

**A.VEERIYA VANDAYAR MEMORIAL
SRI PUSHPAM COLLEGE (AUTONOMOUS)**

POONDI-613 503, THANJAVUR (DT)



SYLLABUS

B.Sc., Computer Science

(From 2020 - 2021 onwards)

Program Specific Outcomes of B.Sc. Computer Science

On the completion of the B.Sc. programme, students will be able to:-

- ❖ Gain the ability to apply knowledge of computing and mathematics appropriate to the discipline.
- ❖ Learn and use new development tools, software framework, middleware, programming language or methodology to aid in the development of software projects.
- ❖ Become an effective member of a multi- disciplinary software project development team with an awareness of individual, professional and ethical responsibilities.
- ❖ Acquire ability to communicate technical concepts in a complete, concise and correct presentation.
- ❖ Participate in team works, brainstorming session, code review or group discussions.

Program Outcomes of B.Sc. Computer Science

At the end of the three year B.Sc., programme the students will be able to:-

- Understand, analyse and develop computer programs in the areas related to algorithm, web design and networking for the efficient design of computer based system.
- Find career in the IT sector as system engineer ,software tester , junior programmer web developer ,system administrator ,software developer ,etc.,
- Undertake careers involving problem solving using computer science technologies.
- Gain ability to pursue advanced studies and research in computer Application

B.Sc COMPUTER SCIENCE (2020 – 2021)

Sl. No.	Semester	Category	Course code	Title of the Course	Maximum marks			Minimum marks for pass			Hours /week	Credits
					CIA	E.E	Total	CIA	E.E	Total		
1	I	Part I	20U1CST1/H1	Tamil-I/Hindi -I	25	75	100	10	30	40	6	3
2		Part II	20U1CSE1	English-I	25	75	100	10	30	40	6	3
3		Core	20U1CSC1	Problem Solving using Python	25	75	100	10	30	40	7	6
4		Core	20U1CSCP1	Lab-I Programming in Python Lab	40	60	100	16	24	40	3	3
5		Allied	20U1CSMAA1	Allied Mathematics I	25	75	100	10	30	40	5	3
		Allied	20U2CSMAA2	Discrete Mathematics (NS)	-	-	-	-	-	-	3	-
6		ES(SS)	20U1CSES	Environment Studies	-	100	100	-	40	40	-	-
7	II	Part I	20U2CST2/H2	Tamil-II/Hindi -II	25	75	100	10	30	40	6	3
8		Part II	20U2CSE2	English-II	25	75	100	10	30	40	6	3
9		Core	20U2CSC2	C Programming and Data Structures	25	75	100	10	30	40	6	6
10		Core	20U2CSCP2	Lab-II C Programming and Data Structures	40	60	100	16	24	40	3	3
11		Allied	20U2CSMAA2	Discrete Mathematics(NS)	25	75	100	10	30	40	3	4
12		Allied	20U2CSMAA3	Allied Mathematics III	25	75	100	10	30	40	5	3
13		VBE(SS)	20U2CSVB	Value Based Education	25	75	100	10	30	40	-	-
14		SBE	20U2CSS1	Skill Based Elective - New Media - 1	25	75	100	10	30	40	1	2
15	III	Part I	20U3CST3/H3	Tamil-III/Hindi -III	25	75	100	10	30	40	6	3
16		Part II	20U3CSE3	English-III	25	75	100	10	30	40	6	3
17		Core	20U3CSC3	Java Programming	25	75	100	10	30	40	7	6
18		Core	20U3CSCP3	Lab-III Java Programming	40	60	100	16	24	40	3	3
19		Allied	20U3CSPHA1	Allied Physics I	25	75	100	10	30	40	6	4
		Allied	20U4CSPHAPL	Allied Physics Lab (NS)	-	-	-	-	-	-	2	-
20		GS	20U3CSGS	Gender Studies	-	100	100	-	40	40	-	-
		Online	-	MOOC	-	-	-	-	-	-	-	-

Sl. No.	Semester	Category	Course code	Title of the Course	Maximum marks			Minimum marks for pass			Hours /week	Credits
					CIA	E.E	Total	CIA	E.E	Total		
21	IV	Part I	20U4CST4/H4	Tamil-IV/Hindi -IV	25	75	100	10	30	40	6	3
22		Part II	20U4CSE4	English-IV	25	75	100	10	30	40	6	3
23		Core	20U4CSC4	Database Management Systems	25	75	100	10	30	40	6	6
24		Core	20U4CSCP4	Lab-IV DBMS Lab	40	60	100	16	24	40	3	3
25		Allied	20U4CSPHA2	Allied Physics II	25	75	100	10	30	40	6	4
26		Allied	20U4CSPHAPL	Allied Physics Lab (N-S)	40	60	100	16	24	40	2	2
27		SBE	20U4CSS2	Skill Based Elective-New Media – 2	25	75	100	10	30	40	1	2
		Online	-	MOOC	-	-	-	-	-		-	-
28	V	Core	20U5CSC5	Distributed Programming using .net	25	75	100	10	30	40	6	6
29		Core	20U5CSC6	Computer architecture and Microprocessor	25	75	100	10	30	40	5	5
30		Core	20U5CSC7	Data Communication Network	25	75	100	10	30	40	5	4
31		Core	20U5CSCP5	Lab-V Distributed Programming using .net Lab	40	60	100	16	24	40	3	3
32		Elective-I	20U5CSEL1A/ 20U5CSEL1B	Soft Computing / Data Mining and Data Warehousing	25	75	100	10	30	40	4	4
33		Elective-II	20U5CSEL2A/ 20U5CSEL2B	Software Engineering/ UML Programming	25	75	100	10	30	40	4	3
34		NME	20U5CSNME	Non Major Elective – Social Media Marketing	25	75	100	10	30	40	2	1
35		Life Skill	20U6CSLSD	Life Skill Development	40	60	100	16	24	40	1	-
36	VI	Core	20U6CSC8	Basics of Big Data	25	75	100	10	30	40	5	5
37		Core	20U6CSC9	Cloud Computing	25	75	100	10	30	40	5	5
38		Core	20U6CSC10	Operating System	25	75	100	10	30	40	5	5
39		Core	20U6CSC11	Mobile Applications	25	75	100	10	30	40	5	5
40		Elective-I	20U6CSEL3A/ 20U6CSEL3B	Web Design/ Open Source Technology	25	75	100	10	30	40	4	4
41		Elective-II	20U6CSEL4PA/ 20U6CSEL4PB	Lab-VI Web Design & Mobile Lab / Open Source Technology-Lab	40	60	100	16	24	40	4	3
42		GK	20U6CSGK	General Knowledge	-	-	100	-	40	40	1	-
43		CN	20U6CSCN	Comprehensive test			100	-	40	40	1	1
				Extension Activities	-	-	-	-	-	-	-	1
				Total	4300						180	140

Abbreviations

ESE: Environmental studies	LSD: Life Skill Development
VBE: Value Based Education	GK : General Knowledge
SBE: Skill Based Elective	NME: Non – Major Elective
GS: Gender Studies	EA: Extension Activities
CC:Certificate Course	SS: Self Study
MOOC-Massive Open Online Course	

Paper Code	Total No. Of Papers	Total Marks	Total Credits	Classification
Part – I	04	400	12	√
Part – II	04	400	12	√
Part – III Core Allied Major Elective	16 06 04 26	1600 600 400 2600	76 20 14 110	√
Part – IV Environmental Studies Value based education Skill Based Elective Gender studies Non Major Elective Soft skill development G.K. Comprehensive test	1 1 2 1 1 1 1 1 1 9	100 100 200 100 100 100 100 100 900	1 - 2 - 1 - - 1 5	√
Part – V	Extension Activity		1	X
Total	43	4300	140	√

Comprehensive Knowledge Test: Objective type question pattern with 100 compulsory questions carrying 100 marks to be answered in 3 Hours with 2 credits. The portion is entire core courses.

MOOC: Massive open online course is introduced in the third and fourth semester as an extra credit course from this academic year 2020-2021. Students can avail any one or more of the courses available in MOOC to equip their skill and knowledge themselves.

Field Visit / Industrial Visit / Hands on training Programme having minimum 15 hours of contact time as Extra Credit course is introduced for II year UG students to gain experiential learning.

Evaluation of the visit report will be held at the end of IV Semester.

Components of Evaluation

Internal Marks	40
External marks	60
Total	100

Project is introduced for III year students to cater for the needs of advanced learners as extra credit course

Components of Evaluation

Internal Marks	40
External marks	60
Total	100

Soft skill development course prescribed in V semester is changed as **Life Skill Development**.

This course will be handled by both Internal Staff and External Experts.

Mode of Assessment for this course is oral examination.

Components of Evaluation

Internal Marks	40
External marks	60
Total	100

Skill Based Elective Offered by the Computer Science Department

1. New Media 1
2. New Media 2

Certificate Course Offered by the Computer Science Department:

Understanding Information Technology Industry Process will be conducted for III UG students as an Extra Credit Course

MOOC online course - Extra Credit Course

Non – Major Elective paper offered by the Computer Science Department

Social Media Marketing

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**Question Pattern for UG and PG Programmes for students to be
admitted during 2020 – 2021 and afterwards.**

Total Marks : 75

QUESTION PATTERN

**SECTION – A
(Question 1 to 10)**

10 x 2 = 20 Marks

1. Short Answer Questions.
2. Two Questions from each unit (All are answerable)

**SECTION – B
(Question 11 to 15)**

5 x 5 = 25 Marks

1. 5 Paragraph type questions with "either / or" type choice.
2. One question from each unit of the Syllabus.
3. Answer all the questions.

**SECTION – C
(Question 16 to 20)**

3 x 10 = 30 Marks

1. 5 Essay type questions – any three are answerable.
2. One questions from each unit of the Syllabus.

B.Sc. Computer Science

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
I	20U1CST1	இக்கால இலக்கியம் (செய்யுள் , உரைநடை, சிறுகதை, புதினம், நாடகம் இலக்கிய வரலாறு)	6	3

நோக்கம்

1. தமிழ் மரபுக்கவிதை, புதுக்கவிதை முதலானவற்றை அறிமுகப்படுத்துதல்.
2. சிறுகதை, நாவல், கட்டுரை முதலான இலக்கிய வடிவங்களைக்காத்தல்.
3. இக்கால இலக்கியத்தின் மீதான கப்பை விருவித்தல்.

கூறு: 1 செய்யுள்

நேரம்:18

1. பாரதியார் : கண்ணன் என் காதலன் — கண்ணம்மா என் காதலி (முதல்பாடல் மட்டும்)
2. பாரதிதாசன் : தமிழின் இனிமை, தமிழ் உணர்வு
3. கவிமணி : ஒற்றுமையே , உயர்வு நிலை - நாட்டுக்குழைப்போம்
4. சுரதா : சிக்கனம்

கூறு: 2 செய்யுள்

நேரம்:18

1. பட்டுக்கோட்டை கல்யாணசுந்தரம்:நாட்டுக்கொரு வீரன்
2. கண்ணதாசன் : காலக்கணிதம்
3. மு.மேத்தா: கண்ணீர் பூக்கள், ஊர்வலம், தாய், வெளிச்சம் வெளியே இல்லை
4. அப்துல் ரகுமான் : தேவகானம் - தேர்ந்தெடுக்கப்பட்ட 5 பாடல்கள்.

கூறு: 3 சிறுகதை

நேரம்:18

1. கேட்டிவி : குரல்கொடுக்கும் வானம்பாடி (1-10)
2. கேட்டிவி : மனோரஞ்சிதம் (1-10)

கூறு: 4 புதினம்

நேரம்:18

புதினம் : துணிந்தவன் - வல்லிக்கண்ணன்

கூறு: 5 நாடகம், இலக்கிய வரலாறு

நேரம்:18

- 1.நாடகம் : மாமன்னன் இராசராசன் - கு.வெ.பாலசுப்பிரமணியன்
- 2.இலக்கிய வரலாறு : இருபதாம் நூற்றாண்டு இலக்கியங்கள்

பயன்கள்

1. தமிழ் இலக்கியத்தின் மீதான ஆர்வம் மிகும்.
2. புதிய இலக்கிய வளங்களை அறிவார்.
3. கவிதை, சிறுகதை ஆகியவற்றைப் படைக்க முயல்வார்.
4. போட்டித் தேர்வுகளுக்குச் செல்பவர்கள் பயன் பெறுவார்.
5. நாடகக் கலைத்திறனை அறிவார்

B.Sc. Computer Science

Semester	Course Code	Title of The Course	Hours of Teaching/ Week	No. of Credits
I	20U1CSE1	PART – II - Prose, Poetry and Communication Skills	6	3

Objective

- To initiate the students to understand English through Prose, Poetry and Basic Communicative Grammar.

Unit – I

- | | |
|--------------------|---|
| Shakespeare | - Shall I Compare Thee to a Summer's Day? |
| John Milton | - On His Blindness |
| William Wordsworth | - The Solitary Reaper |
| P.B.Shelley | - Song to the Men of England |
| Robert Frost | - The Road not Taken |
| Nissim Ezekiel | - Night of the Scorpion |

Unit – II

- | | |
|---------------------------------|-------------------------------|
| 1) The Running Rivulets of Man, | 2) Parliament is Marking Time |
| 3) The Lady in Silver Coat, | 4) Mr. Applebaum at Play |

Unit – III

- | | |
|---------------------------------------|--------------------------|
| 1) The Feigning Brawl of an Impostor, | 2) Thy Life Is My Lesson |
| 3) Solve the Gamble, | 4) The Stoic Penalty |

Unit – IV

- | | |
|---------------------------------|-------------------------------------|
| 1) Nobility in Reasoning, | 2) Malu the Frivolous Freak |
| 3) Bharath! Gird Up Your Loins! | 4) Honesty is the Cream Of Chastity |

Unit – V

- | | | | |
|---|-----------------------------|-------------|--------------|
| 1) The sentence | 2) Parts of Speech | 3) Nouns-I | 4) Nouns –II |
| 5) Adjectives | 6) Comparison of Adjectives | 7) Articles | 8) Pronouns |
| 9) Demonstrative, Indefinite, Interrogative, Distributive and Reciprocal Pronouns | | | |
| 10) Relative Pronouns | 11) Adverbs. | | |

Course outcomes:

After the completion of this course, students will be able to

- **understand and appreciate the English Prose, Poetry and basic functional communicative Grammar and study on style and substance.**
- **develop interest in appreciation of literature**
- **integrate the use of the four language skills: LSRW.**
- **communicate appropriately and use English effectively**
- **imbibe ethical, moral, national and cultural values**

Prescribed Texts:

K.T.V. *A Melodious Harmony*. Thanjavur: Rajendra Publishing House, 2017.
Natarajan, K. *Flying Colours*. Chennai: New Century Book House (P) Ltd., 2017.
Advanced Grammar and Composition. Chennai: New Century Publishing House, 2017.

