

**RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)**

**THANJAVUR -613005**

**Course structure for B.Sc., (Computer Science)**

**(Applicable to the candidates admitted from the academic year 2018-2019 onwards)**

<b>PART</b>	<b>CODE</b>	<b>COURSE</b>	<b>TITLE</b>	<b>HRS</b>	<b>MARKS</b>		<b>TOTAL</b>	<b>CREDIT</b>
			<b>SEMESTER I</b>		<b>IE</b>	<b>WE</b>		
<b>I</b>	<b>S1T1</b>	LT	PART I Tamil – I	6	25	75	100	3
<b>II</b>	<b>S1E1</b>	LE	PART-II English –I	6	25	75	100	3
<b>III</b>	<b>S1CS1</b>	CC1	Programming in C	6	25	75	100	5
<b>III</b>	<b>S1CSP1</b>	CC2	Major practical-I (C lab)	3	40	60	100	5
<b>III</b>	<b>S1ACSM1</b>	Allied 1	Allied Mathematics I	4	25	75	100	4
<b>III</b>	<b>S2ACSM3</b>	Allied 3	Allied Mathematics III	3	-	-	-	-
<b>IV</b>	<b>S1VE</b>	VE	Value Education	2	50	50	100	2
			<b>TOTAL</b>	<b>30</b>			<b>600</b>	<b>22</b>
			<b>SEMESTER II</b>					
<b>I</b>	<b>S2T2</b>	LT	PART I Tamil – II	6	25	75	100	3
<b>II</b>	<b>S2E2</b>	LE	PART II English - II	6	25	75	100	3
<b>III</b>	<b>S2CS2</b>	CC3	Data Structures And Algorithms	6	25	75	100	5
<b>III</b>	<b>S2CSP2</b>	CC4	Major practical-II (Data structure Lab using C)	3	40	60	100	5
<b>III</b>	<b>S2ACM2</b>	Allied 2	Allied Mathematics II	4	25	75	100	4
<b>III</b>	<b>S2ACM3</b>	Allied 3	Allied Mathematics III	3	40	60	100	4
<b>IV</b>	<b>S2ES</b>	ES	Environmental studies	2	50	50	100	2
			<b>TOTAL</b>	<b>30</b>			<b>700</b>	<b>26</b>

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<b>PART</b>	<b>CODE</b>	<b>COURSE</b>	<b>TITLE</b>	<b>HRS</b>	<b>MARKS</b>		<b>TOTAL</b>	<b>CREDIT</b>
			<b>SEMESTER III</b>		IE	WE		
I	<b>S3T3</b>	LT	PART I Tamil – III	6	25	75	100	3
II	<b>S3E3</b>	LE	PART-II English –III	6	25	75	100	3
III	<b>S3CS3</b>	CC5	Programming in Java	6	25	75	100	5
III	<b>S3CSP3</b>	CC6	Major practical-III (Programming in Java Lab)	3	40	60	100	5
III	<b>S3ACSP1</b>	Allied 4	Applied Physics I	4	25	75	100	4
III	<b>S4ACSP</b>	Allied 6	Applied Physics Practical	3	-	-	-	-
IV	<b>S3SB1F</b>	SB1	Hardware Trouble Shooting	2	50	50	100	2
			<b>TOTAL</b>	<b>30</b>			<b>600</b>	<b>22</b>
			<b>SEMESTER IV</b>					
I	<b>S4T4</b>	LT	PART I Tamil – IV	6	25	75	100	3
II	<b>S4E4</b>	LE	PART II English - IV	6	25	75	100	3
III	<b>S4CS4</b>	CC7	Programming in Python	6	25	75	100	5
III	<b>S4CSP4</b>	CC8	Major practical-IV (Python Lab)	3	40	60	100	5
III	<b>S4ACSP2</b>	Allied 5	Applied Physics II	4	25	75	100	4
III	<b>S4ACSP</b>	Allied 6	Applied Physics Practical	3	40	60	100	4
IV	<b>S4SB2D</b>	SB2	Fundamentals of Yogic Practices	2	50	50	100	2
			<b>TOTAL</b>	<b>30</b>			<b>700</b>	<b>26</b>

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PART	CODE	COURSE	TITLE	HRS	MARKS		TOTAL	CREDIT
			<b>SEMESTER V</b>		IE	WE		
III	<b>S5CS5</b>	CC9	Data Base Management System	6	25	75	100	4
III	<b>S5CSP6</b>	CC10	Major practical-V (MySQL Lab)	6	40	60	100	4
III	<b>S5CSEL1A</b>	MEC1	Computer Architecture	6	25	75	100	4
	<b>S5CSEL1B</b>		Visual Basic .Net					
	<b>S5CSEL1C</b>		Digital Computer Fundamentals					
III	<b>S5CSEL2A</b>	MEC2	Operating System	6	25	75	100	4
	<b>S5CSEL2B</b>		Management Information System					
	<b>S5CSEL2C</b>		Computer Graphics					
III	<b>S5COEL01</b>	NMEC1	Principles of Insurance	3	25	75	100	3
IV	<b>S5SSD</b>	SS	Soft Skill Development	2	50	50	100	2
IV	<b>S5SB3E</b>	SB3	Office Management Tools	1	50	50	100	2
			<b>TOTAL</b>	<b>30</b>			<b>700</b>	<b>23</b>
			<b>SEMESTER VI</b>					
III	<b>S6CS7</b>	CC11	Computer Networks	6	25	75	100	4
III	<b>S6CS8</b>	CC12	Micro Processor & Its Applications	6	25	75	100	4
III	<b>S6CSP6</b>	CC13	Major Practical –VI (Micro Processor Lab)	6	40	60	100	4
III	<b>S6CSEL3A</b>	MEC3	Software Engineering	6	25	75	100	4
	<b>S6CSEL3B</b>		Mobile Computing					
	<b>S6CSEL3C</b>		Software Testing					
III	<b>S6BAELO2</b>	NMEC2	Advertising and Sales Promotion	4	25	75	100	3
V	<b>S6GS</b>	GS	Gender Studies	2	50	50	100	1
V	<b>S6EA</b>	EXT. ACTV.	NSS/NCC/SPORTS/RED CROSS	-	-	-	-	1
			<b>TOTAL</b>	<b>30</b>			<b>600</b>	<b>21</b>
			<b>GRAND TOTAL</b>				<b>3900</b>	<b>140</b>

**RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)**

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<b>PART</b>	<b>SUBJECT</b>	<b>PAPERS</b>	<b>TOTAL CREDIT</b>
PART – I	TAMIL	4X3	12
PART – II	ENGLISH	4X3	12
PART – III	CORE	8X5=40, 5X4=20	60
	ELECTIVES	3X4	12
	ALLIED	6X4	24
PART –IV	NON-MAJOR	2X3	6
	ES,VE	2X2	4
	SKILL BASED	3X2	6
	SSD	1X2	2
	GS	1X1	1
PART - V	EXT, ACTIVITIES		1
TOTAL PAPERS		39      TOTAL CREDIT	140

Separate passing minimum is prescribed for Internal and External

- The passing minimum for CIA shall be 40% out of 25 Marks(ie. 10 Marks)
- The passing minimum for Autonomous Examinations shall be 40% out of 75 Marks (ie. 30 Marks)

Credits : 5

Hours/Week : 6

Medium of instruction: English

**Code: S1CS1**

**B.Sc (Computer Science) - Semester: 1**

(For students admitted from 2018 -2019 onwards)

**PROGRAMMING IN C**

**Objective:** *To understand the programming skills using arrays and files in C language.*

**UNIT I**

History of C – Importance of C – Basic Structure of C Programs – Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output Operations

**UNIT II**

Decision Making and Branching – Decision Making with IF Statement – Simple IF Statement – The IF ... ELSE Statement – Nesting of IF ... ELSE Statements – The ELSE IF Ladder – The Switch Statement – The ?: Operator – The GOTO Statement – Decision Making and Looping – The WHILE Statement – The DO Statement – The FOR Statement.

**UNIT III**

Arrays – One-Dimensional Arrays – Two-Dimensional Arrays – Multi-dimensional Arrays – Character Arrays and Strings – Declaring and Initializing String Variables – Reading and Writing Strings – Arithmetic Operations on Characters – Comparison of Two Strings – String-handling Functions .

**UNIT IV**

User-Defined Functions – Function Declaration – Category of Functions – Nesting of Functions – Recursion – Storage Classes – Structures and Union – Arrays of Structures – Arrays within Structures – Structures within Structures – Structures and Functions – Unions.

**UNIT V**

File Management – Defining and Opening a File – Closing a File – Input / Output Operations on Files – Error Handling During I/O operations – Random Access to Files – Command Line Arguments.

**Text book:**

E. Balagurusamy, *Programming in ANSI C*, Tata McGraw Hill Education Private Ltd., Sixth Edition, 2013.

Unit I : Chapter 1 (Sections 1.1, 1.2, 1.8), Chapters 2, 3 & 4

Unit II Chapter 5 & Chapter 6 (Sections 6.1 to 6.4)

Unit III: Chapter 7 (Sections 7.1 to 7.7) & Chapter 8 (Sections 8.1 to 8.8)

Unit IV: Chapter 9 & Chapter 10 (Sections 10.1 to 10.12)

Unit V : Chapter 12

**Reference book:**

R.S. Bichkar, *Programming with C*, University Press, 2012

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 5

Hours/Week : 6

Medium of instruction: English

**Code: S1CSP1**

**B.Sc (Computer Science) - Semester: 1**

(For students admitted from 2018 -2019 onwards)

**PROGRAMMING IN C LAB**

**Objective:** *To Impart Practical Training in C Programming Language*

1. Convert temperature from Centigrade to Fahrenheit.
2. Find whether the given number is Even or Odd.
3. Find the greatest of three numbers.
4. Display Monday to Sunday using switch statement.
5. Display first Ten Natural Numbers and their sum.
6. Find Multiplication of Two Matrices.
7. Find the maximum number in Array using pointer.
8. Reverse a number using pointer.
9. Solve Quadratic Equation using functions.
10. Find factorial of a number using Recursion.
11. Show Call by Value and Call by Reference.
12. Add two numbers using pointer.
13. Create a file containing Student Details.
14. Update the details of student's information using various file modes.

Signature of the HOD

COE

Credits : 2

Hours/Week : 2

Medium of Instruction : English/Tamil

Code: SIVE

**இளநிலை யட்ட வகுப்பு - பகுதி IV**

(2018-2019 ஆம் கல்வியாண்டு முதல் சேர்க்கப்பட்ட மாணவர்களுக்குரியது)

**முதல் பருவம்**

**வாழ்வியல் கல்வி (Value Education)**

**அலகு - 1**

வாழ்வியல் கல்வி ஓர் அறிமுகம், தனி மனித நெறிமுறைகள், சமுதாய நெறிமுறைகள், ஆன்மீக நெறிமுறைகள், வாழ்வியல் நெறிகளின் மூலங்கள், வாழ்வியல் நெறிகளின் அவசியம், நன்னடத்தையும் நற்செயல்களும், நற்பண்புகள் உருவாக்கம்.

**அலகு - 2**

சமூக நற்பணி, சமூக நலப்பணித் திட்டங்கள், சமுதாயத் தீமைகள் குறித்த விழிப்புணர்வு, போதை மருந்துகளுக்கு அடிமையாதல், மதுப்பழக்கம், புகைப்பிடித்தல், தற்கொலை.

**அலகு - 3**

இந்து சமயத்தின் போதனைகள், இஸ்லாம் போதிக்கும் நெறிகள், கிறித்துவம் போதிக்கும் நெறிகள், சமயச் சார்பின்மை, சமய நல்லிணக்கம்.

**அலகு - 4**

காந்தியடிகளின் அகிம்சை கொள்கை, அன்னை தெரசாவின் தொண்டுகள், தன்னலமின்மையின் வடிவம் பெருந்தலைவர் காமராசர்.

**அலகு - 5**

சமூக நீதி, மனித உரிமைகளும் அவற்றின் பாதுகாப்பும், மகளிர்க்கு எதிரான வன்முறைகள், நாட்டின் ஒருமைப்பாடு.

**Question Paper Pattern**

Maximum Marks : 50

Exam Duration : 3 Hours

Part A - 5 x 4 = 20 (5 Out of 7 atleast 1 Question from each Unit)

Part B - 3 x 10 = 30 (3 Out of 5 - 1 Question from each Unit)



Credits : 5

Hours/Week : 6

Medium of instruction: English

**Code: S2CS2**

**B.Sc (Computer Science) - Semester: 2**  
(For students admitted from 2018 -2019 onwards)

## **DATA STRUCTURES AND ALGORITHMS**

**Objective:** *To understand the concepts of Data Structures and Algorithms.*

### **UNIT I**

Introduction and Preliminaries : Basic Terminology, Elementary Data Organization, Data Structures – Data Structure Operations, Algorithms – Mathematical Notations and Functions – Control Structures

Arrays – Introduction – Linear Array, Representation of Linear Array in Memory, Traversing Linear Arrays, Inserting and Deleting, Multidimensional Arrays

### **UNIT II**

Stacks – Array Representation of Stack, Arithmetic Expressions: Polish Notation – Recursion. Queues and Linked Lists : Queues – Deques – Array Representation Queues – Insertion and Deletion

### **UNIT III**

Linked List, Representation of Linked Lists in Memory, Traversing a Linked List, Insertion into a Linked List, Deletion from a Linked List, Two-Way Linked Lists.

### **UNIT IV**

Trees and Graphs : Binary Trees, Representing Binary Trees in Memory, Traversing Binary Tree – Threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree – Graph Theory – Terminology, Sequential Representation of Graph: Adjacency Matrix, Path Matrix.

### **UNIT V**

Sorting and Searching: Sorting – Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Quick sort, Heap Sort – Searching; Linear Search, Binary Search.

### **Text Book:**

Seymour Lipschutz and G.A. Vijayalakshmi Pai (Schaum's Series), *Data Structures*, Tata McGraw Hill Publishing Company Ltd., New Delhi, Indian Adopted Edition, 2006.

Unit I: Chapter I (Sections 1.1 to 1.5) & Chapter II (Sections 2. 2, 2 .4, 2.5)  
Chapter IV (Sections 4.1 to 4.6 , 4.10)

Unit II : Chapter VI (Sections 6.1 to 6.3, 6.5, 6.7, 6.10 to 6.12)

Unit III : Chapter V (Sections 5.1 to 5.4, 5.7, 5.8, 5.11)

Unit IV : Chapter VII (Sections 7.1 to 7.10) & Chapter VIII (Sections 8.1 to 8.3)

Unit V : Chapter IX (Sections 9.1 to 9.6, 4.6 to 4.8, 6.6, 7.17)

**Reference Book:**

Ashok N. Kamthane, *Introduction to Data Structures in C*, Pearson Edition, 2007.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 5

Hours/Week : 6

Medium of instruction: English

**Code: S2CSP2**

**B.Sc (Computer Science) - Semester: 2**  
(For students admitted from 2018 -2019 onwards)

**DATA STRUCTURE LAB USING C**

**Objective:** *To Impart Practical Training in data structure using C Programming Language*

1. Merging two arrays into a single array.
2. To find the following in a matrix:
  - i. Row Sum
  - ii. Column Sum
  - iii. Trace Sum (Sum of Diagonal Elements)
  - iv. Sum of all the elements
3. Matrix addition and multiplication operations
4. Find an element using sequential search.
5. Find an element using binary search.
6. Perform sorting using bubble sort.
7. Perform sorting using insertion sort.
8. Perform sorting using selection sort.
9. Find the factorial of a number using recursion
10. PUSH and POP an element from STACK
11. Insert and delete an element from QUEUE.
12. Insert and delete a node in a linked list

Signature of the HOD

COE

Credits : 2  
Hours/Week : 2  
Medium of Instruction : English/Tamil

Code: S2ES

**இளநிலை யட்ட வகுப்பு - பகுதி IV**

(2018-2019 ஆம் கல்வியாண்டு முதல் சேர்க்கப்பட்ட மாணவர்களுக்குரியது)

**இரண்டாம் பருவம்**

**சுற்றுச்சூழல் அறிவியல்**

**அலகு - 1**

சுற்றுச்சூழல் அறிவியலின் பத்துறை ஆய்வு அணுகுமுறை - சுற்றுச்சூழல் வகைகளும், கூறுகளும் - சுற்றுச்சூழல் அறிவியலின் வாய்ப்புகள் - சுற்றுச்சூழல் அறிவியலின் முக்கியத்துவம் - சுற்றுச்சூழல் கல்வியில் பத்துறை அணுகுமுறையின் பங்கு - பொதுமக்களிடையே சுற்றுச்சூழல் விழிப்புணர்வின் தேவை - சுற்றுச்சூழல் குறித்து பொதுமக்களின் விழிப்புணர்வு - இயற்கை வளங்கள் - புதுப்பிக்கக்கூடிய மற்றும் புதுப்பிக்க இயலாத வளங்கள் - இயற்கை வளங்களும் அதன் பிரச்சனைகளும் - வன வளம், நீர் வளம், கனிம வளம் - உணவு வளம், சக்தி வளம், நில வளம் - இயற்கை வளங்களைப் பாதுகாப்பதில் ஒவ்வொருவரின் பங்கு - நீடித்த வாழ்க்கை முறைக்கு வளங்களின் சமமான பயன்பாடு.

**அலகு - 2**

சூழல் தொகுப்பு - சூழல் தொகுப்பின் அடிப்படைக் கொள்கைகள் - சூழல் தொகுப்பின் அமைப்பு மற்றும் செயல்கள் - உயிர் புவி வேதியியல் சுழற்சி - ஆற்றலும் அது சூழல் தொகுப்பில் பாய்ந்தலும் - சூழியல் வழிமுறை தொடர் வளர்ச்சி - உணவுச் சங்கிலி மற்றும் உணவு வலை - சூழல் தொகுப்பின் முப்பட்டை கோபுரம் - சூழல் தொகுப்புகளின் வகைகள், பண்புகள், அமைப்பு, செயல்கள் - நிலச்சூழல் தொகுப்பு, நீர்ச்சூழல் தொகுப்பு.

**அலகு -3**

உயிரின வளம் மற்றும் அதன் பாதுகாப்பு - உயிரின வளம் - வரையறை - இந்தியாவின் உயிர்புவியியல் வகைப்பாடு - உயிரின வளத்தின் மதிப்புகள் - உலகளாவிய, தேசிய மற்றும் மாநில அளவிலான உயிரின வளம் - இந்தியா ஓர் உயிரின வளமிக்க தேசம் - உயிரின வள செழுமை இடங்கள் - உயிரின வளத்தின் அச்சுறுத்தல்கள் - இந்தியாவில் உள்ள அபாயத்திற்குள்ளாகிய சிற்றினங்கள் மற்றும் இடச்சூழல் சிற்றினங்கள் - உயிரின வளப்பாதுகாப்பு - சுற்றுச்சூழல் மாசுபாடு - வரையறை, மூலங்கள், விளைவுகள் மற்றும் கட்டுப்படுத்தும் வழிமுறைகள் - காற்று மாசுபாடு, நீர் மாசுபாடு - மண் மாசுபாடு - கடல்நீர் மாசுபாடு - இரைச்சல் மாசுபாடு - வெப்ப மாசுபாடு - கதிரியக்க ஆபத்து - திடக்கழிவு : மூலங்கள், விளைவுகள், கட்டுப்படுத்தும் முறைகள், நகர மற்றும் தொழிற்சாலைக் கழிவுகள் - மாசுக்கட்டுப்பாட்டில் தனி மனிதனின் பங்கு - உதாரண சாட்சியங்கள் - இயற்கைச் சீற்றங்களும் அவற்றைத் தடுக்கும் வழிமுறைகளும் வெள்ளம், நிலநடுக்கம், புயல் மற்றும் நிலச்சரிவு.

அலகு -4

சமூகச் சிக்கல்களும், சுற்றுச்சூழலும் - வளம் குன்றிய மேம்பாட்டிலிருந்து வளம் குன்றா மேம்பாடு - சக்தி மூலங்களுடன் சம்மந்தப்பட்ட நகரப் பிரச்சனைகள் - நீர் பாதுகாப்பு, மழை நீர் சேகரிப்பு, நீர் பிடிப்பு மேலாண்மை - மக்கள் குடிப்பெயர்வு - குடியமர்த்தல் - மறுவாழ்வுப் பணிகள் இவற்றின் பிரச்சனைகளும், தீர்வுகளும் - சுற்றுச்சூழல் நன்னெறிகள் - பசுமையக விளைவு - அமில மழை - ஓசோன் (கமழி) அடுக்கு செறிவுகுறைதல் - களர் நிலம் பண்படுத்துதல் - நுகர்தலும், கழிவுகளும் - சுற்றுச்சூழல் சட்டம் - காற்று (மாசுக்கட்டுப்பாடு மற்றும் பாதுகாப்பு ) சட்டம் - நீர் (மாசுக் கட்டுப்பாடு மற்றும் பாதுகாப்பு ) சட்டம் - வனவிலங்கு (பாதுகாப்பு) சட்டம் - வனப்பாதுகாப்புச் சட்டம் - சுற்றுச்சூழல் சட்டங்களை அமுலாக்குவதில் ஏற்படும் சிக்கல்கள் - சமுதாய விழிப்புணர்வு.

