Calculate the result for all the students using update queries, if total>=200, then pass, else fail. d. Search the students, whose name starts with “sh”. e. Show the names and total marks of the students who have passed the examination.
14.	Create a employee personal information using MS – Access

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**2**
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
21U2CSC02	Programming in C++	4	0	0	3	25	75	100
COURSE OBJECTIVES	The basic programming and OOPs conceptsCreating C++ programsTokens, expressions and control structures in C++Arranging same data systematically with arraysClasses and objects in C++							

POs	PROGRAMME OUTCOME
PO 1	To understand the fundamental concepts of computer system, including hardware and software.
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.
PO 4	To analyze impacts of computing on individuals, organization and society.
PO 5	Train students in professional skills related to Software Industry.
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks

COs	COURSE OUTCOME
CO 1	Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
CO 2	Understand dynamic memory management techniques
CO 3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
CO 4	Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
CO 5	Demonstrate the use of various OOPs concepts with the help of programs.
Pre-requisites	A text editor, a C++ compiler, a linker, and libraries

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	1	PO 1	2
		PO 2	4
		PO 3	3
CO 2	2	PO 4	4
		PO 5	2

		PO 6	4
CO 3	3	PO 7	1
CO 4	4		
CO 5	5		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	1	2	1	1
CO2	3	1	2	1	3	1	2
CO3	2	2	3	2	2	2	1
CO4	1	3	2	3	1	3	1
CO5	1	2	1	2	1	2	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Basic Concepts of OOP	Periods	08
	Basic Concepts of OOP - Benefits of OOP -Structure of C++ - Simple programs in C++-Tokens,Expressions and Control Structures.		
Unit - II	Classes and Objects	Periods	08
	Functions in C++: The main function - Function prototyping-Call by Reference-Return by Reference-Inline functions-Function Overloading . Classes and Objects - Constructors and Destructors.		
	Inheritance	Periods	09
Unit - III	Operator Overloading and type conversions:Defining Operator Overloading-Overloading Unary Operators-Manipulation of Strings Using Operators-Rules for Overloading Operators-Type Conversions.Inheritance: defining a derived class - Derived Classes- single inheritance- Multilevel Inheritance- Multiple Inheritance- Hierarchical Inheritance- Hybrid Inheritance.		
Unit - IV	Managing I/O Operations	Periods	10
	Pointers, Virtual Functions and Polymorphism: Pointers - Pointers to Objects - this Pointers-VirtualFunctions - Pure Virtual Functions. Managing I/O Operations: Streams in C++ - C++ Stream Classes - unformatted I/O operation-Formatted Console I/O Operations - Managing Output with Manipulators.		
	Templates and Exception Handling	Periods	10
Unit - V	Templates: Class templates- Class templates with Multiple Parameters- Function templates-FunctionTemplates with Multiple Parameters- Member Function Templates. Exception Handling.		
	Total Periods		45

Text Books	
1	1. E.Balagurusamy, "Object-Oriented Programming with C++", Tata McGraw Hill Publishing Company Limited, New Delhi ,Second Edition, 2001.
References	
1	1. Robert Lafore, " Object Oriented Programming in Turbo C++", Galgotia ,2001.
2	2. Herbert Schildt, "Teach Yourself C++", Third Edition. Tata McGraw Hill, 5th Reprint, 2000
3	3. K.R Venu Gopal , Rajkumar, T.Ravishankar, "Mastering C++",TMG Ltd, New Delhi
E-References	
1	1.https://bookstore.github.io/cse/secondyear/Balaguruswamy%20Object%20Oriented%20Programming%20With%20C++%20Fourth%20Edition.pdf
2	2. http://www.ddegjust.ac.in/studymaterial/mca-3/ms-17.pdf
3	3. https://www.scribd.com/doc/272353233/Object-Oriented-Programming-in-C-Balaguruswamy-pdf

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations	**2021-2022**	
Department	**Computer Science**		Semester			**2**	
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
21U2CSCP03	Programming in C++ Lab	0	0	3	2	40	60	100

List of Experiments

1	Write a C++ program using Classes and Objects.
2	Write a C++ program using Constructors & Destructors
3	Write a C++ program using Inline Functions
4	Write a C++ program using Function Overloading
5	Write a C++ program using Operator Overloading
6	Write a C++ program using Inheritance (Any Two Types)
7	Write a C++ program using Dynamic Polymorphism – Virtual Functions.
8	Write a C++ program using Friend Function
9	Write a C++ program using Pointers
10	Write a C++ program using Templates

Signature of BOS Chairman

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**2**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U2CSC03	DATA STRUCTURES AND ALGORITHMS	3	0	0	3	25	75	100

COURSE OBJECTIVES	To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions.
POs	PROGRAMME OUTCOME
PO 1	To understand the fundamental concepts of computer system, including hardware and software.
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.
PO 4	To analyze impacts of computing on individuals, organization and society.
PO 5	Train students in professional skills related to Software Industry.
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks

COs	COURSE OUTCOME
CO 1	Ability to program data structures and use them in implementations of abstract data types.
CO 2	Ability to sensibly select appropriate data structures and algorithms for problems and to justify that choice.
CO 3	) Implement linear data structure such as stacks, queues, linked lists and their applications
CO 4	Implement basic operations on binary trees
CO 5	Demonstrate the representation and traversal techniques of graphs and their applications
Pre-requisites	The prerequisites for data structures and algorithms (DSA) are knowledge of programming languages, basics of mathematics, organising and problem-solving ability.

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	3
		PO 3	4
CO 2	3	PO 4	3
		PO 5	6
		PO 6	5
CO 3	3	PO 7	4
CO 4	3		
CO 5	4		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	2	1	1	1
CO2	2	3	2	3	1	1	2
CO3	2	3	2	3	1	1	2
CO4	2	3	2	3	1	1	2
CO5	1	2	3	2	1	2	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	An Introduction to Data Structure	Periods	08
	Algorithms - Modular Programming - Top-Down Algorithm Design Bottom - Up Algorithm Design -Structured Programming - Analysis of Algorithm - Classification of Data Structure - Arrays - Lists.		
Unit - II	Stack:	Periods	08
	Operations Performed on Stack - Stack Implementation - Stack Using Arrays - Applications of Stacks -Evaluating Postfix Expression. Queue: Algorithms for Queue Operations - Circular Queue - Deques - Applications of stacks.		
Unit - III	Linked List:	Periods	09
	Representation - Advantages and Disadvantages - Operations - Types of linked list - Singly - Doubly - circular. Sorting Techniques: - Bubble Sort - Insertion Sort - QuickSort - Merge Sort - Heap Sort.		
Unit - IV	Trees:	Periods	10
	Basic Terminologies - Binary Trees - Representation of Binary tree - Operations - Types of Binary Trees:Binary Search Tree - Expression tree .		
Unit - V	Graphs:	Periods	10
	Introduction-Graph Terminologies-Representation of Graphs-Operations on Graphs - Breadth first search -Depth first search - Applications of Graph: Minimum Spanning Tree - Shortest path. Searching Techniques: Sequential - Binary search..		
Total Periods			45

Text Books	
1	1. Vinu V Das "Principles of Data Structures using C and C++", New Age International Pvt Ltd Publishers, New Delhi, 2011.
References	
1	1. Chitra A &Rajan PT, "Data Structures", 2nd Edition, Vijay Nicole Publications, 2016
2	2. Reema Thareja "Data Structures using C" Oxford University Press Second Edition, New Delh, 2014.
3	3. Debasis Samanta "Classical Data structure" 2nd Edition, PHI Learning Private Limited, New Delhi, 2011.
4	4. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd edition, Pearson Education Asia, 2009
E-References	
1	1. www.freetechbooks.com/algorithms-and-data-structures-f11.html
2	2. https://sonucgn.files.wordpress.com/2018/01/data-structures-by-d-samantha.pdf

Signature of BOS Chairman

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**3**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U3CSC04	Java Programming	5	0	0	5	25	75	100

COURSE OBJECTIVES	Validate input in a Java program. Identify and fix defects and common security issues in code. Document a Java program using Javadoc.
POs	PROGRAMME OUTCOME
PO 1	To understand the fundamental concepts of computer system, including hardware and software.
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.
PO 4	To analyze impacts of computing on individuals, organization and society.
PO 5	Train students in professional skills related to Software Industry.
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programme student outcomes and to the discipline.
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks

COs	COURSE OUTCOME
CO 1	Understand the basic object oriented programming concepts and apply them in problem solving.
CO 2	Identify classes, objects, members of a class and relationships among them needed for a specific problem
CO 3	Illustrate inheritance concepts for reusing the program
CO 4	Write Java programs to implement error handling techniques using exception handling
CO 5	Understand the basics of java console and GUI based programming
Pre-requisites	To know knowledge about C and C++