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Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
I	20U1CSC1	Problem Solving using Python	7	6

COURSE OBJECTIVES:

- To provide a programming experience to the students by learning the
- To illustrate the fundamentals of Python Programming.
- To impart the syntax of the language and apply the concepts to write programs for solving simple problems.
- To demonstrate data structures and how the same is used for writing efficient programs.
- To enable creativity for developing games.

UNIT I:

Python – Features of Python: Installing python- The python Interpreter – Interactive mode –Writing and running programs in script mode- IDLE programming environment Data Types : Comments -Docstrings – Variables – Datatypes – Constants – Reserved Words – Naming conventions – Operators – precedence - Input, processing and output – Displaying output with print function –Reading input from the Keyboard –Comment Line Arguments - Control Statements – if – if else – if elif – while – for – nested loops – break – continue – pass – return statements.

UNIT II:

Strings and Characters – indexing – string manipulation – Functions : - Definition – calling a function – formal and actual arguments – positional arguments – keyword arguments – default arguments – variable length arguments – local and global variables – recursive functions – lambda function - Lists and Tuples: Sequences – Introduction to Lists – List slicing – 'in' operator – list methods and built-in-functions – copying lists – processing lists – Two Dimensional Lists – Tuples Basic operation on Tuples - Dictionaries – methods – converting list and string into dictionary – passing dictionary to function.

UNIT III:

Object Oriented Programming: Procedural and Object Oriented Programming – features of OOPS - Classes and objects – Types of Methods – Inheritance: introduction to inheritance – Types – Polymorphism – Operator overloading – Method Overloading – Method Overriding - Abstract classes and Interfaces

Unit IV:

Errors and Exception – Types of Exception – assert statement - File Handling: Types of files – open – close – pickle – seek() and tell() methods - Regular Expressions – using regular expressions on files.

UNIT V:

GUI programming: Root Window – Fonts and Colors – Working with containers – canvas – Frame – widgets – button widget – Label widget – Message – Text – Scrollbar – Checkbutton – Radiobutton – Entry Widget- Listbox – Menu Widget.

Course Outcomes:

On completion of the course, students should be able to

- write programs to solve simple problems
- interpret and manipulate the data structures
- store and manipulate data using file system and handling errors
- solve problems using OOPs concept
- design GUI forms using Tkinter

Text Book:

Core Python Programming , 2nd Edition (kindle) – Dr.R.Nageswara Rao – Dreamtech Press – 2018.

Reference Books:

1. Tony Gaddis, "Starting out with python", 2nd edition, Addison Wesley, Pearson
2. Michael Dawson, "Python programming for the absolute beginner", Premier press, 2003.
3. "Core python Programming "by Wesley Chun Pearson Education- 2006, Second Edition ,ISBN:0137061595

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Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
I	20U1CSCP1	Lab – I Programming in Python Lab	3	3

Objective

- To make familiar in using operators and control structures
- To teach programs using sequences, functions and modules
- To make solve programs using OOPs concepts and Tkinter Module
- To interpret to use the regular expressions to follow format in designing.
To inculcate different syntax in python programming.

Solve Problems using the concepts

- Operators
- Decision making statements
- Loops
- Data Structures
- Functions
- Modules
- Classes and Objects
- Inheritance
- Overloading
- Regular expressions
- Tkinter Module

Course Outcomes:

After completion of the course, students will be able to

- improve their programming skills.
- solve programs using class,objects, operators, loops, sequences, functions and modules.
- reuse and separation of codes using concept like inheritance, interface etc
- design and execute programs using OOPs concepts and Tkinter Module.
- priority will be given by IT industry who have sound knowledge in python programming.

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Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
I	20U1CSMAA1	Allied- Mathematics – I	5	3

Objectives:

- To introduce the concept of binomial, exponential and logarithmic series.
- To teach the relation between circular and hyperbolic function.
- To impart the knowledge of the methods to find radius of curvature and centre of curvature.

UNIT-I

Algebra: Binomial series - Application of Binomial theorem to the summation of series - Exponential series - summation of series using exponential series- Logarithmic series.

UNIT-II

Theory of Equations: Nature of roots – Relation between the coefficients and the roots of an algebraic equation – Transformation of equations – Reciprocal Equations.

UNIT-III

Matrices: Eigen values and eigen vectors – Diagonalisation – similar matrices – Cayley-Hamilton theorem – Eigen values for symmetric matrices.

UNIT-IV

Trigonometry: Expansion of $\cos n\theta$, $\sin n\theta$ and $\tan n\theta$ – Powers of Sines and Cosines of θ in terms of multiples of θ – expansion of $\sin\theta$ and $\cos\theta$ in a series of ascending powers of θ – Hyperbolic Functions – Relation between hyperbolic functions.

UNIT-V

Differential Calculus: Curvature – circle, radius and centre of curvature – Cartesian formula for radius of curvature – coordinates of centre of curvature - parametric form - Maxima and minima of a function of two variables.

COURSE OUTCOMES:

After completion of the course, students will be able to

- find the eigen values, eigen vector of a given matrix.
- calculate centre and radius of curvature.
- apply differential calculus to geometrical problems.
- understand the concept of matrices, in solving a system of linear equation.
- sum the series using binomial, exponential and logarithmic series

Textbook:

Ancillary Mathematics, Volume-I, S. Narayanan, R. Hanumantha Rao, T.K.Manikavachagam Pillay, S. Viswanathan Printers Pvt. Ltd., 2013.

Unit I	: Chapter 1 (Pages: 7 – 17, 28 – 37, 40 - 49)
Unit II	: Chapter 2 (Pages: 59 – 83)
Unit III	: Chapter 3 (Pages: 151 – 164)
Unit IV	: Chapter 5 (Pages: 220 – 247)
Unit V	: Chapter 6 (Pages: 296 – 309, 318 – 326)

References:

1. **Allied Mathematics, Paper-I, First Semester**, P. Kandasamy and K. Thilagavathy, S.Chand & Company Pvt. Ltd., New Delhi, 2014.
2. **Algebra Volume I**, T.K.M. Pillay, T. Natarajan and K.S.Ganapathy,
3. **Calculus Volume I**, S. Narayanan and T.K. Manikavachagam Pillay,
4. **Trigonometry**, Narayanan and T.K.Manikavachagam Pillay,

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Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
I & II	20U2CSMAA2	Allied-II Discrete Mathematics (NS)	3+3	-

OBJECTIVES:

- To introduce the concepts of mathematical logic.
- To teach the operations associated with sets, functions and relations.
- To enrich the knowledge of graphs and trees.

Unit – I

Mathematical Logic : statements and notation – connectives – negation conjunction – disjunction – Statement formulas and truth tables – conditional and bi – conditional – well formed formulae – Tautologies – equivalence of formulae – duality law – disjunctive normal form – conjunctive Normal form.

Unit – II

Set Theory: Basic concepts – Notation – Inclusion and equality – Power set – some operations on sets – Venn diagrams – Some basic set identities – principle of specification – ordered pairs and n-tuples – Cartesian products.

Unit – III

Relations and ordering: relations – properties of binary relations – relation matrix – partition and covering of a set – equivalence relations – compatibility relations composition of binary relations – partial ordering – partially ordered set – **Functions:** Definition and introduction – composition – inverse function – binary and n-array operation.

Unit – IV

Graph: Graph – Sub-graphs – Walks, paths and Circuits – Connected graphs – Euler graphs – operations on graphs – Hamiltonian paths and circuits – Traveling salesman problem.

Unit – V

Trees: trees – properties of trees – pendant vertices – distance and centers in a Tree- Rooted and Binary Trees – on counting trees – Spanning Trees –Fundamental circuits – Spanning Trees in a weighted graph – Shortest spanning tree: kruskal algorithm.

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COURSE OUTCOME:

After completion of the course, students will be able to

- apply mathematical logic to solve problems.
- understand sets, relations, functions and discrete structures.
- use logical notations to define and reason about fundamental mathematical concept such as set relations and functions.
- able to model and solve real world problems using graphs and trees.
- formulate truth table for expressions involving the logical connectives: negation, conjunction, disjunction, conditional and biconditional.

Text Book:

1. J.P.Tremblay, R.Manohar, **"Discrete Mathematical structures with Applications to Computer Science"** Tata McGraw Hill International, 2004.

Unit – I : Chapter 1 (Sec. 1.1 – 1.2.10, 1.3.1, 1.3.2)

Unit – II : Chapter 2 (Sec. 2.1)

Unit – III : Chapter 2 (Sec. 2.3, 2.4.1 – 2.4.4)

2. Narsing Deo **"Graph Theory with Applications to Engineering and Computer Science"**. PHI. Private Ltd., 2014.

Unit – IV : Chapter 1, 2

Unit –V : Chapter 3

Reference:

1. Bernard Kolman & Robert C.Busby "Discrete Mathematical Structure for Computer Science" (Revised) PHI.
2. F. Hamary "Graph Theory" Addison Wesley Publishing Company.

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Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
II	20U2CST2	இடைக்கால இலக்கியம் - பயன்முறைத் தமிழ் - இலக்கண வரலாறு	6	3

நோக்கம் :

1. தமிழிலக்கிய வரலாற்றில் பக்தி இலக்கியங்கள் பெறும் சிறப்பை உணர்வர்.
2. சமய வழிச் சமூக மாற்றத்திறன் பெறுவர்.
3. சமய நல்லிணக்க உணர்வை மாணவர்கள் பெறுவர்.

கூறு: I

நேரம்: 18

1. திருஞானசம்பந்தர் தேவாரம் : சீகாழி திருப்பதிகம் (பா.எ.360—370)
2. திருநாவுக்கரசர் தேவாரம் : திருவையாற்றுப் பதிகம் (பா.எ.124—133)
3. சுந்தரர் தேவாரம் : திருமழபாடி பதிகம் (பா.எ.1-10 பாடல்கள்)
4. மாணிக்கவாசகர் : திருவாசகம் - பிடித்த பத்து

கூறு: 2

நேரம்: 18

1. பெரியாழ்வார்: திருமொழி - தாய்ப்பால் உண்ண அழைத்தல் 10 பாடல்கள்
2. குலசேகர ஆழ்வார்: பெருமாள் திருமொழி- தாலாட்டு - 10 பாடல்கள்
3. ஆண்டாள் நாச்சியார்: நாச்சியார் திருமொழி- திருமணக்கனவை உரைத்தல்
4. திருப்பாணாழ்வார்: அமலனாதிபிரான் -10 பாடல்கள்

கூறு: 3

நேரம்: 18

1. குமரகுருபரர்: மீனாட்சியம்மைப் பிள்ளைத் தமிழ் வருகைப் பருவம் - 10 பாடல்கள்
2. திரிகூடராசப்பக்கவிராயர் : குற்றாலக் குறவஞ்சி - குறத்தி மலைவளம் கூறல்
3. வீரமாமுனிவர்: தேம்பாவணி - காட்சிப்படலம் முழுவதும்
4. உமறுப்புலவர் : சீறாப்புராணம்-விலாதத்துக் காண்டம்-கதீஜா கனவு கண்ட படலம்.

கூறு: 4 பயன்முறைத் தமிழ்

நேரம்: 18

எழுத்தியல்: உயிரெழுத்து, மெய்யெழுத்து, உயிர்மெய்யெழுத்து, முதலெழுத்து, சார்பெழுத்து, மொழிக்கு முதலாக இருதியாக வரும் எழுத்துக்கள், போலி. சொல்லியல்: இலக்கண, இலக்கிய வகையிலான சொற்கள். பொதுவியல் : எழுத்துப் பிழைகளை நீக்குதல், எழுத்துப் பிழைகளும் திருத்தங்களும், வலிமிகுதல், வலிமிகாமை, வாக்கிய அமைப்புகள் நிறுத்தற் குறியீடுகள்.

கூறு: 5 இலக்கண இலக்கிய வரலாறு

நேரம்: 18

1. இலக்கண வரலாறு (தமிழ்த்துறை வெளியீடு)
2. தமிழ் இலக்கிய வரலாறு: இடைக்கால இலக்கியம்

பயன்கள்

1. பல்வகை சமய இலக்கியப் போக்குகளை அறிந்து கொள்வர்.
2. சமயவழித் தமிழரின் வாழ்வியலை அறிவர்.
3. பல்வகை சமயக் கோட்பாட்டினை அறிந்துகொள்வர்.
4. பிழையின்றி எழுதப் பழகுவர்.
5. சமயங்களின் இன்றியமையாமையை உணர்வர்

B.Sc. Computer Science

Semester	Course Code	Title of The Course	Hours of Teaching/ Week	No. of Credits
II	20U2CSE2	PART – II- Extensive Readers and Communicative Skills	6	3

Objective

- To impart language and communicative skills through short stories, one- act plays and communicative grammar.

Unit – I

- Shakespeare – The Seven Stages of Man
- Longfellow – A Psalm of Life
- Nissim Ezekiel – Enterprise
- William Wordsworth – The world is too much with us

Unit – II

- Anton Chekhov – The Bear
- Cedric Mount – The Never-Never Nest
- Farrell Mitchell – The Case of the Stolen Diamonds
- M.V. Rama Sharma – The Mahatma

Unit - III

- Fyodor Dostoevsky – The Christmas Tree and the Wedding
- The Duchess – The Jewelry
- O. Henry – The Romance of a Busy Broker

Unit – IV

Verb, Verbs – Mood and Tense, Concord or Agreement of the verb with the subject.