அலகு - 5

மக்கள் தொகையும் சுற்றுச்சூழலும் - மக்கள் தொகை வளர்ச்சியும், உலக நாடுகளிடையே உள்ள வேறுபாடுகளும் - மக்கள் தொகை விரைவுப் பெருக்கம் - குடும்பநலத் திட்டம் - சுற்றுச்சூழல் மனித நலவாழ்வும் - மனித உரிமைகள் - பயன் மதிப்புக் கல்வி - எச்.ஐ.வி / எய்ட்ஸ் - பெண்கள் மற்றும் குழந்தைகள் நலன் - சுற்றுச்சூழல் மற்றும் மனித நலவாழ்வில் தகவல் தொழில் நுட்பத்தின் பங்கு - சமூக அமைப்பில் பெண்களின் நிலை - ஓர் எடுத்துக்காட்டு.

பார்வை நூல்:

1. அபாசி, எஸ்.எ. 1998இ சுற்றுச்சூழல் வேதியியல், சிபிஎஸ் பதிப்பகம், புதுடில்லி.

### Question Paper Pattern

Maximum Marks : 50

Exam Duration : 3 Hours

Part A - 5 x 4 = 20 (5 Out of 7 atleast 1 Question from each Unit)

Part B - 3 x 10 = 30 (3 Out of 5 - 1 Question from each Unit)

Credits : 5

Hours/Week : 3

Medium of instruction: English

**Code: S3CS3**

**B.Sc (Computer Science) - Semester: 3**  
(For students admitted from 2018 -2019 onwards)

**PROGRAMMING IN JAVA**

**Objective:** *To understand the programming skills using object oriented concepts in Java language.*

**UNIT I**

Fundamentals of Object Oriented Programming: Introduction – Object oriented paradigm – OOP Concepts - Benefits and Applications of OOP. Overview of Java Language: Java Program Structure – Implementing a Java Program – Java virtual Machine – Constants, Variables and Data types - Operators and expressions – Decision making and branching - Decision making and looping.

**UNIT II**

Classes, Objects and Methods : Introduction – Defining a Class – Field and Method declaration – Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Finalizer Method - Arrays, Strings and Vectors.

**UNIT III**

Interfaces: Multiple Inheritances - Defining, Extending, Implementing and Accessing Interfaces. Packages: Introduction – Java API Packages - Using System Packages – Naming Conventions - Creating, Accessing and using a Package. Multithreaded Programming: Creating Thread – Life cycle of a Thread – Using Thread methods – Thread Exceptions – Thread Priority.

**UNIT IV**

Managing Errors and Exceptions: Type of Errors - Syntax of Exception Handling Code – Multiple Catch Statements – Throwing our own Exceptions. Managing Input / Output files in Java: Concept of Stream – Stream Classes – Using the File Class.

**UNIT V**

Graphics Programming: The Graphics Class - Applet Programming: Introduction – Building Applet Code - Applet Life Cycle – Designing Web Page – Applet Tag – Passing Parameters to Applet.

**Text Book:**

E.Balagurusamy, *Programming with Java*, Tata McGraw Hill, and 4th Edition.

UNIT I: Chapter 1, 3.5, 3.9, 3.10, 4, 5, 6, 7)

UNIT II: Chapter 8.1 to 8.9, 8.11 to 8.15, 9

UNIT III: Chapter 10, 11.1 to 11.7, 12.2, 12.5, 12.6, 12.7, 12.8

UNIT IV: Chapter 13.2, 13.4, 13.5, 13.7, 16.2, 16.3, 16.8

UNIT V: Chapter 15.2, 14.1, 14.4, 14.5, 14.7, 14.8, 14.12

**Reference Book:**

Herbert Schildt, *The Complete Reference Java*, Tata McGraw Hill, 4<sup>th</sup> Edition.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 5

Code: S3CSP3

Hours/Week : 3

Medium of instruction: English

**B.Sc (Computer Science) - Semester: 3**  
(For students admitted from 2018 -2019 onwards)

**PROGRAMMING IN JAVA LAB**

**Objective:** *To Impart Practical Training in Java Programming Language*

1. Write a program to sort the given numbers using arrays.
2. Write a program to implement the FIND and REPLACE operations in the given multiple text.
3. Write a program to implement a calculator to perform basic arithmetic Operations.
4. Write a program to find out sum of digits of given number
5. Write a program to find the area of a rectangle using constructor
6. Write a Java program to display the count of all commands line arguments and list each in a line
7. Write a program to find the student's percentage and grade using command line arguments.
8. Write a program to draw circle or triangle or square using polymorphism and inheritance.
9. Implement multiple inheritance concepts in java using interface, you can choose your own example of a company or education institution or a general concept which requires the use of interface to solve a particular problems.
10. Write a program to create threads and assign priorities to them
11. Write a program to develop an applet to play multiple audio clips using multithreading.
12. Write a program to create a window with three check boxes called red, green and blue. The applet should change the colors according to the selection.

Signature of the HOD

COE



Credits : 2

Hours/Week : 2

Medium of instruction: English

**Code: S3SB1F**

**B.Sc (Computer Science) - Semester: 3**  
(For students admitted from 2018 -2019 onwards)

### **HARDWARE TROUBLE SHOOTING**

**Objective:** *To understand the trouble shooting for the hardware problems occurred in a system*

#### **UNIT I**

Introduction mother boards & its types-ports, slots, connectors, add on cards, power supply units, and cabinet types.

#### **UNIT II**

Storage devices: primary & secondary storage medium-magnetic disc, RAM, ROM, PROM, EPROM, Floppy, CD Rom, CDRW, DVD, Virtual memory, Cache memory, Linear & Physical memory, video memory.

#### **UNIT III**

Hardware Trouble Shooting: Printers, floppy drive, Microphone.

#### **UNIT IV**

Hardware Trouble Shooting: Scanner, Network, Hardware failure, Testing, CMOS, CDROM, Hard disk drive,

#### **UNIT V**

Hardware Trouble Shooting: Monitor, Mother Board, Sound Card, Video Card, Tips.

#### **Text Book**

G.Dalin. *M.Sc software Engineering*, HSI PUBLICATIONS

#### Question Paper pattern

Maximum Marks: 50

Exam Duration: Three Hours

Part A 5x4 = 20 Answer any FIVE question from seven questions (one question from each unit and two questions from any one of five unit)

Part B 3x10 = 30 Answer any THREE questions from five questions (one question from each unit)

Signature of the HOD

COE

Credits : 5

Hours/Week : 6

Medium of instruction: English

**Code: S4CS4**

**B.Sc (Computer Science) - Semester:4**  
(For students admitted from 2018 -2019 onwards)

**PROGRAMMING IN PYTHON**

**Objective:** *To understand the programming skills using functions and list in Python language.*

**UNIT I**

Introduction to Computer and Python Programming: Introduction – What is Computer? Overview of Programming Languages – History of Python. Basics of Python Programming –Introduction – Python Character Set – Token – Python Core Data Type – The print() Function – Assigning Value to a Variable – Multiple Assignments – Writing Simple Programs in Python – The input() Function – The eval() Function- Formatting Number and Strings- Python Inbuilt Functions.

**UNIT II**

Operators and Expressions: Introduction – Operators and Expressions – Arithmetic Operators – Operator Precedence and Associativity – Changing Precedence and Associativity of Arithmetic Operators – Translating Mathematical Formulae into Equivalent Python Expressions – Bitwise Operator – The Compound Assignment Operator. Decision Statements – Decision Making Statements. Loop Control Statements – The While Loop – The for Loop – The break statement – The Continue Statement.

**UNIT III**

Functions: Introduction – Syntax and Basics of a Function – Use of a Function – Parameters and Arguments in a Function – The Local and Global Scope of a Variable – The return Statement – Recursive Functions – The Lambda Function. Strings – Introduction – The str Class – Basic Inbuilt Python Functions for String – The index [ ] Operator –Traversing String with FOR and WHILE Loop – Immutable Strings – The String Operators – String Operations.

**UNIT IV**

Lists: Introduction – Creating Lists – Accessing the Elements of a List – Negative List Indices – List Slicing List Slicing with Step Size – Python Inbuilt Functions for Lists – The List Operator – List Comprehensions – List Methods. Object – Oriented Programming : Class, objects and Inheritance : Defining Classes – The Self – Parameter and Adding Methods to a Class – Display Class Attributes and Methods- Special Class Attributes – Accessibility – The\_init\_Method(Constructor) – Passing An Object as Parameter to a Method - \_del\_() (Destructor Method) – Inheritance – Types of Inheritance- Method Overriding.

## UNIT V

Graphics Programming: Drawing with Turtle Graphics: Introduction – Getting Started with the turtle Module – Moving the Turtle in any Direction – Moving Turtle to Any Location – The Color, bgcolor, circle and Speed Method of Turtle – Drawing with Colors – Drawing Basic Shapes using Iterations – Changing Color Dynamically Using List – Turtles to Create Bar Charts. File Handling: Introduction – Need of File Handling - Text Input and Output.

### Text Book:

Ashok Namdev Kamthane Amit Ashok Kamthane, “*Programming and Problem Solving With PYTHON*”,– Mc Graw Hill Education.

Unit I : Chapter 1.1 – 1.4, 2.1 – 2.12

Unit II : Chapter 3.1 – 3.8, 4.7, 5.2, 5.4, 5.6, 5.7

Unit III: Chapter 6.1 – 6.8, 7.1 – 7.8

Unit IV: Chapter 8.1 – 8.10, 10.2 – 10.11, 10.13, 10.14, 10.21

Unit V : Chapter 12.1 – 12.9, 13.1 – 13.3

### Reference Books:

1. John Zelle, *Python Programming: An Introduction to Computer Science*, Franklin, Beedle & Associates Inc
2. Mark Lutz , *Learning Python, 5th Edition*, Shroff

### Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 5  
Hours/Week : 3  
Medium of instruction: English

**Code: S4CSP4**

**B.Sc (Computer Science) - Semester: 4**  
(For students admitted from 2018 -2019 onwards)

**PYTHON LAB**

**Objective:** *To Impart Practical Training in Python Programming Language*

1. Write a Program to find Square Root of a Number.
2. Write a Program to Reverse a Four Digit Number using % and // Operators.
3. Write a Program to Read the Radius of a Sphere and calculate the Volume of the Sphere  
Volume of Sphere =  $\frac{4}{3} * 3.14 * r^3$
4. Write a Program to find the Maximum of a List of Numbers.
5. Write a Program to calculate the Factorial of a Number using Recursion.
6. Write a Recursive Function which Computes  $n^{\text{th}}$  Fibonacci Numbers.
7. Write the Function ReplaceVowels(Word) Which removes all the Vowels( 'a', 'e', 'i', 'o', 'u') in a Word and Returns the Remaining Letters in the Word..
8. Write a Program to Return Prime Numbers from a List.
9. Write a Program to Search an Element from a List.
10. Write a Program for Binary Search.
11. Write a Program to implement Bubble Sort.
12. Write a Program to implement Selection Sort.
13. Write a Program to Simulate Bouncing Ball using Pygame.
14. Write a Program to Override Display() method in Multiple Inheritance.

Signature of the HOD

COE

Credits : 2

Hours/Week : 2

Medium of instruction: English

Code: S4SB2D

**B.Sc(Computer Science) - Semester: 4**  
(For students admitted from 2018 -2019 onwards)

**FUNDAMENTALS OF YOGIC PRACTICES**

**Objective:** *To understand the basic concepts in yoga*

**UNIT I**

Introduction to Human Anatomy and Physiology – Need and Scope of Anatomy and Physiology in Yoga –Types of various systems in the Human Body.

**UNIT II**

Concept of Yogic Practices – Kinds of Yogic Practices: Asana, Pranayama, Kriya, Bandha, Mudra, Dhyana.

**UNIT III**

Asana: Meaning - Principles of practicing asanas– Classification of asana.

**UNIT IV**

Pranayama – Meaning – Stages of Pranayama: Puraka, Rechaka, & Kumbhaka -Breathing regulation- Benefits of Pranayama.

**UNIT V**

Kriyas & Dhyana (Meditation) – Types of kriya - Methods of practicing & Benefits of: Kapalabhati & Neti. - Meditation: Meaning – Types of Meditation – Breath awareness – Body Awareness- Transcendental Meditation.

**Text books:**

1. Swami Kuvalayananda and Dr.S.L. Vinekar, *Yogic therapy*, Kaivalyadhama SM YM samiti, Lonavla, Pune Dist, Maharashtra.
2. Swami kuvalayananda: *Pranayama*, Kaivalyadhama, Lonavala, Pune.
3. Bangali Baba, *Yoga Sutra of Patanjali*, Motilal Banaridass Publishers, 1996.
4. Swami Satyananda Saraswati, *A systematic course in the ancient tantric techniques of yoga and kriya*, Bihar school of yoga, Bihar, 1981.

**Reference Books:**

1. Dr. P. Mariayyah, *Asanas*, Sports Publications, Raja Street, Coimbatore-1.
2. Dr. K. Chandrasekaran, *Sound Health Through Yoga*, Prem Kalyan Publications, Sedapatti, Tamilnadu 1999.
3. Dr.M.L. Gharote and S.K. Ganguly. *Teaching methods for yogic practice*, Kaivalyadhama, Lonavla.
4. Dr. M.L. Gharote, *applied yoga* kaivalyadhama, Lonavla.
5. Sri. O.P. Tiwari: *Asanas why? And How?* Kaivalyadhama, Lonavla.

Question Paper pattern

Maximum Marks: 50

Exam Duration: Three Hours

Part A  $5 \times 4 = 20$  Answer any FIVE question from seven questions (one question from each unit and two questions from any one of five unit)

Part B  $3 \times 10 = 30$  Answer any THREE questions from five questions (one question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S5CS5**

**B.Sc(Computer Science) - Semester: 5**  
(For students admitted from 2018 -2019 onwards)

## **DATABASE MANAGEMENT SYSTEM**

**Objective :** *To provide the basic concepts of the Database Systems including Data Models, Storage Structure, Normalization and SQL*

### **UNIT I**

Introduction: Database-System Applications- Purpose of Database Systems - View of Data - Database Languages - Relational Databases - Database Design -Data Storage and Querying Transaction Management -Data Mining and Analysis - Database Architecture - Database Users and Administrators - History of Database Systems.

### **UNIT II**

Relational Model: Structure of Relational Databases -Database Schema - Keys – Schema Diagrams - Relational Query Languages - Relational Operations. Fundamental Relational- Algebra Operations Additional Relational-Algebra Operations- Extended Relational-Algebra Operations.

### **UNIT III**

SQL: Overview of the SQL Query - Language - SQL Data Definition - Basic Structure of SQL Queries - Additional Basic Operations - Set Operations - Null Values - Aggregate Functions - Nested Subqueries - Modification of the Database -Join Expressions - Views - Transactions - Integrity Constraints - SQL Data Types and Schemas – Authorization.

### **UNIT IV**

Relational Languages: The Tuple Relational Calculus - The Domain Relational Calculus. Database Design and the E-R Model: Overview of the Design Process - The Entity- Relationship Model - Reduction to Relational Schemas - Entity-Relationship Design Issues - Extended E-R Features - Alternative Notations for Modeling Data - Other Aspects of Database Design.

### **UNIT V**

Relational Database Design: Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional-Dependency Theory - Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies-More Normal Forms - Database-Design Process.

**Text Book:**

Abraham Silberschatz, Henry F. Korth, S.Sudarshan “ *Database System Concepts*”, Sixth edition, McGraw-Hill-2010.

Unit I- Chapter 1.1 – 1.9, 1.12, 1.13

Unit II – Chapter 2, 2.1-2.6, 6.1

Unit III – Chapter 3.1 - 3.9, 4.1 – 4.6

Unit IV – Chapter 7.1, 7.2, 7.6 – 7.10

Unit V – Chapter 8.1 – 8.8

**Reference Book:**

Ramez Elmasri, *Database Systems: Models, Languages, Design and Application*, Pearson Education 2014

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE



Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S5CSP5**

**B.Sc(Computer Science) - Semester: 5**  
(For students admitted from 2018 -2019 onwards)

### **MySQL - LAB**

**Objective:** *To Impart Practical Training in MySQL Software*

1. Write a MySQL statement to create a Simple Table Countries including Columns Country\_ID, Country\_Name and Region\_ID.
2. Write a MySQL statement to change Salary Employee to 8000 Who's ID is 105, if the Existing Salary is less than 5000
3. Write a MySQL statement to Rename Table Countries to Country\_New and to add a Column Region\_ID to the Table.
4. Create the above tables by properly specifying the primary keys and the foreign keys
5. Develop MySQL queries to implement String operations using % , ' \_ ' and Sort the element using asc,desc
6. Write a MySQL statement to Joining Tables.
7. Implement the following transaction control statements Commit , Rollback, Save point
8. Write a MySQL statement to Aggregate Functions.
9. Write a MySQL statement to Built in Function.
10. Write a MySQL statement to differentiate the Drop and Delete Table.
11. Create database for a store and Enter at least five tuples for each relation
12. Create a table containing phone number, user name, address of the phone user. Write a Function to search the address using phone number.

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S5CSEL1A**

**B.Sc(Computer Science) - Semester: 5**  
(For students admitted from 2018 -2019 onwards)

### **COMPUTER ARCHITECTURE**

**Objective:** *To understand the digital logic circuits and its components*

#### **UNIT I**

Digital Logic Circuits: Digital computers – Logic Gates – Boolean Algebra – Map simplification – Combinational Circuits – Flip Flops - Sequential Circuits.

#### **UNIT II**

Digital components: Integrated circuits – Decoders – Multiplexers- Registers – Shift Registers – Binary counters – Memory Unit.

#### **UNIT III**

Data Representation: Data Types – Complements – Fixed Point representations – Floating Point representations – Other binary codes – Error detection codes.

#### **UNIT IV**

Register Transfer and Micro Operations: Register transfer Language – Register transfer – Bus and Memory Transfer – Arithmetic Micro operations – Logic Micro operations – Shift Micro operations – Arithmetic Logic Shift Unit.

#### **UNIT V**

Central Processing Unit: Introduction - General Register organization – Stack Organization – Instruction formats – Addressing modes – Data transfer and manipulation – Program control.

#### **Text Book:**

Morris Mano M, *Computer System and Architecture* by Prentice Hall of India, 3<sup>rd</sup> Edition

Unit I : Chapter 1.1 to 1.7

Unit II : Chapter 2.1 to 2.7

Unit III: Chapter 3.1 to 3.6

Unit IV: Chapter 4.1 to 4.7

Unit V : Chapter 8.1 to 8.7

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S5CSEL1B**

**B.Sc(Computer Science) - Semester: 5**

(For students admitted from 2018 -2019 onwards)

**VISUAL BASIC .NET**

**Objective:** *To understand the programming skills using vb .net*

**UNIT I**

Introduction – Start Page – IDE main window- Class view window-Object browser – Code window – Intelligence- Compiling the code – Code Debugging- Developing a simple VB.NET console application – Developing simple VB.NET project through visual studio IDE

**UNIT II**

Variables Constants and Expressions: Value types and Reference types- Variable Declaration and initialization – Value Data Types- Reference Data types – Boxing and un boxing- Arithmetic operators-Text box control – Label control- Button control– Control Statements: IF statement – Radio button, Check box, Group Box, List Box, Checked list box, Combo box Control – Select.. Case, While, Do, for statements

**UNIT III**

Methods and Arrays: Type of methods- Arrays- One dimensional- multidimensional Arrays- Jagged Arrays - Classes Properties and Indexes: Definition and usage of a class- Constructor overloading – Copy constructor – Instance and shared Class members – Shared constructors – Properties – Indexers- Inheritance and Polymorphism: Virtual Methods- Abstract Classes and Abstract Methods- Sealed classes

**UNIT IV**

Definition and usage of Interfaces – Namespaces – Delegates – Events – Default Exception Handling Mechanism – User Defined exception handling mechanism – Back tracking – Throw statement – Custom exception – Usage of thread – Thread class – Start(),Abort(), Join(), Sleep(), Suspend() and Resume methods

**UNIT V**

I/O Streams: Streams – Binary data files – Text files – Data files – File info and Directory Info classes – Database Connectivity: Advantages of ADO.NET – Managed Data providers – Developing simple application – Creation of a Data table – Retrieving Data from Tables – Table updating

**Text Book:**

C. Muthu *Visual Basic.Net*, , Vijay Nicole Imprints Private Limited

Unit I : Chapter 2

Unit II: Chapter 3, 4

Unit III: Chapter 5, 6, 7

Unit IV: Chapter 8, 9, 10, 11

Unit V: Chapter 12, 15

**Reference Books**

1. Jeffrey R. Shapiro The Complete Reference -Visual Basic .NET, Tata McGraw Hill, 2002
2. Programming Microsoft Visual Basic.NET – Francesco Balena, Micro soft press

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S5CSEL1C**

**B.Sc(Computer Science) - Semester: 5**  
(For students admitted from 2018 -2019 onwards)

### **DIGITAL COMPUTER FUNDAMENTALS**

**Objective :** *To understand the concepts in Digital Computer System*

#### **UNIT I**

Number Systems and Codes: Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Binary Addition – Binary Subtraction – Binary Multiplication and Division – Octal Numbers – Hexadecimal Numbers – Binary Codes – Error Detecting Codes – Error Correcting Codes.