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	1
		PO 2	3
		PO 3	3
CO 2	4	PO 4	4
		PO 5	6
		PO 6	3
CO 3	5	PO 7	3
CO 4	3		
CO 5	2		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	2	1	1	2	2
CO2	1	2	2	3	1	2	2
CO3	1	1	1	2	2	1	1
CO4	1	3	3	2	1	3	1
CO5	2	2	2	1	1	2	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Overview of Java Language	Periods	12
	Introduction - simple java program-Java program structure-Java Tokens-Implementing a Java programConstants, variables, Data Types and Operators: Constants-variables-Data Types-Declaration of variables-Operators and Expression.		
Unit - II	Classes, objects and Methods	Periods	12
	Defining a classes-Field and method declaration-creating objects-constructors-methods overloading-static members-Abstract class. Array: Introduction - One Dimensional Array-Creating Array-Two dimensional Array.		
Unit - III	Inheritance and Packages	Periods	12
	Extending a class -Overriding methods. Interfaces: Defining Interface-Extending Interface. Packages: Java API package-creating package-Accessing Package. Java String.		
	Exception Handling	Periods	12
Unit - IV	Hierarchy, Advantage, Types, Keywords. Multithreading: Advantage, Multitasking. I/O Streams.		
	Applet Programming	Periods	12
Unit - V	Building Applet Code-Applet Life Cycle-Designing a web page-Applet Tag-Running the Applet.AWTEvent Handling: Introduction to AWT package-Swing Package-JDBC.		
	Total Periods		60

Text Books	
1	Balagurusamy, "Programming in Java", 4th Edition 2010, TMH, New Delhi. UnitÃ¢â‚¬"I (Chapter Ã¢â‚¬" 3.1,3.2,3.5,3.6,3.9,4.1 Ã¢â‚¬" 4.5, 5) Unit Ã¢â‚¬"II(Chapter Ã¢â‚¬" 8.2 -8.5,8.7 -8.9,8.16,9.1-9.4) Unit Ã¢â‚¬" III (Chapter Ã¢â‚¬" 8.11, 8.12,10.2,10.311.2,11.5,11.6) Unit Ã¢â‚¬" IV (Chapter Ã¢â‚¬"14.4,14.5,14.7,14.814.10) Unit Ã¢â‚¬"V (Chapter Ã¢â‚¬" 15.2,15.3,15.5-15.7,15.9-15.11,16.1-16.12)
References	
1	Herbert Scheldt, "Java2 The complete Reference" -McGraw Hill Publication
2	John R. Hubbard, "Programming With Java", 2nd Edition, TMH
E-References	
1	www.learnjavaonline.org
2	www.javaworld.com
3	www.onjava.com
4	www.java.sun.com

Signature of BOS Chairman

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**3**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U3CSCP04	Java Programming Lab	0	0	3	2	40	60	100

List of Experiments

1	Create a Simple Program Using Array in Java.
2	Create a Simple Program Using Java String.
3	Write a Java Program to Create Multi threading.
4	Write a Java Program to handle Exception Handling.
5	Write a Java Program for File Operation Using IO Stream.
6	Create Event Handling using Mouse.
7	Create Event Handling using Keyboard.
8	AWT Package Using Student Information.
9	Swing Package Using Telephone Bill System.
10	JDBC Using Employee Details.

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**3**
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
21U3CSS01	HTML AND WEB DESIGNING	3	0	0	3	25	75	100
COURSE OBJECTIVES	To inculcate knowledge on HTML concepts and Programming knowledge.To understand basic concepts of style sheets and graphics.							
POs	PROGRAMME OUTCOME							
PO 1	Develop problem solving abilities using a computer.							
PO 2	Build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.							
PO 3	Imbibe Quality Software Development practices							
PO 4	Create awareness about process and product standards							
PO 5	Train students in professional skills related to Software Industry.							
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.							
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks							

COs	COURSE OUTCOME
CO 1	Understand the basic concepts of HTML
CO 2	Applying Hyperlinks
CO 3	Creation Tables and Frames.
CO 4	Discuss about cascading style sheet
CO 5	Creation of Padding and Margins.
Pre-requisites	HTML is text-based computer-coding that can be made and run by children that understand the alphabet and symbols . Prospective web developers should have expertise in the three core programming components: HTML, CSS, and JavaScript

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	1	PO 1	2
		PO 2	2
		PO 3	6
CO 2	1	PO 4	1
		PO 5	2
		PO 6	4
CO 3	2	PO 7	5
CO 4	3		
CO 5	4		

COs	Programme Outcome (POs)							CO / PO Mapping (3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	2	2	2	3	2	1	1	
CO2	2	2	2	3	2	1	1	
CO3	3	3	3	2	3	2	2	
CO4	2	2	2	1	2	3	1	
CO5	1	1	1	1	1	2	2	

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	HTML Basics	Periods	6
	HTML Basics: Getting Started with web designing - Creating a Simple Page - Marking Up Text.		
Unit - II	Hyperlinks	Periods	6
	Hyperlinks: Adding Links -Adding Images.		
Unit - III	Tables & Forms	Periods	6
	Tables & Forms: Tables Markup - Forms - Embedded Media.		
Unit - IV	Cascading Style Sheet	Periods	6
	Cascading Style Sheet: Introducing Cascading Style Sheet - Formatting Text - Colors and Backgrounds.		
Unit - V	Padding and Margins	Periods	6
	Padding and Margins: Thinking Inside the Box - CSS Layout with Flex Box and Grid.		
	Total Periods		30

Text Books	
1	"Learning Web Designing" - A Beginnerâ€™s Guide to HTML , CSS , JavaScript and Web Graphics - Jennifer Niederst Robbins ,5th Edition , Oâ€™Reilly Media.
References	
1	"Web design with HTML", C. Xavier, TMH Publisher, 2000
E-References	
1	www.w3schools.com/html/
2	www.w3schools.com/html/html_responsive.a636sp
3	www.how - to - build - websites.com/

Signature of BOS Chairman

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**3**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U3CSCP05	HTML & Web Designing Lab	0	0	3	2	40	60	100

List of Experiments

1	Create a web page illustrating text formatting tags , font variations , paragraph alignment and headings in marquee.
2	Create a web page using hypertext link and image as hyperlink.
3	Design a catalog for a restaurant using lists.
4	Using Nested tables create your Mark sheet.
5	Create a class time table using tables.
6	Design a login form.
7	Prepare a student registration form.
8	Design an application for pay slip through HTML forms.
9	Create a HTML page to demonstrate the usage of Frames. Choose the content of the page on your own.
10	Design a simple college website.

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**4**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T P	C	CA	ESE Total
21U4CSC05	RELATIONAL DATABASE MANAGEMENT SYSTEMS		5	0 0	4	25	75 100
COURSE OBJECTIVES	The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS						
POs	PROGRAMME OUTCOME						
PO 1	To understand the fundamental concepts of computer system, including hardware and software.						
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.						
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.						
PO 4	To analyze impacts of computing on individuals, organization and society.						
PO 5	Train students in professional skills related to Software Industry.						
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.						
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks						

COs	COURSE OUTCOME
CO 1	Identify the basic concepts and various data model used in database design ER modelling concepts and architecture use and design queries using SQL
CO 2	Apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression fro queries.
CO 3	Recognize and identify the use of normalization and functional dependency, indexing and hashing technique used in database design.
CO 4	Recognize/ identify the purpose of query processing and optimization and also demonstrate the basic of query evaluation.
CO 5	Apply and relate the concept of transaction, concurrency control and recovery in database.
Pre-requisites	The proper understanding of data structures and algorithms will help you to understand the DBMS quickly.

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	4
		PO 3	3
CO 2	3	PO 4	4
		PO 5	6
		PO 6	3
CO 3	4	PO 7	3
CO 4	4		
CO 5	5		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	1	1	2	2
CO2	2	2	3	2	1	3	1
CO3	1	3	2	3	1	2	2
CO4	1	3	2	3	1	2	2
CO5	1	2	1	2	2	1	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction to DBMS:	Periods	12
	Introduction-Database System Applications - Purpose of Database Systems - View of Data - Database Languages and its types - Database Design - Database Engine - Database Architecture - Database Users and Administrators - History of Database Systems.		
Unit - II	Database Design Using ER Model:	Periods	12
	Overview - The Entity- Relationship Model - Mapping Cardinalities - Primary Key - Reducing ER Diagrams to Relational Schemas - ER Features -Symbols used in ER Notation.		
Unit - III	Relational Database Design:	Periods	12
	Relational Database Design- Features - Decomposition using Functional Dependency - NormalForms 1NF,2NF,3NF and BCNF. Relational Algebra: Introduction- Relational Algebra Operations.		
Unit - IV	SQL:	Periods	12
	Overview-Structure of SQL-Set Operations-Aggregate Functions- Modification of the Database -Joins-Transactions - Integrity Constraints .		
Unit - V	PL/SQL:	Periods	12
	History- Fundamentals - Block structure - comments -Ã,- Data types - Declaration - Assignment operation-cursor and exceptions. PL/SQL Named blocks: Procedure -Ã,- Function- Package- Triggers.		
	Total Periods		60

Text Books	
1	1. A Silberschatz, H Korth, S Sudarshan, "Database System and Concepts", 7th Edition McGraw-Hill, 2019.(Unit I to IV)
2	2.Database system using ORACLEÃ," , Nilesh Shah, PHI publication, 2nd Edition, 2010 (Unit V)
References	
1	1. Fundamentals of Data base management SystemÃ," , Alexix Leon and Mathew Leon, TMH Publications, 2010.
2	2. E-Book : Bill Pribyl, Steven Feuerstein, "Oracle PL/SQL Programming", OÃ¢â‚¬â„¢Reilly Media, Inc., 6th Edition, February 2014.
E-References	
1	www.javatpoint.com
2	www.w3schools.com
3	www.geeksforgeeks.org
4	www.oracletutorial.com

Signature of BOS Chairman

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**4**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U4CSCP06	Relational Database Management System Lab	0	0	3	2	40	60	100

List of Experiments

1	Data Definition Language (DDL) commands in RDBMS
2	Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS
3	Execute the following queries i) Display employee whose salary greater than 8000. ii) Display employee whose salary between 6000 and 15000. iii) Create a view employee with Ename, Phone and Department.
4	Write a program to implement Built in Functions in SQL.
5	Write a program to implement Set Operations.
6	Write PL/SQL Function to find factorial.
7	Write PL/SQL Program for Electricity Bill Calculation using Cursor.
8	Write a PL/SQL procedure to insert a number.
9	Write a Database Trigger for displaying Grade of the Student
10	Database Design and Implementation Pay Roll Processing.