Unit – V

The Auxiliaries, Model Auxiliaries, Preposition, Conjunctions, Interjection.

Course outcomes

After the completion of this course students will be able to

- **promote the linguistic and communicative objectives through the study of poems, short stories and the communicative grammar.**
- **gain language and communicative skills through short stories**
- **identify and differentiate different forms of literature.**
- **engage in reflective writing after learning the prescribed lessons.**
- **enhance the communicative skills through LSRW**

Prescribed Texts:

- *Voices of Vision*, Board of Editors, NCBH, Chennai, 2016.
- Communicative Grammar*, The Department of English Course Material.

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Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
II	20U2CSC2	C PROGRAMMING AND DATA STRUCTURES	6	6

COURSE OBJECTIVES:

- To teach the basics and advanced concepts of C programming language.
 - To interpret the concepts of linear data structures and its applications.
 - To describe the concepts of non-linear data structures.
 - To illustrate the usage of sorting techniques.
 - To impart the concepts of hashing.
-

UNIT I BASICS OF C PROGRAMMING

Data Types – Variables – Operators and Expressions – Conditional Statements – Control Statements – Arrays.

UNIT II ADVANCED C PROGRAMMING

Functions– Pointers – Structures and Union – Preprocessor Directives – File Handling.

UNIT III LINEAR DATA STRUCTURES

Abstract Data Types (ADTs) – List ADT – Array-Based Implementation – Linked List Implementation – Doubly-Linked Lists – Circular Linked Lists – Stack ADT: Implementation of Stacks – Queue ADT: Implementation of Queues – Applications.

UNIT IV HIERARCHICAL DATA STRUCTURES

Trees: Preliminaries – Implementation of Trees – Tree Traversals with an Application – Binary Trees: Implementation – Expression Trees – Search Tree ADT – Binary Search Trees – Applications of Trees.

UNIT V HASHING AND SORTING

Fundamentals of Hashing – Hash Function – Separate Chaining – Open Addressing – Linear Probing – Quadratic Probing – Double Hashing – Rehashing – Extendible Hashing
Sorting Algorithms: Insertion Sort, Shell Sort, Quick Sort, Heap Sort, Merge Sort.

Course Outcomes:

After completion of the course, students will be able to

- write a procedure/an algorithm for any given problems in their working place.
- be strong in concepts like sorting, searching, traversing, hashing, inserting, deleting an item in data structures.
- know to store the data in data structures like linked list, stack, queue, tree and graph.
- use graph algorithms to find the shortest distance of the road to reach the destination.
- use sorting algorithms to rearrange the position of a number using merge sort, shell sort, quick sort, bubble sort and heap sort.

REFERENCES:

1. Brian W. Kernighan, Dennis Ritchie, "The C Programming Language", Second Edition, Pearson Education, 2015.
2. Brian W. Kernighan, Rob Pike, "The Practice of Programming", Pearson Education, 1999.
3. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 1997.
4. Y. Langsam, M. J. Augenstein, A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004.
5. V. Alfred, J. E. Hopcroft, J. D. Ullman, "Data Structures and Algorithms", Pearson education Asia, 1983.

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
II	20U2CSCP2	LAB – II C PROGRAMMING AND DATA STRUCTURES Lab	3	3

Objective

- To introduce the concepts of structured programming language.
- To inculcate skills in design and implementation of data structures and their applications.
- To inculcate linear data structures and nonlinear data structures.
- To interpret hashing techniques.
- To illustrate the different sorting and searching techniques.

-
1. Implementation of simple programs in C using Data types, Variables, Conditional and Iterative Statements.
 2. Implementation of simple programs in C using arrays and functions.
 3. Implementation of simple programs in C using structures and unions.
 4. Implementation of simple programs in C using pointers.
 5. Implementation of singly linked list ADT, doubly linked list ADT.
 6. Implementation of circular linked list ADT and applications of lists.
 7. Implementation of stack ADT using arrays and linked lists and applications of stack.
 8. Implementation of queue ADT using arrays and linked lists.
 9. Implementation of binary search tree ADT.
 10. Implementation of hashing techniques such as separate chaining, open addressing.
 11. Implementation of sorting algorithms – insertion sort, shell sort, merge sort.
 12. Implementation of searching algorithms – linear search and binary search.

Course Outcomes:

After completion of the course, students will be able to

- apply knowledge in C language with data structure.
- choose and apply linear and non-linear data structures for a given problem..
- apply different types of hashing techniques based on the problem requirements.
- use sorting and searching techniques in a real time application.
- get employed in both it industry, and teaching and also can face competitive exam.

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Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
I & II	20U2CSMAA2	Allied- Discrete Mathematics (NS)	3+3	4

OBJECTIVES:

- To introduce the concepts of mathematical logic.
- To teach the operations associated with sets, functions and relations.
- To enrich the knowledge of graphs and trees.

Unit – I

Mathematical Logic : statements and notation – connectives – negation conjunction – disjunction – Statement formulas and truth tables – conditional and bi-conditional – well formed formulae – Tautologies – equivalence of formulae – duality law – disjunctive normal form – conjunctive Normal form.

Unit – II

Set Theory: Basic concepts – Notation – Inclusion and equality – Power set – some operations on sets – Venn diagrams – Some basic set identities – principle of specification – ordered pairs and n-tuples – Cartesian products.

Unit – III

Relations and ordering: relations – properties of binary relations – relation matrix – partition and covering of a set – equivalence relations – compatibility relations composition of binary relations – partial ordering – partially ordered set – **Functions:** Definition and introduction – composition – inverse function – binary and n-array operation.

Unit – IV

Graph: Graph – Sub-graphs – Walks, paths and Circuits – Connected graphs – Euler graphs – operations on graphs – Hamiltonian paths and circuits – Traveling salesman problem.

Unit – V

Trees: trees – properties of trees – pendant vertices – distance and centers in a Tree- Rooted and Binary Trees – on counting trees – Spanning Trees –Fundamental circuits – Spanning Trees in a weighted graph – Shortest spanning tree: kruskal algorithm.

COURSE OUTCOME:

After completion of the course, students will be able to

- apply mathematical logic to solve problems.
- understand sets, relations, functions and discrete structures.
- use logical notations to define and reason about fundamental mathematical concept such as set relations and functions.
- able to model and solve real world problems using graphs and trees.
- formulate truth table for expressions involving the logical connectives: negation, conjunction, disjunction, conditional and biconditional.

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Text Book:

1. J.P.Tremblay, R.Manohar, "**Discrete Mathematical structures with Applications to Computer Science**" Tata McGraw Hill International, 2004.

Unit – I : Chapter 1 (Sec. 1.1 – 1.2.10, 1.3.1, 1.3.2)

Unit – II : Chapter 2 (Sec. 2.1)

Unit – III : Chapter 2 (Sec. 2.3, 2.4.1 – 2.4.4)

2. Narsing Deo "**Graph Theory with Applications to Engineering and Computer Science**". PHI. Private Ltd., 2014.

Unit – IV : Chapter 1, 2

Unit –V : Chapter 3

Reference:

1. Bernard Kolman & Robert C.Busby "Discrete Mathematical Structure for Computer Science" (Revised) PHI.
2. F. Hamary "Graph Theory" Addison Wesley Publishing Company

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
II	20U2CSMAA3	Allied Mathematics-III	5	3

OBJECTIVES:

- To introduce various methods to solve the partial differential solution.
- To teach the concept of curl & divergence of vector field.
- To introduce the concept of laplace transforms and fourier series.

Unit – I Partial Differential Equation:

Derivation of partial differential equation – Different integrals of PDE – standard types of first order equations of the form $f(p, q)=0$; $f(x, p, q)=0$; $f(y, p, q)=0$; $f(z, p, q) = 0$; $f_1(x, p) = f_2(Y, q)$; $z = p x + q y + f(p, q)$ – Lagrange's method for solving $P_p + Q_q = R$.

Unit – II Vector differentiation:

Vector differential operator – Gradient – Direction and magnitude of gradient – Divergence and curl – Formulae involving operator ∇ .

Unit –III Vector integration:

Gauss Divergence theorem – Stoke's theorem (no proof of the theorem).

Unit – IV Laplace Transforms:

Definition – Results and proofs: Laplace Transform of functions $f(t) + g(t)$, $cf(t)$, $f'(t)$, $f''(t)$, e^{at} , $\cosh at$, $\sinh at$, $\cos at$, $\sin at$, t^n – some general theorems – Inverse transforms relating to the above standard forms – solution of ordinary differential equation with constant coefficients.

Unit – V Fourier Series:

Definition – finding Fourier coefficients for the given periodic function with period 2π – Even and odd functions – Properties of odd and even functions – Half range Fourier series – Development in Cosine and sine series.

COURSE OUTCOME:

After completion of the course, students will be able to

- solve partial differential equation of both first and second order.
- use Stoke's theorem to give a physical interpretation of the curl of a vector field.
- use Green's theorem to evaluate line integral along simple closed contours on the plane.
- gain knowledge about basic concept of laplace transforms, vector differentiation and vector integration.
- understand the properties of fourier series.

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Text Book:

Ancillary Mathematics, Volume-II, S. Narayanan, R. Hanumantha Rao,
T.K.Manicavachagom Pillay, S. Viswanathan Printers Pvt. Ltd., 2015.

Unit I	:	Chapter 5, Sec: 1 – 3, 5, 6 (Pages: 252 – 257, 262 – 273)
Unit II	:	Chapter 8, Sec: 16 – 21 (Pages: 335 – 357)
Unit III:	:	Chapter 8, Sec: 6, 9 (Pages: 381 – 389, 399 – 407)
Unit IV	:	Chapter 7, Sec: 1 – 6 (Pages: 289 – 310)
Unit V	:	Chapter 2, Sec: 1 – 5 (Pages: 123 – 148)

General References:

1. *Engineering Mathematics – A Singaravelu*(Volume I & II)
2. *Vector Calculus – K.Viswannathan and S.Selvaraj.*
3. *Ancillary Mathematics – P.R.Vittal, Margam Publications.*

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Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
II	20U2CSS1	Skill Based Elective- I New Media – 1	1	1

Objectives:

- To inculcate the extra skills apart from major subjects.
- To interpret the MS-Office applications.
- To teach the hardware components.
- To inculcate the OS installation.
- To demonstrate the peripherals of computer system.

Hardware Installation:

System services and Troubleshooting- OS Installation – Driver Installation – Printer Installation – Software Installation – **Peripherals** – SMPS – RAM – Processor – Mother Board – Fan – Assembling Configurations

Open Office Exercises:

1. Search, generate, manipulate data using Open Office
2. Business Letter and official letter creation
3. Working with Pictures and formatting pictures
4. Working with tables and formatting tables
5. Mail merge
6. Excel files - Worksheets, Inserting, Deleting and Renaming Worksheets. Center the worksheet horizontally and vertically on the page.
7. Headings - Rows, Columns, Row/Column, Inserting and Deleting Rows and Columns. Changing Column Width and Row Height. Merging Cells, Cell range.
8. Format Cells - Fonts, Alignment, Warp Text, Text Orientation, Border and Shading.
9. Data and picture representation
10. Visualization graphs - 2D, 3D chart creation in presentation.

Course Outcomes:

After completion of the course, students will be able to

- work the ms-office applications.
- apply this knowledge in documentation, desktop support etc.,
- send letter to multiple users or customers in their business.
- do the design and format the contents as they need.
- get job opportunities in all domains where the MS-office needed.

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Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
III	20U3CST3	காப்பியங்கள், கட்டுரைகள், இலக்கிய வரலாறு	6	3

நோக்கம்

1. காப்பியங்களின் உள்ளடக்கம், உத்திகளைக் கற்றுக்கொடுத்தல்.
2. காலந்தோறும் காப்பியங்களில் காணலாகும் பாடுபொருள்களின் மாற்றங்களை எடுத்துரைத்தல்.
3. காப்பியச்சுவையை மாணவர்கள் அறிந்து கொள்ளச் செய்தல்.

பயன்கள்

1. காப்பியங்கள் வாயிலாக அக்காலச் சமுதாயச் சூழலை அறிவர்.
2. பல்வேறு காப்பியங்களையும் ஒப்பிட்டு அவற்றின் தனித்தன்மைகளை அறிந்துகொள்வர்.
3. மீட்டுருவாக்கச் சிந்தனைகளை அறிவர்.

கூறு: 1 காப்பியங்கள் 1

நேரம்: 18

1. சிலப்பதிகாரம்: மதுரைக்காண்டம்-வழக்குரைகாதை
2. மணிமேகலை; மலர்வனம் புக்ககாதை
3. சீவக சிந்தாமணி: சுரமஞ்சரியார் இலம்பகம்
4. கம்பராமாயணம்: கங்கைப் படலம்

கூறு: 2 காப்பியங்கள் 2

நேரம்: 18

1. பெரியபுராணம் : மெய்ப்பொருள் நாயனார் புராணம்-முழுவதும்
2. அரிச்சந்திரபுராணம்: மயான காண்டம்
3. தேம்பாவணி: திருமணப் படலம்-1-10 பாடல்கள்
4. சீறாப்புராணம் : நபி அவதாரப் படலம்-1-10 பாடல்கள்.

கூறு: 3 கட்டுரைத் தொகுப்பு

நேரம்: 18

1. கேட்டிவி - இராகபாவம் (1-10)
2. கேட்டிவி - பயணங்கள் தொடரும்

கூறு: 4 கட்டுரைகள், கழதங்கள் மொழிபெயர்ப்புப் பயிற்சி

நேரம்: 18

பயிற்சிக்கட்டுரைகளும் கடிதங்களும் -பாவை வெளியீடு
கட்டுரைப் பயிற்சி - 10 மதிப்பெண்கள்
மொழிபெயர்ப்புப் பயிற்சி - 5 மதிப்பெண்கள்

கூறு: 5

நேரம்: 18

அ. இலக்கிய வரலாறு

காப்பிய இலக்கியங்கள் - சிற்றிலக்கியங்கள்

பயன்கள்

1. காப்பியங்கள் வாயிலாக அக்காலச் சமுதாயச் சூழலை அறிவர்.
2. பல்வேறு காப்பியங்களையும் ஒப்பிட்டு அவற்றின் தனித்தன்மைகளை அறிந்துகொள்வர்.
3. மீட்டுருவாக்கச் சிந்தனைகளை அறிவர்.
4. கட்டுரை எழுதும் திறன் பெறுவர்.
5. கடிதங்கள் எழுதும் பயிற்சி பெறுவர்.