#### **UNIT II**

Logic Gates and Circuits: Boolean Algebra and Logic Gates – AND, OR, NOT, NAND, NOR, Exclusive OR and Exclusive OR Gates – Applications of XOR Gate – The Exclusive NOR Gate – Positive and Negative Logic – Logic Characteristics – Bipolar Logic Families – Integrated Circuits – Boolean Algebra: Definitions – Fundamentals of Boolean Algebra – Boolean Functions – Minterms and Maxterms – Laws and Theorems of Boolean Algebra – DeMorgan's Theorem – Universal Building Blocks (UBB) – NAND Gate as UBB – NOR Gate as UBB.

#### **UNIT III**

Boolean Algebra: Simplifying Logic Circuits – Sum of Products – AND-OR Networks – Sum of Products and Product of Sums Forms – Karnaugh Maps – Product of Sums Simplification – NAND and NOR Implementation – AND-OR-INVERT Implementation – OR-AND-INVERT Implementation – Don't Care Conditions – Overlapping Groups – Rolling the Map – Eliminating Redundant Groups.

#### **UNIT IV**

Combinational Logic Circuits: Introduction – Adders – The Half Adder – The Full Adder – Subtractors – BCD Adder – Multiplexers – Demultiplexers – Decoders – Encoders – Floating Point Number System – Range of Stored Numbers.

#### **UNIT V**

Sequential Logic Circuits: Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop – Triggering of Flip Flops – Master Slave Flip Flop – Conversion of D Flip Flop – Conversion of T Flip Flop – Transfer Circuit – Clock – Counters and Shift Registers: Counters – Asynchronous or Ripple Counter – Ring Counter – Twisted Ring Counter – State Diagrams and State Tables – Magnitude Comparator – Programmable Arrays of Logic Cells – Shift Registers.

**Text Book:**

Dr. K. Meena *Principles of Digital Electronics*, PHI Learning Private Limited, New Delhi, 2009.

**Reference Book:**

M. Morris Mano *Digital Logic Design*, , Pearson Education, 2010

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S5CSEL2A**

**B.Sc(Computer Science) - Semester: 5**  
(For students admitted from 2018 -2019 onwards)

### **OPERATING SYSTEM**

**Objective:** *To understand memory management, processor management and device management of operating system*

#### **UNIT I**

Importance of operating system – Basic concepts and terminology – an operating system resource manager – Os process view point - I/O programming.

#### **UNIT II**

**Memory Management:** Single contiguous allocation – partitioned allocation – relocatable partitioned memory management – paged memory management - demand paged memory management – segmented memory management – segmented and demand paged memory management.

#### **UNIT III**

**Processor management:** State model - Job scheduling – process scheduling – Process synchronization.

#### **UNIT IV**

**Device management :** Techniques for device management – device characteristics-hardware considerations – I/O traffic controller, I/O scheduler, I/O device handlers – Virtual devices.

#### **UNIT V**

**Information management:** Introduction - A Simple file system - general model of a file system – logical file system - physical file systems.

#### **Text Book:**

Stuart .E. Madnick and John J. Donovan “*Operating System*”, Tata McGraw Hill book company limited.

Unit I: Chapter 1.1, 1.2, 1.3, 1.4, 2.3

Unit II: Chapter 3.1, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8

Unit III: Chapter 4.1, 4.2, 4.3, 4.5

Unit IV: Chapter 5.1, 5.2, 5.5, 5.6

Unit V : Chapter 6.1, 6.2, 6.3, 6.7, 6.8



Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S5CSEL2B**

**B.Sc(Computer Science) - Semester: 5**  
(For students admitted from 2018 -2019 onwards)

### **MANAGEMENT INFORMATION SYSTEM**

**Objective:** *To understand the concepts Management Information Systems and their Applications.*

#### **UNIT I**

Definition of MIS – Systems approach – meaning and objectives of MIS – MIS and use of computer – limitations of MIS.

#### **UNIT II**

Computer Software for information systems – introduction – system software – Application software – Software Trends.

#### **UNIT III**

Information system in Business – introduction – Functional areas of Business – marketing information system – Human Resource Information system.

#### **UNIT IV**

Application of Information Technology in Business – Introduction of ECommerce, Mobile Commerce, E- Governance, E- enterprises, From PC to the Web.

#### **UNIT V**

Information security, Ethics and Society – Challenges of Securing computer systems – Types of Security Breaches, Cyber Laws and IT Act 2000 – Ethical and social Dimensions of Information Technology.

#### **Text Books:**

1. A.K. Gupta, S. Chand “*Management Information System*”, A.K. Gupta, S. Chand and Company, 2010
2. Dr. S.P. Rajagopalan “*Management Information System*”, – Margham Publications, 2012

#### **Reference Books:**

1. P. Mohan, “*Management Information System*”, Himalaya Publishing House, 2006
2. D.P. Goyal, Macmillan “*Management Information System*”, Managerial Perspectives, , 2010

RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S5CSEL2C**

**B.Sc(Computer Science) - Semester: 5**  
(For students admitted from 2018 -2019 onwards)

## **COMPUTER GRAPHICS**

### **Objective:**

*To understand the concepts on basic Graphical Techniques, Raster Graphics, Two Dimensional and Three Dimensional Graphics.*

### **UNIT I**

Overview of Computer Graphics System: Video Display Devices – Raster Scan Systems – Random – Scan Systems - Graphics Monitors and Workstations – Input Devices – Hardcopy Devices – Graphics Software.

### **UNIT II**

Output Primitives: Line Drawing Algorithms – Loading the Frame Buffer – Line Function – Circle – Generating Algorithms. Attributes of Output Primitives: Line Attributes – Curve Attributes – Color and Grayscale levels– Area fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions.

### **UNIT III**

2D Geometric Transformations: Basic Transformation – Matrix Representations – Composite Transformations – Window to View port Co-Ordinate Transformations. Clipping: Point Clipping – Line Clipping – Cohen-Sutherland Line Clipping – Liang BarskyLineClipping – Polygon Clipping – Sutherland – Hodgman Polygon Clipping – Curve Clipping – TextClipping.

### **UNIT IV**

Graphical User Interfaces and Interactive Input Methods: The User Dialogue – Input of Graphical Data – Input Functions – Interactive Picture Construction Techniques. Three Dimensional Concepts: 3D-Display Methods – #Three Dimensional Graphics Packages.

### **UNIT V**

3D Geometric and Modeling Transformations: Translation – Scaling – Rotation – Other Transformations.Visible Surface Detection Methods: Classification of Visible Surface Detection Algorithm –Backface Detection – Depth-Buffer Method – A-Buffer Method – Scan-Line Method –Applications of Computer Graphics.

### **Text Book:**

Donald Hearn M. Pauline Baker, “*Computer Graphics*” C Version, Second Edition, Pearson Education, 2014.

**Reference Book:**

Sunil Kumar Sharma, ManojSinghal “*Computer Graphics*”, , Pearson Education,2014

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A  $10 \times 2 = 20$  Answer All Question (Two questions from each unit)

Part B  $5 \times 5 = 25$  Answer All questions (Either or Type – Two questions from each unit)

Part C  $3 \times 10 = 30$  Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credit : 2

CODE: 55SSD

Hours/week : 1

Medium of Instruction: English/Tamil  
SOFT SKILLS DEVELOPMENT

### Learning Objective

Today's world is all about relationship, communication and presenting oneself, one's ideas and the company in the most positive and impactful way. This course intends to enable students to achieve excellence in both personal and professional life.

#### Unit I

Know Thyself/ Understanding Self

Introduction to Soft skills-Self discovery-Developing positive attitude-Improving perceptions-Forming values

#### Unit II

Interpersonal Skills/ Understanding Others

Developing interpersonal relationship-Team building-group dynamics-Net working-Improved work relationship

#### Unit III

Communication Skills / Communication with others

Art of listening-Art of reading-Art of speaking-Art of writing-Art of writing e-mails-e mail etiquette

#### Unit IV

Corporate Skills / Working with Others

Developing body language-Practising etiquette and mannerism-Time management-Stress management

#### Unit V

Selling Self / Job Hunting

Writing resume/cv-interview skills-Group discussion- Mock interview-Mock GD - Goal setting - Career planning

### TEXT BOOKS:

Meena.K and V.Ayothi (2013) A Book on Development of Soft Skills (Soft Skills : A Road Map to Success), P.R. Publishers & Distributors, No, B-20 & 21, V.M.M. Complex, Chatiram Bus Stand, Tiruchirappalli- 620 002.  
(Phone No: 0431-2702824; Mobile No: 94433 70597, 98430 74472)

Alex K. (2012) Soft Skills - Know Yourself & Know the World, S.Chand & Company. LTD, Ram Nagar, New Delhi- 110 055.  
Mobile No : 94425 14814 (Dr.K.Alex)

### REFERENCE BOOKS:

- (i) Developing the leader within you John c Maxwell
- (ii) Good to Great by Jim Collins
- (iii) The seven habits of highly effective people Stephen Covey
- (iv) Emotional Intelligence Daniel Goleman
- (v) You can win Shive Khara
- (vi) Principle centred leadership Stephen Covey

Question Pattern

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1

Max marks : 50

Exam hours : 3

Part A :  $5 \times 4 = 20$  (5 out of 7 atleast 1 question from 1 unit)

Part B :  $3 \times 10 = 30$  (3 out of 5 atleast 1 question from 1 unit)

Credits : 2

Hours/Week : 2

Medium of instruction: English

**Code: S5SB3E**

**B.Sc(Computer Science) - Semester: 5**

(For students admitted from 2018 -2019 onwards)

**OFFICE MANAGEMENT TOOLS**

**Objective:** *To understand the office management tools MS-Word, Excel and power point*

**UNIT I**

Computer Fundamentals: Computer and Operating system Fundamentals – Components of a computer system –Input and Output devices – Memory Handling –Storage Device s

**UNIT II**

MS -Word : Introduction to MS-Word and User Utilities – Exploring Template and Formation of Documents – Table handling –Mail Merge and Print Process

**UNIT III**

MS – Excel : Spreadsheet –workbook window –Formatting Cells / Worksheet – Working with Formula, Function and Charts – Filtering data and Printing a Presentation

**UNIT IV**

MS – Power Point : Introduction to MS –Power Point –Creating Templates – Font and color editing – Adding – Multimedia effects – Consolidating using MS-Power Point

**UNIT V**

Officer Appliances : Accounting machine – Addressing machine – Envelope Sealing machine – Franking machine & other modern office gadgets

**Text Books:**

1. Dr.S.V.Srinivasa Vallabhan “*Computer Application in Business*” –, Sultan Chand and Sons, New Delhi
2. Alexis Leon – “*MS-Office and Internet*”
3. K.Mohan Kumar, Dr.S.Rajkumar”*Computer Application in Business*” –Vijay Nicole imprints Private Limited–Chennai
4. V.Rajaraman “*Computer Basics*” — PHI.
5. R.S.N.Pillai & Bagavathi – S.Chand “*Office Management*”

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THANJAVUR -613005

Question Paper pattern

Maximum Marks: 50

Exam Duration: Three Hours

Part A  $5 \times 4 = 20$  Answer any FIVE question from seven questions  
(one question from each unit and two questions from any one of five unit)

Part B  $3 \times 10 = 30$  Answer any THREE questions from five questions  
(one question from each unit)

Signature of the HOD

COE



Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S6CS7**

**B.Sc(Computer Science) - Semester: 6**  
(For students admitted from 2018 -2019 onwards)

### **COMPUTER NETWORKS**

**Objective:** *To understand the Design and Organization of Computer Networks*

#### **UNIT I**

Introduction: The use of Computer Networks – Networks Hardware – Network Software – The Reference Model. The Physical Layer: Guided Transmission media – Wireless Transmission.

#### **UNIT II**

The Data Link Layer: Data link layer design Issues – Error Detection and Correction – Elementary Data Link Protocols. The Medium Access control Sub Layer: The Channel Allocation Problem – Multiple Access Protocols.

#### **UNIT III**

The Network Layer: Network Layer Design issues – Routing algorithms – Congestion control algorithms – Internetworking – The Network Layer in the internet.

#### **UNIT IV**

The Transport Layer: The Transport Service – Elements of Transport protocols – A Simple Transport Protocol – The Internet Transport Protocols (UDP & TCP).

#### **UNIT V**

The Application Layer: DNS – The Domain Name System – Electronic Mail – The World Wide Web – Network Security : Cryptography – E-Mail security – Web security.

#### **Text Book:**

Andrew S.Tenenbaum, “*Computer Networks*”, Prentice Hall, 4<sup>th</sup> Edition.

Unit I: Chapter 1.1, 1.2, 1.3, 1.4, 2.2, 2.3,

Unit II: Chapter 3.1, 3.2, 3.3, 4.1, 4.2,

Unit III: Chapter 5.1, 5.2, 5.3, 5.5, 5.6,

Unit IV: Chapter 6.1, 6.2, 6.3, 6.4, 6.5,

Unit V: Chapter 7.1, 7.2, 7.3, 8.1, 8.8, 8.9

#### **Reference Book**

Prakash C.Gupta “*Data Communications and Computer Networks*” Prentice-Hall of India, 2006.

RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S6CS8**

**B.Sc(Computer Science) - Semester: 6**

(For students admitted from 2018 -2019 onwards)

**MICROPROCESSOR AND ITS APPLICATIONS**

**Objective:** *To understand the programming skills using microprocessor*

**UNIT I**

Evaluation of Microprocessor – Single Chip Microcomputer – CPU. Memory: Semiconductor Memory – Magnetic Memory – Optical Disk – Cache Memory. Buses – Microprocessor Application – Microprocessor Architecture – Intel 8085 – Instruction Cycle -Timing Diagram.

**UNIT II**

Instruction Set of Intel 8085: Addressing modes – Status Flags – Symbols and Abbreviations – Intel 8085 Instructions.

**UNIT III**

Examples of Assembly Language Programs – Addition - Subtraction – Multiplication – Division - Finding the Largest and Smallest Numbers in an Array – Arranging a Series of Numbers in Ascending and Descending Order – Sum of a Series of Numbers — Block Move.

**UNIT IV**

Peripheral Devices and their Interfacing: Addressing Space Partitioning – Memory and I/O Interfacing – Data Transfer Schemes – Interrupts of Intel 8085 – Interfacing Devices and I/O Devices – I/O Ports: Programmable Peripheral Interface – Programmable Counter / Interval Timer – A/D Converter and D/A Converter.

**UNIT V**

Microprocessor Applications – Delay Subroutine – 7 Segment LED Displays – Frequency Measurement – Temperature Measurement and Control – Water Level Indicator – Microprocessor based Traffic Control.

**Text Book:**

Badri Ram “*Fundamentals of Microprocessor and Microcomputers*” – 7th Editions - Dhanpat Rai and Sons -2010.

Unit 1: 1.2, 1.5, 1.8, 1.9.1-1.9.3, 1.9.5, 1.10, 1.29.

Unit II: 4.3-4.6.

Unit III: 6.3, 6.4, 6.21, 6.22, 6.24 – 6.26, 6.29, 6.30, 6.37

Unit IV: 7.2 - 7.6, 7.7.1, 7.11, 8.2, 8.12

Unit V: 9.2, 9.3, 9.5.1, 9.6.1, 9.6.4, 9.8

**Reference Book:**

S. Ganokar “*Microprocessor Architecture, Programming and Applications with the 8085/8080A – ROMs*”, Wiley Eastern -1990

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4  
Hours/Week : 6  
Medium of instruction: English

**Code: S6CSP6**

**B.Sc(Computer Science) - Semester: 6**  
(For students admitted from 2018 -2019 onwards)

**Objective:** *To impart the programming skills using 8085 microprocessor*

**MICRO PROCESSOR Lab**

1. Addition – 8 bit using 8085
2. Subtraction – 8 bit using 8085
3. Multiplication – 16 bit using 8085
4. Division - 16 bit using 8085
5. Find the Smallest Number in a Data Array.
6. Find the Biggest Number in a given list
7. To Arrange an Array of Data in Ascending order
8. To Arrange an Array of Data in Descending order.
9. Sum of series.
10. Search a given number an Array of Data.
11. To Finding Two's complement of a number.
12. To shift the data

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S6CSEL3A**

**B.Sc(Computer Science) - Semester: 6**

(For students admitted from 2018 -2019 onwards)

**SOFTWARE ENGINEERING**

**Objective:** *To provide knowledge of the various phases of Software Engineering Process*

**UNIT I**

Introduction to Software Engineering: Definitions – Size factors- Quality and productivity Factors- Planning a software project: Planning the development Process – Planning an Organizational Structure.

**UNIT II**

Software Cost Estimation: Software Cost factors – Software Cost Estimation Techniques – Staffing-Level Estimation – Estimating Software Estimation Costs.

**UNIT III**

Software Requirements Definition: The Software Requirements Specification – Formal Specification Techniques. Software Design: Fundamental Design Concepts – Modules and Modularization Criteria.

**UNIT IV**

Design Notations – Design Techniques. Implementation issues: Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation Guidelines.

**UNIT V**

Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Unit Testing and Debugging – System Testing. Software Maintenance: Enhancing Maintainability during Development – Managerial Aspects of Software Maintenance - Configuration Management.

**TextBook:**

Richard Fairley “*Software Engineering Concepts*” –, 1997, Tata McGraw Hill.

Unit I: Chapter 1.1, 1.2, 1.3, 2.3, 2.4

Unit II: Chapter 3.1, 3.2, 3.3, 3.4

Unit III: Chapter 4.1, 4.2, 5.1, 5.2

Unit IV: Chapter 5.3, 5.4, 6.1, 6.2, 6.3, 6.4

Unit V: Chapter 8.1, 8.2, 8.5, 8.6, 9.1, 9.2, 9.3

**Reference Book**

Roger S. Pressman, “*Software Engineering*” –Tata Mcgraw Hill, 5<sup>th</sup> Edition

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S6CSEL3B**

**B.Sc(Computer Science) - Semester: 6**  
(For students admitted from 2018 -2019 onwards)

### **MOBILE COMPUTING**

**Objectives:** *On successful completion of the course the student should have: Understood the generation of mobile communication.*

#### **UNIT I**

Introduction: Introduction to mobile communications – generation of mobile communication FM, TDMA, CDMA – basic cellular architecture.

#### **UNIT II**

Digital cellular system infrastructure: global system for mobile communication (GSM) – GSM architecture – principles of synchronous digital hierarchy – principles of Pleisiosynchronous digital hierarchy – principles of fiber optics communications.

#### **UNIT III**

Mobile switching systems: Mobile service switching centre (MSC) – inter working functions (IWF) – home location register (HLR) and Visitor Location register (VLR) – Gateway MSC – Signaling transfer point (STP).

#### **UNIT IV**

Base station sub systems: Base station controller (BSC) – base transceiver station (BTS) – transcoder rate adaptation unit (TRAU) – open system interconnection – frequency management.

#### **UNIT V**

Network management systems: Operating sub systems – network operation, maintenance and administration – subscription management and charging – mobile equipment management.

#### **Reference Books:**

1. J. Schiller, Mobile Communications, Addison Wesley, 2000.
2. William C.Y.Lee, Mobile Cellular telecommunication, McGraw Hill, Int. Edition.
3. William C.Y.Lee, Mobile Communication Engineering, McGraw Hill, Inter. Edition.
4. RajanKurupillai and others, Wireless PCS, McGraw Hill, Inter. Edition
5. Johan Powers, Fiber optics systems, McGraw Hill Inter. Edition
6. William Stallings, Wireless Communications and networks, Pearson education
7. Joachim Tisal, GSM radio telephony, John Wiley.



Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S6CSEL3C**

**B.Sc(Computer Science) - Semester:6**  
(For students admitted from 2018 -2019 onwards)

## **SOFTWARE TESTING**

**Objective :** *To understand the basics of Software Testing*

### **UNIT I**

Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing.

### **UNIT II**

Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black-Box Testing? – Challenges in White Box Testing -Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase Testing – Scenario Testing – Defect Bash.

### **UNIT III**

System and Acceptance Testing: system Testing Overview – Why System testing is done? – Functional versus Non-functional Testing – Functional testing – Nonfunctional Testing – Acceptance Testing – Summary of Testing Phases.

### **UNIT IV**

Performance Testing: Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing? – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

### **UNIT V**

Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting –Best Practices. Test Metrics and Measurements: Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics.