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VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**4**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U4CSC06	Computer Networks	4	0	0	4	25	75	100

COURSE OBJECTIVES	Learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks
POs	PROGRAMME OUTCOME
PO 1	To understand the fundamental concepts of computer system, including hardware and software.
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.
PO 4	To analyze impacts of computing on individuals, organization and society.
PO 5	Train students in professional skills related to Software Industry.
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks

COs	COURSE OUTCOME
CO 1	Build an understanding of the fundamental concepts of computer networking.
CO 2	Familiarize the student with the basic taxonomy and terminology of the computer networking area.
CO 3	Analyze the contents in a given data link layer packet, based on the layer concept.
CO 4	Decide routing entries given a simple example of network topology.
CO 5	Analyze the details of Transport Layer Protocols and suggest appropriate protocol in reliable/unreliable communication.
Pre-requisites	Understand the basics of computer architecture and operating systems.

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	4
		PO 3	3
CO 2	5	PO 4	4
		PO 5	6
		PO 6	3
CO 3	4	PO 7	3
CO 4	6		
CO 5	4		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	1	1	2	2
CO2	1	2	1	2	2	1	1
CO3	1	3	2	3	1	2	2
CO4	1	1	1	1	3	1	1
CO5	1	3	2	3	1	2	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction of Computer Network	Periods	12
	Uses of Computer Network- LAN - WAN- MAN- Protocol Hierarchies - Protocols and Standards-Connection Oriented and Connection less Services - OSI Reference Model.		
Unit - II	Physical Layer	Periods	12
	Transmission Media: Guided Transmission media - Wireless Transmission - Communication Satellites -Public Switched Telephone Network.		
Unit - III	Data Link Layer	Periods	12
	Data Link Layer Design Issues - Error Detection and Correction - Elementary data link protocols - Sliding Window Protocols.		
Unit - IV	Network Layer	Periods	12
	Network Layer Design Issues. Routing Algorithms: Shortest Path- Link State - Distance Vector. Congestion Control Algorithms: Principles. Inter networking: - Fragmentation - IP Addresses -OSPF.		
Unit - V	Transport Layer	Periods	12
	Transport Services - Elements of Transport protocols - Application layer: DNS- Electronic mail-WorldWide Web.		
Total Periods			60

Text Books	
1	"Computer Networks" Andrew S. Tanenbaum, 5th Ed, PHI private Ltd, 2009.
References	
1	Behrouz A. Forouzan, "Data Communication and Networking", TMH, 2009.
E-References	
1	https://stevessmarthomeguide.com/basic-networking-course
2	https://www.studytonight.com/computer-networks

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	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations	**2021-2022**	
Department	**Computer Science**		Semester			**4**	
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
21U4CSS02	INTERNET OF THINGS	2	0	0	2	25	75	100
COURSE	The Internet of Things (IOT) is the nextwave, world is going to witness.							
OBJECTIVES POs	PROGRAMME OUTCOME							
PO 1	To understand the fundamental concepts of computer system, including hardware and software.							
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.							
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.							
PO 4	To analyze impacts of computing on individuals, organization and society.							
PO 5	Train students in professional skills related to Software Industry.							
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.							
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks							

COs	COURSE OUTCOME
CO 1	Able to understand the application areas of IOT
CO 2	Able to realize the revolution of Internet in Mobile Devices, Cloud & SensorNetworks
CO 3	Able to understand building blocks of Internet of Things and characteristics.
CO 4	Demonstrate the ability to transmit data wirelessly between different devices.
CO 5	appreciate the role of big data, cloud computing and data analytics in a typical IoT system
Pre-requisites	Higher-level protocols for the Internet of Things (IoT) offer various features that make them suitable for a broad range of applications.

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	3
		PO 3	4
CO 2	4	PO 4	5
		PO 5	1
		PO 6	6
CO 3	3	PO 7	3
CO 4	5		
CO 5	6		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	1	2
CO2	1	2	3	2	1	1	2
CO3	2	3	2	1	1	1	1
CO4	1	1	2	3	1	2	1
CO5	1	1	1	2	1	3	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction TO Internet OF Things:	Periods	06
	Introduction - Physical Design of IoT - Things in IoT, IoT Protocols.		
Unit - II	IoT Enabled Technologies:	Periods	06
	Wireless Sensor Networks - Cloud Computing - Big data analytics - Communication protocols - EmbeddedSystems.		
Unit - III	Domain Specific IoTs:	Periods	06
	Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.		
Unit - IV	IoT Platforms Design Methodology:	Periods	06
	Introduction - IoT Design Methodology.		
Unit - V	Logical Design Using Python:	Periods	06
	IoT Systems - Logical Design Using Python: Introduction - Installing Python - Python Data Types & DataStructures: Numbers - Strings - Lists.		
	Total Periods		30

Text Books	
1	1. Arshdeep Bahga and Vijay Madisetti, "Internet of Things - A Hands-on Approach", Universities Press, 2015.
References	
1	1. Samuel Greengard, "The Internet of Things".
2	2. Cuno Pfister, "Getting started with Internet of Things".
E-References	
1	1. https://wwkw.tutorialspoint.com/internet_of_things/
2	2.https://www.guru99.com/iot-tutorial.html
3	3. http://www.steves-internet-guide.com/internet-of-things/

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Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**5**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
21U5CSC07	Dot Net Programming		5	0	0	5	25	75	100
COURSE OBJECTIVES	To explore .NET technologies fordesigning and developing dynamic,interactive and responsive webapplications.								
POs	PROGRAMME OUTCOME								
PO 1	To understand the fundamental concepts of computer system, including hardware and software.								
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.								
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.								
PO 4	To analyze impacts of computing on individuals, organization and society.								
PO 5	Train students in professional skills related to Software Industry.								
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.								
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks								

COs	COURSE OUTCOME
CO 1	Understand the .NET framework.
CO 2	Introduce to .Net IDE Component Framework
CO 3	Use ADO.NET for data persistence in aweb application.
CO 4	Inculcate ability in creativity & design of computer support systems and skills for analyze various softwareapplications
CO 5	Understand & apply Data binding
Pre-requisites	Knowledge of C and C++

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	1	PO 1	1
		PO 2	4
		PO 3	3
CO 2	1	PO 4	4
		PO 5	6
		PO 6	3
CO 3	2	PO 7	3
CO 4	5		
CO 5	3		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	1	1	1	1
CO2	3	1	1	1	1	1	1
CO3	2	1	2	1	1	2	2
CO4	1	2	1	2	2	1	1
CO5	1	2	3	2	1	3	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction to .Net	Periods	15
	.Net Framework - Visual Basic .Net - Creating windows forms applications - creating a web formsapplication - Data types and variables - Operators -Conditional Logic.		
Unit - II	Procedures	Periods	15
	Procedures - Dialog Boxes - Dictionary Object - Namespaces - Visual Basic .Net IDE - Controls - Specificcontrols.		
Unit - III	Data Access	Periods	15
	Introduction to Data Access in .Net - Overview of ADO.Net - ADO .Net -Visual Studio .Net DatabaseTools.		
Unit - IV	Introduction to XML	Periods	15
	Introduction to XML in .Net - Introduction to Web Development - Introduction to ASP.Net - Pageframework.		
Unit - V	Web Controls	Periods	15
	Web Controls - Validation Control - Events - Cascading Style sheets - ASP.Net applications.		
	Total Periods		75

Text Books	
1	Bill Evjen &Jason Beres, Visual Basic .Net Programming Bible, Wiley Publishing, 2006
References	
1	David Chappell ,Understanding .NET ,Pearson education ,2002
2	Steven Holzner, VB.Net Programming Black book, Dreamtech ,2005
3	Matt J. Couch, ASP. NET and VB. NET Web programming, Pearson Education. 2002
E-References	
1	www.slideshare.net/
2	www.powershow.com/

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Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**5**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U5CSCP07	.Net Programming Lab	0	0	4	2	40	60	100

List of Experiments

1	Implementing.Net controls and creation of menus.
2	Mouse Events Using VB.Net
3	Implementing dialog controls
4	Validation control in ASP.Net
5	Implementing Data grid.
6	Web page creation using ASP.Net.
7	Implementation with connectivity of database.
8	Feedback form creation using ASP.Net.
9	Employee Database maintenance using ASP.Net.
10	Create a user control that displays the current date and time. Include it in a Web Form and refresh it each time a button is clicked.