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Semester	Course Code	Title of The Course	Hours of Teaching /Week	No. of Credits
III	20U3CSE3	PART - II Shakespeare, Extensive Readers And Communicative Skills	6	3

Objective

- To introduce the language and creativity of the world renowned dramatists and novelists to enhance the communicative skills of the learners.

Unit – I

Julius Caesar

The Merchant of Venice

Unit – II

Macbeth

Twelfth Night

Unit – III

Romeo and Juliet

Tempest

Unit – IV

Charles Dickens – David Copperfield.

Unit – V

Simple, Compound, Complex and Compound – Complex Sentences, Analysis of Simple Sentences, Clauses, analysis of Complex Sentences, Analysis of Compound Sentences and Compound – Complex Sentences, Synthesis of Sentences, Transformation of Sentences – I, Transformation of Sentences – II

Course outcomes

After the completion of this course students will be able to

- **promote their communicative skills through the study of Shakespeare and modern communicative methods.**
- **expand their perception interacting with the culture across the world**
- **imbibe moral and ethical prescriptions**
- **appreciate the creative genius and affluent expressions of Shakespeare**
- **develop the creative and analytical faculty**

Prescribed Texts:

Natarajan, K.ed. *Selected Scenes from Shakespeare*. Chennai: NCBH, 2017.

Hardy, Thomas. *The Mayor of Casterbridge*. (abridged) Chennai: Macmillan Publishers, 2012.

Communicative Grammar. Department of English Edition. 2017.

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
III	20U3CSC3	Java Programming	6	6

Objective

- ❖ To teach Programming concepts in Java
- ❖ To impart programming skills in java to design web applications.
- ❖ To explain how to implement the object oriented designs with java.
- ❖ To inculcate program stand-alone java applications.
- ❖ To illustrate read and write files and to exception handling.

Unit I

Object Oriented Fundamentals and Java Evolution: Object oriented programming – encapsulation–inheritance–polymorphism – java genesis – characteristics – java programming techniques – reserved words – identifiers – literals – operators– separators – variables – types – arrays–operator precedence.

Unit II

Flow Control And Classes: If – else – Break – switch – Return Statements – Looping – While – do while – For – Comma statements – Declaration – Object reference – Instance – variables – new operators – method declaration – method calling – this operators – Constructor – Method over loading – Inheritance – Super class – Dynamic method dispatch – Final – Static – Abstract classes.

Unit III

Packages and Interfaces: Packages – The package statement – Import statements – Interface statement – implement statement – Constructor – String creation – String concatenation – Character Extraction.

Unit IV

Exception Handling: Exception Handling Fundamentals – The java Thread model priorities–synchronization – Runnable – The synchronized statements – Dead lock – Thread API Summary.

Unit V

Abstract Windowing Tools & Applets: Events – listeners – Events handling methods – Inheritance hierarchy control classes – Labels – Layouts – Windows and frames – Menus – dialogs – Mouse events – Adaptor classes – Inner classes. Applets – HTML Applet Tag – Order of Applet Initialization.

Course Outcomes:

After completion of the course, students will be able to

- do practical - implement object oriented concepts of java programming.
- work with generics, networking and GUI based application development.
- develop dynamic web applications with database connectivity using server side technologies.
- create distributed applications using RMI, java bean and web services.
- design and development of applications using advanced frameworks.
- realize the importance of advanced frameworks

References:

1. PATRICK NAUGHTON, "The JAVA Hant Book" , Tata MC_Graw Hill Publishers Company Pvt. Ltd, 1996.
2. KENNY CHU – "The Complete Reference Java", Tata McGraw Hill Publishers company Pvt. Ltd, 1997.
3. Herbert schildt, "The Complete Reference Java 2" , Tata McGraw Hill Publishers company Pvt. Ltd, Fifth Edition. 2008.

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
III	20U3CSCP3	Lab – III Java Programming Lab	3	3

Objective

- ❖ To impart the features of the Java.
- ❖ To teach the basics in java programming.
- ❖ To interpret knowledge for debugging in java.
- ❖ To demonstrate own packages, interfaces etc.,
- ❖ To illustrate java programming in applications.

-
1. Write a java program that will accept command line arguments and print the same in order (ascending & descending)
 2. Write a java program that will print details about the current date, time, month, year, day of month & day of week
 3. Write a java program
 - a. test equality between two strings
 - b. concatenate the two strings
 - c. find the length of the string
 - d. replace the 'i' in the string with 'z'
 - e. convert one of the string to upper & lowercase
 4. Create an integer array to contain ten numbers. using random access file, write the array into a file called randl.dat. The program show read the contents of the rand.dat file backwards. Make use of try, catch & finally clauses
 5. Create a subpackages called child whose base package is called parent. This should contain a class c1.class a contains a method called disp() to display a message "Inside sub package child- c1 class", create a class called parenttest, which imports this subpackage and calls the disp() method of the c1 class.
 6. Write a java program to accept parameters on the command lin. If there are no command line arguments entered, the program should print error message and exit. The program should check if the first file exists and if it is an ordinary file. If it is so contents of the first file should be copied to the second file, In case the first parameter is a directory, print message accordingly and exit. appropriate message should be displayed at all points.
 7. Create applet to accept in integer as parameter and display name message as "Are You year old? "the age should be displayed in the blank space the default age should be 60.
 8. Create applet to display string "I am in the center" in courier font, with size 30 and style bold and italic this text should be centered both horizontally and vertically.
 9. Create an applet that lets the user adjust its background color, provided three scrollbars in your applet, one each for the three basecolors, red, green, blue.
 10. Using html tag to create the college website(minimum 15 to 20 tag used)

Course Outcomes:

After completion of the course, students will be able to

- generate simple packages and to design thread.
- acquire skills and knowledge in various file handling techniques.
- develop their java programming skill in java.
- get job in IT industry without fail.
- work and design number of games, real time applications, mobile applications etc.,.

B.Sc. Computer Science

Semester	Subject Code	Title of the Paper	Hours of Teaching /week	No. of Credits
III	20U3CSPA1	Allied Physics –I	6	4

Objectives:

- To understand the fundamentals of electronic circuits
- To gain the knowledge in basic electronics

Unit I –Semiconductors Physics

Semiconductor diode – Characteristics – Zener diode – Characteristics –Regulated power supply –Rectifiers – Transistors– CE characteristics – Field effect transistor – construction – characteristics – FET parameters measurement – SCR – Characteristics –SCR as a switch.

Unit – II Transistor Amplifiers

Transistor biasing – R-C coupled amplifier – positive and negative feedback – feedback amplifier – current and voltage feedback – power amplifier – push pull amplifier – class A and class B and class C amplifier.

Unit – III Transistor oscillators

General theory – feedback requirements for oscillators – Hartley, Colpitt and Phase shift oscillator – Multivibrators–Astable, Bistable and Monostable.

Unit – IV IC Fabrication

Integrated circuit – advantages and disadvantages of IC – Scale of integration – Making monolithic IC – Fabrication of components on monolithic IC (Diodes – Transistors–Resistors – Capacitors) – IC packings – IC symbols.

Unit – V Linear Integrated Circuits

Operational amplifier – Characteristics – Parameters – Applications – Summing – Integrating – Differentiating– Sin,Square, Triangular and Ramp Wave generation – Multi vibrators – Astable and Bistable – Schmitt trigger.

Course Outcomes:

After completion of the course, students will be able to

- be aware on the types of semiconductors
- have gained good knowledge about semiconductor devices, transistors and oscillators
- effectively handle electronic circuit experiments.

Books for study

1. Integrated Electronics (Analog and digital circuits and systems), Jacob Millman and Christos C. Halkias, Tata McGraw Hill edition, New Dehli.
2. Electronic Devices and Circuits, Millman and Halkias.
3. Micro Electronics, Digital and Analog circuit and System – Jacob Mill man.

Books for Reference

1. Principles of electronics, V.K.Mehtha and shalumehta, S.Chand & Company Ltd.
2. Basic Electronics, B.L. Theraja.

B.Sc. Computer Science

Semester	Subject Code	Title of the Paper	Hours of Teaching / week	No. of Credits
III & IV	20U4CSPHAPL	Allied Physics Practicals (NS)	3	-

Objectives:

- To gain the knowledge in basic and digital electronic experiments.
- To perform experiments related to diodes, transistors, oscillators, amplifiers and discrete components.
- To demonstrate the gates, flip-flops and amplifiers.

List of Experiments

1. Zener diode – Forward and Reverse Characteristics
2. R-C coupled amplifier – Study of frequency response
3. Hartley oscillator – Determination of L
4. Boolean Law - Verification
5. NAND and NOR – Universal gates
6. Logic gates – Truth table Verification
7. Demorgan's theorem verification
8. FET – amplifier
9. Emitter follower Amplifier
10. Semiconductor Diode - Characteristics
11. AND, OR and, NOT Logic ,Circuits using – discrete components
12. Half and Full adder circuits
13. Half and Full Subtractor circuits.
14. Parallel Binary adder – IC 7483 function

Course Outcomes:

- After completion of the course, students will be able to
- do electronic projects with diodes, transistors and gates
 - handle analog and discrete components effectively.
 - understand the process of flip-flops, gates, diodes.
 - get career opportunities as hardware engineer

B.Sc. Computer Science

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
IV	20U4CST4	சங்க இலக்கியம் - அறு இலக்கியம் - செம்மொழி தமிழ் -இலக்கிய வரலாறு	6	3

நோக்கம்:

1. பழந்தமிழ் இலக்கியங்களின் திணைத்துறைக் கோட்பாடுகளை அறிதல்.
2. திணைசார் சமுதாய வாழ்வின் பல்வேறுபட்டப் பரிமாணங்களைப்
3. புலவர்கள் வாயிலாகவும் திணை இலக்கியத்தின் வாயிலாகவும் அறிதல்.
4. பழந்தமிழ் இலக்கியங்களின் உயர்தனித்தன்மை வாய்ந்த சிறப்பியல்புகளை அறிதல்.

ஹை: I

நேரம்: 18

குறுந்தொகை

1. குறிஞ்சி : தலைவன் கூற்று-யாயும் ஞாயும் யாராகியரோ - பா.எ.-40
2. முல்லை : தலைவி கூற்று-கருங்கால் வேம்பின் ஒண்பூ யாணர் - பா.எ.-24
3. மருதம் : தோழி கூற்று-யாய் ஆகியளே விழவு முதலாட்டி - பா.எ.-10
4. நெய்தல் : தலைவி கூற்று : நள்ளன் றன்றே யாமம் - பா.எ.-6
5. பாலை: செவிலி கூற்று-பறைபடப் பணிலம் - பா.எ.-15

நற்றிணை:

1. குறிஞ்சி-நின்ற சொல்லர் பா.எ. 1
2. முல்லை:இறையும் அருந்தொழில் -பா.எ.161
3. மருதம்:அறியாமையின் அன்னை - பா.எ.50
4. நெய்தல்:இவளே கானல் நண்ணிய - பா.எ.45
5. பாலை:புணரில் புணராது பொருளே-பா.எ.16

கலித்தொகை

1. பாலை: எறித்தரு கதிர் தாங்கி- பா.எ.9
2. குறிஞ்சி : காமர் கடும்புனல்- பா.எ.39

அகநானூறு

1. குறிஞ்சி:நீர்நிறம் கரப்ப-பா.எ.18
2. முல்லை: வந்துவினை- பா.எ.44

ஹை: 2

நேரம்: 18

1. ஐங்குறுநூறு : குறிஞ்சி -அன்னாய் வாழிப்பத்து -பா.எ.201-210
2. புறநானூறு : பாடல் எண்கள் - 9,16,20,51,109
3. பதிற்றுப்பத்து:ஆறாம் பத்து-பா.எ.1 வடுவடு நுண்ணுயிர், பா.எ.2.கொடி நுடங்கு நிலைய
4. பரிபாடல் : ஏழாம்பாடல் - வையை

ஹை: 3 பத்துப்பாட்டு

நேரம்: 18

1. குறிஞ்சிப்பாட்டு - முழுவதும்

ஹை: 4 அறநூல்கள்

நேரம்: 18

1. திருக்குறள்: செய்ந்நன்றியறிதல், வினைத்திட்டம், நெஞ்சொடு கிளத்தல்
2. மூதுரை: 1-10 பாடல்கள்.
3. நல்வழி: 11-20 பாடல்கள்
4. நீதிநெறி விளக்கம்: 51-60 பாடல்கள்

ஹை: 5

நேரம்: 18

அ. செம்மொழித் தமிழ்— இலக்கிய வரலாறு: செம்மொழி வரலாறு:

மொழி விளக்கம்-மொழிக்குடும்பங்கள்-உலகச் செம்மொழிகள் -இந்தியச் செம்மொழிகள் — செம்மொழித் தகுதிகள் - வரையறைகள் - தமிழின் தொன்மை - தமிழ்ச் செம்மொழி நூல்கள்.

ஆ. இலக்கிய வரலாறு:

சங்க இலக்கியங்கள், பதினெண் கீழ்க்கணக்கு நூல்கள்.

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பயன்கள்

- 1.பழந்தமிழ் இலக்கியங்களை ஆய்வியல் நோக்கில் அணுகுவதற்கான வழிமுறைகளை உணர்த்துதல்.
- 2.பண்டைத்தமிழரின் அக, புற வாழ்வியலை மாணவர்கள் அறியச் செய்தல்
- 3.அறத்தின் பெருமையை உணர்வார்
- 4.ஒழுக்க நெறிகளைப் பின்பற்றுவார்
- 5.தமிழ் செம்மொழியின் பண்புகளை உணருதல்
- 6.சங்க இலக்கியத்தின் தொன்மை உணர்தல்

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Semester	Course Code	Title of The Course	Hours of Teaching/ Week	No. of Credits
IV	20U4CSE4	PART - II English For Competitive Examinations	6	3

Objective

- To prepare the learners for competitive examinations and the fundamentals of practical communication.