### **Text Book**

Srinivasan Desikan & Gopalswamy Ramesh, "Software Testing Principles and Practices " – Pearson Education, 2014

**Reference Book**

Aditya P. Mathur “*Foundations of Software Testing*”, Pearson Education, 2013

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Hours / week : 2

Medium of Instruction : ~~English~~ Tamil

பாலின சமத்துவம்

Code : 56GS

அலகு - I

பாலினம் தொடர்பான கோட்பாடுகள் : பாலியல் - பாலினம் - உடற்கூறுரீதியாக நிர்ணயித்தல் - ஆணாதிக்கம் - பெண்ணியம் - பாலின பாகுபாடு - பாலின வேலைப்பாகுபாடு - பாலின ஒருபடித்தானவைகள் - பாலின உணர்வுட்டல் - பாலின சமவாய்ப்பு - பாலின சமத்துவம் - பாலின மையநீரோட்டமாக்கல் - அதிகாரப்படுத்துதல்

அலகு -II

மகளிரியல் Vs பாலின சமத்துவக்கல்வி - பல்கலைக்கழக மானியக்குழுவின் வழிக்காட்டுதல்கள் - ஏழாவது ஐந்தாண்டுதிட்டம் முதல் பதினோராவது ஐந்தாண்டுதிட்டம் - பாலின சமத்துவக்கல்வி : பெய்ஜிங் மாநாடு மற்றும் பெண்களுக்கு எதிரான அனைத்து வன்முறைகளையும் ஒழிப்பதற்கான சர்வதேச உடன்படிக்கை - இணைத்தல் /உட்படுத்துதல் - ஒதுக்கல் -

அலகு - III

பாலியல் பாகுபாட்டிற்கான தளங்கள் : குடும்பம் - பாலின விகிதாச்சாரம் - கல்வி - ஆரோக்கியம் - ஆளுமை -மதம் - வேலை Vs வேலை வாய்ப்பு - சந்தை - ஊடகங்கள் - அரசியல் - சட்டம் -குடும்ப வன்முறை -பாலியல் துன்புறுத்தல் - அரசு கொள்கைகள் மற்றும் திட்டங்கள் .

அலகு - IV

பெண்கள் மேம்பாடு மற்றும் பாலின சமத்துவ மேம்பாடு : முயற்சிகள் - சர்வதேச பெண்களுக்கான தசாப்தம் - சர்வதேச பெண்கள் ஆண்டு - பெண்களின் மேம்பாட்டிற்கான தேசிய கொள்கை - பெண்கள் அதிகார ஆண்டு 2001 - சர்வதேச கொள்கைகளை மைய நீரோட்டமாக்கல்

அலகு - V

பெண்கள் இயக்கங்கள் மற்றும் பாதுகாப்பு நிறுவன ஏற்பாடுகள் : தேசிய மற்றும் மாநில மகளிர் ஆணையம் - அனைத்து மகளிர் காவல் நிலையங்கள் - குடும்ப நீதி மன்றங்கள் - குடும்ப வன்முறையிலிருந்து பெண்களைப் பாதுகாக்கும் சட்டம் 2005 - பணியிடங்களில் பெண்கள் மீதான பாலியல் துன்புறுத்தல்களை தடுப்பதற்கான உச்சநீதிமன்ற வழிகாட்டுதல்கள் - தாய்சேய் சேமநலச்சட்டம் - பெண்சிசுவை கருவிலேயே கண்டறியும் தொழில் நுட்பம் (முறைப்படுத்துதல் மற்றும் தவறாக பயன்படுத்துதலை தடை செய்திடும் ) சட்டம் - ஈவ்ஃசிங் (பெண்களை தொல்லை செய்தல் ) தடுப்புச்சட்டம் - சுய உதவிக் குழுக்கள் - பஞ்சாயத்து அமைப்புகளுக்கான 73வது மற்றும் 74வது சட்டத்திருத்தம்.

References

1. Bhasin Kamala, Understanding Gender : Gender Basics , New Delhi : Women Unlimited , 2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics , New Delhi: Women Unlimited ,2004
3. Bhasin Kamala , What is Patriarchy? : Gender Basics, New Delhi :Women Unlimited ,1993
4. Pernau Margrit, Ahmad Imtiaz, Reifeld Hermut (ed.,)Family and Gender : Changing Values in Germany and India ,New Delhi :Sage Publications,2003
5. Agarwal Bina, Humphries Jane and Robeyns Ingrid(ed.,) Capabilities , Freedom , and Equality: Amartya Sen's Work from a Gender Perspective,New Delhi : Oxford University Press ,2006
6. Rajadurai. S.V,Geetha.V,Themes in Caste Gender and Religion, Tiruchirappalli : Bharathidasan University ,2007
7. Misra Geetanjali, Chandiramani Radhika (ed.,) Sexuality , Gender and Rights: Exploring Theory and Practice in South and Southeast Asia, New Delhi : Sage Publication ,2005
8. Rao Anupama (ed.,) Gender &Caste : Issues in Contemporary Indian Feminism, New Delhi : Kali for Women, 2003
9. Saha Chandana , Gender Equity and Gender Equality : Study of Girl Child in Rajasthan , Jaipur: Rawat Publication ,2003.
10. Krishna Sumi, (ed.,),Livelihood and Gender : Equity in Community Resource Management, New Delhi : Sage Publication ,2004
11. Pludi.A Michele(ed.,) praeger Guide to the Psychology of Gender ,London : Praeger Publisher ,2004
12. Wharton .S Amy , The Sociology of Gender : An Introduction to Theory and Research , USA : Blackwell Publishing ,2005
13. Mohanty Manoranjan(ed.,) Class ,Caste ,Gender : Readings in Indian Government and Politics -5,New Delhi : Sage Publications ,2004.
14. Arya Sadhna Women ,Gender Equality and the State ,New Delhi :Deep &Deep Publication, 2000
15. பாலியலை புரிந்து கொள்வோம், மதுரை :ஏக்தா.....
16. Mishra .O.P, Law Relating to Women &Child ,Allahabad :Central Law Agency ,2001
17. Chari Leelavathi ,Know Your Rights ,Madras; Tamilnadu Social Welfare Board,1987
18. Bhattacharya Malini , Sexual Violence and Law ,Kolkata; West Bengala Commission for Women ,2002
19. Sexual Harassment at the Workplace – A Guide , New Delhi ;Sakshi,1999
20. அஜிதா, குடும்ப வன்முறையிலிருந்து பெண்களை பாதுகாக்கும் சட்டம் 2005, மதுரை : ஏக்தா 2005
21. கு.சாமிதுரை& இராதாகிருட்டிணன், பெண்கள் நலன் காக்கும் சட்டங்கள், மதுரை: Account Test Center:2007
22. பொன்.கிருஷ்ணசாமி,ஜே.பால் பாஸ்கர்&ஆ.ஜான் வின்சென்ட், பெண்களும் உச்ச நீதிமன்றமும், மதுரை :சோக்கோ வாசகர் வட்டம், 2004
23. வனஜா &சியாமா சுந்தரி, பெண்களுக்கான சட்டங்கள், செகந்திராபாத் : உலகத்தோழமை மையம்
24. க.உமாசங்கர், பி.பாலசுந்தர், க.சசிகலா, செ.பழனிச்சாமி, குரியன் (பெண்கள் தொடர்பான சட்டங்கள் குறித்த தொடக்கநிலை கையேடு: செகந்திராபாத்: உலகத்தோழமை மையம்,2006
25. குடும்ப வன்முறையிலிருந்து பெண்களை பாதுகாக்கும் சட்டம் 2005- கையேடு, திருச்சி:
26. Women's Integrated National Development Trust
27. ரவீந்திரநாத். ஜி.ஆர்., 'ராகிங் ஒழிப்போம்!' 'சுஷ்மசிங்' ஒழிப்போம், சென்னை I.D.P.D.வெளியீடு

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QP Pattern

3

Exam hours : 3 each

Part A : 5 x 4 = 20 (5 out of 7 1 Question from Unit)

Part B : 3 x 10 = 30 (3 out of 5 1 Question from each unit)

Credits : 3

Hours/Week : 3

Medium of instruction: English

Code: S5CSEL01

(For students admitted from 2018 onwards)

### **INTERNET AND WEB DESIGN**

**Objective:** *To understand the concepts of internet and web page designing*

#### **UNIT I**

Introduction to the Internet : Computer in Business – Networking – Internet – Email - Resource Sharing – Gopher – WWW – Usenet – Telnet – Bulletin board service - Wide Area Information Service. Internet Technologies : Modem – Internet addressing – Physical Connections – telephone lines. Internet Browsing : Internet Explorer – Netscape Navigator.

#### **UNIT II**

Introduction to HTML : Designing a home page – History of HTML - HTML generations – HTML document – Anchor tag – Hyper links – Sample HTML Documents. Head and Body sections: Head Section – Title – Prologue – Links – Colourful web page – Comment lines.

#### **UNIT III**

Design the body Section: Heading printing – aligning the heading – Horizontal rule – Paragraph – tab setting – Image and pictures – Embedding PNG format images Ordered and Unordered Lists : Lists - Unordered lists – Heading in all list – Ordered List – Nested lists. Table Handling : Table – Table creation in HTML – Width of the Table and Cells – Cells spanning Multiple Rows/Columns – Coloring cells – Column specification.

#### **UNIT IV**

DHTML and Style sheets : Defining styles – Element of styles – Linking a style sheet a to and HTML document – In-line styles – External Style Sheets – Internal style sheets – Multiple styles.

#### **UNIT V**

Frames : Frameset defining – Frame definition – Nested Framesets – Web Page designing and forms.

#### **Text Book**

C. Xavier, “*World Wide Web design with HTML*”, TMH,2000( All Chapters)

#### **Reference Book**

Jennifer Niederst “*Web Design in a Nutshell*” – O Reilly first edition – shroff publishers and distributors Pvt Ltd.



Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions ( One question from each unit)

Signature of the HOD

COE

**NMEC**

Credits : 3

Code: **S6CSEL02**

Hours/Week : 3

Medium of instruction: English

**Semester:**

(For students admitted from 2018-2019 onwards)

**FUNDAMENTALS OF INFORMATION TECHNOLOGY**

**Objective:** *To understand the fundamentals of information technology such as input and output devices*

**UNIT I**

Introduction to computers: Introduction-Importance of computers- Characteristics of computers- classification of computers- What computers can do- can't do - Uses of computers - Five Generations of Modern Computers- Classification of Digital computer Systems – Anatomy of a digital computer.

**UNIT II**

Central Processing Unit (CPU) and Memory: Introduction - Central processing Unit (CPU)- Memory- RAM, ROM, Registers- factors affecting processor speed- Input Devices: Keyboard- Mouse- Trackball- Game Controllers- Scanners- Barcode Reader- Card Reader- Digitizer - Voice Recognition – Webcams - Digital Cameras- Video Cameras- OCR- OMR- ICR- MICR.

**UNIT III**

Output devices: Introduction – monitor – printer- plotter – Introduction to computer software: Introduction- computer software- Hardware/software interaction- classification of software- operating system- utilities- compilers and interpreters- word processors – Spreadsheets- presentation software- image processors.

**UNIT IV**

Internet & World Wide Web: Introduction, internet access – internet basic –internet protocol- internet addressing- World wide web (www). Overview of Electronic mail- Introduction- How E-mail works? – Why use e-mail- e-mail- name and addresses- mailing basics.

**UNIT V**

Computer in Education and Training- Introduction-computer in schools- distance learning- Computers in Entertainment, science, Medicine and Engineering.



**Text Book:**

Alexis Leon and Mathews Leon “*Fundamentals of Information Technology*” - 2<sup>ND</sup> Edition, , Leon Vikas publishing House Pvt Ltd, Chennai

Unit I: Chapter 1,2,3,4

Unit II: Chapter 7, 9

Unit III: Chapter 10, 11

Unit IV: Chapter 24, 25

Unit V: Chapter 47, 48

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of HOD

COE

Course structure for M.Sc., (Computer Science)

(Applicable to the candidates admitted from the academic year 2018-2019 onwards)

Semester	Code	Course	Course Title	Inst. Hrs./ Week	Marks		Total	Exam Hrs.	Credit
					Int.	Ext.			
I	S1PCS1	CC1	Object Oriented Analysis and Design	6	25	75	100	3	5
	S1PCS2	CC2	Network Security	6	25	75	100	3	5
	S1PCS3	CC3	Python Programming	6	25	75	100	3	5
	S1PCSP1	CC4	Practical- I (Python – Lab)	6	40	60	100	3	4
	S1PCSEL1A	EC1	Distributed Operating System	6	25	75	100	3	4
	S1PCSEL1B		Parallel Processing						
	S1PCSEL1C		Open Source Technology						
			<b>Total</b>	<b>30</b>			<b>500</b>		<b>23</b>
II	S2PCS4	CC5	Design and Analysis of Algorithm	6	25	75	100	3	5
	S2PCS5	CC6	Mobile Communications	6	25	75	100	3	5
	S2PCS6	CC7	PHP & MySQL	6	25	75	100	3	4
	S2PCSP2	CC8	Practical –II (PHP & MySQL Lab)	6	40	60	100	3	4
	S2PCSEL2A	EC2	Data Mining and Algorithm	6	25	75	100	3	4
	S2PCSEL2B		Data Science						
	S2PCSEL2C		Wireless Networks						
			<b>Total</b>	<b>30</b>			<b>500</b>		<b>22</b>
III	S3PCS7	CC9	Compiler Design	6	25	75	100	3	5
	S3PCS8	CC10	Software Project Management	6	25	75	100	3	5
	S3PCS9	CC11	Web Technology	6	25	75	100	3	5
	S3PCSP3	CC12	Practical – III (Web Technology – Lab)	6	40	60	100	3	4
	S3PCSEL3A	EC3	Cloud Computing	6	25	75	100	3	4
	S3PCSEL3B		Human Computer Interaction						
	S3PCSEL3C		Digital Image Processing						
			<b>Total</b>	<b>30</b>			<b>500</b>		<b>23</b>

Semester	Code	Course	Course Title	Inst. Hrs./ Week	Marks		Total	Exam Hrs.	Credit
IV	<b>S4PCS10</b>	CC13	Internet Of Things (IoT)	6	40	60	100	3	5
	<b>S4PCSP4</b>	CC14	Practical IV (IoT Lab)	6	25	75	100	3	5
	<b>S4PCSPW</b>	CC15	Project Work	6	20	80	100		4
	<b>S4PCSEL4A</b>	EC4	Pervasive Computing	6	25	75	100	3	4
	<b>S4PCSEL4B</b>		Soft Computing						
	<b>S4PCSEL4C</b>		Embedded Systems						
	<b>S4PCSEL5A</b>	EC5	Big data Analytics	6	25	75	100	3	4
	<b>S4PCSEL5B</b>		Artificial Intelligence						
	<b>S4PCSEL5C</b>		Database Administration and Management						
			<b>Total</b>	<b>30</b>			<b>500</b>		<b>22</b>
			<b>Grand Total</b>				<b>2000</b>		<b>90</b>

	No of Papers	Total Credit
<b>Core Courses</b>	15	70
<b>Elective Course</b>	5	20
<b>Total</b>	20	90

Separate passing minimum is prescribed for Internal and External

- The passing minimum for CIA shall be 40% out of 25 Marks(ie. 10 Marks)
- The passing minimum for Autonomous Examinations shall be 40% out of 75 Marks(ie. 30 Marks)
- The passing minimum not less than 50% in the aggregate

Credits : 5

Hours/Week : 6

Medium of instruction: English

**Code: S1PCS1**

**M.Sc(Computer Science) - Semester: 1**

(For students admitted from 2018 -2019 onwards)

**OBJECT ORIENTED ANALYSIS AND DESIGN**

**Objective:** *To provide a brief overview of object oriented analysis in software process.*

**UNIT I**

Object Basics: Object Oriented Philosophy - Objects - attributes, Objects behaviors and methods- Encapsulation and information hiding- Class hierarchy -polymorphism, Object relationships and association – aggregation and object containment-Object oriented systems development life cycle

**UNIT II**

Object oriented methodologies: Introduction - Rumbaugh et al.'s Object Modeling - Booch Methodology - Jacobson et al. Methodology – Patterns. Unified Modeling Language: Introduction – UML diagram- UML class diagram- use case diagram - UML dynamic modeling.

**UNIT III**

Object Oriented Analysis: Introduction- Why analysis is a difficult activity- Business object analysis- use case driven object- Use case model – Developing effective documentation- Object Classification- Classification theory- Approaches for identifying classes - Noun phrase approach- Association – super sub class relationships.

**UNIT IV**

Object Oriented Design: Object Oriented design process - Design axioms – corollaries - design patterns - designing classes – Design philosophy – Designing classes: The process– class visibility – Refining attributes – Designing methods and protocols.

**UNIT V**

Software quality assurance: Introduction Quality assurance tests-Testing strategies – Test cases – Test plan – continuous testing - System usability and measuring user satisfaction: - Introduction – usability testing – User satisfaction test.

**Text Book**

Ali Bahrami, "*Object Oriented Systems Development*", Tata- McGraw Hill, New Delhi.

Unit I: 2.2, 2.3, 2.5, 2.6, 2.8 to 2.12, 3

Unit II: 4.1, 4.3 to 4.6, 5.4-5.8

Unit III: 6.1 to 6.4, 6.6, 6.7, 7.2 to 7.4, 8.2, 8.3

Unit IV: 9.2 to 9.5, 10.4 to 10.6, 10.8

Unit V: 13.1 to 13.3, 13.5 to 13.7, 14.1 to 14.3

**Reference Book**

Grady Booch, "*Object Oriented Analysis and Design with applications*", 2<sup>nd</sup> Edition, Addison Wesley

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 5

Hours/Week : 6

Medium of instruction: English

**Code: S1PCS2**

**M.Sc(Computer Science) - Semester: 1**  
(For students admitted from 2018 -2019 onwards)

**NETWORK SECURITY**

**Objective:** *To impart knowledge related to the various concepts, methods of Network Security using cryptography basics, program security, database security and security in networks.*

**UNIT I**

Overview: Computer Security Concepts – The OSI Security Architecture – Security Attacks – Security Services – Security Mechanism – A Model for Network Security. Symmetric Ciphers: Classical Encryption Techniques - Symmetric Cipher Model – Substitution Techniques – Transposition Techniques - Rotor Machines – Steganography.

**UNIT II**

Block Ciphers and the Data Encryption Standard: Block Ciphers Principles – DES – The Strength of DES – Block Ciphers Design Principles. Advanced Encryption Standard: – AES Structure – AES Round Functions – AES Key Expansion

**UNIT III**

Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems – The RSA Algorithm. Other Public-Key Cryptosystems: Diffie-Hellman Key Exchange – ElGamal Cryptographic System – Elliptic Curve Cryptography – Pseudorandom Number Generation Based on an Asymmetric Cipher.

**UNIT IV**

Network and Internet Security: Transport Level Security: Web Security Issues – Secure Socket Layer - Transport Layer Security – HTTPS – Secure Shell(SSH). Electronic Mail security: Pretty Good Privacy-S/MIME – Domain Keys Identified Mail.

**UNIT V**

System Security: Intruders: Intruders - Intrusion detection - Password management - Malicious software: Types of Malicious Software - Viruses -Virus Counter Measures – worms – Distributed Denial of Service Attacks. Firewall: The need for Firewalls - Firewall Characteristics – Types of Firewall

**Text Book:**

William Stallings, “*Cryptography and Network Security-Principles and Practices*”, Prentice-Hall, Fifth edition, 2003 **ISBN:** 8178089025

Unit I: 1.1 – 1.6, 2.1 – 2.5

Unit II: 3.1 – 3.4 , 3.6, 5.2 – 5.4

Unit III: 9.1, 9.2, 10.2 , 10.4, 10.5

Unit IV: 16.1 – 16.5, 18.1 – 18.3

Unit V: 20.1 – 20.3, 21.1 – 21.5, 22.1 – 22.3

**Reference Books**

1. Johannes A. Buchaman, “*Introduction to cryptography*”, Springer-Verlag 2000.
2. AtulKahate, “*Cryptography and Network Security*”, Tata McGraw Hill. 2007

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 5

Code: S1PCS3

Hours/Week : 6

Medium of instruction: English

**M.Sc(Computer Science) - Semester:1**

(For students admitted from 2018 -2019 onwards)

**PYTHON PROGRAMMING**

**Objective:** *To understand the programming skills using functions and list in Python language*

**UNIT I**

Basics of Python Programming: Introduction – Python Character Set – Token – Python Core Data Type – The print() Function – Assigning Value to a Variable – Multiple Assignments – Writing Simple Programs in Python – The input() Function – The eval() Function- Formatting Number and Strings- Python Inbuilt Functions. Decision Statements: Decision Making Statements - Loop Control Statements – The While Loop – The for Loop – The break statement – The Continue Statement.

**UNIT II**

Functions: Introduction – Syntax and Basics of a Function – Use of a Function – Parameters and Arguments in a Function – The Local and Global Scope of a Variable – The return Statement – Recursive Functions – The Lambda Function. Strings – Introduction – The str Class – Basic Inbuilt Python Functions for String – The index [ ] Operator –Traversing String with FOR and WHILE Loop – Immutable Strings – The String Operators – String Operations.