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Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**5**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U5CSC08	PHP Programming	5	0	0	5	25	75	100

COURSE OBJECTIVES	Learn how to take a static website and turn it into a dynamic website run from a database using PHP and MySQL.
POs	PROGRAMME OUTCOME
PO 1	To understand the fundamental concepts of computer system, including hardware and software.
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.
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COs	COURSE OUTCOME
CO 1	Analyze PHP scripts and determine their behavior.
CO 2	Create PHP scripts capable of inserting and modifying data in a MySQL database
CO 3	Understand the concepts of Functions & Arrays
CO 4	Applying the concepts of Object Oriented PHP, Error and Exception Handling in PHP Programming
CO 5	Explore the concepts Strings and Regular Expression, Design the Web Form
Pre-requisites	To know JavaScript, CSS, HTML, APIs, Unix/Linux

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	4	PO 1	1
		PO 2	4
		PO 3	3
CO 2	3	PO 4	4
		PO 5	6
		PO 6	3
CO 3	2	PO 7	3
CO 4	3		
CO 5	5		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	3	2	3	1	2	2
CO2	1	2	3	2	1	3	1
CO3	2	1	2	1	1	2	2
CO4	1	2	3	2	1	3	1
CO5	1	2	1	2	2	1	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction to PHP	Periods	15
	History - General Language Features - PHP Basics: Embedding PHP Code in your Web Pages - Commanding Your Code - Output Data to the Browser. PHP Supported Data Types- Identifiers -Variables - Constants - Expressions -String - Interpolation. Control Structures: Conditional Statements -Looping Statements - File Inclusion Statements		
Unit - II	Introduction to MySQL	Periods	15
	Naming Database Elements-Choosing Your Column Types- Choosing other Column Properties-Accessing MySQL. Using PHP With MySQL Modifying The Template - Connecting To MySQL - Executing Simple Queries - Retrieving Query Results -Ensuring Secure SQL-Counting Returned Records- UpdatingRecords With PHP.		
Unit - III	Functions	Periods	15
	Invoking Function - Creating a Function - Function Libraries. Arrays: Creating an Array - Adding andRemoving Array Elements - Locating Array Elements - Traversing Array - Merging - Slicing - Splicing and Dissecting Array.		
Unit - IV	Object Oriented PHP	Periods	15
	Benefits of OOP - Key OOPs Concepts- Constructors and Destructors- Static Class Members -The instanceof Keyword- Error and Exception Handling- Configuration Directives- Error Logging-Exception Handling		
Unit - V	Strings and Regular Expression	Periods	15
	Other String Specific Function - Alternatives for Regular Expression Functions. Forms: PHP and WebForms-Taking Advantage of Pear: HTML_QuickForm-Installimg HTML_QuickForm-Creating a Simple Form- Using Auto-Completion		
Total Periods			75

Text Books	
1	"Beginning PHP and Oracle From Novoice to professional" W.Jason Gilmore and Bob Brylr edition Ã¢â‚¬" 2008
2	"PHP 6 and my SQL 5 " Larry Ullman -2008(chapter 4 & 8)
References	
1	"Spring into PH5 the Small Professional choice" Steven Holzner, Pearson education, Edition: First Impression 2006.
2	"PHP and my SQL for dynamic websites" ,¬" Larry Ullam-fourth edition 2015
3	"PHP 6 and my SQL ": bible ,¬" Steve Suehring, Tim converse, Joy Park -2009
E-References	
1	www.w3schools.com/php

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Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**5**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U5CSCP08	PHP Programming Lab	0	0	4	2	40	60	100

List of Experiments

1	Develop PHP program using the following Use of conditional statements in PHP Use of looping statements in PHP Use of different types of arrays
2	Write a PHP program to prepare the student marks list.
3	Create a PHP Program to find odd or even number from given numbers.
4	Write a PHP Program to demonstrate the variable function Gettype() b) Settype() c) Isset() d)Unset()
5	Give the example of String function Substr(); b) Strcmp() c) Strcasecmp() d) Strpos()
6	Write a PHP Program that demonstrates Form element input elements.
7	Database connectivity in PHP with MySQL
8	To Create a table using PHP Programming.
9	To create a table and do all the DDL commands using PHP Programming
10	Develop a PHP program to display student information using MYSQL table.
11	Creating simple webpage using PHP
12	Create a College Web site using PHP Program.

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Programme	**B.Sc**	Programme Code	**UCS**		Regulations	**2021-2022**
Department	**Computer Science**		Semester			**5**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U5CSCPR01	**Mini Project**	0	0	5	3	40	60	100

Project Work Pattern

FIRST REVIEW: **(20 Marks)**

1. Project Title
2. Project Platform (Language / Package Selected)
3. Confirmation Letter (from Company / Industry)
4. Details of Internal Guide with Designation & Qualification (in the company / Industry)
5. Presentation

SECOND REVIEW: **(20 Marks)**

1. Work Observation
2. Modules in Project (Design Screens Sample)
3. DFD / ERD / System Flow Diagram (Whichever Applicable)
4. Estimated Time of Completion
5. Completed Work in the form of Percentage Analysis
6. PowerPoint Presentation.

FINAL REVIEW: **(60 Marks)**

1. Documentation
2. Screens Shots
3. DFD / ERD / System Flow Diagram (Whichever Applicable)
4. Final Project Report (with executable format including complete source code)

The Passing minimum shall be 40% out of 60 marks (24 Marks)

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Programme	**B.SC**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**5**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
21U5CSS03	Soft Skill		2	0	0	2	25	75	100
COURSE OBJECTIVES	Develop effective presentation skills. Conduct effective business correspondence and prepare business reports which produce results.								
POs	PROGRAMME OUTCOME								
PO 1	To understand the fundamental concepts of computer system, including hardware and software.								
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.								
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.								
PO 4	To analyze impacts of computing on individuals, organization and society.								
PO 5	Train students in professional skills related to Software Industry.								
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.								
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks								

COs	COURSE OUTCOME
CO 1	Effectively communicate through verbal/oral communication and improve the listeningskills
CO 2	Improving Listening and Conversation.
CO 3	Time and resource management, conflict resolution, teaching and mentoring others
CO 4	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations
CO 5	To expose students to right attitudinal and behavioral aspects and to build the same throughactivities
Pre-requisites	Knowledge about Speaking Skills and Listening Skills

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	1
		PO 2	3
		PO 3	3
CO 2	4	PO 4	4
		PO 5	5
		PO 6	3
CO 3	5	PO 7	3
CO 4	3		
CO 5	5		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	2	1	1	2	2
CO2	1	2	2	3	2	2	2
CO3	1	1	1	2	3	1	1
CO4	1	3	3	2	1	3	1
CO5	1	1	1	2	3	1	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Nature of technical communication	Periods	6
	Nature of technical communication: Communication as sharing - Stages ofcommunication - Channels of communication - Nature of technical communication -Importance and need for technical communication - Technical communication skills.		
Unit - II	The Listening process	Periods	6
	The Listening process: Types of listening - Listening with a purpose - Barriers tolistening -The speech process - Conversation and oral skills - Strategies for good conversation - Improving fluency and self-expression - Body language.		
Unit - III	Job interviews	Periods	6
	Job interviews: Interview process - Characteristics of job interview-Pre-interviewpreparation techniques-Interview questions - Answering strategies - Frequently asked interview questions - Projecting a positive image - Alternative interview formats.		
Unit - IV	Group Discussion	Periods	6
	Group Discussion: Nature of group discussion - Characteristics of successful group discussions - Selection group discussion - Group discussion strategies - Techniques forindividual contribution - Group interaction strategies.		
Unit - V	Presentation Skills	Periods	6
	Presentation Skills: Nature and importance of oral presentation -Planning the presentation - Preparing the presentation - Organizing your presentation - Rehearsingthe presentation - Improving delivery.		
	Total Periods		30

Text Books	
1	M. Ashraf Rizvi, "Effective Technical Communication" Tata McGraw â€“ Hill Publishing Company Limited , New Delhi.Unit -I (Chapter-1), Unit-II(Chapter-4,6),Unit-III(Chapter-9), Unit-IV(Chapter-10), Unit-V(Chapter-11).
References	
1	Monippally, Matthukutty. M. 2001. Business Communication Strategies. 11thReprint. Tata McGraw-Hill. New Delhi
2	Sasikumar.V and P.V. Dhamija. "Spoken English: A Self-Learning Guide to Conversation Practice. ", 1993 34th Reprint. Tata McGraw-Hill. New Delhi.
E-References	
1	www. tutorialspoint.com.
2	www.myreaders.info.

Signature of BOS Chairman

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Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**6**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T P	C	CA	ESE Total
21U6CSC09	Python Programming		5	0 0	4	25	75 100

COURSE OBJECTIVES	To learn how to design and program Python applications.
POs	PROGRAMME OUTCOME
PO 1	To understand the fundamental concepts of computer system, including hardware and software.
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.
PO 4	To analyze impacts of computing on individuals, organization and society.
PO 5	Train students in professional skills related to Software Industry.
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks

COs	COURSE OUTCOME
CO 1	Explain basic principles of Python programming language
CO 2	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
CO 3	Express proficiency in the handling of strings and functions
CO 4	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
CO 5	Implement database and GUI applications
Pre-requisites	Experience with a high level language (C/C++, Java, MATLAB)

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	1
		PO 2	4
		PO 3	3
CO 2	2	PO 4	4
		PO 5	6
		PO 6	4
CO 3	3	PO 7	3