Unit – I

Sequence of Tenses and Direct and Indirect Speech
Punctuation and Capitals

Unit – II

Synonyms and Antonyms
One – Word Substitutes for Phrases and Clauses.

Unit – III

Paragraph – Writing, Letter Writing.

Unit – IV

Precise – Writing, Expansion of Passages

Unit – V

Essay – Writing, Writing stories from outlines.

Course outcomes

After the completion of this course students will be able to

- **develop English language skills by equipping themselves to face competitive exams**
- **improve English language abilities and gain the skills of writing and vocabulary building**
- **gain confidence to face competitive exams**
- **assimilate grammatical rule clearly and precisely**
- **hone their presentation and public speaking skills**

Prescribed Text:

English for Competitive Examinations, NCBH, Chennai, Dec. 2019.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
IV	20U4CSC4	Database Management Systems	6	6

Objective:

- ❖ To teach about concepts and techniques to design DBMS.
- ❖ To apply how organize, maintain and retrieve the database efficiently.
- ❖ To impart how to protect data from physical harm and unauthorized user.
- ❖ To inculcate about eliminating the redundant data.
- ❖ To interpret the database management system concepts.

Unit I

Introduction: Purpose of data base systems- View of data-Data models-Database Users and Administrators-Database Languages-Database Architecture-E-R Model:Basic concepts-Design issues-Constraints-Keys-ER-Diagrams-weak Entity set-Extended E-R features-Reduction to E-R schema

Unit II

Relational model: structure– Relational Algebra: Fundamental, Additional & Extended operations Modification–View-Other Relational Database - Tuple Relational Calculus - Domain Relational Calculus.

Unit III

SQL-Basic Structure-Set operation-aggregate Functions- null values- nested sub queries-Derived Relations-view-modification of database-join relations-Advanced SQL-Embedded SQL-Advanced SQL Features.

Unit IV

Advanced SQL: Domain Constraints-Referential integrity-assertion-Application Design and Development-triggers-RDB design-Decomposition using Functional Dependency-Normalization Units-F.D

Unit V

Indexing & Hashing-Basic concepts -Ordered indices-B++ tree index files-B tree index files-Static Hashing-Multiple Key Access-Comparison of ordered indexing and hashing-index definition in SQL.

Course Outcomes:

After completion of the course, students will be able to

- model an application's data requirements using conceptual modeling and design database schemas based on the conceptual model.
- formulate solutions to a broad range of query problems using relational algebra/SQL.
- normalize the database in order to avoid the redundancy data.
- do backup process and can manipulate the data stored in databases.
- students can get job in IT industry under the DBA and developer side.

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Text Books:

1. "Database System concepts", Abraham Silber Schatz, Henk F.Korth, S.Sudarsan, Fifth Edition, 2006, McGraw Hill.

General References:

1. Fred Mc Fadden, Jeffery A Hoffer, Mary B.prescott, "Modern Database Management", 5 Edition, Addison Wesley, 2000.
2. Elmasri, Navathe, "Fundamentals of Database System", Third Edition, Addison wesley, 2000.
3. Jefrey D.Ulman, Jenifer widomj, "A First Course in Database System", pearson Education Asia, 2001
4. Bipin c Desai, "An Introduction to Database System", Galgotia publications Pvt Limited, 2001.
5. Database System Concepts, C.J. Date. Seventh Edition, 1993.

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Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
IV	20U4CSCP4	Lab – IV DBMS Lab	3	3

Objective

- ❖ To teach DBMS features through Oracle.
- ❖ To demonstrate the practical applicability of DBMS concepts.
- ❖ To explain on existing database.
- ❖ To inculcate relational database and analysis of table design.
- ❖ To cultivate practical knowledge and to understand advanced database concepts like data mining, big data analysis.

-
1. Library information processing.
 2. Students mark sheet processing.
 3. Telephone directory maintenance.
 4. Gas booking and delivering system.
 5. Electricity bill processing.
 6. Bank transaction (SB)
 7. Pay roll processing.
 8. Inventory.
 9. Question database and conducting quiz.
 10. Purchase order processing.

Course Outcomes:

After completion of the course, students will be able to

- create databases with different types of key constraints.
- write simple and complex SQL queries using DML and DCL commands.
- realize database design using 3NF and BCNF.
- use advanced features such as stored procedures and triggers and incorporate in GUI based application development.
- create XML database and validate with meta-data (XML schema).
- create and manipulate data using NOSQL database.
- ability to get employment not only in IT industry but also in teaching and all kind of domains.
- Create and manipulate data using NOSQL database.

B.Sc. Computer Science

Semester	Subject Code	Title of the Paper	Hours of Teaching / week	No. of Credits
IV	20U4CSPHA2	Allied Physics – II	6	4

Objectives:

- To gain the knowledge in digital and analog electronics
- To understand the types of number systems
- To demonstrate gates and flip-flops

Unit – I Number Systems

Decimal Binary, Octal, Hexadecimal Number systems – conversions from one system to another – counting in binary system – binary addition, subtraction, multiplication and division – 1's and 2's complement notation – subtraction by 1's and 2's complement – BCD – ASCII – Excess 3 codes.

Unit – II Boolean Algebra and combinational logic circuits

Fundamental concepts of Boolean Algebra – Evaluation of logical expressions – Basic laws of Boolean Algebra – DeMorgan's theorem – verification – NAND and NOR as a Universal building block.

Unit – III Flip Flops and Sequential Logic Circuits

RS – T – D – JK flip flops – Binary counters – (Mod 3 and 5) – Ripple counter – Parallel counter – series and parallel combination counter – Binary decade counter – Ring counter – Up down counter – Shift register – Left shift – Right shift operations.

Unit – IV Digital Arithmetic Circuits

Exclusive OR gate – Half adder – Full adder – Parallel binary adder – Half and Full subtractors – 8421 adder – Parallel Binary Adder/ Subtract or using 2's complement – BCD Adder.

Unit -V D/A and A/D Converters

D/A Converter – Binary Weighted resistor network – Binary ladder – accuracy and resolution. A/D converter – Simultaneous conversion – countertype methods – Dual slope A/D converter – Voltage to frequency converters.

Course Outcomes:

After completion of the course, students will be able to

- be aware on number systems, Boolean algebra, flip-flops, register, counters, A/D and D/A converters
- have in depth knowledge on digital fundamentals.
- understand the implementation of gates like AND, OR, NOT, etc.,
- learn about where to use flip-flops.

Books for study

1. Digital Principles and application – A.P Malvino and Donald P. Leach, Tata Mc Graw Hill Publishing Company, New Delhi 1976.
2. Digital Computer Electronics – A.P Malvino.

Book for Reference

1. Introduction to Integrated Electronics (Digital and Analog) by V. Vijayendran, S. Viswanathan (printers & Publishers), PVT LTD.

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Semester	Subject Code	Title of the Paper	Hours of Teaching / week	No. of Credits
III & IV	20U4CSPHAPL	Allied Physics Lab (NS)	2	2

Objectives:

- To gain the knowledge in basic and digital electronic experiments.
- To perform experiments related to diodes, transistors, oscillators, amplifiers and discrete components.
- To demonstrate the gates, flip-flops and amplifiers.

List of Experiments

15. Zener diode – Forward and Reverse Characteristics
16. R-C coupled amplifier – Study of frequency response
17. Hartley oscillator – Determination of L
18. Boolean Law - Verification
19. NAND and NOR – Universal gates
20. Logic gates – Truth table Verification
21. Demorgan's theorem verification
22. FET – amplifier
23. Emitter follower Amplifier
24. Semiconductor Diode - Characteristics
25. AND, OR and, NOT Logic ,Circuits using – discrete components
26. Half and Full adder circuits
27. Half and Full Subtractor circuits.
28. Parallel Binary adder – IC 7483 function

Course Outcomes:

After completion of the course, students will be able to

- do electronic projects with diodes, transistors and gates
- handle analog and discrete components effectively.
- understand the process of flip-flops, gates, diodes.
- get career opportunities as hardware engineer

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Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
IV	20U4CSS2	Skill Based Elective – II New Media - II	1	1

Objectives:

- To teach multimedia components and their requirements.
- To impart multimedia on webpage.
- To cultivate multimedia skills and work with all objectives.
- To interpret with all aspects of video, images and developing projects.
- To illustrate multimedia contents help to vary and enhance the learning process and leads to better knowledge retention.

Multimedia Tools Exercise:

1. Letterhead design
2. Newspaper Advertisement design
3. Invitation/Thank you card design
4. Brochure design
5. Newsletter design
6. Business Card and CD Cover design
7. 2D animation – Tweening (Motion & Shape)
8. Animation Button creation and events for the buttons.
9. Video file editing , sub title addition.
10. Audio dubbing and changing in a video.

Course Outcomes:

After completion of the course, students will be able to

- develop multimedia skills understanding the principal players of individual players in multimedia teams in developing projects.
- work with all aspects of images, sound and videos.
- identify issues and obstacles encountered by web authors in deploying web-based applications.
- create a well-designed, interactive Web site with respect to current standards and practices.
- Determine the appropriate use of interactive versus standalone web applications.

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Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
V	20U5CSC5	Distributed Programming using .net	6	6

Objective:

- To introduce the .NET architecture and its applications.
- To illustrate features of C# , ASP.NET and ADO.NET programming.
- To teach an applications in the .NET platform.
- To demonstrate how to create create and consume libraries.
- To impart data access mechanism.

Unit – I

Introduction to .NET: .NET Framework, Components of .NET Framework, Visual Studio .NET IDE- Introduction to Visual Basic .NET- Console Applications, Data Types – Operators- Flow of Controls.

Unit – II:

Introduction to C# .NET - Features of C#, similarities and Differences between C# and VB- similarities and Differences between C# – Classes and Objects in C#– Operators, Types and Variables in C#- Selective and Iterative flow of Controls.

Unit – III:

Advanced Features of C#: Arrays – Indexers and Collections – Inheritance – Properties – Abstract Properties - Polymorphism – Attributes – Structs - Exceptions – Delegates and Events.

Unit – IV:

ADO.NET and its components – Database project in VB.NET , Structured Query Language – Navigate database with VB.NET – Database coding with Oracle and SQL server - **ASP.NET:** Introduction – Components – Web pages – Server Controls – Validation Controls – Data Binding – Arraylist object - Hashtable object.

Unit V: (Self Study)

XML files – Repeater Controls – Master Pages – Themes – Database Connection – Case study with Web services.

Course Outcomes:

After completion of the course, students will be able to

- work with the basic of C# language.
- know the difference between .NET and other programming languages.
- create applications using various data providers.
- create web application, mobile applications and console applications.
- ability to use all the features of .NET like portability, interoperability, adaptability, and scalability.
- get priority in IT industry for employment.

Books for Study:

1. K.Meena, R.Sivakumar and A.B.Karthick Anand Babu, "Dot NET Technologies", Himalaya Publishing House, First Edition 2016.
2. Stephen C. Perry, Atul Khate, Joseph Mayo, " ***Essentials of .Net and Related Technologies: With a focus on C#, XML, Asp.NET and ADO.NET***", First Edition, Pearson Education., 2009.
3. Matt Telles, Kogent Solutions Inc.Telles, "***C# 2005Programming, Black Book***", Dreamtech Press, 2007.
4. Schildt, Herbert, "***C#: The Complete Reference***", Second Edition, McGraw-Hill, 2008.
5. Kevin Hoffman & Jeff Gabriel, "***Professional .NET Framework***" Shorff Publish-ers and Distributors Pvt. Ltd .

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
V	20U5CSC6	Computer architecture and Microprocessor	5	6

Objective

- ❖ To teach the programming techniques in Microprocessors.
 - ❖ To impart architecture and apply operation of typical microprocessors and microcontrollers.
 - ❖ To illustrate solid foundation on the fundamentals of microprocessors and applications, interfacing the external devices to the processor.
 - ❖ To demonstrate microprocessor hardware and software.
- To interpret the microprocessor and computer architecture concepts.

Unit I

Basic Computer organization and Design: Instruction codes – Computer Instructions – Timing and Control – Instruction cycle – input/output and interrupt. Central Processor unit: General Register organization – stack organization – instruction format – Addressing modes – data transfer and manipulation – program control.

Unit II

Input – output organization: Peripheral device – I/O interface – asynchronous data transfer – direct memory access – input output processor – priority interrupt.

Unit III (Self Study)

Memory Organization: Main memory – Auxiliary memory – Associative memory – Cache memory – Virtual memory.

Unit IV

Microprocessor architecture and microcomputer systems – 8085 Microprocessor Architecture and Memory Interfacing – Interfacing I/O devices – Introduction to 8085 instructions.

Unit V

Interrupts – Interfacing data converters - General Purpose Programmable Peripheral Devices: Interfacing keyboard and seven segment display – 8255 A Programmable peripheral interface - 8259 A Programmable interrupt controller.

Course Outcomes:

After completion of the course, students will be able to

- learn the internal organization of some popular microprocessors/microcontrollers.
- design of hardware & software, microprocessor, micro controller, interaction and integration.
- design their own embedded system and electronic devices.
- know the interconnection of hardware & how the system works inside.
- get job opportunities in ISRO as apprentice and can face competitive exams.

Text Book:

1. Computer System Architecture, M.Morris Mano, Third Edition, Prentice Hall of India, 2002.
2. Microprocessors Architecture , Programming and Application with the 8085, Ramesh S.Gaonkar , Fifth Edition, Penram International Publishing, 2010.

Reference:

1. Digital Computer Fundamentals – Thomas C.Bartee. 6th Edition, 2005.
2. Computer Organization and Programming – C.W. Gean.