**UNIT III**

Lists: Introduction – Creating Lists – Accessing the Elements of a List – Negative List Indices – List Slicing List Slicing with Step Size – Python Inbuilt Functions for Lists – The List Operator – List Comprehensions – List Methods. Object – Oriented Programming : Class, objects and Inheritance : Defining Classes – The Self – Parameter and Adding Methods to a Class – Display Class Attributes and Methods- Special Class Attributes – Accessibility – The\_init\_Method(Constructor) – Passing An Object as Parameter to a Method - \_del\_() (Destructor Method) – Inheritance – Types of Inheritance- Method Overriding.

**UNIT IV**

Tuples, Sets and Dictionaries: Introduction to Tuples: Creating Tuples – The tuple() Function – Inbuilt Functions for Tuples – Indexing and Slicing – Operations on Tuples – Passing Variables Length Arguments to Tuples – List and Tuples – Sort Tuples – Traverse Tuples from a List – The zip() Functions – The Inverse zip(\*) Functions. Sets: Creating Sets – The Set in and Not in Operator – The Python Set Class – Set Operations. Dictionaries.

**UNIT V**

Graphics Programming: Drawing with Turtle Graphics: Introduction – Getting Started with the turtle Module – Moving the Turtle in any Direction – Moving Turtle to Any Location – The Color, bgcolor, circle and Speed Method of Turtle – Drawing with Colors – Drawing Basic Shapes using Iterations – Changing Color Dynamically Using List – Turtles to Create Bar Charts. File Handling:



Introduction – Need of File Handling - Text Input and Output – The Seek () Function – Binary Files.

**Text Book:**

Ashok Namdev Kamthane Amit Ashok Kamthane “*Programming and Problem Solving With PYTHON*”, – Mc Graw Hill Education.

Unit I: Chapter 2.1 – 2.12, 4.7, 5.2, 5.4, 5.6, 5.7

Unit II: Chapter 6.1 – 6.8, 7.1 – 7.8

Unit III: Chapter 8.1 – 8.10, 10.2 – 10.11, 10.13, 10.14, 10.21

Unit IV: Chapter 11.1.1 – 11.1.11, 11.2.1 – 11.2.4, 11.3.1 – 11.3.10

Unit V: Chapter 12.1 – 12.9, 13.1 – 13.5

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S1PCSP1**

**M.Sc(Computer Science) - Semester:1**

(For students admitted from 2018 -2019 onwards)

**PYTHON PROGRAMMING LAB**

**Objective:** *To Impart Practical Training in Python Programming Language*

1. Write a Recursive Function which Computes  $N^{\text{th}}$  Fibonacci Numbers and to generate Prime numbers for the same N Value.
2. Write a Program to find the Maximum of a List of Numbers.
3. Write a Program for String Operations.
4. Write a Python program to Create a Tuple, Add an item in a Tuple, Remove an item from a Tuple, Convert a Tuple to a String and Get an item in the Tuple
5. Write a Program to Multiply Matrices.
6. Write a Program to Search an Element from a List.
7. Write a Program for Linear Search.
8. Write a Program for Binary Search.
9. Write a Program to implement Merge Sort.
10. Write a Program to implement Insertion Sort.
11. Write a Program to implement Selection Sort.
12. Write a Python Program to Copy the Content of a File to another File
13. Write a Program to Simulate Bouncing Ball using Pygame.
14. Write a Program to Override Display() method in Multiple Inheritance.
15. Write a Python program to Create a Shallow Copy of Set.

Signature of the HOD

COE

Credits : 4

Code: S1PCSEL1A

Hours/Week : 6

Medium of instruction: English

**M.Sc(Computer Science) - Semester: 1**

(For students admitted from 2018 -2019 onwards)

**DISTRIBUTED OPERATING SYSTEM**

**Objective:** *To provide fundamentals of distributed operating systems and insight study of DOS features such as message passing, distributed shared memory, synchronizations, distributed file systems and security.*

**UNIT I**

Fundamentals: What is Distributed Computing System – Evolution of Distributed Computing System – Distributed Computing System Models – Why are Distributed Computing Systems gaining popularity – Issues in Designing Distributed Operating System – Introduction to Distributed Computing Environment. Computer Networks – ATM Technology.

**UNIT II**

Message Passing: Introduction – Desirable features – Issues in IPC Message Passing – Synchronization – Buffering – Multidatagram Messages – Encoding and Decoding of Message Data – Process Addressing – Failure Handling – Group Communication.

**UNIT III**

Distributed Shared Memory: Introduction – General Architecture of DSM system – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory Space – Consistency Models – Replacement Strategy – Thrashing – Other Approaches to DSM – Heterogeneous DSM – Advantages of DSM. .

**UNIT IV**

Distributed File System: Introduction – Desirable features – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles

**UNIT V**

Security: Introduction – Potential Attacks to Computer System – Cryptography – Authentication – Access Control – Digital Signatures – Design Principles

**Text Book**

Pradeep K Sinha, “*Distributed Operating Systems – Concepts and Design*”, PHI, 2013.

Unit I: Chapter 1.1 – 1.7, 2.7.

Unit II: Chapter 3.1 - 3.10.

Unit III: Chapter 5.1 - 5.11

Unit IV: Chapter 9.1 – 9.10.

Unit V: Chapter 11.1 – 11.7.

**Reference Book**

Andrew S Tanenbaum “*Distributed Operating Systems*” 1e, , PHI.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S1PCSEL1B**

**M.Sc(Computer Science) - Semester:1**

(For students admitted from 2018 -2019 onwards)

**PARALLEL PROCESSING**

**Objective:** *To study the Parallel computer Architecture, theories of parallel computing, interconnection networks and applications of cost effective computer systems.*

**UNIT I**

Introduction to Parallel Processing – Evolution of Computer Systems – Parallelism in Uniprocessor Systems – Parallel Computer Structures – Architectural Classification Schemes– Parallel Processing Applications.

**UNIT II**

Memory and Input-Output Subsystems – #Hierarchical Memory Structure# – Virtual Memory System – Memory Allocation and Management – Cache Memories and Management – Input-Output Subsystems.

**UNIT III**

Principles of Pipelining and Vector Processing – Pipelining : An Overlapped Parallelism – Instruction and Arithmetic Pipelines – Principles of Designing Pipelined Processors – Vector Processing Requirements.

**UNIT IV**

Vectorization and Optimization methods – Parallel Languages for Vector Processing – Design of Vectorizing Compiler – Optimization of Vector Functions – SIMD Array Processors – SIMD Interconnection Networks

**UNIT V**

Multiprocessors Architecture and Programming – Functional Structures – Interconnection Networks - Parallel Memory Organizations – Multiprocessor Operating Systems – Language Features to Exploit Parallelism – Multiprocessor Scheduling Strategies.

**Text Book:**

Kai Hwang and Faye “A. Briggs, *Computer Architecture and Parallel Processing*”, McGraw Hill International Edition, 1985.

Unit I Chapter 1.1 – 1.5

Unit II Chapter 2 1 – 2.5

Unit III Chapter 3.1 – 3.4

Unit IV Chapter 4.5.1 – 4.5.3, 5.1, 5.2, 5.4

Unit V Chapter 7 7.1 – 7.4, 7.5-7.5.1, 8.3

**Reference Books:**

1. Richard Kain, Advanced Computer Architecture, PHI, 1999.
2. V. Rajaraman and C. Siva Ram Murthy, Parallel Computers, Architecture and Programming, PHI, 2000.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S1PCSEL1C**

**M.Sc(Computer Science) - Semester: 1**

(For students admitted from 2018 -2019 onwards)

**OPEN SOURCE TECHNOLOGIES**

**Objective:** *To Impart Practical Training in Python Programming Language*

**UNIT I**

Introduction: Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, History : BSD, The Free Software Foundation and the GNU Project, Philosophy: Software Freedom, Open Source Development Model, Licenses and Patents, Economics of FOSS - Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization.

**UNIT II**

Open Source Platform and Technologies: The Open Source Platform–Operating Systems, Windowing Systems and Desktops, GIMP, Technologies Underlying Open source Development.

**UNIT III**

**Linux Application:** Accessing and Running Applications-Multimedia in Linux : Listening to Audio, Playing video, Using Digital Camera, Recording music / video CDs. Publishing: Open office, Working with Graphics, Printing Documents, Displaying documents with Ghost script and Acrobat, Using Scanners driven by SANE.

**UNIT IV**

**PHP:** Installing and Configuring PHP, Building Blocks of PHP, Flow control functions in PHP, Working with functions, arrays, objects and forms.

**UNIT V**

**PHP and MySQL Integration:** Understanding the Database Design Process, Learning Basic SQL commands, Using Transactions and Stored Procedures in MySQL, Interacting with MySQL using PHP.

**Reference Book**

1. Christopher Negus, Red Hat Linux Bible, Wiley Publishing, ISBN: 0-7645-4333-4.
2. Fadi P. Deek, James A. M. McHugh, Open Source Technology and Policy, Cambridge University Press, 2008.
3. Julie C Melonie, PHP, MySQL and Apache, Pearson Education, ISBN: 81-297-0443-9.
4. [http://en.wikibooks.org/wiki/Open\\_Source](http://en.wikibooks.org/wiki/Open_Source).

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A  $10 \times 2 = 20$  Answer All Question (Two questions from each unit)

Part B  $5 \times 5 = 25$  Answer All questions (Either or Type – Two questions from each unit)

Part C  $3 \times 10 = 30$  Answer any THREE questions (One question from each unit)

Signature of the HOD

COE



Credits : 5

Hours/Week : 6

Medium of instruction: English

Code: S2PCS4

**M.Sc(Computer Science) - Semester: 2**

(For students admitted from 2018 -2019 onwards)

**DESIGN AND ANALYSIS OF ALGORITHM**

**Objective:** *To understand the fundamentals of algorithm like Linked Lists, Trees, Graphs, Backtracking methods*

**UNIT I**

Introduction: overview - Arrays: Axiomatization - Ordered Lists- Representation of arrays- Stacks and queues: Fundamentals – Evaluation of Expressions – Multiple Stacks and queens.

**UNIT II**

Linked Lists: Singly Linked Lists – Linked Stacks and Queues - Polynomial Addition – More on linked lists - Doubly Linked Lists and Dynamic Storage Management- Generalized lists.

**UNIT III**

Trees: Basic Terminology- Binary tree - Binary tree representations – Binary Tree traversal - More on binary trees- Threaded binary trees – Binary tree representation of trees – set representations – decision trees – Game trees - counting binary Trees.

**UNIT IV**

Graphs: Terminology and Representations – Traversals, Connected components and spanning trees – shortest paths and transitive closure – Activity Networks, Topological sort and critical paths. Internal Sorting: Searching – Insertion sort- Quick sort - Merge sort – Heap sort.

**UNIT V**

Backtracking: The general method – the 8 Queens problem – Sum of subsets – graph coloring – Hamiltonian cycles – Knapsack problem. Branch and Bound: The method- 0/1 Knapsack problem- Traveling sales person.

**Text Books:**

1. Ellis Horowitz and Sartaj Sahni “*Fundamentals of Data Structures*” – Galgotia publications.(Unit – I, II, III, IV)
2. Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran “*Fundamentals of Computer Algorithms*” – Ellis – Universities Press. 2<sup>nd</sup> Edition. (Unit – V)

Unit- I: Chapter 1.1, 2.1, 2.3, 2.4, 3.1, 3.3, 3.4.

Unit –II: Chapter 4.1, 4.2, 4.4, 4.5, 4.8, 4.9.

Unit –III: Chapter 5.1-5.9.

Unit –IV: Chapter 6.1-6.4, 7.1-7.3, 7.5, 7.6

Unit - V: Chapter 7.1 – 7.6, 8.1-8.3

**Reference Books:**

1. Lipschuta "*Data structures*" –, Tata Mc GrawHill, Schaum's outline series.
2. Trembley (JP), Sorenson -*An Introduction to Data Structures* .

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits :4

Hours/Week : 6

Medium of instruction: English

**Code: S2PCS5**

**M.Sc(Computer Science) - Semester: 2**

(For students admitted from 2018 -2019 onwards)

**MOBILE COMMUNICATIONS**

**Objective:** *To study the Mobile and Wireless devices, Satellite systems, Mobile network layer of mobile communications*

**UNIT I**

Mobile and Wireless devices – Simplified Reference Model – Wireless transmission – Frequencies for radio transmission – Signals –Antennas –Signal propagation – Multiplexing – Modulation – Spread Spectrum – Cellular systems.

**UNIT II**

Medium Access Control – Motivation for a specialized MAC – SDMA – FDMA- TDMA- CDMA- Telecommunications systems – GSM – DECT.

**UNIT III**

Satellite systems – Applications – Basic – Routing – Localization – Handover – Broadcast systems – Cyclical repetition of data – Digital audio broadcasting – digital video broadcasting- convergence of broadcasting and mobile communications.

**UNIT IV**

Wireless LAN – Infra red Vs Radio transmission - Infrastructure and ad-hoc network – IEEE 802.11 – HYPERLAN – Bluetooth - Architecture – Radio layer – Base band layer – Link management protocol.

**UNIT V**

Mobile network layer - Mobile IP - Dynamic host configuration protocol – Mobile ad-hoc networks- Mobile transport layer – Traditional TCP – Classical TCP improvements.

**Text Book:**

Jochen H. Schiller “*Mobile communications*” — Second Edition

Unit- I: Chapter 1 & 2

Unit –II: Chapter 3 & 4

Unit –III: Chapter 5 & 6

Unit –IV: Chapter 7

Unit - V: Chapter 8 & 9

**Reference Book:**

Sandeep Singhal. “*The Wireless Application Protocol: Writing Application for the Mobile Internet*” –

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A  $10 \times 2 = 20$  Answer All Question (Two questions from each unit)

Part B  $5 \times 5 = 25$  Answer All questions (Either or Type – Two questions from each unit)

Part C  $3 \times 10 = 30$  Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits :5

Hours/Week : 6

Medium of instruction: English

**Code: S2PCS6**

**M.Sc(Computer Science) - Semester: 2**

(For students admitted from 2018 -2019 onwards)

**PHP & MYSQL**

**Objective:** *PHP is the most powerful scripting language for web development. It is free, open source, and server-side language. MySql is an open source, free, relational database management system that uses SQL for database processing. Developing web applications using PHP and Mysql is easier, flexible. The paper introduces basics of PHP along with overview of web applications techniques and form processing. It covers the library functions in PHP to access mysql and facilitates a reader to develop simple web application with PHP and mysql.*

**Unit I**

**Essential php:** Development environment-Creating and running PHP page-Mixing HTML and PHP- Printing-Echo Power- 'Here' Documents-Command Line PHP- Adding comments-Variables-Strings-Constants-Internal data types.

**Operator and flow control:** Math, Assignment, String, Bitwise, Execution operators- Operator precedence -Incrementing and decrementing values- If, else, else if statements- Comparison operators-Logical operators- Ternary operator-Switch statement-Loop statements.

**Unit II**

**Strings and arrays:** String functions-Conversion-formatting text strings-Building arrays-Modifying data in arrays-Deleting array elements- Arrays with loops- Array functions-Arrays using implode and explode-Extracting data from arrays-sorting arrays-array operators-Multidimensional arrays.

**Creating functions:** Function creation-Passing data-Passing array-Passing by reference-Using default arguments-Passing variable-Returning data-Returning array-Returning List-Returning References-Variable scope-Global data-Conditional, variable and nesting functions –creating include files-Returning error from functions.

**Unit III**

**Reading data in web pages:** Setting up web page-Handling text fields-Text areas-Check boxes, Radio buttons-List boxes>Password controls-Hidden controls-Image maps-File uploads-Handling buttons.

**PHP Brower handling power :** Server variables-HTTP headers-Getting browser type-Redirecting browsers-Dumping a form's data –Putting all in one page-data validation –Checking the entry of required data, numbers, text – Persisting user data – Client side data validation – Handling HTML tags.

**Unit IV**

**Object oriented programming:** Creating classes and objects – Setting access – constructors – destructors – Inheritance – Overloading and Overriding methods – Auto loading

classes. **File handling:** Opening file – Looping over a file – Reading text – closing – Reading file character – Reading a whole file – Reading a file into array – Checking the file existence – Getting file size – Parsing files – Parsing .ini files – Getting file information – Setting file pointer – Copying, Deleting, Reading and Writing files – Appending and locking files.

## Unit V

**Working with data base:** Database – Essential SQL- creating MySQL Database-Creating a new table-Putting data- Accessing data – Updating databases – Inserting new data items- Deleting records- Creating new tables – Creating new database-Sorting data

**Sessions, cookies and FTP:** Setting and Reading Cookie-Cookie expiration – Deleting Cookies- Working with FTP-Downloading and uploading with FTP-Deleting files with FTP-Sending E-mail – Adding attachments – storing data in sessions- Writing Hit counter.

## TEXT BOOKS

1. The Complete Reference: PHP, Steven Holzner, McGraw Hill education(India) Edition 2008.

Unit I : Chapter 1, Chapter 2

Unit II : Chapter 3, Chapter 4

Unit III : Chapter 5, Chapter 6

Unit IV : Chapter 7, Chapter 9

Unit V : Chapter 10, Chapter 11

## REFERENCE BOOK

1. 'Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP and working Together', Eric Rosebrock, Eric Filson, Published by John Wiley and Sons, 2004
2. Rasmus Lerdorf "*Programming PHP*", 2<sup>nd</sup> edition, O'Reilly publishers.
3. Brad Bulger, Jay Greenspan, David Wall *Introduction part of MySQL/PHP database applications*, 2<sup>nd</sup> edition, Wiley publishers.

### Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

Code: **S2PCSP2**

**M.Sc(Computer Science) - Semester: 2**  
(For students admitted from 2018 -2019 onwards)

**PHP & MySQL LAB**

**Objective:** *To Impart Practical Training in PHP and MySQL Software*

1. Create the website to enter your Bio-Data using HTML controls
2. Write a simple PHP Program to output all the even numbers that are lesser than or equal to N numbers using Functions.
3. Write a Program to find the odd and even numbers in an array.
4. Write a PHP Script access a base class constructor in derived class.
5. Write a PHP Code to find the remote address.
6. Write a PHP script to read the data from sample.txt and write it into another file named example.txt.
7. Write a Program to declare three variables such as \$x, \$y, \$radius and define them five different functions to store and process values.
8. Write a program to create an E-mail using HTML & PHP
9. Write a Program to print the input given by the users while log in to the system, for example, username and password (authentication mechanism).
10. Write a program to connect the MySQL database using PHP and apply appropriate Queries

Signature of the HOD

COE

Credits : 4

Code: S2PCSEL2A

Hours/Week : 6

Medium of instruction: English

**M.Sc(Computer Science) - Semester: 2**

(For students admitted from 2018 -2019 onwards)

**DATA MINING AND ALGORITHM**

**Objective:** *To study the fundamentals concepts of Data Mining , Data preprocessing , Data Mining Trends and Research Frontiers*

**UNIT I**

Introduction: Data mining- moving toward the information age – kinds of data can be mined- Database data- Data warehouse- kind's patterns can be mined –technologies are used- kinds of applications are targeted - major issues

**UNIT II**

Data preprocessing: Data preprocessing – Data cleaning – Data Integration - Data Reduction – Data Transformation and Data Discretization.

**UNIT III**

Data warehousing and online analytical processing: data warehouse basic concepts-data warehouse modeling- Data warehouse Design and usage- Classification: basic concepts - Bayesian classification method classification advanced method: - Classification by Back propagation

**UNIT IV**

Cluster Analysis Basic concepts and methods – Cluster analysis - Partitioning methods- Hierarchical methods – Density based methods -Grid based methods -Model based clustering methods.

**UNIT V**

Data Mining Trends and Research Frontiers: - Mining complex Data Types – other methodologies of Data Mining- Data Mining Applications - Data Mining and Society-Data Mining Trends

**Text Book :**

Jiwei Han, Michelen Kamber, Morgan Kaufmann , “*Data Mining Concepts and Techniques*”, Publishers an Imprint of Elsevier, 2012.3<sup>rd</sup> editon.

Unit I– chapter 1: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7

Unit II- chapter 3: 3.1, 3.2, 3.3, 3.4, 3.5

Unit III- chapters 4, 8, 9: 4.1, 4.2, 4.3, 8.1, 8.3, 9.2

Unit IV – chapter 10: 10.1, 10.2, 10.3, 10.4, 10.5)

Unit V- chapter 13: 13.1 t13.5



**Reference Books:**

1. Arun K.Pujari, “*Data Mining Techniques*”, Universities Press (India) Limited, 2001.
2. George M. Marakas, “*Modern Data warehousing, Mining and Visualization: core concepts*”, Printice Hall, First Edition, 2002.
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, “*Introduction to Data Mining*”, Pearson, 2008.
4. Soman K. P, Shyam Diwakar, V. Ajay , “*Data Mining*”, , Printice Hall, 2008.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 5

Hours/Week : 6

Medium of instruction: English

**Code: S2PCSEL2B**

**M.Sc(Computer Science) - Semester: 2**  
(For students admitted from 2018-2019 onwards)

**DATA SCIENCE**

**Objective:** *To study the fundamentals concepts of Data Mining, Big Data, Applications and Trends in Data Mining ,Data Preprocessing , Big data analytics*

**UNIT I**

Introduction – What is Data mining – Data Warehouses – Data Mining Functionalities – Basic Data mining tasks – Data Mining Issues – Social Implications of Data Mining– Applications and Trends in Data Mining.