CO 4	4
CO 5	5

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	2	1	1	1	2
CO2	2	1	2	1	1	1	2
CO3	1	2	3	2	1	2	1
CO4	1	3	2	3	1	3	2
CO5	1	2	1	2	2	2	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Python Overview, Data Types, Expressions	Periods	10
	Python programming - variable, Datatype, Keywords, Literals, Operator, Expression, type conversion,Comments, input and output, Strings, Assignment and Comments - Numeric Data Types and Character Sets, Expressions.		
Unit - II	Functions, Modules and Control Statements	Periods	14
	Functions and Modules- Calling Functions, The math Module, The Main Module, Program Format and Structure and Running a Script from a Terminal Command Prompt - Iteration - for loop - Selection - Boolean Type, Comparisons, and Boolean Expressions, if-else Statements, One-Way Selection Statements, Multi-way if Statements, Logical Operators and Compound Boolean Expressions, Short- Circuit Evaluation and Testing Selection Statements - Conditional Iteration - while loop.		
Unit - III	Strings and Text Files	Periods	12
	Strings-Accessing Characters and Substrings in Strings - Data Encryption - Strings and Number Systems and String Methods- Text Files-Text Files and Format - Writing Text to a File - Writing Numbers to a File - Reading Text from a File - Reading Numbers from a File and Accessing and Manipulating Files and Directories on Disk.		
Unit - IV	Lists and Dictionaries	Periods	12
	Lists- List Literals and Basic Operators, Replacing an Element in a List, List Methods for Inserting and Removing Elements, Searching and Sorting a List, Mutator Methods and the Value None, Aliasing and Side Effects, Equality and Tuples - Defining Simple Functions - Syntax, Parameters and Arguments, return Statement, Boolean Functions and main function, Dictionaries-Dictionary Literals - Adding Keys andReplacing Values - Accessing Values, Removing Keys and Traversing a Dictionary.		
	Design with Functions and Classes, Graphical User Interface	Periods	12
Unit - V	Design with Functions and Design with Classes - Functions as Abstraction Mechanisms - Design with Recursive Functions and Managing a ProgramÃ¢â‚¬â„¢s Namespace - Data Modeling and Structuring Classes with Inheritance and Polymorphism - Behavior of terminal based programs and GUI based programs-Coding simple GUI based programs- Other useful GUI resources- Case Study: GUI based ATM.		
	Total Periods		60

Text Books	
1	Kenneth A. Lambert, Martin Osborne, "Fundamentals of Python: First Programs, Cengage Learning", second edition, 2018
References	
1	Dr. S. Suresh kumar, "Problem Solving and Python Programming" Charulatha Publications, 2018.
2	Python Essential Reference (4th Edition): David Beazley.
3	Michal Jaworski, TarekZiade, "Expert Python Programming ", Packt Publishing, Second Revised edition 2016.
4	Sam Washington, Dr. M. O. FaruqueSarker, "Learning Python Network Programming", Packt Publishing Limited, 2015.
E-References	
1	https://www.w3schools.com/python/1.
2	www.python.org/about/gettingstarted/
3	www.tutorialspoint.com/python/index.htm
4	www.realpython.com/python-beginner-tips/

Signature of BOS Chairman

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**6**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U6CSC10	R Programming	5	0	0	4	25	75	100

COURSE OBJECTIVES	Understand the basics in R programming in terms of constructs, control statements, string functionsUnderstand the use of R for Big Data analyticsLearn to apply R programming for Text processing.
POs	PROGRAMME OUTCOME
PO 1	Apply the knowledge of mathematics, science and computing in the core information technologies
PO 2	Build software systems and apply the technologies in various fields of Computer Technology, including hardware problems, Web site development and management, databases, and software engineering techniques.
PO 3	Design, implement and evaluate a computer-based system to meet the desired needs within the realistic constraints.
PO 4	Review literature and indulge in research using research based knowledge and methods to design new experiments, analyze, and interpret data to draw valid conclusions.
PO 5	Select and apply current techniques, skills, and tools necessary for computing practice and integrate IT-based solutions into the user environment effectively.
PO 6	Apply contextual knowledge to assess professional, legal, health, social and cultural issues during profession practice.
PO 7	Analyze the local and global impact of computing on individuals, organizations, and society.

COs	COURSE OUTCOME
CO 1	To understand the History and Overview of R
CO 2	To gain knowledge in Getting Data In and Out of R
CO 3	Able to understand various Vectorized Operations
CO 4	Able to understand various Control Structures in R
CO 5	Scoping Rules of R.
Pre-requisites	Basic knowledge of mathematics and programming language

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	3
		PO 3	4
CO 2	1	PO 4	1
		PO 5	5
		PO 6	4
CO 3	4	PO 7	2
CO 4	5		
CO 5	6		

COs	Programme Outcome (POs)							CO / PO Mapping (3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	2	2	2	2	2	2	2	
CO2	3	3	3	3	3	3	1	
CO3	1	1	1	1	1	1	1	
CO4	1	1	1	1	1	1	1	
CO5	1	1	1	1	1	1	1	

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	History and Overview of R	Periods	12
	What is R? What is S? The S Philosophy - Back to R - Basic Features of R - Free Software - Design of the R System - Limitation of R - R Resources Getting Started with R: Installation - Getting started with the R interface. R Nuts and Bolts: Entering Input - Evaluation - R Objects - Numbers - Attributes - Creating Vectors - Mixing Objects - Explicit Coercion - Matrices - Lists - Factors - Missing Values - Data Frames - Names.		
Unit - II	Getting Data In and Out of R	Periods	12
	Reading and Writing Data - Reading Data Files with read.table() - Reading in Larger Datasets with read.table - Calculating Memory - Requirements for R Objects - Using the readr Package - Using Textual and Binary Formats for Storing Data - Using dput() and dump() - Binary Formats - Interfaces to the Outside World - File Connections - Reading Lines of a Text File - Reading From a URL Connection		
Unit - III	Subsetting R Objects	Periods	12
	Subsetting R Objects - Subsetting a Vector - Subsetting a Matrix - Subsetting Lists - Subsetting Nested Elements of a List - Extracting Multiple Elements of a List - Partial Matching - Removing NA Values. Vectorized Operations - Vectorized Matrix Operations - Dates and Times - Dates in R Times in R - Operations on Dates and Times - Summary		
Unit - IV	Managing Data Frames	Periods	12
	Managing Data Frames with the dplyr package - Data Frames - The dplyr Package - dplyr Grammar - Installing the dplyr package - select() - filter() - arrange() - rename() - mutate() - group_by(). Control Structures - if-else - for Loops - Nested for loops - while Loops - repeat Loops - next, break - Summary.		
Unit - V	Functions and Standards	Periods	12
	Functions - Functions in R - Your First Function - Argument Matching - Lazy Evaluation The ... Argument - Arguments Coming After the ... Argument.Coding Standards for R - Loop Functions - Looping on the Command Line - lapply() - sapply() - split() - Splitting a Data Frame - tapply - apply() - Col/Row Sums and Means - Other Ways to Apply - mapply()		
Total Periods			60

Text Books	
1	Roger D. Peng, "R Programming for Data Science", LeanPub, 2015. (e-Book).
References	
1	Tony Fischetti, "Data Analysis with R", Paperback, PACKT Publications, 2015
2	Grolemund, Garrett, "Hands on Programming with R", Oâ€™ Reilly Inc., 2015
3	Paal Teetor, "R Cook Book", Oâ€™ Reilly, Paperback Edition, 2011
4	Joris Meys Andrie de Vries , "R Programming Dummies", Paperback Edition, 2016 (eBook).
E-References	
1	https://www.youtube.com/watch?v=_V8eKsto3Ug
2	https://www.youtube.com/watch?v=7NLPPFU0O3w
3	https://www.javatpoint.com/r-tutorial

Signature of BOS Chairman

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**6**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U6CSCP09	R Programming Lab	0	0	4	2	40	60	100

List of Experiments

1	Installing R and R Studio
2	Applying Simple Commands in R
3	R as aCalculator application
4	Execution of Loops and Functions via R - Control Structures
5	Basic Descriptive Statistics using *summary()* – *sapply()* – *describe()* – *stat.desc()* – by group using *aggregate()* in R
6	Reading and writing different types of Datasets in R
7	Visualizations: Visualize various Plotting and Graphics in R
8	Regression: Perform Simple Regression using R Package
9	Clustering: Apply k-means by using R Package
10	Classification: Use Random Forest / Naïve Bayes / NN by using R Package

Signature of BOS Chairman

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**6**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U6CSCP10	Python Programming Lab	0	0	4	2	40	60	100

List of Experiments

1	Write a python program using Control statements
2	Write a python program using Functions and String Operations
3	Write a python program using List, Tuples and List comprehensions
4	Write a python program using Inheritance
5	Write a python program using Synchronization
6	Write a python program using Text Files
7	Write a python program using Graphical user Interfaces
8	Write a python program using Exceptional Handling
9	Write a python program using Classes and Objects
10	Write a python program using Chat Applications

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**6**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T P	C	CA	ESE Total
21U6CSC13	Data Mining		5	0 0	4	25	75 100
COURSE OBJECTIVES	To fully understand standard data mining methods and techniques such as association rules, data clustering and classification.						

POs	PROGRAMME OUTCOME
PO 1	To understand the fundamental concepts of computer system, including hardware and software.
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.
PO 4	To analyze impacts of computing on individuals, organization and society.
PO 5	Train students in professional skills related to Software Industry.
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks

COs	COURSE OUTCOME
CO 1	To fully understand standard data mining methods and techniques such asassociation rules, data clustering and classification.
CO 2	Understand the functionality of the various datamining and data warehousing component
CO 3	Describe different methodologies used in datamining and data ware housing
CO 4	Adapt to new data mining tools.
CO 5	Explore recent trends in data mining such as web mining, spatial-temporal mining
Pre-requisites	Data mining requires knowing about math and statistics, programming, business concepts and communications.