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
V	20U5CSC7	Data Communication Networks	4	5

Objective

- To teach various layers and protocols for networks.
- To interpret the basic concepts of data communication, layered model and protocols.
- To impart interworking between computer networks and switching components in telecommunication systems.
- To illustrate the functioning of Frame Relay, ATM.
- ❖ To cultivate the nature, uses and implications of internet technology

Unit I

Introduction: Data communication – Networks – protocols and standards – topology – Transmission mode – Categories of network – Transmission media.

Unit II

The OSI model – Digital Data Transmission – DTE – DCE interface – multiplexing – Error detection and correction.

Unit III

Data link controls – Flow control – Error control – Data link protocols – Asynchronous protocols – synchronous protocols.

Unit IV

Local Area Network – Metropolitan Area Network – Circuit Switching – Packet Switching – Message Switching – Network Layer – Integrated services Digital Network – ISDN Services – Broadband ISDN - Networking and Internetworking Devices

Unit V (Self Study)

Transport Layer–Upper OSI Layers– TCP/IP.

Course Outcomes:

After completion of the course, students will be able to

- observe the fundamentals of networking.
- know the port numbers, ip addresses, mask, subnet masking, and various protocols.
- calculate the capacity of links between nodes.
- identify suitable signal encoding techniques for various scenarios.
- get job opportunities as network admin, hardware engineer, desktop support etc.,

Reference:

1. Introduction to Data Communication Networking – Tata McGraw Hill Edition.
Author: Behrouz.Ferouzan.

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching / Week	No.of Credits
V	20U5CSCP5	Lab -V Distributed Programming using .net	3	3

Objectives:

- To teach an application using C#, ADO.net and ASP.net
- To impart a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but web-distributed, or executed remotely.
- To illustrate safe execution of code, including code created by an unknown or semi-trusted third party.
- To demonstrate the performance problems of scripted or interpreted environments.
- To cultivate build all communication on industry standards to ensure that code based on .NET Framework integrates with any other code.

.NET lab

1. Working with call backs and delegates in C#
2. Code access security with C#.
3. Creating a Windows Service with C#
4. Interacting with a Windows Service with C#
5. Using Reflection in C#
6. Sending Mail and SMTP Mail and C#
7. Perform String Manipulation with the String Builder and String Classes and C#:
8. Using the System .Net Web Client to Retrieve or Upload Data with C#
9. Reader/Writer Class and C#
10. Working with Page and forms using ASP .Net.
11. Data Sources access through ADO.Net,
12. Working with Data readers , Transactions

Course Outcomes:

After completion of the course, students will be able to

- work with the basic and advanced features of C# language.
- create applications using various data providers.
- create web application, mobile application using .NET framework.
- work in the distributed environment.
- get employment in IT industry, school, and college laboratories.

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
V	20U5CSEL1A	Major Elective – I SOFT COMPUTING	4	4

Objective

- To teach Artificial Intelligence, Neural network and Fuzzy system concepts.
- To illustrate an introduction to the basic principles, techniques, and applications of soft computing.
- To demonstrate of the basic areas of Soft Computing including Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms.
- To interpret the mathematical background for carrying out the optimization associated with neural network learning.
- To cultivate familiarity with current research problems and research methods in Soft Computing.

UNIT – I

Problems, Problem Spaces and Search: Defining the Problem as a State Space Search – Production Systems – Problem Characteristics– Production System characteristics – Issues in the Design of Search Programs– Additional Problems. **Heuristic Search Techniques:** Generate and Test – Hill Climbing – Best-First Search – Problem Reduction – Constraint Satisfaction – Means-Ends Analysis.

UNIT - II

Knowledge Representation Issues: Representing and Mappings – Approach to Knowledge Representation – Issues in Knowledge Representation – The Frame Problem. **Using Predicate Logic:** Representing Simple Facts in Logic – Representing Instance and Isa Relationships – Computable Functions and Predictions – Resolution. **Representing Knowledge using Rules:** Procedural versus Declarative knowledge – Logic Programming – Logic Programming – Forward versus Backward Reasoning-Matching.

UNIT - III

Artificial Neural Networks: Concepts –Neural Attributes –Modeling-basic model of a Neuron-Learning in Artificial Neural Networks-Characteristics of ANNs-Important ANNs Parameter-Artificial Neural Network Topology-Learning Algorithm-Discrimination ability-ANN adaptability-The Stability-Plasticity Dilemma. **Neural Network Paradigms:** McCulloch-Pitts Model-The Perceptron

UNIT - IV

ADALINE and MADALINE Models:-Winner-Takes-All Learning Algorithm-Back-Propagation Learning Algorithm-Cerebellum Model Articulation controller(CMAC)-Adaptive Resonance Theory(ART) Paradigm-Hopfield Model-Competitive Learning Model-Memory Type Paradigms-Linear Associative Memory (LAM) – Real Time Models – Linear Vector Quantization(LVQ) Self-Organizing Map(SOM) Probabilistic Neural Network(PNN) – Radial Basis Function(RBF) – Time –Delay Neural Net(TDNN) Cognitron and Necognitron Models-Simulated Annealing – Boltzmann Machine- Other Paradigm.

UNIT - V

FUZZY LOGIC: Propositional Logic – The Membership function – Fuzzy logic – Fuzzy Rule Generation – Defuzzification of Fuzzy Logic – Time- Dependent Fuzzy Logic – Temporal Fuzzy Logic(TFL) - Applying Temporal Fuzzy Operators – Defuzzification of Temporal Fuzzy Logic – Example: Applicability of TFL in Communications Systems- Fuzzy Neural Networks – Fuzzy Artificial Neural Network(FANN) Fuzzy Neural Example- Neuro-Fuzzy Control- Fuzzy Neural Net –A Reality? **Applications:** Signal Processing –Image Data Processing – Communication Systems- Intelligent Control- Optimization Techniques- Other Applications – Tools and Companies.

Course Outcomes:

After completion of the course, students will be able to

- identify and describe soft computing techniques and their roles in building intelligent machines.
- apply genetic algorithms to optimization problems.
- design neural networks to pattern classification and regression problems using soft computing approach.
- use soft computing in research, medical applications, artificial intelligence, and neural networks.
- get employment as, system designer, software designer, software testing and web developer.

Text Book:

1. Stamatis V.KartaLopoulos, "understanding Neural Networks and Fuzzy logic". Prentice –Hall of India Private Limited, New Delhi, 2000.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence" Second Edition, Tata McGraw – Hill publishing Computing Ltd. NewDelhi,1999.

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
V	20U5CSEL1B	Major Elective – I Data Mining and Data Warehousing	4	3

Objective

- ❖ To teach about the architecture and application areas of Data ware housing and Mining.
- ❖ To impart and implement classical models and algorithms in data warehouses and data mining.
- ❖ To inculcate skill in selecting the appropriate data mining algorithm for solving practical problems
- ❖ To interpret the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- ❖ To cultivate with the process of data analysis, identifying the problems, and choosing the relevant models and algorithms to apply.

UNIT I

Introduction – data mining –data mining functionalities – classification of data mining systems – data mining task primitives- integration of a Data mining system with a database or data warehouse system – Descriptive Data Summarization -Data processing - Data cleaning – data integration and transformation - data reduction- data discretization and concept of hierarchy generation.

UNIT II

Data ware housing and OLAP Technology - A Multidimensional Data Model - data warehouse architecture - Data Warehouse implementation- from data warehousing of data mining.

UNIT III

Classification and Prediction - what is classification? what is Prediction? -Issues regarding classification and Prediction - classification by decision Tree Induction.

UNIT IV

Cluster analysis - Types of Cluster Analysis Partitioning Methods - Hierarchical methods -Density based methods.

UNIT V (Self Study)

Applications and Trends in data mining- data mining Application , Social Impacts of Data mining -Trends in data mining - Data mining system Products and research Prototypes

Course Outcomes:

After completion of the course, students will be able to

- design, create and maintain data warehouses.
- apply data mining techniques and methods to large data sets.
- evaluate various mining techniques on complex data objects.
- evolve multidimensional intelligent model from typical system.
- discover the knowledge imbibed in the high dimensional system.
- understand various tools of data mining and their techniques to solve the real time problems.

References:

1. "Data Mining concepts and techniques", Jiawei Han and Micheline Kamber, Second Edition, Morgan Kaufman Publishers - 2006.
2. "Data Ware housing in the Real World", Sam Anahory and Dennis Murray, Addition Wesley, Pearson Education Asia Pvt. Ltd, 2000.

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
V	20U5CSEL2A	Major Elective – II SOFTWARE ENGINEERING	4	3

Objective

- To teach phases in developing a software.
- To impart software engineering layered technology and process frame work.
- To interpret software requirements and the SRS documents.
- To inculcate data models, object models, context models and behavioural models.
- To illustrate software testing approaches such as unit testing and integration testing.
- To describe software testing approaches.

Unit I

Introduction to Software Engineering: introduction-some definitions-some size factor-Total effort devoted to software-distribution of effort-project size categories-how programmer spend their time-quality and productivity factors-managerial issues **Planning a software project: Introduction** –defining the problem-goals and requirements-developing solution strategy-planning the development process-the phased life Cycle Model-Milestones, documents, and Reviews-the cost model –The prototype life Cycle Model.

Unit II

Software Cost Estimation: Introduction software cost factor-programmer Ability – product complexity-product size-Available Time –Required level of Reliability-Level of technology-**Software cost estimation Techniques**-Expert Judgment-Delphi cost estimation-work breakdown structures-algorithmic cost models-staffing Level Estimation-Estimating software Maintenance costs.-**software Requirements Definition**-The Software Requirement specification-Formal specification Techniques-Relational Notations-implicit Equations /Recurrence Relations.

Unit III

Software Design: Introduction-Fundamental design concepts-Abstraction-Information hiding-structure-modularity-concurrency-verification-Aesthetics-Modules and Modularization Criteria- design Notation-data flow diagrams-structure charts-HIPO Diagrams-procedure templates-pseudo code-structured flow charts-structured English-Design Tables-Design Techniques-Stepwise Refinement- Level of Abstractions-structured

design-integrated top- down development-Jackson structured programming-summary of design techniques.

Unit IV

Implementation Issues-introduction- structured coding techniques-single entry, single Exit Constructs-Efficiency considerations –Violations of single entry, single –data encapsulations-the go to statement-Recursions-coding style-standard and guidelines-documentation guidelines-supporting documents-internal documentations.

Unit V

Verification and Validation Techniques-introduction-quality assurance-walkthroughs and inspections- walkthroughs- inspections-static analysis-Symbolic Execution-unit Testing and Debugging-unit testing- Debugging-system testing-integration testing-acceptance testing-Formal Verification-input –output Assertions-weakest preconditions structural induction.

Course Outcomes:

After completion of the course, students will be able to

- know the role and impact of software engineering in contemporary business, global, economic, environmental and societal context.
- elicit the requirements for real, time problems. Analyze and use open source tools for project designing.
- develop user interface design for the given system.
- analyze and resolve information technology problems through the application of systematic approaches and diagnostic tools.
- estimate the cost of software and apply software management principles.
- identify the issue of Software Quality and activities present in typical Quality management process.

Reference:

1. Richard E.Fairley, "Software Engineering Concepts", McGraw-Hill Book Company-1985.
2. Roger Pressman, "Software Engineering", Sixth Edition, McGraw-Hill Book Company, 2005.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
V	20U5CSEL2B	Major Elective - II UML Programming	4	3

OBJECTIVES

- To teach the basic concepts of UML Programming.
- To interpret requirements model using UML class notations and use-cases based on statements of user requirements.
- To demonstrate requirements models of correctness and quality.
- To interpret the OO(object oriented) design of a system from the requirements model in terms of a high-level architecture description.
- To illustrate low-level models of structural organization and dynamic behavior using UML class, object, and sequence diagrams

UNIT I

Principles of Modeling-OO Modeling-Introducing the UML-basic Structural Modeling: Classes-Relationships-Common Mechanism-Diagrams-Class Diagrams.

UNIT II

Advanced Structural Modeling: Advanced Classes-Relationships-Interfaces, types and roles-Packages-Object Diagrams.

UNIT III

Basic Behavioral Modeling: Interactions-Use cases-Use case Diagram-Interaction Diagram-Activity Diagrams.

UNIT IV

Advanced Behavioral Modeling: Events and Signals- State Machines- Processes and threads- Time and Space – State Chart Diagrams.

UNIT V

Architectural Modeling: Components – Deployment- Components Diagram – Deployment Diagrams – Systems and Models.

Course Outcomes:

After completion of the course, students will be able to

- analyse, design, document the requirements through use case driven approach.
- identify, analyse, and model structural and behavioural concepts of the system.
- develop,explore the conceptual model into various scenarios and applications.
- apply the concepts of architectural design for deploying the code for software.
- get job in IT as designer of software products.

Book for Study:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, *“The Unified Modeling Language”*, Addison-Wesley Ltd, ISBN: 0321267974, 9780321267979.

Book for Reference:

Simon Bennett, John Skelton, Ken Lunn, “Schaum's Outline of UML”, McGraw-Hill Professional, Second Edition, ISBN-13: 978-0077107413.

B.Sc. Computer Science

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
V	20U5CSNME	Non Major Elective - Social Media Marketing	3	1

Objective:

- To teach what social media marketing is and it can be applied to the business in order to improve and promote business.
- To impart how E-commerce and social media intersect.
- To demonstrate attract traffic to their site while developing and enhancing brand value.
- To interpret educating and training participants in the field of Social Media.
- To inculcate social media in marketing and training students to adapt their social media strategy to company goals

Unit – I:

Introduction - Social Media Marketing - The Most Important Social Media Websites – Blogging - Social Media Engagement - Social Media and Target Audience - Sharing Content on Social Media - Social Bookmarking Websites - Approach to Social Media.

Unit – II:

Dos and Don'ts of Social Media - Social Media Strategy - Tips on Using Social Media in Marketing - Using Social Media for Promotion - How to Promote Using Social Media - Social Media ROI - Using Social Media for Branding - Using Social Media for Establishing Relationship - Social Media and SEO - Tools for Managing Social Media - Social Analytics - Automation and Social Media - Social Media and Other Types of Marketing.