**UNIT II**

Data Preprocessing: Why preprocess the Data? –Data Cleaning - Data Integration and Transformation – Data Reduction – Data cube Aggregation – Attribute Subset Selection Classification: Introduction – statistical based algorithms – Bayesian Classification. Distance based algorithms – decision tree based algorithms – ID3.

**UNIT III**

Clustering: Introduction- Hierarchical algorithms– Partitional algorithms– Minimum spanning tree – K-Means Clustering - Nearest Neighbour algorithm. Association Rules: What is an association rule? – Methods to discover an association rule–APRIORI algorithm – Partitioning algorithm .

**UNIT IV**

Introduction to big data: Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured, Sources of data, Working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, Data environment versus big data environment

**UNIT V**

Big data analytics: Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment

**Text Books**

1. Jiawei Han and Micheline Kamber , “*Data Mining Concepts and Techniques*” ,Morgan Kaulmann Publishers, 2006.  
UNIT I– Chapter 1 -1.2, 1.4 , Chapter 11-11.1)  
Unit II – Chapter 2 - 2.1,2.3, 2.4, 2.5.1,2.5.2)
2. Margaret H Dunham , “*Data mining Introductory & Advanced Topics*”, Pearson Education , 2003.  
Unit I– Chapter 1 -1.1 , 1.3, 1.5 ,  
Unit II – Chapter 4 – 4.1, 4.2, 4.3, 4.4)  
Unit III – Chapter 5 – 5.1,5.4, 5.5.1, 5.5.3,5.5.4, Chapter 6 –6.1,6.3.
3. Seema Acharya and Subhashini Chellappan, “*Big Data and Analytics*”, Wiley India Pvt. Ltd., 2016 (UNIT IV and V)

**Reference Books:**

1. G.K.Gupta, “*Introduction to Data mining with case studies*” ,Prentice Hall India , 2006
2. Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, “*Big Data*” Wiley Publications, 2014.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

Code: **S2PCSEL2C**

**M.Sc(Computer Science) - Semester: 2**

(For students admitted from 2018 -2019 onwards)

**WIRELESS NETWORKS**

**Objective:** *On successful completion of the course the student will be able to, Explain the fundamental of cellular communication and channel allocation., Explain the constraints and performance of wireless personal area networks, sensor and adhoc networks.*

**UNIT I**

Wireless Networks: Evolution of wireless networks – Challenges - Transmission fundamentals: Analog and digital data transmission - Transmission media - Modulation techniques for wireless systems - Multiple access for wireless systems - Performance increasing techniques for wireless networks.

**UNIT II**

Wireless LAN: Introduction to Wireless LANs – WLAN Equipment, Topologies, Technologies, IEEE 802.11 WLAN – Architecture and Services - Physical Layer - MAC Sub Layer –MAC Management Sub Layer, Other IEEE 802.11 Standards.

**UNIT III**

Wireless Personal Area Networks: Introduction – Bluetooth : Architecture - Protocol Stack - Physical Connection – Mac mechanism – Frame format – Connection management -Low Rate and High Rate WPAN , ZigBee Technology IEEE 802.15.4 : Components – Network topologies – PHY – MAC.

**UNIT IV**

Ad-hoc Wireless Networks: Introduction- Characteristics of Adhoc Networks - Classifications of MAC Protocols: Connection Based protocols, Reservation Mechanism - Table driven Routing protocols: DSDV, WRP - On Demand routing protocols: DSR, AODV, TORA –Routing Protocol with Efficient Flooding Mechanism: OLSR - Hierarchical routing protocols – CBRP, FSR.

**UNIT V**

Wireless Sensor Networks : Introduction - Challenges for wireless sensor networks - Comparison of sensor network with ad-hoc network - Single node architecture : Hardware components - Energy consumption of sensor nodes - Network architecture: Sensor network scenarios - Design principles – Operating systems.

**Reference Books:**

1. Nicopolitidis P, Obaidat M S, Papadimitriou G S and Pomportsis A S, “Wireless Networks”, John Wiley and Sons, New York, 2009.
2. Vijay K Garg, *Wireless Communication and Networking*, Morgan Kaufmann Publishers 2010.

3. Siva Ram Murthy C.,. Manoj B S, “*Ad Hoc Wireless Networks: Architectures and Protocols*”, Prentice Hall, 2006.
4. Holger Karl and Andreas Willig, “*Protocol and Architecture for Wireless Sensor Networks*”, John Willey Publication, 2011.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits :5  
Hours/Week : 6  
Medium of instruction: English

**Code: S3PCS7**

**M.Sc(Computer Science) - Semester: 3**  
(For students admitted from 2018 -2019 onwards)

**COMPILER DESIGN**

**Objectives :** *On successful completion of the subject the students should have Understood the different phases of compiler and needs of the compiler.*

**UNIT I**

Introduction to compilers – Analysis of source program – Phase of compiler – Cousins of compilers – Grouping of phases. Simple one pass compiler: overview – Syntax definition .Lexical analysis: Role of a lexical analyzer – Input buffering –Specification of tokens – Recognition of tokens – Finite Automata – NFA – DFA.

**UNIT II**

Symbol tables: Symbol table entries – List data structures for symbol table – - Hash tables – Representation of scope information – Syntax Analysis: Role of parser – Context free grammar – Writing a grammar – Top down parsing – Simple bottom up parsing.

**UNIT III**

Syntax directed Translation: Construction of syntax trees – Bottom up evaluation of S-Attributed definition – L-Attributed definitions – Top down translation - Type checking: Type systems – Specifications of simple type checker.

**UNIT IV**

Run-time environment: Source language issues – Storage organizations – Storage allocation strategies - Intermediate code generation: Intermediate languages – Declarations – Assignment statements.

**UNIT V**

Code generation: Issue in design of code generator – The target machine – Runtime storage management – Basic blocks and flow graphs – Code optimization: Introduction – Principle source of code optimization – Optimization of basic blocks.

**Text Book:**

Aho, Ullman, “*Compilers, Principles And Techniques And Tools*”, Pearson Education – 2001 6th Edition.

(Unit – I: 1.1 – 1.5, 2.1, 2.2, 2.6, 3.1 -3.4, 3.6 – 3.9

Unit – II: 4.1 – 4.5, 7.6

Unit – III: 5.1 – 5.6, 6.1, 6.2

Unit – IV: 7.1 – 7.3, 8.1 – 8.3

Unit – V: 9.1 – 9.4, 10.1 – 10.3)

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S3PCS8**

**M.Sc(Computer Science) - Semester: 3**

(For students admitted from 2018 -2019 onwards)

**SOFTWARE PROJECT MANAGEMENT**

**Objective:** *To provide knowledge of the various phases of Software project Management*

**UNIT I**

Introduction to Software Project Management: Introduction - Why is SPM important - Why is a project – software projects Vs other types of project – Contract Management and Technical Project Management - Plans, Methods and Methodologies –Categorizing software projects- stakeholders – setting objectives- Business case – Project success and failures- Management.

Project Evaluation and Programme Management: Introduction – Business Case-Project portfolio Management- Evaluation of individual projects – Cost – Benefit Evaluation Techniques- Risk Evaluation – Programme Management- Managing the Allocation of Resources within Programmes-Strategic Programme Management- Creating a Programme – Aids to programme management- Benefits Management.

**UNIT II**

Overviews of Project Planning : Introduction to steps wise Planning - Steps.Selection of an Appropriate Project Approach: Introduction – Build or Buy – Choosing Methodologies and Technologies – Software Processes and Process Models - Choice of Process Models - Structure Versus Speed of Delivery – Water fall Model – Spiral Model – Software Prototyping – Rapid Application Development – Agile Methods – Extreme Programming.

**UNIT III**

Software Effort Estimation: Introduction – Where are estimation done? – Problem with Over – and Under Estimates – Basis for Software Estimating – Software Effort Estimation Techniques – Bottom –up Estimating – Top – Down Approach and Parametric Models – Expert Judgement – Estimating by Analog – Albrecht Function Point Analysis – Function Point Mark II - COSMIC Full Function Points – COCOMO II : A Parametric Productivity Model – Cost Estimation – Staffing Pattern.

Activity Planning : Introduction – Objectives of Activity Planning - Where to plan – Project Schedules- Project and Activities – Sequence and scheduling Activities- Network Planning Models- Formulating a Network Models – Adding the Time Dimension – Forward Pass – Backward Pass –Critical Path Activity Float – Shortening the Project Duration – Identifying Critical Activities – Activities –on- Arrow Networks.



**UNIT IV**

Risk Management: Introduction – Risk – Categories of Risk – Frame work for dealing with Risk- Risk Identification – Risk Assessment – Risk Planning – Risk Management – Evaluating Risks to the schedule – Applying the PERT Technique – Monte Carlo simulation - Critical Chain Concepts. Resource Allocation: Introduction – Natures of Resources – Identifying Resource Requirements – Scheduling Resources – Crating Critical Paths – Counting the Cost – Being Specific Publishing the resource schedule – Cost schedules – Scheduling Sequence.

**UNIT V**

Monitoring and Control: Introduction – Creating the Framework – Collecting the Data- Review – Software Configuration Management. Managing Contracts: Introduction – types of contracts – Contract Management – Managing people in software environment.

**Text Book:**

Bob Hughes , Mike Cotterel and Rajib Mall “Software Project Management” — Fifth Edition

Unit I– Chapter 1 & 2,

Unit II – Chapter 3 & 4,

Unit III – Chapter 5 & 6,

Unit IV – Chapter 7 & 8 ,

Unit V – Chapter 9 & 10

**Reference Book:**

Walker Royce “*Software Project Management*” – Pearson Education – Fifth Edition

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S3PCS9**

**M.Sc(Computer Science) - Semester: 3**

(For students admitted from 2018 -2019 onwards)

**WEB TECHNOLOGY**

**Objective:** *To study the fundamentals concepts of Web Technology, HTML,DHTML, XML. Java Script,ASP and internet and WWW Resources*

**UNIT I**

Introduction to HTML 4 :Introduction –markup languages- editing HTML- common tags- Headers- text styling- linking- images- formatting text with <FONT>- special characters, Horizontal rules and more line breaks- Intermediate HTML 4 – introduction – ordered and unordered lists- HTML tables and formatting –HTML forms- Internal linking- creating and using image maps- <META> tags- <FRAMESET> tag- Nested <FRAMESET> tag.

**UNIT II**

JAVA Script/JScript: Introduction – simple program- memory concepts- arithmetic- decision making- Control Structures I : if selection structure- if/else selection structure- while repetition structure- assignment operators – increment and decrement operators control structures II: for repetition structure – switch multiple selection structure- the do/while repetition structure- the break and continue statements- the labeled break and continue statements- logical operators – Functions – Arrays – Objects.

**UNIT III**

Dynamic HTML Object Model and Collections – Event Model: introduction- ONCLICK- ONLOAD- ONERROR- ONMOUSEMOVE- ONMOUSEOVER and ONMOUSEOUT – ONFOCUS and ONBLUR- ONSUMIT and ONRESET - event bubbling – Filters and Transitions–Data Binding with Tabular Data Control.

**UNIT IV**

Database: Introduction - Relational Database Model and Overview – SQL –Registering Books.mdb as on ODBC Data source-ADO-RDS-Web Resources. ASP: Working of ASP Client-side Scripting versus Server-side scripting-Using personal web server-Server side ActiveX components – File System Objects – Session tracking and cookies – Accessing a Database from ASP.

**UNIT V**

XML: Structuring Data – DTD –customized Markup Language-XML parsers-Using XML with HTML-XSL– Microsoft Schema-Servlets: Servlet Overview- JSWDK – Handling HTTP Request – Get and post request – Session tracking-Multitier applications using JDBC from a servlet-Servlet internet and WWW Resources.

**Text Book:**

Deitel & Deitel, Goldberg, “*Internet and World Wide Web – How to Program*”, Pearson Education Asia, 2001.

Unit I: Chapter 3.1 to 3.10, 4.1 to 4.12.

Unit II : Chapter 8 ,9.5,9.6,9.7,9.11,9.12,10.3,10.5 to10.9,11,12,13.

Unit III: Chapter 15, 16, 17, 18.

Unit IV: Chapter 25.1 to 25.8, 26.1 to 26.9.

Unit V: Chapter 28.1 to 28.8, 29.1 to 29.8.

**Reference Books:**

1. Eric Ladd, Jim O’ Donnel, “*Using HTML 4, XML and JAVA*”, Prentice Hall of India – QUE, 1999.

2. Aferganatel, “*Web Programming: Desktop Management*”, PHI, 2004.

3. Rajkamal, “*Web Technology*”, Tata McGraw-Hill, 2001.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 5

Hours/Week : 6

Medium of instruction: English

Code: **S3PCSP3**

**M.Sc(Computer Science) - Semester:3**

(For students admitted from 2018 -2019 onwards)

**WEB TECHNOLOGY LAB**

**Objectives :** *To provide fundamental concept of Internet, JavaScript, XML, JSP, ASP with a view to Developing professional software development skills.*

1. Write a XML program for job listing in HTML.
2. Write a JavaScript code block, which checks the contents entered in a form's text element.  
If the text entered is in the lower case, convert to upper case.
3. Write a JavaScript code block, which validates a username and password.
  - a) If either the name or password field is not entered display an error message.
  - b) The fields are entered do not match with default values display an error message.
  - c) If the fields entered match, display the welcome message.
4. Write a JavaScript code to display the current date and time in a browser.
5. Write a JSP Program for user authentication.
6. Write a JSP Program for a simple shopping cart.
7. Write a JSP Program to prepare a bio data and store it in database.
8. Write an ASP Program using Response and Request Object.
9. Write an ASP Program using AdRotator Component.
10. Write an ASP program using database connectivity for student's record.

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S3PCSEL3A**

**M.Sc(Computer Science) - Semester:3**  
(For students admitted from 2018 -2019 onwards)

## **CLOUD COMPUTING**

**Objective:** *On successful completion of the course the student should have understood the different concepts of cloud computing and its services, deployment models and technological drivers of cloud computing*

### **UNIT I**

Computing Paradigms: High-Performance Computing - Parallel Computing - Distributed Computing - Cluster Computing -Grid Computing – Bio computing - Mobile Computing- Quantum Computing- Optical Computing- Nano computing- Network Computing. Cloud computing fundamentals: Motivation for Cloud Computing- Defining Cloud Computing-5-4-3 Principles of Cloud computing- Cloud Ecosystem- Requirements for Cloud Services- Cloud Application- Benefits and Drawbacks

### **UNIT II**

Cloud computing architecture and management: Cloud Architecture- user layer – network layer – cloud management layer – hardware resource layer – Anatomy of cloud – Network connectivity in cloud - Public Cloud Access Networking - Private Cloud Access Networking- Intracloud Networking for Public Cloud Services - Private Intracloud Networking - New Facets in Private Networks- Path for Internet Traffic - Applications on the Cloud - Managing the Cloud- Managing the Cloud Infrastructure - Managing the Cloud Application - Migrating Application to Cloud - Phases of Cloud Migration- Approaches for Cloud Migration.

### **UNIT III**

Cloud Deployment Models: Private Cloud- Public Cloud - Community Cloud - Hybrid Cloud – Characteristics, Suitability, Issues, Advantages, Disadvantages. Cloud Service Models : Infrastructure as a Service- Platform as a Service- Software as a Service – Characteristics – Suitability- Pros and Cons.

### **UNIT IV**

Technological Drivers for Cloud Computing: SOA and Cloud - SOA and SOC- Benefits of SOA- Technologies Used by SOA - Similarities and Differences between SOA and Cloud Computing – CCOA- Virtualization- Approaches in Virtualization - Full Virtualization – Para virtualization - Hardware-Assisted Virtualization - Types of Virtualization - Multicore Technology-memory and storage technologies – network technologies

### **UNIT V**

Web 2.0 characteristics – applications – Web 3.0 – components – characteristics – convergence of cloud and web 3.0 – Software process models for cloud – Programming models for cloud – how pervasive computing helps cloud – Operating system – Role – features – Cloud OS requirements –

Application environment - Need for Effective ADE - Application Development Methodologies - Power of Cloud Computing in Application- Cloud Application Development Platforms- Cloud Computing APIs

**Text Book:**

K. Chandrasekaran. '*Essentials of cloud computing*' CRC Press, Taylor & Francis Group, 2015

Unit I: Chapter 1 & Chapter 2

Unit II: Chapter 3

Unit III: Chapter 4 & Chapter 5

Unit IV: Chapter 6 – Sections 6.1 – 6.6

Unit V: Chapter 6 – Sections 6.7 – 6.13

**Reference Books:**

1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, “Cloud Computing: A Practical Approach”, McGraw Hill.
2. Kris Jamsa, “ Cloud Computing” Jones and Barlett Student Edition 2014.
3. RajkumarByya, James Broberg, AndrzejGoscinski, “ Cloud Computing Principles and Paradigms”, Wiley & sons

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

Code: **S3PCSEL3B**

**M.Sc(Computer Science) - Semester: 3**

(For students admitted from 2018 -2019 onwards)

**HUMAN COMPUTER INTERACTION**

**Objective:** *To impart knowledge related to the various concepts, methods of Human Computer Interaction techniques with design basics, design rules and evaluation techniques*

**UNIT I**

**The Interaction:** Introduction – Models of interaction – Frameworks and HCI Ergonomics – Interaction styles – Elements of the WIMP interface – Interactivity – The context of the interactions. Paradigms : Introduction – Paradigms for interaction.

**UNIT II**

**Interaction, Design basics:** Introduction – What is design? – User focus – Scenarios – Navigation design – Screen design and layout – Interaction and prototyping. HCL in the Software Process : Introduction – The software lifecycle – Usability engineering – interactive design and prototyping – Design rationale.

**UNIT III**

**Design Rules:** Introduction – Principles to support usability – Standards – Guidelines – Golden rules and heuristics – HCI patterns. Implementation Support : Introduction – Elements of windowing systems – Programming the application Using toolkits – User interface management systems.

**UNIT IV**

**Evaluation Techniques:** What is evaluation – Goals of evaluation – Evaluation through expert analysis – Evaluation through user participation – Choosing an evaluation method. Universal Design: Introduction – Universal design principles – Multi-modal interaction – Designing for diversity.

**UNIT V**

**User Support:** Introduction Requirements of user support – Approaches to; user support – Adaptive help systems designing user support systems.

**Text Book :**

Alan Dix, Janet Finlay, Gregory D. Abowd and Russell Beale, “*Human - Computer Interaction*”- Third Edition, “Pearson Education, 2004.

Unit I– chapter 3.1 – 3.8, 4.1, 4.2

Unit II- chapter 5.1 – 5.8, 6.1- 6.5

Unit III- chapters 7.1 – 7.6, 8.1 -8.5

Unit IV – chapter 9.1 – 9.5, 10.1 -10.4

Unit V- chapter 11.1 – 11.5

**Reference Book :**

John C. Carroll, “Human – Computer Interaction” in the New Millennium, Pearson Education 2002.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE



Credits : 4

Hours/Week : 6

Medium of instruction: English

Code: **S3PCSEL3C**

**M.Sc(Computer Science) - Semester: 3**

(For students admitted from 2018 -2019 onwards)

**DIGITAL IMAGE PROCESSING**

**Objective:** *To understand the fundamental concept of Digital Image Processing, Image Perception, Image Transforms, Image Enhancement*

**UNIT I**

Introduction: Digital Image Processing: Problems and Applications – Image Representation and Modeling – Image Enhancement – Image Restoration – Image Analysis – Image Reconstruction from Projections – Image Data Compression - Two-Dimensional Systems and Mathematical Preliminaries.

**UNIT II**

Image Perception: Introduction – Light, Luminance, Brightness and Contrast – MTF of the Visual System – The Visibility Function – Monochrome Vision Models – Image Fidelity Criteria – Color Representation – Color Matching and Reproduction – Color Coordinate Systems – Color Difference Measures – Color Vision Model – Temporal Properties of Vision - Image Sampling and Quantization.

**UNIT III**

Image Transforms: Introduction – Two-Dimensional Orthogonal and Unitary Transforms – Properties of Unitary Transforms – The One-Dimensional Discrete Fourier Transform(DFT) – The Two-Dimensional DFT – The Cosine Transform – The Sine Transform – The Hadamard Transform – The Haar Transform – The Slant Transform – The KL Transform – A Sinusoidal Family of Unitary Transforms – Outer Product Expansion and Singular Value Decomposition.

**UNIT IV**

Image Enhancement: Introduction – Point Operations – Histogram Modeling – Spatial Operations – Transform Operations – Multispectral Image Enhancement – False Color and Pseudo color – Color Image Enhancement.

**UNIT V**

Image Analysis and Computer Vision: Introduction – Spatial Feature Extraction – Transform Features – Edge Detection – Boundary Extraction – Boundary Representation – Region Representation – Moment Representation – Structure – Shape Features – Texture – Scene Matching and Detection – Image Segmentation – Classification Techniques.

**Text Book**

Anil K. Jain, “*Fundamentals of Digital Image Processing*”, PHI Learning Private Ltd, Delhi – 2013.