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	1	PO 1	1
		PO 2	1
		PO 3	1
CO 2	1	PO 4	1
		PO 5	1
		PO 6	1
CO 3	1	PO 7	1

CO 4	1
CO 5	1

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3	3	3	3	1
CO2	3	3	3	3	3	3	1
CO3	3	3	3	3	3	3	1
CO4	3	3	3	3	3	3	1
CO5	3	3	3	3	3	3	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction to Data Mining	Periods	12
	Introduction: Data Mining - Data Mining Functionalities - Kinds of Patterns can be Mined - Classification - Data Mining Task Primitives - Major Issues. Data pre-processing: Descriptive Data Summarization - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and conceptHierarchy Generation.		
Unit - II	Data warehouse and OLAP Technology	Periods	12
	Data warehouse and OLAP Technology: Data Warehouse - A Multidimensional Data Model - DataWarehouse Architecture - Data Warehouse Implementation - From data warehouse to data mining.		
	Mining Frequent Patterns, Associations, and Correlations	Periods	12
Unit - III	Mining Frequent Patterns, Associations, and Correlations: Basic Concepts - Efficient and Scalable Frequent Itemset Mining Methods - Mining various kinds of Association Rules- From Association Mining to Correlation Analysis -. Constraint Based Association Mining. Classification and prediction: Issues regarding classification and prediction - Decision Tree Induction - Bayesian classification - Rule BasedClassification - Classification by Back propagation - Prediction.		
Unit - IV	Cluster Analysis	Periods	12
	Cluster Analysis: Types of Data in Cluster Analysis - A categorization of Major Clustering Methods - Partitioning Methods - Hierarchical Methods - Density Based Methods - Grid Based Methods - Model Based Clustering Methods - Outlier Analysis - Mining Time-Series Data - Mining Sequence Patterns inBiological Data.		
Unit - V	Spatial Data Mining, Applications and Trends in Data Mining	Periods	12
	Spatial Data Mining - Multimedia Data Mining - Text Mining -Mining the World Wide Web. Applicationsand Trends in Data Mining: Applications - Data Mining System Products and Research Prototypes - Additional Themes on Data Mining - Social Impacts of Data Mining - Trends in Data mining.		
	Total Periods		60

Text Books	
1	Jiwei Han, Michelien Kamber, "Data Mining Concepts and Techniques",Morgan Kaufmann Publishers an Imprint of Elsevier, 3rd Edition, 2012.(Unit I: Chapter 1,2, Unit II: Chapter 3, Unit III: Chapter5, 6, Unit IV: Chapter 7,8 Unit V: Chapter 10,11)
References	
1	Arun K.Pujari, "Data Mining Techniques", Universities Press (India) Limited, 2014.
2	Pang-NingTan,Michael Steinbach,Vipin Kumar, Introduction to Data Mining, Pearson, 2014
E-References	
1	freevideolectures.com Ã¢â‚¬Âº Computer Science Ã¢â‚¬Âº IIT Madras
2	videolectures.net/is2011_grobelnik_warehouses
3	www.learnerstv.com/video/Free-video-Lecture-1636-Computer-Science
4	mydatamine.com/2011/04/top-10-data-mining-video-sites
5	www.slideshare.net/vivekjv/data-warehouse-modeling-presentation

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**6**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
22U6CSS04	ETHICAL HACKING		2	0	0	2	25	75	100
COURSE OBJECTIVES	Understanding the basics Cryptography and Network Security.								
POs	PROGRAMME OUTCOME								
PO 1	To understand the fundamental concepts of computer system, including hardware and software.								
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.								
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.								
PO 4	To analyze impacts of computing on individuals, organization and society.								
PO 5	Train students in professional skills related to Software Industry.								
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.								
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks								

COs	COURSE OUTCOME
CO 1	Plan a vulnerability assessment and penetration test for a network.
CO 2	Execute a penetration test using standard hacking tools in an ethical manner.
CO 3	Report on the strengths and vulnerabilities of the tested network.
CO 4	Identify legal and ethical issues related to vulnerability and penetration testing.
CO 5	Be able to evaluate the security status of systems and suggest solutions for removing security vulnerabilities
Pre-requisites	Ethical Hacking is all about compromising computers and networks to analyze the security levels and act in good faith.

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	2
		PO 3	3
CO 2	4	PO 4	4
		PO 5	4
		PO 6	5
CO 3	5	PO 7	1
CO 4	3		
CO 5	3		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	2
CO2	1	1	2	3	3	2	1
CO3	1	1	1	2	2	3	1
CO4	2	2	3	2	2	1	1
CO5	2	2	3	2	2	1	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction to hacking,ports and protocols:	Periods	06
	Hacking-Introduction to hacking-Types of hacking-Phases of hacking-protocols in hacking-Virtualization.Deep web-Introduction to Deep web-Dark Net-TOR(The Online Router).		
Unit - II	Scanning,Hacking and Foot Printing:	Periods	06
	Scanning-What is scanning?Basics of scanning-Techniques of Scanning.System Hacking-Process of system hacking-Password Cracking.Foot printing-Foot Printing types.		
Unit - III	Malwares,Viruses and Worms:	Periods	06
	Malwares-Trojans-Working of Trojans.Virus-Introduction to virus-Working of Virus-Characteristics of virus.worms.		
Unit - IV	Social Engineering	Periods	06
	Social Engineering-Introduction to Social Engineering-Process of social engineering-Identity theft.Phishing-What is Phishing-phishing process-types of phishing Attacks.		
Unit - V	Cryptography and Stenography	Periods	06
	Cryptography:Cryptography-DigitalSignature-Hash functions.Stenography-what is stenography-stenography process-Terms associated with stenography-Methods-Stenogrphy tools.		
	Total Periods		30

Text Books	
1	1.Harsh Bothra,2017,"Hacking:Be a Hacker with Ethics",Kindle edition,Kanna Publishing.
References	
1	1.Roger A Grimes,2017,"Hacking the Hacker",John Wiley & Sons.
2	2.Michael Gregg,2017,Certified Ethical Hacker(CEH),Second Edition,Pearson IT Certification version 9.
E-References	

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**5**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
21U5CSE01	CRYPTOGRAPHY		5	0	0	3	25	75	100
COURSE OBJECTIVES	Cryptography is the practice and study of techniques for secure communication in the presence of third parties.Cryptography enables you to store sensitive information or transmit it across insecure networks (like the Internet) so that it cannot be r								
POs	PROGRAMME OUTCOME								
PO 1	To understand the fundamental concepts of computer system, including hardware and software.								
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.								
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.								
PO 4	To analyze impacts of computing on individuals, organization and society.								
PO 5	Train students in professional skills related to Software Industry.								
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.								
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks								

COs	COURSE OUTCOME
CO 1	Analyze and design classical encryption techniques and Block ciphers
CO 2	Understand and analyze data encryption standard
CO 3	Understand and analyze public -key cryptography,RSA and other public key cryptosystems
CO 4	Analyze and design hash and MAC algorithms,and digital signatures
CO 5	Design network application security schemes
Pre-requisites	Computer Networks

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	4	PO 1	1
		PO 2	4
		PO 3	3
CO 2	2	PO 4	4
		PO 5	5
		PO 6	3
CO 3	4	PO 7	5
CO 4	3		
CO 5	5		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	3	2	3	2	2	2
CO2	2	1	2	1	1	2	1
CO3	1	3	2	3	2	2	2
CO4	1	2	3	2	1	3	1
CO5	1	2	1	2	3	1	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Classical Cryptography	Periods	08
	Classical Cryptography: Introduction to Cryptography and Network Security - OSI Security Architecture - Introduction to Security Attacks - Security Mechanisms- Symmetric Cipher Model -Substitution Techniques: Caesar Cipher - Mono Alpha Cipher - Poly Alphabetic Ciphers, One Time Pad - TranspositionTechniques - Steganography.		
Unit - II	Block Ciphers	Periods	08
	Block Ciphers: Block Cipher Principles - Data Encryption Standard (DES) - Block Cipher models of operation - Advanced Encryption Standard (AES) - Blowfish , RC5Algorithm.		
Unit - III	Public Key Cryptography	Periods	09
	Public Key Cryptography : Principles of public key cryptosystems - The RSAAlgorithm - Key management - Diffie Hellman Key Exchange - EllipticCurve:Arithmetic, Elliptic Curve Cryptography.		
Unit - IV	Hash Functions and Cryptographic Applications	Periods	10
	Hash Functions and Cryptographic Applications: MAC - Hash Algorithm (MD5,SHA) - DigitalSignature Standard - Applications pertaining to Encryption using different ciphers and modes - One way hashing algorithms.		
Unit - V	Network and Internet Security	Periods	10
	Network and Internet Security : Transport Level Security- SSL - TLS - HTTPS - Wireless Network Security - IEEE 802.11i Wireless LAN Security - WAP End to EndSecurity - Electronic Mail Security - Pretty Good Privacy (PGP) - S/MIME.		
Total Periods			45

Text Books	
1	William Stallings,"Cryptography and Network Security â€“ Principles and Practice ", 7thEdition , Pearson Education,2017. ISBNâ€“13: 978 â€“ 9332585225.
References	
1	Atul Kahate, "Cryptography and Network Security",4th Edition,2019 ISBNâ€“10: 978 â€“ 9353163307
2	V.K.Jain ,"Cryptography and Network Security ",1st Edition Khanna Publishing â€“New Delhi,2013 ISBNâ€“10: 978 â€“ 9380016808.
E-References	
1	ttps://www.tutorialspoint.com/cryptography/index.htm
2	https://www.edureka.co/blog

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**5**
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
21U5CSE02	CLIENT/SERVER TECHNOLOGIES	5	0	0	3	25	75	100
COURSE OBJECTIVES	Client Server Technologies Model defines the way successful organizations will use technology during the next decade.							
POs	PROGRAMME OUTCOME							
PO 1	To understand the fundamental concepts of computer system, including hardware and software.							
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.							
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.							
PO 4	To analyze impacts of computing on individuals, organization and society.							
PO 5	Train students in professional skills related to Software Industry.							
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programme student outcomes and to the discipline.							
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks							

COs	COURSE OUTCOME
CO 1	Compare and contrast Client Software, Variousapplications and their issues.
CO 2	Understand all about the tools of the Internet system.
CO 3	Design a dynamic remote application with RMI and JDBC Connectivity
CO 4	Understand and Implement the Client Access Server Management.
CO 5	Understand and describe the applications of information technology and about internet Server System.
Pre-requisites	Knowledge of Advanced UNIX system programming.Concept of Computer networksFunctions of Operating System.