Course Outcomes:

After completion of the course, students will be able to

- build a loyal community, learn from the community, work on product development and improve sales.
- create a social media marketing plan and track progress in achieving goals with a variety of measurement tools, services, and metrics.
- understand the meaning and nature of social marketing
- analyse social marketing problems and recognise the range of stakeholders involved in social marketing programmes and their role as target markets
- evaluate a company's current situation, isolate social media issues and provide solutions by identifying appropriate social media marketing portals to influence consumer and improve the company's reputation.

Text Book:

1. "Social Media Marketing: Social Media Marketing Fundamentals", eMarketing Institute, Demark, eBook, 2018, Weblink: <https://www.emarketinginstitute.org/free-ebooks/social-media-marketing-for-beginners>.

B.Sc. Computer Science

Semester	Course Code	Title of The Course	Hours of Teaching/ Week	No. of Credits
V	20U5CSLSD	LIFE SKILLS DEVELOPMENT Employability Skill	1	-

Course objectives

- To enhance one's ability to be fully self aware by helping oneself to overcome all fears and insecurities and to grow fully from inside out and outside in.
- To increase one's knowledge and awareness of emotional competency and emotional intelligence at place of study/work.
- To provide opportunity for releasing one's potential through practical experience.
- To develop interpersonal skills and adopt good leadership behaviour for empowerment of self and others.
- To set appropriate goals, manage stress and time efficiently.
- To manage competency- mix at all levels for achieving excellence with ethics.

Unit – I

(30 hrs)

Communication and Professional skills

1. Writing and different modes of writing.
2. Digital Literacy.
3. Effective use of social media.
4. Non verbal communication.
5. Resume skills.
6. Presentation skills.
7. Listening as a Team skill.
8. Brainstorming.
9. Social and cultural Etiquettes.
10. Internal communication.

Unit – II

(30 hrs)

Leadership, management and Universal Human Value

1. Leadership skills.
2. Managerial skills.
3. Entrepreneurial skills.
4. Innovative Leadership and Design thinking.
5. SWOT (Strengths, Weaknesses, Opportunities and Threats Analysis)
6. EQ (Emotional Quotient)
7. Love and Compassion.
8. Truth.
9. Non Violence.
10. Righteousness.
11. Ethic and Integrity.

Course outcomes

At the end of the programme learners will be able to:

- Gain Self Competency and Confidence.
- Practice Emotional Competency.
- Gain Intellectual Competency.
- Gain an edge through Professional Competency.
- Aim for high sense of Social Competency.
- Be an integral Human Being.

References:

1. Bailey, Stephen, Academic Writing: A handbook for International Students, 2010 Rourlege.
2. Shlpa Sablok Bhardwaj (2018). Computer Applications for Class 9 MS Office Blueprint Education (Contributor).
3. [http:// WWW.lyfemarketing.com / blog / how-digital – marketing – works/](http://WWW.lyfemarketing.com/blog/how-digital-marketing-works/)
4. [http:// WWW.thoughtco.com/what-is-nnverbasl - communication - 1691351](http://WWW.thoughtco.com/what-is-nnverbasl-communication-1691351)
5. [http:// WWW.wikihow.com/Write-a-Neat-Resume](http://WWW.wikihow.com/Write-a-Neat-Resume)
6. [http:// WWW.gildabonanno.com/presentation-skill-coaching-videos](http://WWW.gildabonanno.com/presentation-skill-coaching-videos)
7. [http:// blog.vantagecircle.com/active-listening/](http://blog.vantagecircle.com/active-listening/)
8. Osborn, A.F. (1963) Applied imagination: Principles and procedures of creative problem solving (Third Revised Edition). New York, NY: Charles Scribner's Sons.
9. [http:// WWW.thespruce.com/what-is-etiquette-and-why-is-it-important-1216650](http://WWW.thespruce.com/what-is-etiquette-and-why-is-it-important-1216650)
10. [http:// WWW.talkfreely.com/blog/internal-and-eternal-communication](http://WWW.talkfreely.com/blog/internal-and-eternal-communication).

Semester	Subject code	Title of the course	Hours of Teaching /Week	No. of Credits
VI	20U6CSC8	Basics of Big Data	5	5

Objectives:

- ✓ To provide an overview of an exciting growing field of big data analytics.
- ✓ To introduce the tools required to manage and analyze big data like Hadoop, NoSql Map- Reduce.
- ✓ To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
- ✓ To enable students to have skills that will help them to solve complex real-world problems in for decision support.

Unit I : Introduction to Big Data, Hadoop and NoSQL

Introduction to Big Data, Big Data characteristics, types of Big Data, Traditional vs. Big Data business approach, Case Study of Big Data Solutions - What is Hadoop? Core Hadoop Components; Hadoop Ecosystem; Physical Architecture; Hadoop limitations - What is NoSQL? NoSQL business drivers - NoSQL case studies - NoSQL data architecture patterns: Key-value stores, Graph stores, Column family (Bigtable) stores, Document stores, Variations of NoSQL architectural patterns - Using NoSQL to manage big data: What is a big data NoSQL solution? - Understanding the types of big data problems - Analyzing big data with a shared-nothing architecture - Choosing distribution models: master-slave versus peer-to-peer - Four ways that NoSQL systems handle big data problems

Unit II: MapReduce and the New Software Stack

Distributed File Systems : Physical Organization of Compute Nodes, Large- Scale File-System Organization - **MapReduce:** The Map Tasks, Grouping by Key, The Reduce Tasks, Combiners, Details of MapReduce Execution, Coping With Node Failures - **Algorithms Using MapReduce:** Matrix-Vector Multiplication by MapReduce , Relational-Algebra Operations, Computing Selections by MapReduce, Computing Projections by MapReduce, Union, Intersection, and Difference by MapReduce, Computing Natural Join by MapReduce, Grouping and Aggregation by MapReduce, Matrix Multiplication, Matrix Multiplication with One MapReduce Step.

Unit III: Finding Similar Items and Mining Data Streams

Applications of Near-Neighbor Search, Jaccard Similarity of Sets, Similarity of Documents, Collaborative Filtering as a Similar-Sets Problem - **Distance Measures:** Definition of a Distance Measure, Euclidean Distances, Jaccard Distance, Cosine Distance, Edit Distance, Hamming Distance - **The Stream Data Model:** A Data-Stream-Management System, Examples of Stream Sources, Stream Query, Issues in Stream Processing - **Sampling Data in a Stream :** Obtaining a Representative Sample , The General Sampling Problem, Varying the Sample Size - **Filtering Streams:** The Bloom Filter, Analysis - **Counting Distinct Elements in a Stream:** The Count-Distinct Problem, The Flajolet-Martin Algorithm, Combining Estimates, Space Requirements - **Counting Ones in a Window:** The Cost of Exact Counts, The Datar-Gionis-Indyk-Motwani Algorithm, Query Answering in the DGIM Algorithm, Decaying Windows.

Unit IV: Link Analysis and Frequent Itemsets

PageRank Definition, Structure of the web, dead ends, Using Page rank in a search engine, Efficient computation of Page Rank: Page Rank Iteration Using MapReduce, Use of Combiners to Consolidate the Result Vector - Topic sensitive Page Rank, link Spam, Hubs and Authorities - **Handling Larger Datasets in Main Memory:** Algorithm of Park, Chen, and Yu, The Multistage Algorithm, The Multihash Algorithm - **The SON Algorithm and MapReduce - Counting Frequent Items in a Stream:** Sampling Methods for Streams, Frequent Itemsets in Decaying Windows.

Unit V: Clustering, Recommendation Systems and Mining Social-Network Graphs

CURE Algorithm - Stream-Computing - A Stream-Clustering Algorithm - Initializing & Merging Buckets - Answering Queries - A Model for Recommendation Systems - Content-Based Recommendations - Collaborative Filtering - Social Networks as Graphs - Clustering of Social-Network Graphs - Direct Discovery of Communities - SimRank - Counting triangles using Map-Reduce.

Course Outcomes:

After completion of the course, students will be able to

- work with big data tools and its analysis techniques
- design efficient algorithms for mining the data from large volumes
- design an efficient recommendation system
- design the tools for visualization
- learn NoSQL databases and management
- acquire required skills such as analytical, mining, programming, problem solving,
- get job in IT as big data engineer, big data tester, data analyst, database manager, etc.,

Text Books:

1. Anand Rajaraman and Jeff Ullman “Mining of Massive Datasets”, Cambridge University Press,
2. Alex Holmes “Hadoop in Practice”, Manning Press, Dreamtech Press.
3. Dan McCreary and Ann Kelly “Making Sense of NoSQL” – A guide for managers and the rest of us, Manning Press.
4. Study Material for “Big Data Analytics” based on Stanford Info-Lab Manual, Compiled by ANURADHA BHATIA, Mumbai University.

References:

1. Bill Franks , “Taming The Big Data Tidal Wave: Finding Opportunities In Huge Data Streams With Advanced Analytics”, Wiley
2. Chuck Lam, “Hadoop in Action”, Dreamtech Press

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
VI	20U6CSC9	Cloud Computing	5	5

OBJECTIVES

- To teach the basic concepts of Cloud Computing
- To introduce the cloud services and developing cloud in different platforms
- To impart the various applications of cloud.
- To illustrate the principles of virtualization technologies and cloud computing.
- To provide information about virtual machines, virtual networking, virtual storage, VM management and troubleshooting.

UNIT I

Cloud Computing Fundamentals: Learning Objectives – Preamble Motivation for Cloud Computing – The Need for Cloud Computing – Defining Cloud Computing – NIST Definition of Cloud Computing – Cloud Computing Is a Service – Cloud Computing Is a Platform – Principal of cloud Computing – Five Essential Characteristics – Four Cloud Deployment Models – Cloud Ecosystem – Requirement for Cloud Services – Cloud Application Benefits and Drawbacks . **Cloud Computing Architecture and Management:** Learning Objectives – Preamble -Introduction - Cloud Architecture – Layer 1 (User/Client Layer) – Layer 2 (Network Layer) Layer 3 (Cloud Management Layer) – Layer 4 (Hardware Resource Layer) – Anatomy of the Cloud – network Connectivity in Cloud Computing – Public 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 Infrastructure – Managing the Cloud Application – Migrating Application to Cloud – Phases of Cloud Migration – Approaches for Cloud Migration.

UNIT II

Cloud Deployment Models: Learning Objectives – Preamble – Introduction – Private Cloud – Characteristics –Suitability – On-Premise Private Cloud – Issues – Outsourced Private Cloud – Issue – Advantages – Disadvantages – Public Cloud – Characteristics – Suitability – Issue – Advantages – Disadvantages –Hybrid Cloud – Characteristics- Suitability – Issue – Advantages – Disadvantages. **Cloud Service Models:** Learning Objectives – Preamble – Introduction – Infrastructure as a Service – Characteristics of IaaS – Suitability of IaaS – Pros and Cons of IaaS – Summary of IaaS Providers – Platform as a Service – Characteristics of PaaS - Suitability of PaaS – Pros and Cons of PaaS – Summary of PaaS Providers – Software as a Service – Characteristics of SaaS - Suitability of SaaS – Pros and Cons of SaaS – Summary of SaaS Providers.

UNIT III

Technological Drivers for Cloud Computing: Learning Objectives – Preamble – Introduction. **SOA and Cloud:** SOA and SOC – Benefits of SOA – Technologies Used by SOA – Similarities and Differences Between SOA and Cloud Computing – Similarities – Difference – How SOA Meets Cloud Computing – CCOA. **Virtualization:** Approaches in Virtualization – Full Virtualization – Para Virtualization – Hardware Assisted Virtualization – **Hypervisor and Its Role: Types of Virtualization:** OS Virtualization – Server Virtualization – Memory Virtualization – Storage Virtualization – Network Virtualization – Application Virtualization. **MultiCore Technology:** Multicore Processors and VM Scalability – MultiCore Technology and Parallelism in Cloud – Case Study. **Memory and**

Storage Technologies: Cloud Storage Requirements – Virtualization Support Storage as a Service (STaaS) – Emerging Trends and Technologies in Cloud Storage. **Networking Technologies:** Network Requirements for Cloud –Virtualization Support Usage of Virtual Networks – DCs and VPLS – SDN –MPLS Other Emerging Networking Trends and Technologies in cloud. **Web 2.0:** Characteristics of Web 2.0 – Difference between Web 1.0 and Web 2.0 – Application of Web 2.0 – Social Media – Marketing – Education – Web 2.0 and Cloud Computing. **Web 3.0:** Components of Web 3.0 – Semantic Web – Web Services – Characteristics of Web 3.0 – Convergence of Cloud and Web 3.0 – Case Studies in Cloud and Web 3.0 – Connection Information Facebook – Search Optimization and Web Commerce: Best Buy – Understanding Text: Millward Brown. **Software Process Models for Cloud:** Types of Software Models – Waterfall Model – V Model Incremental Model – RAD Model – Agile Model – Iterative Model –Spiral Model.

UNIT IV

Pervasive Computing: How pervasive Computing Work? – How Pervasive Computing Helps Cloud Computing?. **Operating System:** Types of Operating Systems – Role of OS in Cloud Computing – Features of Cloud OS – Well-Defined and Abstracted Interfaces Support for Security at the Core – Managing Virtualized Workloads – Cloud OS Requirements – Cloud-Based OS. **Application Environment:** Need for Effective ADE – Application Development Methodologies – Distributed Development – Agile Development – Power of Cloud Computing in Application Development – Disadvantages of Desktop Development – Advantages of Application development in the cloud – Cloud Application Development platforms – Windows Azure- Google App Engine – Force.com – Manjrasoft Aneka – Cloud Computing APIs – Rackspace – IBM – Intel.

UNIT V

Cloud Service Providers: Learning Objectives – Preamble – Introduction – EMC IT – Captiva Cloud Toolkit – Google – Cloud platform – Cloud Storage – Google Cloud Connect – Google Cloud Print – Google App Engine – Amazon Web Services – Amazon Elastic Compute Cloud – Amazon Simple Storage Service – Amazon Simple Queue Service – Microsoft Windows Azure – Microsoft Assessment And Planning Toolkit – Share Point – IBM – Cloud Models – IBM Smart Cloud – SAP Labs –Sales Cloud – Service Cloud: Knowledge as a Service- Rackspace – VMware – Manjrasoft – Aneka Platform.