Unit- I: Chapter 1.1 – 1.7, 2.1 – 2.13

Unit- II: Chapter 3.1 – 3.12, 4.1 – 4.9

Unit-III: Chapter 5.1 – 5.13

Unit- IV: Chapter 7.1 – 7.8

Unit- V: Chapter 9.1 – 9.14

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A  $10 \times 2 = 20$  Answer All Question (Two questions from each unit)

Part B  $5 \times 5 = 25$  Answer All questions (Either or Type – Two questions from each unit)

Part C  $3 \times 10 = 30$  Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 5

Hours/Week : 6

Medium of instruction: English

**Code: S4PCS10**

**M.Sc(Computer Science) - Semester: 4**

(For students admitted from 2018 -2019 onwards)

**INTERNET OF THINGS (IoT)**

**Objectives:**

On successful completion of the course the student should have to:

- Understand the communication technologies in IoT
- Know the IoT protocols and web of things
- Know the various applications of IoT

**Unit - I**

Introduction : IOT Definitions and Functional Requirements – Web 3.0 View of IoT- Ubiquitous IoT Applications : A Panoramic View of IoT Applications - Important Vertical IoT Applications – Four Pillars of IoT: The Horizontal, Verticals, and Four Pillars- M2M: The Internet of Devices- RFID: The Internet of Objects- WSN: The Internet of Transducers- SCADA: The Internet of Controllers

**Unit - II**

DNA of IoT:- DCM: Device, Connect, and Manage- Device: Things That Talk -Connect: Via Pervasive Networks- Manage: To Create New Business Value

Middleware for IoT: An Overview of Middleware - Communication Middleware for IoT - IoT protocols : Protocol Standardization for IoT - IoT Protocol Standardization Efforts: M2M and WSN Protocols- SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards: A Challenging Task

**Unit - III**

Web of Things: Web of Things versus Internet of Things: Two Pillars of the Web – Architecture Standardization for WoT: Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence-Challenges of IoT Information Security

**Unit - IV**

Cloud of Things: Cloud Computing – Grid/SOA and Cloud Computing - Cloud Middleware - NIST's SPI Architecture and Cloud Standards- Cloud Providers and Systems - The Cloud of Things : The Internet of Things and Cloud Computing- Mobile Cloud Computing - Cloud of Things Architecture

**Unit - V**

IoT Applications for Value Creations: Asset Management :Introduction -Expected benefits -e-Maintenance in the M2M Era - Industrial Automation : Service-oriented architecture-based device integration- SOCRADES: realizing the enterprise integrated Web of Things-IMC-AESOP: from the Web of Things to the Cloud of Things-The Smart Grid : Smart metering-Commercial Building Automation: commercial building automation today

**TEXT BOOK**

1. The Internet of Things in the Cloud:A Middleware Perspective-Honbo Zhou–CRC Press 2012.

**Unit I** - Chapter 1.3,1.4, Chapter 22.1,2.2, Chapter 3 ,

**Unit II** - Chapter 4 , Chapter 5 , Chapter 6.2,6.3

**Unit III** - Chapter 6.1, Chapter 7

**Unit IV** - Chapter 8, Chapter 9

2. From Machine-to-Machine to the Internet of Things Introduction to a New Age of Intelligence  
Jan Holler, Vlasios Tsiatsis, Catherine Mulligan,Stamatis Karnouskos,Stefan Avesand,David  
Boyle, Academic Press is an imprint of Elsevier 2014

**Unit V** - Chapter 10, 11,12,13,14

**REFERENCES:**

1. Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles-  
(Eds.) – Springer – 2011

2. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley  
and Jon Kleinberg, Cambridge University Press - 2010.

3. The Internet of Things: Applications to the Smart Grid and Building Automation by - Olivier  
Hersent, Omar Elloumi and David Boswarthick - Wiley -2012

4. Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications  
and Protocols”, Wiley, 2012.

5. Internet of Things (A Hands-on-Approach), by Vijay Madisetti and Arshdeep Bahga, 1st  
Edition, VPT, 2014.

Credits :5

Hours/Week : 6

Medium of instruction: English

**Code: S4PCSP4**

**M.Sc(Computer Science) - Semester: 4**  
(For students admitted from 2018 -2019 onwards)

**INTERNET OF THINGS- LAB**

**Objective:** *To impart the programming skills using Arduino board with various sensors*

1. Write an Internet of Things with Arduino program using LED & resistor Blinking LED.
2. Write a Program detects vibration, vibration or tilt of any object gives output.
3. Write an Arduino program find the working of a touch sensor is similar to that of a simple switch.
4. Write a program using Arduino Board respectively to generate the ultrasound using Ultrasonic Sensor find duration and distance.
5. Write a program using smoke sensor has a built-in potentiometer that allows you to adjust the sensor sensitivity according to how accurate you want to detect gas.
6. Write an IoT program using temperature sensor is a device which is designed specifically to measure the hotness or coldness of an object.
7. Write a program using soil moisture to find Measure the Volumetric content of water.
8. Write an Arduino program using IR sensor remote, measure the heat of an object as well as detects the motion.
9. Write an Arduino program using PIR sensor detects a human being moving around.
10. Write an Arduino program using Magnetic Reed Switch, read open or closed.
11. Write an Arduino program using stepper motor, the rotor is a permanent magnet.
12. Create an Arduino Sketch with Water Level Sensor get the water level Indicator Alarm.

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S4PCSPW**

**M.Sc(Computer Science) - Semester: 4**  
(For students admitted from 2018 -2019 onwards)

**PROJECT WORK**

Dissertation : 75 Marks

Viva voce : 25 Marks

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S4PCSEL4A**

**M.Sc(Computer Science) - Semester: 4**  
(For students admitted from 2018 -2019 onwards)

### **PERVASIVE COMPUTING**

**Objective:** *On successful completion of the course the students should have: Understand the concept of web applications and WAP fundamentals. Learn the PDA.*

#### **UNIT I**

Pervasive Computing: Past, Present and Future - Pervasive Computing Market – m- Business – Application examples: Retail, Airline check-in and booking – Health care – Car information system – E-mail access via WAP and voice.

#### **UNIT II**

Device Technology: Hardware – Human Machine Interfaces – Biometrics – Operating Systems – Java for Pervasive devices.

#### **UNIT III**

Device Connectivity: Protocols – Security – Device Management - Web Application Concepts: WWW architecture – Protocols – Transcoding - Client Authentication via Internet.

#### **UNIT IV**

WAP and Beyond: Components of the WAP architecture – WAP infrastructure –WAP security issues – WML – WAP push – Products – i-Mode - Voice Technology: Basics of Speech recognition- Voice Standards – Speech applications – Speech and Pervasive Computing.

#### **UNIT V**

PDA: Device Categories – PDA operation Systems – Device Characteristics – Software Components - Standards – Mobile Applications - PDA Browsers - Pervasive Web Application architecture: Background – Development of Pervasive Computing web applications - Pervasive application architecture.

#### **Text Book:**

JochenBurkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Pearson Education, 2006.

**Unit I:** Chapter (1.3, 1.4, 2.1, 2.2, 2.4, 2.6, 2.7)

**Unit II:** Chapter (3.1 – 3.5).

**Unit III:**Chapter (4.1 – 4.3, 5.2- 5.5).

**Unit IV:** Chapter (6.2-6.8, 7.1 – 7.4)

**Unit V:** Chapter (8.2 – 8.8, 10.1, 10.3, 10.4)

**Reference Book:**

Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, “*Fundamentals of Mobile and Pervasive Computing*” McGraw Hill edition, 2006.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE



Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S4PCSEL4B**

**M.Sc(Computer Science) - Semester: 4**  
(For students admitted from 2018-2019 onwards)

### **SOFT COMPUTING**

**Objective:** *To impart knowledge in Fuzzy Set Theory, Optimization, Neural Networks, Neuro Fuzzy Modeling and Application Of Computational Intelligence.*

#### **UNIT I**

**Fuzzy Set Theory :** Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

#### **UNIT II**

**Optimization :** Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

#### **UNIT III**

**Neural Networks:** Supervised Learning Neural Networks – Perceptrons – Adaline Backpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

#### **UNIT IV**

**Neuro Fuzzy Modeling:** Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

#### **UNIT V**

**Application of Computational Intelligence:** Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

**Text Book**

J.S.R. Jang, C.T. Sun and E. Mizutani, “*Neuro Fuzzy and Soft Computing*”, PHI, Pearson Education, 2004.

**Reference Books**

1. Timothy J. Ross, “*Fuzzy Logic with Engineering Application*“, McGraw Hill, 1977.
2. Davis E. Goldberg, “*Genetic Algorithms Search, Optimization and Machine Learning*”, Addison Wesley, 1989.
3. S. Rajasekaran and G.A.V. Pai, “*Neural Networks, Fuzzy Logic and Genetic Algorithms*”, PHI, 2003. Emereo Pty Limited, July 2008.
4. Ahmar, Abbas, “*Grid Computing - A Practical Guide to technology and Applications*”, Charles River media, 2003.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S4PCSEL4C**

**M.Sc(Computer Science) - Semester: 4**

(For students admitted from 2018 -2019 onwards)

**EMBEDDED SYSTEMS**

**Objectives:** *To provide fundamental concept of Embedded systems and real time operating systems.*

**UNIT I**

Introduction to Embedded systems – processor in the system – software embedded into a system – structural units in a processor – processor, memory selection, Memory devices - Allocation of memory to program segments and blocks and memory map of a system.

**UNIT II**

Device drivers – Interrupt servicing mechanisms – context and periods for context switching - Programming concepts and Embedded programming in C and C++: Software programming in ALP and in high level language ‘C’ – ‘C’ program elements: Header source files and preprocessor directives – Macros and functions: Data types – data structures – modifiers – statements – loops and pointers – Embedded programming in C++ and Java.

**UNIT III**

Program modeling concepts in single and multiprocessor systems – software – development process: modeling process for software analysis – programming model for event controlled or response time constrained real time program- modeling of multiprocessor systems. Multiple processes – sharing data by multiple tasks and routines – inter process communications.

**UNIT IV**

Real time operating systems: OS services – IO sub systems – Real time and embedded operating systems – Interrupt routines in RTOS environment – RTOS task scheduling models, Interrupt latency and response times of the task as performance metrics – performance metrics in scheduling models.

**UNIT V**

Hardware Software code design: Embedded system project management – Embedded system design and Co-design Issues – Design Cycle – uses of target system – use of software tools for development – use of scopes and logic analysers for system hardware tests – issues in embedded system design.

**Text Book:**

Raj Kamal , “*Embedded systems – Architecture, Programming and Design*” – TMH, 2007.

**Reference Book:**

Mohamed Ali Maszidi & Janice Gillispie Maszidi, “The 8051 Microcontroller and Embedded System”, Pearson Publishers

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

Code: **S4PCSEL5A**

**M.Sc(Computer Science) - Semester:4**

(For students admitted from 2018 -2019 onwards)

**BIG DATA ANALYTICS**

Objective: *To impart knowledge in Fundamentals, Big Data Analytics, Technologies and databases, Hadoop and Map Reduce Fundamentals*

**UNIT I**

Introduction to big data: Data, Characteristics of data and Types of digital data:

Unstructured, Semi-structured and Structured, Sources of data, Working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, Data environment versus big data environment.

**UNIT II**

Big data analytics: Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment.

**UNIT III**

Big data technologies and Databases: Introduction to NoSQL, Uses, Features and Types, Need, Advantages, Disadvantages and Application of NoSQL, Overview of NewSQL, Comparing SQL, NoSQL and NewSQL, Introduction to MongoDB and its needs, Characteristics of MongoDB, Introduction of apache cassandra and its needs, Characteristics of Cassandra

**UNIT IV**

Hadoop foundation for analytics: History, Needs, Features, Key advantage and Versions of Hadoop, Essential of Hadoop ecosystems, RDBMS versus Hadoop, Key aspects and Components of Hadoop, Hadoop architectures.

**UNIT V**

Hadoop Map Reduce and YARN framework: Introduction to MapReduce, Processing data with Hadoop using MapReduce, Introduction to YARN, Components, Need and Challenges of YARN, Dissecting YARN, MapReduce application, Data serialization and Working with common serialization formats, Big data serialization formats.

**Text Book:**

Seema Acharya and Subhashini Chellappan, *“Big Data and Analytics”*, Wiley India Pvt. Ltd., 2016

**Reference Books**

1. Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, “*Big Data*” Wiley Publications, 2014.
2. Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, Apress Media, “*Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics*” Springer Science + Business Media New York, 2013
3. Anand Rajaraman, Jure Leskovec, Jeffery D. Ullman, “*Mining of Massive Datasets*”, Springer, July 2013
4. Tom White, “*Hadoop: The definitive Guide*”, O'Reilly Media, 2010.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

Credits : 4

Hours/Week : 6

Medium of instruction: English

**Code: S4PCSEL5B**

**M.Sc(Computer Science) - Semester: 4**

(For students admitted from 2018 -2019 onwards)

**ARTIFICIAL INTELLIGENCE**

**Objective:** *On Successful completion of the course the students should have: understood the AI & Expert Systems.- Learnt the Heuristic techniques and reasoning.*

**UNIT I**

Introduction: AI Problems - AI techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems.

**UNIT II**

Heuristic Search techniques: Generate and Test - Hill Climbing- Best-First - Means-end analysis. Knowledge representation issues: Representations and mappings -Approaches to Knowledge representations -Issues in Knowledge representations - Frame Problem.

**UNIT III**

Using Predicate logic: Representing simple facts in logic – Representing Instance and Is a relationships - Computable functions and predicates - Resolution.

**UNIT IV**

Representing knowledge using rules: Procedural Vs Declarative knowledge –Logic programming - Forward Vs Backward reasoning - Matching – Control knowledge.

**UNIT V**

Game playing – The minimax search procedure – Expert System – Perception and Action

**Text Book:**

Elaine Rich and Kevin Knight, " *Artificial Intelligence*", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991.

**Unit I:** Chapter 1(1.1,1.3.1.5), Chapter 2(2.1,2.2)

**Unit II:** Chapter 3(3.1,3.2,3.3,3.6), Chapter 4(4.1,4.2,4.3,4.4).

**Unit III:** Chapter 5(5.1,5.2,5.3,5.4).

**Unit IV:** Chapter 6.

**Unit V:** Chapter 12(12.1,12.2),Chapter 20 and Chapter 21.

Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE



Credits : 4

Hours/Week : 6

Medium of instruction: English

Code: **S4PCSEL5C**

**M.Sc(Computer Science) - Semester:4**  
(For students admitted from 2018 -2019 onwards)

**DATABASE ADMINISTRATION AND MANAGEMENT**

**Objectives:**

- *To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram and data storage techniques a query processing.*
- *To make a study of SQL and relational database design*
- *To import knowledge in transaction processing, concurrency control techniques and recovery procedures*
- *Learnt distributed databases*
- *Understood database administration and security*

**UNIT I**

Introduction to Database Design: Database Design and ER Diagrams-Entities, Attributes, and Entity Sets- Relationships and Relationship Sets- Additional Features of the ER Model – Conceptual Design With the ER Model – Conceptual Design for Large Enterprises- The Unified Modeling Language .The Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data – Logical Database Design: ER to Relational –Introduction to Views – Destroying/Altering Tables and Views.

**UNIT II**

Relational Algebra and Calculus: Preliminaries – Relational Algebra – Relational Calculus – Expressive Power of Algebra and Calculus. SQL: Queries, Constraints, Triggers: Overview – The Form of a Basic SQL Query – Union, Intersect and Except – Nested Queries – Aggregate Operators – Null Values – Complex Integrity Constraints in SQL – Triggers and Active Databases – Designing Active Databases.

**UNIT III**

Database Application Development: Accessing Databases from Applications – An Introduction to JDBC – JDBC Classes and Interfaces – SQLJ – Stored Procedures. Internet Applications: Introduction – Internet Concepts – HTML Documents – XML Documents – The Three – Tier Application Architecture – The Presentation Layer – The Middle Tier.

**UNIT IV**

Transaction Management : Overview of Transaction Management- The ACID Properties- Transactions and Schedules- Concurrent Execution of Transactions - Lock-Based Concurrency Control - Performance of Locking - Introduction to Crash Recovery. Concurrency Control: 2PL, Serializability, and Recoverability - Introduction to Lock Management - Lock Conversions -

Dealing With Deadlocks - Specialized Locking Techniques - Concurrency Control without Locking.

#### UNIT V

Schema Refinement and Normal Forms: Introduction to Schema Refinement – Functional Dependencies – Reasoning about FDs- Normal Forms – Properties of Decompositions – Normalization – Schema Refinement in Database Design – Other Kinds of Dependencies. Security and Authorization: Introduction to Database Security- Access Control- Discretionary Access Control – Mandatory Access Control – Security for Internet Applications – Additional Issues Related to Security.

#### Text Book:

Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, McGraw Hill, Third Edition 2004.

Unit I: 2.1- 2.7, 3.1 – 3.7

Unit II: 4.1 – 4.3, 5.1 – 5.9

Unit III: 6.1 – 6.5, 7.1-7.7

Unit IV: 16.1-16.5, 16.7, 17.1 – 17.6

Unit V: 19.1 – 19.8 , 21.1 – 21.6

#### Reference Books:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “*Database System Concepts*”, Fifth Edition, McGraw Hill, 2006.
2. Peter Rob, Carlos Coronel, “*Database System Concepts*”, Cengage Learning, 2008

#### Question Paper pattern

Maximum Marks: 75

Exam Duration: Three Hours

Part A 10x2 = 20 Answer All Question (Two questions from each unit)

Part B 5x5 = 25 Answer All questions (Either or Type – Two questions from each unit)

Part C 3 x10 30 Answer any THREE questions (One question from each unit)

Signature of the HOD

COE

**Course structure for M.Phil (Computer Science)**  
(Applicable to the candidates admitted from the academic year 2018-2019 onwards)

Semester	Code	Course	Course Title	Marks		Total	Exam Hrs	Credit
				Int.	Ext.			
I	<b>S1MCS1</b>	Core Course 1	Research Methodology	40	60	100	3	4
	<b>S1MCS2</b>	Core Course 2	Advanced Concepts in computer science	40	60	100	3	4
	<b>S1MCS3</b>	Core Course 3	Research Tools	40	60	100	3	4
		Core Course 4	Guide Paper*	40	60	100	3	4
			<b>Total</b>			<b>400</b>		<b>16</b>
				<b>V.V</b>	<b>DIS</b>	<b>Total</b>		
II	<b>S2MCSD</b>	Core Course 5	Dissertation and viva voce	50	150	200		8
			<b>Grand Total</b>			<b>600</b>		<b>24</b>

\*

S.No	Code	Guide Paper - Title
1	<b>S1MCS4A</b>	Data Mining techniques
2	<b>S1MCS4B</b>	Cloud Computing
4	<b>S1MCS4C</b>	Network Security
5	<b>S1MCS4D</b>	Big Data Analytics
6	<b>S1MCS4E</b>	Digital Image Processing
		<b>No. of Papers</b>
	<b>Core Courses</b>	4 (Each of 4 Credits)
	<b>Project</b>	1
	<b>Total</b>	5 ( 24 Credits)

Credits : 4

Exam Hours : 3

Medium of instruction: English

**Code: S1MCS1**

**M.Phil(Computer Science) - Semester 1**  
(For students admitted from 2018 -2019 onwards)

### **CORE COURSE I – RESEARCH METHODOLOGY**

**Objectives:** *To understand the fundamentals of Research, Research types, Thesis Writing, Analysis of algorithm and Probability and Statistical Analysis*

#### **UNIT I**

Thesis Writing: Research types – objectives and approaches – Literature collection, Web browsing – Software tools – Writing review and journal articles – manuscript publication  
Planning a thesis – general format – page and chapter format – footnotes – tables and figures – references and appendices

#### **UNIT II**

Analysis of algorithm: The role of algorithm in computing – Insertion sort – Analyzing and designing algorithms – growth of functions – introduction to NP – completeness

#### **UNIT III**

Formal Languages and Finite Automata: Context free grammars – Derivation trees – Simplification of context free Grammars – Chomsky normal form – Greiback normal form – The pumping lemma for context free languages-Finite state systems – Basic definitions – Non deterministic finite automata – Finite automata with epsilon moves – Regular expressions – Applications of finite Automata (Stress on theorem statement and problems only, no proof for theorems)

#### **UNIT IV**

Probability and Statistical Analysis: Probability – Fail time data analysis – Hazard models – Conditional probability – Bayes rule – System reliability – Stochastic process

#### **UNIT V**

Logics – Relations and Functions: Propositions – Precedence rules for operators – Laws of equivalence – Natural deduction system – Developing natural deduction system proofs  
Relation properties – Matrix and Graph – Graph Notations for relations – Partition and covering – Equivalence relation – Compatibility relations – Partial ordering – Functions – Components – Composition of function – Inverse functions – Binary and n-ary operations

#### **Text Books:**

1. Kothari C. R. “*Research Methodology – methods and techniques*”, 2nd Edition, Wishwa Prakashjan New Delhi 1999
2. Elis Horowitz and Sartaj Sahni, “*Fundamentals of Computer algorithms*”, Galgotia Publications, New Delhi 2000
3. John E. Hopcroft, Jeffery D. Ullman, “*Introduction to Automata Theory Language and Computation*,” narosa Publishing House, 1979

4. L.S. Srinath, "*Reliability Engineering*," Third Edition, Affiliated East, West press pvt. Ltd, New Delhi, 2005
5. David Gries, "*The Science of Programming*" Narosa Publishing House, 1981

**Reference Books:**

1. Berny H. Durston, M. Poole, „Thesis and Assignment writing, Wiley Eastern Ltd. ND 1970
2. Misra R.P. Research Methodology – A Hand Book, Concept publishing Company, New Delhi 1988
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest „Introduction to Algorithms, Prentice Hall of India, 1998
4. E. Balagurusamy, Reliability Engineering, Tata Mc Graw Hill Publishing Ltd., New Delhi 2003
5. Leon S. Levy, ;Discrete structures of Computer Science, Wiley Eastern Ltd., 1980

Question Paper pattern

Maximum Marks: 60

Exam Duration: Three Hours

Part A 5x6 = 30 Answer All questions (Either or Type – Two questions from each unit)

Part B 3 x10 = 30 Answer any THREE questions ( One question from each unit)

Signature of HOD

COE

Credits : 4

Exam Hours : 3

Medium of instruction: English

**Code: S1MCS2**

**M.Phil(Computer Science) - Semester 1**  
(For students admitted from 2018 -2019 onwards)

**CORE COURSE II–ADVANCED CONCEPTS IN COMPUTER SCIENCE**

Objective: *The objective of this paper is to understand web services Grid computing and fundamentals of cloud computing*

**UNIT I**

Introduction - What are web services-SOAP-WSDL-UDDI Basic web services standards, technologies and concepts: XML fundamentals: Documents- Namespaces-schema-processing XML-Simple API for XML(SAX)-Document object model(DOM)

**UNIT II**

SOAP and WSDL: The SOAP model-SOAP messages-SOAP encoding WSDL: Structure-The types element-Managing WSDL descriptions-Using SOAP and WSDL Service implementation and Invoking web services. UDDI: Introduction- UDDI specification - UDDI and lifecycle management.