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	4	PO 1	2
		PO 2	4
		PO 3	3
CO 2	2	PO 4	4
		PO 5	5
		PO 6	3
CO 3	3	PO 7	3
CO 4	6		
CO 5	5		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	3	2	3	2	2	2
CO2	3	1	2	1	1	2	2
CO3	2	2	3	2	1	3	1
CO4	1	1	1	1	2	1	1
CO5	1	2	1	2	3	1	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Client/Server Computing	Periods	08
	Client/Server Computing - Advantages of Client / Server Computing - Technology Revolution- Connectivity - Ways to improve Performance - How to reduce network Traffic.		
Unit - II	Components of Client/Server Applications	Periods	08
	Components of Client/Server Applications - The Client: Role of a Client - Client Services - Request for Service. Components of Client/Server Applications - The Server: The Role of a Server - Server Functionality in Detail - The Network Operating System - What are the Available Platforms - The Server Operating system.		
Unit - III	Components of Client/Server Applications-Connectivity	Periods	09
	Components of Client/Server Applications -Connectivity: Open System Interconnect - Communications Interface Technology - Inter process communication - WAN Technologies.		
Unit - IV	Components of Client/Server Applicationsâ€“Software	Periods	10
	Components of Client/Server Applications-Software: Factors Driving demand for application software development - Rising Technology Staff costs - Need to improve Technology - Need for Common Interface across Platforms - Client/Server System DevelopmentMethodology. Components of Client/Server Applications-Hardware: Hardware/Network Acquisition- PC-Level Processing Units - Macintosh, notebooks, Pen -UNIX Workstation - x-terminals - Disk, Tape, Optical Disks,NIC and UPS.		
Unit - V	Components of Client/Server applicationsâ€“Service and Support	Periods	10
	Components of Client/Server applications-Service and Support: System Administration. The Future of Client/Server Computing: Enabling Technologies - Transformational Systems.		
	Total Periods		45

Text Books	
1	CLIENT/SERVER COMPUTING - Patrick Smith , Steve Guenferich, 2nd Edition , Prentice Hall of India Private Limited ,New Delhi.
References	
1	Internetworking with TCP/IP Client/Server Programming and its Applications by Douglas E Comer.
E-References	
1	www.clientserverworld.com
2	www.learnclientserveronline.com

Signature of BOS Chairman

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

Elayampalayam, Tiruchengode-637 205.

Programme	**B.Sc**	Programme Code	**UCS**	Regulations	**2021-2022**
Department	**Computer Science**		Semester		**5**

Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
21U5CSE03	Artificial Intelligence	5	0	0	3	25	75	100

COURSE OBJECTIVES	Working Knowledge of designing a expert systems and applying expert system technologies in designing and analyzing engineering systems.
POs	PROGRAMME OUTCOME
PO 1	Apply the knowledge of mathematics, science and computing in the core information technologies
PO 2	Build software systems and apply the technologies in various fields of Computer Technology, including hardware problems, Web site development and management, databases, and software engineering techniques.
PO 3	Design, implement and evaluate a computer-based system to meet the desired needs within the realistic constraints.
PO 4	Review literature and indulge in research using research based knowledge and methods to design new experiments, analyze, and interpret data to draw valid conclusions.
PO 5	Select and apply current techniques, skills, and tools necessary for computing practice and integrate IT-based solutions into the user environment effectively.
PO 6	Apply contextual knowledge to assess professional, legal, health, social and cultural issues during profession practice.
PO 7	Analyze the local and global impact of computing on individuals, organizations, and society.

COs	COURSE OUTCOME
CO 1	Solve basic AI based problems.
CO 2	Define the concept of Artificial Intelligence
CO 3	Apply AI techniques to real-world problems to develop intelligent systems.
CO 4	Apply AI techniques for reasoning.
CO 5	Defining with game playing in AI.
Pre-requisites	Strong knowledge of Mathematics.Good command over programming languages.

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	1
		PO 2	2
		PO 3	6
CO 2	2	PO 4	5
		PO 5	3
		PO 6	5
CO 3	5	PO 7	4
CO 4	2		
CO 5	5		

COs	Programme Outcome (POs)							CO / PO Mapping (3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	2	3	1	1	2	1	1	
CO2	2	3	1	1	2	1	1	
CO3	1	1	2	3	1	3	2	
CO4	2	3	1	1	2	1	1	
CO5	1	1	2	3	1	3	2	

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction	Periods	08
	Introduction: Artificial Intelligence Problems- Artificial IntelligenceTechniques-Criteria for Success. Problems, Problems Space, Search: State Space Search-Production Systems-Problem Characteristics- Issues in design of search. Heuristic Search Techniques: Generate & Test- Hill climbing- BestFirst, problem Reduction, Constraint satisfaction, Means End Analysis.		
Unit - II	Knowledge Representation Issues	Periods	08
	Knowledge Representation Issues: Representations and Mappings- Approaches to Knowledge representation-Issues in knowledgerepresentations-The Frame Problem. Using Predicate Logic: RepresentingSimple Facts in Logic-Representing instance and ISA Relationships- Computable Functions and Predicates- Resolution-Natural deduction.		
Unit - III	Representing Knowledge Rules	Periods	09
	Representing Knowledge Rules: Procedural vs. Declarative Knowledge- Logic Programming- Forward vs Backward Reasoning- Matching- Control Knowledge-Symbolic Reasoning under Uncertainty: Introduction to Nonmonotonic Reasoning- Logics for Nonmonotonic Reasoning-Implementation Issues Augmenting Problem Solver- Implementation: Depth First Search-Implementation: Breadth First Search		
Unit - IV	Statistical Reasoning	Periods	10
	Statistical Reasoning: Probability and Bayes Theorem-Certainty Factors and Rule-based Systems-Bayesian Networks- Dempster- Shafer Theory- Fuzzy Logic- Weak slot -Filler Structures: Semantic Nets Frames. Strong Slot Filler Structures: Conceptual Dependency- Scripts		
Unit - V	Game Playing	Periods	10
	Game Playing: Overview-The Minimax Search Procedure-Adding Alpha- Beta Cutoffs-Additional Refinements- Expert Systems: Representing and using Domain Knowledge-Expert system Shells-Explanation- KnowledgeAcquisition		
	Total Periods		45

Text Books	
1	Elaine Rich ,Kevin Knight,Shivashankar B Nair, "Artificial Intelligence", Tata McGraw-Hill Publication, 3rd Edition,2010
References	
1	Donald A.Waterman – A Guide to Expert Systems Tata Mcgraw Hill – secondEdition,1991.
2	Stuart Russell and Peter Norving ,"Artificial Intelligence – A Modern Approach"Second Edition,2007.
E-References	
1	www. tutorialspoint.com.
2	www.myreaders.info.

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2021-2022**
Department	**Computer Science**		Semester				**6**
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
21U6CSE04	COMPILER DESIGN	5	0	0	4	25	75	100

COURSE OBJECTIVES	To introduce the concept of compiler with in detail coverage of basic tasks, metrics, issues, and implication. To introduce the concept of Syntactic specification of programming languages.
POs	PROGRAMME OUTCOME
PO 1	To understand the fundamental concepts of computer system, including hardware and software.
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.
PO 4	To analyze impacts of computing on individuals, organization and society.
PO 5	Train students in professional skills related to Software Industry.
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks

COs	COURSE OUTCOME
CO 1	To develop skills in compiler basics and applications
CO 2	To Understand about specifications of programming languages in detail.
CO 3	Able to know how to apply syntax directed translation.
CO 4	Explores about run time storage and phase errors.
CO 5	To provide knowledge in code optimization and code generation.
Pre-requisites	FINITE AUTOMATA THEORY,CONTEXT FREE GRAMMAR

Knowledge Levels
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping
(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	1	PO 1	1
		PO 2	1
		PO 3	2
CO 2	2	PO 4	2
		PO 5	3
		PO 6	3
CO 3	3	PO 7	3
CO 4	4		
CO 5	5		

COs	Programme Outcome (POs)							CO / PO Mapping (3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	3	3	2	2	1	1	1	
CO2	2	2	3	3	2	2	2	
CO3	1	1	2	2	3	3	1	
CO4	1	1	1	1	2	2	2	
CO5	1	1	1	1	1	1	1	