Course Outcomes:

After completion of the course, students will be able to

- articulate the main concepts, key technologies, strengths and limitations of cloud computing.
- understand and use the architecture of compute and storage cloud, service and delivery models.
- Identify the core issues of cloud computing such as resource management and security.
- choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.
- establish own cloud environment using openstack and work on it.
- get job opportunities in IT as cloud architect, DevOps cloud engineer, cloud engineer etc.,

Text Book:

Essentials of CLOUD COMPUTING by K. Chandrasekaran , 2015 , Taylor & Francis Group, CRC Press

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
VI	20U6CSC10	Operating Systems	5	5

Objective

- To teach about design principles of operating system with different cases.
- To inculcate different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
- To demonstrate how operating system is important for computer system.
- To make aware of different types of operating system and their services.
- To illustrate memory and secondary memory management.

Unit I

Introduction and Process Concepts : Definition of OS – Early History – History of DOS and UNIX operating system – definition of process – process states – process state transition – Interrupt processing – Interrupt classes – context switching – semaphores – Deadlock and Indefinite postponement.

Unit II

Storage Management : Real Storage: Real storage management strategies – Contiguous Vs non – contiguous storage allocation – Single user contiguous storage allocation – Fixed partition multiprogramming – Variable partition multiprogramming – Multiprogramming with storage swapping. **Virtual Storage :** Virtual storage management strategies – page replacement strategies – Working sets – Demand paging – Page size.

Unit III

Processor Management: Job and Processor Scheduling : Preemptive Vs No preemptive scheduling – Priorities – Deadline scheduling – FIFO – RR – Quantum size – SJF – SRT – HRN. **Distributed Computing:** Classification of sequential and parallel processing – Array processors – Dataflow computers – Multiprocessing – Fault tolerance.

Unit IV

Device and Information Management: Disk Performance Optimization: Operation of moving head disk storage – Need for disk scheduling – Seek optimization – FCFS – SSTF – SCAN – RAM Disks – optical disks. **File and Database Systems:** File system – Function – Organization – Allocating and freeing space – File descriptor – Access control matrix.

Unit V (Self Study)

Case Studies: Windows: Memory Management – Overlaying – Extended and Expanded memory – Memory allocation – File system and allocation method – Internal and External common Memory management commands – File management commands. **UNIX:** Processes in UNIX – Memory management – I/O systems – File systems and allocation method – semaphores – command systems.

Course Outcomes:

After completion of the course, students will be able to

- gain extensive knowledge on principles and modules of operating systems
- understand key mechanisms in design of operating systems modules
- understand process management, concurrent processes and threads, memory management, virtual memory concepts, deadlocks

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- compare performance of processor scheduling algorithms - produce algorithmic solutions to process synchronization problems
- use modern operating system calls such as Linux process and synchronization libraries
- get job as OS engineer, system admin IT , as assistant in schools and colleges.

Reference:

1. H.M. Deital, "An introduction to operating system", Addison Wesley Second edition, 1998.
2. Andrew S.Tanenbaum "Modern Operating System", Prentice – Hall of India, Second Edition, 1996.

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Semester	Subject Code	Title of the course	Hours of Teaching / Week	No. of Credits
VI	20U6CSC11	Mobile Applications	5	5

Objectives:

- To provide thorough introduction to Android.
 - To inculcate the basic concepts of Android Development tools and Life cycle.
 - To impart knowledge about user interfaces
 - To illustrate databases and content providers
- To teach the principles of graphics, messaging, sound , video and publishing the application

Unit – I

Android Introduction: An Open Platform for Mobile Development – Native Android ap-plications – Android SDK features – Evolution- development of android for mobile – Development framework.

Unit – II

Android application development: installation – Creating application – Types of Appli-cations – Android development tools. Creating Applications and activities: Application Manifest file – Manifest editor – Externalizing the resources – Android application life cycle – Android application class- android activities.

Unit – III

Building user interfaces: Fundamental UI Design – Layouts – Fragments – Widget Tool box – Creating new views.

Unit – IV

Introducing adapters - Databases and content providers: Android databases – working with SQLite databases – Creating content providers – Native android content providers.

Unit - V

Introducing the Action Bar – Creating and Using Menus and Action bar action items – Introducing Dialogs – Introducing notifications- signing and publishing application.

Books for Study

1. Reto Meier, **“Professional Android 4 Application Development”**, WROX Publication – Wiley – India, 2012

Books for Reference:

1. Pradeep Kothari &Kogent Learning Solutions Inc, **“Android Application Devel-opment Black Book”**, Dreamtech Press, Edition 2014, ISBN:978-93-5119-409-5
2. W.FrankAbleson, RobiSen, Chris King, C.Enrique Ortiz, **“Android in Action”**, Manning Publications Co,Third Edition, ISBN 9781617290508.
3. Lauren Darcey, Shane Conder, **“SAMS Teach Yourself Android Application Development in 24 Hours”**, Second edition.

Course Outcomes:

On completion of the course, the students will be able to:

- Design the right user interface for mobile application.
- Implement mobile application using UI toolkits and frameworks.
- Design a mobile application that is aware of the resource constraints of mobile devices.
- Develop web based mobile application that accesses internet and location data.
- Implement android application to use telephony for SMS communication.
- Implement android application with multimedia support.

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Semester	Subject Code	Title of the course	Hours of Teaching / Week	No. of Credits
VI	20U6CSEL3A	Major Elective–III WEB DESIGN	4	4

Objective

- To understand the basic concepts of HTML
- To give insight for JavaScript
- To imbibe the programming concepts of PHP
- To imbibe the necessary knowledge of the tools useful for creating dynamic website
- It also introduces the client server technology by integrating the technologies of
 - HTML, Java Script, PHP and MySQL.

Unit I

HTML: Basic HTML, The Document body, Text, Hyperlinks, Adding more formatting, Lists, Tables, Using colors and images, Images, Multimedia objects, Frames, Forms-towards interactivity, Cascading Style Sheets: Introduction, Using styles: Simple exam-ples, Defining your own styles, Properties and values in styles.

Unit II

Client Side Scripting : JavaScript:JavaScript—The basics, Variables, String manipulation, Mathematical functions, Statements, Operators, Arrays, Functions- Data and objects in java script, Regular expressions, Exception Handling, Built in objects, Events. Dynamic HTML with Java Script: Data validation, Opening a new window, Messages and Confirmations, The status bar, writing to a different frame, Rollover buttons, Moving images, multiple pages in a single download, A text-only menu system, Floating logos.

Unit-III

Server Side Scripting: PHP: PHP Introduction – syntax of PHP - Variables – Constants - PHP operators – Flow of controls – PHP looping – Arrays. PHP Functions – PHP and Object Oriented Programming – PHP access specifiers.

Unit-IV

PHP cookie – Session – Server variables – header() – Code reuse functions. PHP files – Introduction – Testing files – Accessing files– Functions for Directories - MySQL Database: Need for Database – MySQL Database, Insert, Query, Fetch Array.

Unit-V

(Self Study)

Select, Order by, Joins, Update, Delete, Groupby functions, Data Formats- Case

Studies.

Books for Study:

1. N.P Gopalan,J.Akilandeswari, "Web Technology" A Developer's Perspective, Prentice Hall of India Private Limited, New Delhi, 2008.
2. K.Meena, R.Sivakumar and A.B.Karthick Anand Babu "Web Programming Using PHP and MySQL", Himalaya Publishing House, 2012 First Edition.

Course Outcomes:

- To understand the Internet concepts and Realize the Basic Network concepts
- To learn and identify the features of HTML tags
- To design the HTML tables, frames and forms
- To acquire the basic concepts of JavaScript Programming
- To comprehend the objects in HTML and Java Script
- To handle the events and set the cookies in Java Script
- To develop the programming skills using Markup and Scripting Languages
- To design the simple web pages using HTML and JavaScript

Books for Reference:

1. Robin Nixon, "**Learning PHP, MySQL &JavaScript With jQuery, CSS & HTML5**"
O'Reilly Media, Fourth edition, December 2014, ISBN:978-1-491-91866-1.
2. David R. Brooks, "**An Introduction to HTML and JavaScript for Scientists and Engineers**", Springer-Verlag London Limited 2007, ISBN-13: 978-1-84628-656-.

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Semester	Subject Code	Title of the course	Hours of Teaching / Week	No. of Credits
VI	20U6CSEL3B	Major Elective – III OPEN SOURCE TECHNOLOGY	4	4

Objective

- ❖ To teach about the techniques and concepts of Open source technology.
- ❖ To impart free open source software environment and introduce them to use open source packages.
- ❖ To inculcate working with library standards and files.
- ❖ To demonstrate the errors and debugging techniques.
To illustrate the process managements.

Unit I

Introduction: shell programming: shell - pipes and redirection - shell as a programming language - shell Syntax.

Unit II

Working with Files: File structure - Library functions - Low - level File Access - The standard I/O Library - File & Directory Maintenance.

Unit III

Reading from & Writing to the Terminal - Terminal Structure - Terminal output - Debugging: Types of error - General debugging Techniques.

Unit IV

Process management: Process structure - Starting new process - Signals - Threads - Thread attributes - Canceling a Thread.

Unit V

Internet programming: CGI: Form elements - Sending information to the WWW server - Returning HTML to the client.

Course Outcomes:

After completion of the course, students will be able to

- install and run open-source operating systems.
- apply the security concept in open source database.
- contribute software to and interact with Free and Open Source Software development projects and use a version control system.
- build and modify one or more Free and Open Source web server's configuration.
- develop open source software, open source project, build a personal brand etc.,
- get job opportunities in IT.

Reference:

1. Beginning LINUX programming - Neil Mathew & Richard Stones - Shroff Publications & Distributors Pvt Ltd., 1999. Chapters: Only relevant topics from chapters 1-3, 5, 9, 10 – 11 & 20.

General References:

1. Professional LINUX Microprogramming - Richard Stones & Neil Mathew, 2008.
2. WWW.advacedlinuxprogramming.com
3. WWW tdlp.Com4.WWW.stk.org

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Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
VI	20U6CSEL4PA	Major Elective - IV Software Lab – IV – Web Design & Mobile Lab	4	3

Objective

- To provide in depth programming practical knowledge in Web Technology and Mobile Lab
- To impart an ability to design and implement static and dynamic website.
- To inculcate best technologies for solving web client/server problems.
- To demonstrate programming issues relating to VB Script, JavaScript, and PHP.
- To illustrate design, implement, document and present through mobile emulators.

Web Design:

- Create a web page with all types of cascading style sheets.
- Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
- Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.
- Using JavaScript perform Form Validation with Limit Login Attempts.
- Write a PHP script to display the values entered into a Web form that contains:
 - i. One text input field ii. One text area iii. One hidden field
 - iv. One password field v. One selection list vi. Two radio buttons Two checkboxes.
- Create a calculator script that allows the user to submit two numbers and Choose an operation to perform on them (addition, multiplication, Division, subtraction).
- Write a program in PHP for admin interface to add and delete users Using MySQL.
- Create an authentication script that checks a username and password. If the user input matches an entry in the database, present the user with a special message. Otherwise, re-present the login form to the user.
- Create a database with three fields: email (up to 70 characters), message (up to 250 characters), and date (an integer that contains a Unix timestamp). Build a script to allow users to populate the database.
- Create a script that displays the information from the database. Use regular expressions to extract email addresses from a file. Add Them to an array and output the result to the browser.
- Write a program in PHP to upload file using form control.

Mobile:

1. Layouts
2. Views
3. Events
4. Files
5. Preferences
6. Notifications
7. Programs using SQLite
8. Audio and Video Applications

Course Outcomes:

After completion of the course, students will be able to

- understand the Internet concepts and realize the basic network concepts
- learn and identify the features of HTML tags
- design the HTML tables, frames and forms
- acquire the basic concepts of JavaScript Programming
- comprehend the objects in HTML and Java Script
- handle the events and set the cookies in Java Script
- develop the programming skills using markup and scripting languages
- design the simple web pages using HTML and JavaScript
- design the right user interface for mobile application.
- implement mobile application using UI toolkits and frameworks.
- design mobile applications that are aware of the resource constraints of mobile devices.
- develop web based mobile application that accesses internet and location data.
- implement android application to use telephony for SMS communication.
- implement android application with multimedia support.
- get job opportunities in IT.

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Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
VI	20U6CSEL4PB	Major Elective - IV Software Lab-IV Open Source Technology Lab	4	3

Objective

- ❖ To introduce the techniques and concepts of Open source technology.
- ❖ To teach about the techniques and concepts of Open source technology.
- ❖ To impart free open source software environment and introduce them to use open source packages.
- ❖ To demonstrate working with library standards and files.
- ❖ To illustrate the errors and debugging techniques.
- ❖ To explain LINUX, PHP program by doing exercise programs.

1. Write a shell program to create a menu for copy, edit, rename and delete a file.
2. Write a shell program to generate menu creation.
3. Write a shell program to prepare the E.B.Bill.
4. Write a LINUX program to for file handling.
5. Write a shell program for merging a file.
6. Write a LINUX program to find a given word in the specific file.
7. Write a shell program for file checking and formatting and difference between two files.
8. Write a shell program to perform sorting and unsorting the file name.
9. Write a shell program for sorting the file depends upon the primary key.
10. Write a LINUX program to find whether the given number is palindrome number or not.
11. Write a PHP program that adds products that are selected from a web page to a shopping cart.
12. Write a PHP program to access the data stored in a mysql table.
13. Write a PHP program interface to create a database and to insert a table into it.
14. Write a PHP program using classes to create a table.
15. Write a PHP program to upload a file to the server.

Course Outcomes:

After completion of the course, students will be able to

- install and run open-source operating systems.
- apply the security concept in open source database.
- contribute software to and interact with Free and Open Source Software development projects.
- build and modify one or more Free and Open Source web server's configuration.
- use a version control system.
- get job opportunities in IT.