**UNIT III**

Grid Computing: Grid computing systems – Elements of Grid computing – Grid architecture – main characteristics of grid – Standard bodies related to grid – Economic aspects of grid systems – Security models – Chinese wall model – task based authorization – role based access control model – access control approaches – Grid computing Security .

**UNIT IV**

Cloud computing architecture & management - Cloud Architecture - user layer – network layer – cloud management layer – hardware resource layer – Anatomy of cloud – Network connectivity in cloud - Applications on the Cloud - Managing the Cloud -Migrating Application to Cloud - Phases of Cloud Migration- Approaches for Cloud Migration.

**UNIT V**

Cloud Deployment Models: Private Cloud- Public Cloud - Community Cloud - Hybrid Cloud – Characteristics, Suitability, Issues, Advantages, Disadvantages. Cloud Service Models : Infrastructure as a Service- Platform as a Service- Software as a Service – Characteristics – Suitability- Pros and Cons

**Text Books:**

1. Sandeep Chatterjee, James Webber, “*Developing Enterprise Web Services: An Architects Guide*”, Prentice Hall, Nov 2003

Unit I: Chapter 1 (Pg. 1 to 8), Chapter 2 (Pg.19 to 64)

Unit II : Chapter 3 (Pg. 71 to 86 , 100 – 119) , Chapter 4 (Pg. 121 to 122, Pg. 129 , Pg. 137 to 139) Grid Computing thesis chapter 1 downloaded from Web (Unit III)

2. K. Chandrasekaran. '*Essentials of cloud computing*' CRC Press, Taylor & Francis Group, 2015 (Unit IV Chapter 3 Unit V Chapter 4 and 5)

Question Paper pattern

Maximum Marks: 60

Exam Duration: Three Hours

Part A 5x6 = 30 Answer All questions (Either or Type – Two questions from each unit)

Part B 3 x10 = 30 Answer any THREE questions ( One question from each unit)

Signature of HOD

COE

Credits : 4

Exam Hours : 3

Medium of instruction: English

**Code: S1MCS3**

**M.Phil(Computer Science) - Semester 1**  
(For students admitted from 2018 -2019 onwards)

**CORE COURSE III - RESEARCH TOOLS**

**Objective:** *The objective of this paper is to understand the R language and Matlab programming.*

**UNIT I**

R – Installation - Getting started with 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 – Getting Data In and Out of R - Reading and Writing Data Reading Data Files with read.table() – reading in large data sets with read.table – calculating memory requirements for R Objects – using the readr package – Using textual and binary formats for storing data – dput-dump – binary formats.

**UNIT II**

Interfaces to outside world – file connections – reading lines of text file – reading from URL connection. Sub setting R Objects – Sub setting a vector – sub setting a matrix – sub setting lists – sub setting nested elements of lists –extracting multiple elements of a list - vectorized matrix operations – dates in R- times in R operations on dates & times – data frames with dplyr package – select – filter – arrange – rename – mutate – group by.-Control Structures-Functions in R.

**UNIT III**

Data Science with R- Introduction-Prerequisites-mpg data frame-ggplot-Aesthetic mapping-Common problems-Facets-Geometric objects-Data Transformations-Relational Data-Tidy Data-Graphics for communications-Labels, Annotations, Scales ,Zooming & Themes

**UNIT IV**

Matlab's power of computational mathematics – Features of Matlab – Uses of Matlab – Local Environment Setup – Understanding the Matlab Environment – Comments in Matlab – commonly used operators and special characters – Special variables and constants – variables – naming variables – multiple assignments – who command – whos command – clear command – long assignment – format command – commands for managing workspace – some system commands in Matlab – input and output commands – formatted input and output with format specifiers – basic commands for vector, matrix and array – plotting commands – m-files in Matlab - Datatypes in Matlab- data type conversion – determination of data types – operators – arithmetic – relational – logical – bitwise – set operations.



## UNIT V

Matlab decision making – if, if-else, if-elseif-else, nested if, switch, for loop, while loop – loop control statements –break and continue. - Vectors – row vectors – column vectors – vector operations – addition – subtraction – scalar operations – transpose – appending vectors – dot product. Matrices – deleting row or column in a matrix – matrix operations – addition – subtraction – scalar operations – concatenation of matrices – multiplication - transpose – determinant – inverse. Arrays – Special arrays in Matlab – zeors, ones, eye, magic square – functions in matlab – data import and export

### Text Book & Website link:

1. Roger D Peng, *R Programming for Data Science*, Lulu.com, 2012
2. <https://www.tutorialspoint.com/matlab/index.htm>

Unit 1 – chapter 2,3,4,5,6

Unit II - chapter 7,8,9,10, 11

Unit III - chapter 12,13,14,15,16

Unit IV & Unit V – Matlabtutorialpoint weblink

### Reference Books:

1. Hadley Wickham, Garrett Grolemund, *R for Data Science*, Published by O'Reilly January 2017 First Edition
2. Andrew Knight, *Basics of Matlab and beyond*, CRC press
3. *Matlab programming fundamentals*, MathWorks handbook

### Question Paper pattern

Maximum Marks: 60

Exam Duration: Three Hours

Part A 5x6 = 30 Answer All questions (Either or Type – Two questions from each unit)

Part B 3 x10 = 30 Answer any THREE questions (One question from each unit)

Signature of HOD

COE

**GUIDE PAPERS**

Credits : 4

Exam Hours : 3

Medium of instruction: English

**Code: S1MCS4A**

**M.Phil(Computer Science) - Semester 1**  
(For students admitted from 2018 -2019 onwards)

**DATA MINING CONCEPTS AND TECHNIQUES**

**Objectives:**

- *To understand the fundamental processes, concepts and techniques of data mining*
- *To emphasis on classification, clustering and association rule mining*
- *To develop the ability to select methods and techniques appropriate for a given data mining problem.*

**UNIT I**

**Introduction to Data Mining:** Data mining - data mining functionalities; data pre-processing - data cleaning; missing values -data cleaning as a process; data integration and transformation; data reduction: data cube aggregation - attribute subset selection - dimensionality reduction - numerosity reduction, principal component analysis; data discretization and concept hierarchy generation for numerical and categorical data.

**UNIT II**

**Association Rule Mining and Multirelational Data Mining :** Basic Concepts and a road Map; Frequent- set Mining Methods: Apriori Algorithm and FP growth; From Association Mining to correlation analysis. **Graph mining**– mining frequent subgraphs, mining alternative substructure patterns, substructure similarity search in graph databases, community mining from multi-relational networks, multi-relational data mining

**UNIT III**

**Clustering Analysis :** Basic concepts and methods: Requirement of Clustering in Data Mining, Similarity and Distance Measures; Partitioning algorithms: k-means clustering, Nearest Neighbour, A Centroid Based Technique, Hierarchical clustering, BIRCH, Density-based methods, model-based clustering methods, outlier analysis.

**UNIT IV**

**Advanced Cluster Analysis :** Probabilistic Model-Based Clustering: Fuzzy Clusters, Expectation, Maximization Algorithms, Clustering High Dimensional Data: Subspace Clustering Methods, Bi-Clustering, Dimensionality Reduction Methods and Spectral Clustering, Clustering Graph and Network Data: Similarity Measures, Graph Clustering Methods, Clustering with Constraints.

**UNIT IV**

**Classification Methods :** Issues in classification; Naïve Bayesian classifier; Decision Tree; Rule Based Classification; Support Vector Machines; maximal margin classifier; Linearly separable and linearly inseparable cases; Classifier Accuracy Measures and methods to improve accuracy. Lazy learners – k-nearest neighbours, case-based reasoning.

**Text book:**

Han, J and Kamber, M. Data Mining: Concepts and Techniques. Morgan Kaufmann Publications, 3e, 2011.

**Reference Books:**

1. Wang, J. T. L. Data Mining In Bioinformatics. Springer, UK, 1e, 2004.
2. Dunham, M.H. Data Mining - Introductory and Advanced Topics. Prentice Hall, 1e, 2002.
3. Alpaydin, E. Introduction to Machine Learning. MIT Press, 2e, 2010.

Question Paper pattern

Maximum Marks: 60

Exam Duration: Three Hours

Part A 5x6 = 30 Answer All questions (Either or Type – Two questions from each unit)

Part B 3 x10 = 30 Answer any THREE questions ( One question from each unit)

Signature of HOD

COE

Credits : 4

Exam Hours : 3

Medium of instruction: English

**Code: S1MCS4B**

**M.Phil(Computer Science) - Semester 1**  
(For students admitted from 2018 -2019 onwards)

**CLOUD COMPUTING**

**Objective:** *To understand the concepts of Cloud Computing and to study the cloud service and management.*

**UNIT I**

Introduction to Cloud Computing: Roots of Cloud Computing - Layers and Types of Cloud – Features of a Cloud-Infrastructure Management-Cloud Services-Challenges and Risks. Migrating into a Cloud: Introduction - Broad Approaches – Seven Step Model. Integration as a Service-Integration Methodologies - SaaS.

**UNIT II**

Infrastructure as a Service: Virtual Machines-Layered Architecture-Life Cycle-VM Provisioning Process- Provisioning and Migration Services. Management of Virtual Machines Infrastructure - Scheduling Techniques. Cluster as a Service-RVWS Design-Logical Design. Cloud Storage - Data Security in cloud Storage- Technologies.

**UNIT III**

Platform and Software as a Service: Integration of Public and Private Cloud- Techniques and Tools-Framework ArchitectureResourceProvisioning Services - Hybrid Cloud. Cloud based solutions for Business Applications- Dynamic ICT services-Importance of quality and Security in clouds-Dynamic Data Center-case studies. Workflow Engine in the cloud – Architecture - Utilization.Scientific Applications for cloud – Issues – Classification – SAGA – Map Reduce Implementation.

**UNIT IV**

Cloud Resource Virtualization. Virtualization, Layering and Virtualization, Virtual machine monitors, Virtual Machines,Performance and Security Isolation, Full Virtualization and Paravirtualization, Hardware support for Virtualization.

**UNIT V**

Cloud Resource Management and Scheduling. Policies and Mechanism for Resource Management, Application of control theoryto task scheduling on acloud, Stability of a two-level Resource Allocation Architecture, Scheduling Algorithms forComputing Clouds, Resource Management and Dynamic Scaling.

**Text Books:**

1. Rajkumar Buyya, James Broberg, and Andrzej Goscinski : *Cloud Computing Principles and Paradigms*, John Wiley & Sons, Inc, 2011.
2. Dan C Marinescu: *Cloud Computing Theory and Practice*. Elsevier(MK)2013.

**Reference Books:**

1. George Reese, — *Cloud Application Architectures*, O'Reilly Media, Inc, First Edition, 2009.
2. Michael Miller, — *Cloud Computing: Web based Applications That Change the Way You Work and Collaborate Online*, QUE Publishing, 2009.

Question Paper pattern

Maximum Marks: 60

Exam Duration: Three Hours

Part A 5x6 = 30 Answer All questions (Either or Type – Two questions from each unit)

Part B 3 x10 = 30 Answer any THREE questions ( One question from each unit)

Signature of HOD

COE

Credits : 4

Exam Hours : 3

Medium of instruction: English

**Code: S1MCS4C**

**M.Phil(Computer Science) - Semester 1**  
(For students admitted from 2018 -2019 onwards)

**NETWORK SECURITY**

**Objective:** *To understand the concepts of Computer Network Security and to study the Cryptographic techniques and procedures.*

**UNIT I**

**Introduction:** Security Trends – The OSI Architecture – Security Attacks – Security Services – Security Mechanisms – A model for Network Security – Classic Encryption Techniques – Symmetric Cipher Model – Substitution Techniques – Transposition techniques – Rotor Machines – Stegnography.

**UNIT II**

**Block Ciphers and Data Encryption Standards:** Block Cipher - Principles - Data Encryption Standard – The strength of DES – Differential and Linear Cryptanalysis – Block Cipher design principles – Advanced encryption Standard – The AES Cipher

**UNIT III**

**Public Key Encryption and Hash functions:** Principles of Public Key Crypto Systems – The RSA algorithm – Message Authentication – Authentication Requirements – Authentication Functions – Message Authentication codes – Hash Functions – Security of Hash Functions and MAC - Whirlpool – HMAC – CMAC – Digital Signatures – Authentication Protocols – Digital Signature standard

**UNIT IV**

**Authentication Applications:** Kerberos – X.509 Authentication Service – PKI – Electronic Mail Security - Pretty Good Privacy – S/MIME – IP Security – IP Security Overview – IP Security Architecture – Authentication Header – Key Management – Web Security – Web Security Considerations SSL and Transport Layer Security

**UNIT V**

**System Security:** Intruders – Intrusion Detection – Password Management – Viruses – DOS and DDOS Attacks – Firewalls – Firewall Design Principles – Trusted Systems – IT Security Evaluation

**Text Book:**

William Stallings, —Cryptography and network Security – Principles and Practices, Prentice Hall (Pearson Education), Fourth Edition, 2006

**Reference Book:**

Atul Kahate, —Cryptography and Network Securityll, Tata McGraw Hill Publications, New Delhi.

Question Paper pattern

Maximum Marks: 60

Exam Duration: Three Hours

Part A 5x6 = 30 Answer All questions (Either or Type – Two questions from each unit)

Part B 3 x10 = 30 Answer any THREE questions ( One question from each unit)

Signature of HOD

COE

Credits : 4

Exam Hours : 3

Medium of instruction: English

**Code: S1MCS4D**

**M.Phil(Computer Science) - Semester 1**  
(For students admitted from 2018 -2019 onwards)

## **BIG DATA ANALYTICS**

**Objective:** *To understand the concepts of Big data and to study the big data analytic techniques and Hadoo & MapReduce.*

### **UNIT I**

Fundamentals of Big Data : The Evolution of Data Management – Understanding the waves of Managing Data – Defining Big Data – Building a Successful Big Data Management Architecture – Examining Big Data Types : Defining Structured Data – Defining Unstructured Data – Looking at Real Time and Non Real Time Requirements - Operational Databases – Organizing Data Services and Tools – Analytical Data Warehouses – Big Data Analytics – Big Data Applications.

### **UNIT II**

No SQL Management: Introduction to NOSQL – Difference between SQL and NOSQL-Types of NOSQL Databases-NOSQL Data Model-relational vs Aggregate Data Models – Schema less Map-Reduce – Partitioning and Combining – Composing Map-Reduce Calculations

### **UNIT III**

Big Data Analytics : Defining Big Data Analytics : Using Big Data to get Results – Modifying Business Intelligence Products to Handle Big Data – Studying Big Data Analytics Examples – Big Data Analytics Solutions – Understanding Text Analytics and Big Data : Exploring Unstructured Data – Analysis and Extraction Techniques – Putting Results Together with Structured Data – Putting Big Data to use – Text Analytics Tools for Big Data – Customized Approaches for Analysis of Big Data : Characteristics of a Big Data Analysis Framework.

### **UNIT IV**

Basics Of Hadoop: Introduction to Hadoop - Hadoop Architecture- Map Reduce in Hadoop - Data format – Analyzing Data with Hadoop - Design of Hadoop Distributed File System (HDFS) – HDFS Concepts

### **UNIT V**

Map Reduce : MapReduce Fundamentals : Tracing the Origins of MapReduce - Understanding the map Function - Adding the Reduce Function - Putting Map and Reduce Together - Optimizing MapReduce Tasks - Exploring - Building a Big Data Foundation with the Hadoop Ecosystem - Storing Big Data with HBase - Mining Big Data with Hive -Interacting with the Hadoop Ecosystem.



**Reference Books:**

1. Michael Minelli, Michele Chambers, AmbigaDhiraj , “Big Data, Big Analytics”,
2. John Willey , 2013 2. Chris Eaton, Dirk Deroos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, Tata McGraw Hill Education, 2012
3. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
4. Richael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
5. Tom White, "Hadoop:The Definitive Guide", Third Edition, O'Reilley, 2012.

Question Paper pattern

Maximum Marks: 60

Exam Duration: Three Hours

Part A 5x6 = 30 Answer All questions (Either or Type – Two questions from each unit)

Part B 3 x10 = 30 Answer any THREE questions ( One question from each unit)

Signature of HOD

COE

Credits : 4

Exam Hours : 3

Medium of instruction: English

**Code: S1MCS4E**

**M.Phil(Computer Science) - Semester 1**  
(For students admitted from 2018 -2019 onwards)

**DIGITAL IMAGE PROCESSING**

**Objective:** *To understand the concepts Digital Image Fundamentals and Transforms, Image Enhancement Techniques, Image Restoration Image Segmentation and Representation.*

**UNIT I**

Digital Image Fundamentals and Transforms: Elements of visual perception – simple image model – sampling and quantization - relationships between pixels – imaging geometry – photographic film – fourier transform – discrete fourier transform – properties of the two dimensional fourier transform – fast fourier transform – separable image transform – hotelling transform

**UNIT II**

Image Enhancement Techniques: Background – enhancement by point processing – spatial filtering – enhancement in the frequency domain – generation of spatial masks from frequency domain specifications – color image processing

**UNIT III**

Image Restoration: Degradation model – diagonalization of circulant and block circulant matrices – algebraic approach to restoration – inverse filtering – constrained least squares restoration – interactive restoration – restoration in the spatial domain – geometric transformations

**UNIT IV**

Image Compression: Fundamentals – image compression models – elements of information theory – error free compression – lossy compression – image compression standards

**UNIT V**

Image Segmentation and Representation: Detection and discontinuities – edge linking and boundary detection – thresholding – region oriented segmentation – use of motion in segmentation – representation schemes – boundary descriptions – regional descriptions – morphology – relational descriptions

**Text Book:**

Rafael C Gonzalez and Richard E Woods, Fifth edition, Digital Image Processing, Addison Wesley Pearson Education – 2000

Unit I : Chapter 2,3

Unit II : Chapter 4

Unit III : Chapter 5

Unit IV : Chapter 6

Unit V : Chapter 7, 8

**Reference books:**

1. William K Pratt, Digital Image Processing, John Willey – 2001
2. Image Processing Analysis and Machine Visions , Millman sonka, Vaclav hlavac, Roger Boyle , Broos/Colic, Thompson Larniy – 1999
3. A K Jain, PHI New Delhi , Fundamentals of Digital Image Processing – 1995
4. Chandra Dutta Magundar, Digital Image Processing and applications, prentice hall of India

Question Paper pattern

Maximum Marks: 60

Exam Duration: Three Hours

Part A  $5 \times 6 = 30$  Answer All questions (Either or Type – Two questions from each unit)

Part B  $3 \times 10 = 30$  Answer any THREE questions ( One question from each unit)

Signature of HOD

COE

RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)

THANJAVUR -613005

Credits : 8

**Code: S2MCSD**

Medium of instruction: English

**M.Phil(Computer Science) - Semester 2**

(For students admitted from 201 onwards)

**CORE COURSE –V DISSERTATION AND VIVA VOCE**

**Viva Voce 50 Marks**

**Dissertation 150 Marks**

Signature of HOD

COE