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction to Compliers	Periods	12
	Compliers and Translator - Need of Translator - The structure of a Complier - Lexical analysis - Syntax analysis - Intermediate code generation -Optimization - Code generation - Complier writing tools. Finite automata and lexical Analysis: The role of the lexical analysis - A simple approach to the design of lexical analyzers- Regular expressions to finite automata - Minimizing the number of states of a DFA.		
Unit - II	The Syntactic specification of programming languages:	Periods	12
	Context free grammars -Derivations and parse trees - Capabilities of context free grammars. Basic parsing techniques: Parsers - Shift reduce parsing - Operator precedence parsing - Top down parsing - Predictive parsers.		
Unit - III	Syntax directed translation	Periods	12
	Intermediate code - Postfix notation - Parse trees and syntax trees - 3 address code - Quadruples and triples -Boolean expressions - Statements that alter the flow of control. Symbol tables: The contents of a symbol table - Data structures for symbol table - Representing scope		
Unit - IV	Run time storage administration	Periods	12
	Implementation of a simple stack allocation scheme -Implementation of block-structured languages. Error deduction and recovery: Errors - Lexical phase errors - Syntactic phase errors - Semantic errors.		
Unit - V	Introduction of code optimization	Periods	12
	The principle sources of optimization - Loop optimization - The DAG representation of basic blocks -Global data flow analysis. Code generation: Object programs - Problems in code generation-A simple code generator - Register allocation and assignment -Code generation from DAGâ€˜s-Peepholes optimization		
	Total Periods		60

Text Books	
1	Principles of Complier Design by Alfred V.Aho, Jeffrey D.Ullman , Narosa Publications House.
References	
1	Modern Compiler Design by David Galles, Fifth Edition 2012.
E-References	
1	http://www.w3schools.com/php/php_mysql_intro.asp.
2	http://www.tutorialspoint.com/mysql/mysql-php-syntax.htm
3	http://downloads.mysql.com/docs/apis-php-en.pdf

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations		**2022-2023**
Department	**Computer Science**		Semester				**6**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
21U6CSE05	Mobile Computing		5	0	0	4	25	75	100
COURSE	To gain knowledge about different mobile platforms and application development.								
OBJECTIVES POs	PROGRAMME OUTCOME								
PO 1	To understand the fundamental concepts of computer system, including hardware and software.								
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.								
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.								
PO 4	To analyze impacts of computing on individuals, organization and society.								
PO 5	Train students in professional skills related to Software Industry.								
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programâ€™s student outcomes and to the discipline.								
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks								

COs	COURSE OUTCOME
CO 1	Explain the basics of mobile telecommunication systems
CO 2	Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network
CO 3	Describe how mobile technology functions to enable other computing technologies
CO 4	To gain knowledge about different mobile platforms and application development.
CO 5	Illustrate the generations of telecommunication systems in wireless networks
Pre-requisites	History, evolution, classification, advantages and disadvantages, security issues, future trends

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	1	PO 1	1
		PO 2	3
		PO 3	3
CO 2	2	PO 4	4
		PO 5	6
		PO 6	3
CO 3	4	PO 7	4
CO 4	2		
CO 5	5		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	1	1	1	1
CO2	2	2	2	1	1	2	1
CO3	1	2	2	3	1	2	1
CO4	2	2	2	1	1	2	1
CO5	1	1	1	2	2	1	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction	Periods	12
	Applications - A Short history of wireless communication - A market for mobile communication - A short history of wireless communication - Some open research topics - A simplified reference model. Wireless transmission: Frequencies for radio transmission - Signals - Antennas - Signal propagation - Multiplexing -Modulation - Spread spectrum - Cellular systems		
Unit - II	Medium Access Control	Periods	12
	Motivation for a specialized MAC - SDMA - FDMA - TDMA - CDMA - Comparison of S/T/F/CDMA.Telecommunications systems: GSM-DECT-TETRA-UMTS and IMT-2000		
Unit - III	Satellite systems	Periods	12
	History - Applications - Basics - Routing - Localization - Handover - Examples. Broadcast systems - Overview - Cyclical repetition of data - Digital Audio Broadcasting - Digital Video Broadcasting - Convergence of broadcasting and mobile communications		
Unit - IV	Wireless LAN	Periods	12
	Infra red vs radio transmission - Infrastructure and ad-hoc network -IEEE 802.11 - HIPERLAN - Bluetooth		
Unit - V	Mobile Network Layer	Periods	12
	Mobile IP - Dynamic host configuration protocol - Mobile ad-hoc networks. Mobile Transport Layer:Traditional TCP - Classical TCP improvements - TCP over 2.5/3G wireless networks		
	Total Periods		60

Text Books	
1	Jochen Schiller, Mobile Communications, Pearson Education, Second Edition, 2003.
References	
1	William Stallings, Wireless Communications and Networks, Pearson Education, 2015.
2	Asoke K Talukder http://www.amazon.com/Mobile- Computing Applications-McGraw-Hill-Communications/dp/0071477330Mobile Computing: Technology, Applications, and Service Creation, TataMcGraw-Hill Communications Engineering, 2012.
E-References	
1	www.readorrefer.in/article/Mobile-Computing
2	www.readorrefer.in/article/Characteristics-of-Mobile-Computing
3	www.slideshare.net/manishreddy27/mobile-communication-72543084
4	www.powershow.com/view0/7841ea-NjI3N/Fundamentals_of_Mobile_communication_powerpoint_ppt_presentation

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) **Elayampalayam, Tiruchengode-637 205.**						
Programme	**B.Sc**	Programme Code	**UCS**		Regulations	**2021-2022**	
Department	**Computer Science**		Semester			**6**	
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
21U6CSE06	BIG DATA ANALYTICS		5	0	0	4	25	75	100
COURSE OBJECTIVES	Allow to assess how the choice of data structures and algorithm design methodsimpacts the performance of programs								
POs	PROGRAMME OUTCOME								
PO 1	To understand the fundamental concepts of computer system, including hardware and software.								
PO 2	To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.								
PO 3	To apply the appropriate technologies, skills and tools in various fields of Computer Science.								
PO 4	To analyze impacts of computing on individuals, organization and society.								
PO 5	Train students in professional skills related to Software Industry.								
PO 6	An ability to apply knowledge of computing and mathematics appropriate to the programme student outcomes and to the discipline.								
PO 7	Apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks								

COs	COURSE OUTCOME
CO 1	Understand Big Data and its analytics in the real world
CO 2	Analyze the Big Data framework like Hadoop and NOSQL to efficientlystore and process Big Data to generate analytics
CO 3	Design of Algorithms to solve Data Intensive Problems using MapReduce Paradigm
CO 4	Design and Implementation of Big Data Analytics using pig and spark tosolve data intensive problems and to generate analytics
CO 5	Implement Big Data Activities using Hadoop
Pre-requisites	Anybody with basic programming knowledge can learn Hadoop.

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	1
		PO 2	4
		PO 3	2
CO 2	3	PO 4	3
		PO 5	4
		PO 6	5
CO 3	4	PO 7	6
CO 4	4		
CO 5	3		

COs	Programme Outcome (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	3	2	1	1	1
CO2	1	2	2	3	2	1	1
CO3	1	3	1	2	3	2	1
CO4	1	3	1	2	3	2	1
CO5	1	2	2	3	2	1	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	Introduction	Periods	12
	Types of Digital Data: Classification of Digital Data. Introduction to Big Data: Characteristics of Data-Evolution of Big Data- Definition of Big Data- Challenges with Big Data-What is big Data? Why big Data? Traditional Business Intelligence versus Big Data-A Typical Data Warehouse Environment- A TypicalHadoop Environment.		
Unit - II	Big Data Analytics	Periods	12
	Where do we Begin? What is Big Data Analytics? What is Big Data Analytics IsnÃ¢â‚¬â„¢t? Classification ofAnalytics-Why Big Data Analytics Important? Challenges Facing Big Data-Data Science-Terminologies used in Big Data Environment-Basically Available Soft State Eventual consistency (BASE).		
Unit - III	The Big Data Technology Landscape: NoSQL: Hadoop	Periods	12
	Where it is used? What is it? Types of NoSQL Databases- Why NoSQL - Advantages of NoSQL- What we miss with NoSQL? -Use of NoSQL in Industry- NoSQL Vendors- SQL vs NoSQL-NewSQL-comparision of SQL, NoSQL and NewSQL.Hadoop:Feature of Hadoop-Key Advantage of Hadoop-versions of Hadoop-Overview of Hadoop Ecosystem- Hadoop Distribution- Hadoop versusSQL- cloud Based Hadoop solution		
Unit - IV	Introduction to Hadoop	Periods	12
	Introducing Hadoop-Why Hadoop?-why not RDBMS?- RDBMS vs Hadoop=Distributed Computing Challenges- History of Hadoop-Overview of Hadoop- Use Case of Hadoop- Hadoop Distribution-HDFS-Processing Data with Hadoop- Managing resources and Applications with Hadoop YARN-Interacting with Hadoop Ecosystem.		
Unit - V	Introduction to MongoDB	Periods	12
	What is MongoDB? -Why MongoDB-Terms Used in RBDMS and MongoDB- Data Types in MongoDB-MongoDB Query Language.		
	Total Periods		60

Text Books	
1	Seema Acharya, Subhashini Chellappan, "Big Data and Analytics", Wiley Publication, 2015.
References	
1	Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, "Big Data for Dummies", John Wiley & Sons, Inc., 2013.
2	Tom White, "Hadoop: The Definitive Guide", OÃ¢â‚¬â„¢Reilly Publications, 2011.
3	Kyle Banker, "Mongo DB in Action", Manning Publications Company, 2012.
4	Russell Bradberry, Eric Blow, "Practical Cassandra A developers Approach", Pearson Education, 2014.
E-References	
1	https://www.webopedia.com/TERM/B/Big_data_analytics.html
2	https://www.simplilearn.com/data-science-vs-big-data-vs-data-analytics-article

Signature of BOS Chairman