Bachelor of Computer Applications (BCA)

Affiliated to Thiruvalluvar University

PROGRAMME HANDBOOK
CURRICULUM AND SYLLABUS UNDER CBCS
WITH EFFECT FROM 2022-2023

AUGUST 2023

DON BOSCO COLLEGE (CO-ED)

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PROGRAM OVERVIEW

Bachelor in Computer Application (BCA) is one of the most popular programs among the students who want to make their career in IT (Information Technology) field. The duration of the program is three years and divided into six semesters. It comprises subjects like database, networking, data structure, core programming languages like 'C', 'C++' and 'Java'. This program provides numerous opportunities to the students who are interested in the field of Computer Applications and desire to work in IT and/or IT enabled industries. It prepares students with the required knowledge to proceed for higher studies such as MCA, M.Sc. (IT), M.Sc. (Computer Science), MBA and likewise.

UNIVERSITY REGULATIONS - DEFINITIONS

PROGRAM - "Programme" means a course of study leading to the award of a degree in a discipline.

PROGRAM DURATION - It shall extend over a period of three years comprising six semesters with two semesters in one academic year.

COURSE - "Course" refers to a paper / practical / subject offered under the degree programme. Each Course is to be designed with lectures / tutorials/Laboratory or field work / seminar / practical training / Assignments / Term paper or Report writing etc., to meet effective teaching and learning needs.

CREDITS - The weightage given to each course of study (subject) by the experts of the Board of Studies concerned. The total minimum credits required for completing a UG program is 140.

CHOICE BASED - All Undergraduate Programs offered by Thiruvalluvar University are under Choice Based Credit System. This is to enhance the quality and mobility of the students within and between the Universities in the country and abroad.

ELIGIBILITY FOR ADMISSION - Candidate seeking admission to the first year of the UG Degree Course should have passed the Higher Secondary Course Examination (Academic or Vocational) Conducted by the Govt. of Tamil Nadu with Mathematics as a subject or any other Examination accepted as equivalent thereto by the Syndicate subject to such other conditions as may be prescribed.

PATTERN OF STUDY

The pattern of study for all UG Programs in Thiruvalluvar University consists of the following:

PART-I: Tamil or any one of the following modern/classical languages i.e. Telugu, Kannada, Malayalam, Hindi, Sanskrit, French, German, Arabic & Urdu.
The subject is offered during the **first two semesters** with one examination at the end of each semester (2 courses: 2 x 4 = 8 credits).

PART-II: English - The subject shall be offered during the **first two semesters** with one examination at the end of each semester (2 courses: 2 x 4 = 8 credits).

PART-III
(i) Core Subjects - Core papers including practicals wherever applicable are offered as prescribed in the scheme of examination, by the Board of Studies of respective subjects. There are 13 Core papers, 8 core practical papers, 4 allied and 3 electives constituting 80 credits for theory and 22 for practicals.

(ii) Allied Subjects - Allied papers including practicals wherever applicable are offered as prescribed in the scheme of Examination by the Boards of Studies of different subjects. There shall be 4 papers, **one each** in I, II, III and IV semester, for all UG Courses except for Science courses with practicals. For all the 4 semesters, the total number of credits for Allied courses shall be 20 only.

(iii) Electives Courses - Three elective courses with (3x3=) 9 credits are to be offered, one in the V Semester and two in the VI Semester. Elective subjects are selected from the list of electives prescribed by the Board of Studies concerned, as given below. Colleges can choose any one of the papers, given below, as an elective for a particular semester whether 5th semester or 6th semester. Elective paper for a particular semester once chosen by a particular college, should not be changed without getting prior permission and approval of the University.

PART-IV
i) Basic Tamil / Advanced Tamil (OR) Non-major Elective - Those who have not studied Tamil up to XII std and taken a non-Tamil language under Part-I shall take Tamil comprising two courses with 2 credits each (2x2=4 credits). The course content of which shall be equivalent to that prescribed for the 6th standard by the Board of Secondary Education and they shall be offered in the **third and fourth semesters**. (OR)
b. Those who have studied Tamil up to XII std and taken a non-Tamil language under Part-I shall take Advanced Tamil comprising two courses with 2 credits each (2x2=4 credits) in the **third and fourth semesters**. (OR) c. Others who do not come under the above a/b categories can choose the offered **non-major electives** consisting of two courses with (2x2=) 4 credits, in the **third and fourth semesters**.

ii) Skill Based Subjects All the UG Programs shall offer four courses of **skill based subjects one each** in III, IV, V & VI semester with 3 credits each (4x3= 12 credits) for which examination shall be conducted at the end of the respective semesters.

iii) Foundation Courses - There are 3 Foundation Courses offered.
1. Environmental Studies - offered in 1st Semester, under Part IV of the programme.
2. Value Education - offered in 2nd Semester under Part IV of the programme.
3. Soft Skill - offered in 2nd Semester under Part IV of the programme

(a) Environmental Studies - All UG Programs shall offer a course in Environmental Studies subject and it shall be offered in the **first semester as** one paper with 2 credits. Examination shall be conducted at the end of the first semester.

(b) Value Education - All UG Programs shall offer a course in "Value Education" and it shall be offered in the **second semester as** one paper with 2 credits. Examination shall be conducted at the end of second semester.

(c) Soft Skill - All the UG Programs shall offer a course in "Soft Skill" subject and it shall be offered in the **Second Semester by the Department of English**, as one paper with 1 credit. Examination shall be conducted at the end of the 2nd semester.

The assessment for the course in **Part IV,** namely (i)(a) alone, shall be only through CIA and not through external (University) examination for the total marks prescribed.
The assessment for the courses in **Part IV** namely (i)(b) & (i)(c) and (ii), (iii)(a), (iii)(b) and (iii)(c), shall be through CIA as well as external (University) examination for the total marks prescribed.

PART V
Extension Activities - Proper relevant records shall be maintained by the respective departments and if necessary it may be verified by the university authority at any time. The extension activities shall be conducted outside the regular working hours of the college. The mark sheet shall carry the gradation relevant to the marks awarded to the candidates. This grading shall be incorporated in the mark sheet to be issued at the end of the semester for which students shall pay the fee for one theory paper.
The marks shall be sent to the Controller of Examinations before the commencement of the final semester examinations.

Marks to be awarded as follows:
1. 20% of marks for Regularity of attendance.
2. 60% of marks for Active Participation in classes/camps/games/special Camps/Programmes in the college/ District / State/ University activities.
3. 10% of marks for Exemplary awards/Certificates/Prizes
4. 10% of marks for Other Social components such as Blood Donations, Fine Arts, etc

PASSING MINIMUM

1.A candidate shall be declared to have passed the whole examination, if the candidate passes in all the theory papers and practicals wherever prescribed as per the scheme of examinations by earning 140 credits in Part I, II, III, IV and V. He / She shall also fulfill the extension activity prescribed by earning 1 credit to qualify for the degree.

2.A candidate should get **not less than 40% in the University (external)** Examination, compulsorily, in any course of Part I, II, III & IV papers. Also the candidate who secures **not less than** 40% marks in the external as well as internal (CIA) examinations put together in any course of Part I, II, III & IV shall be declared to have successfully passed the examination in the subject in theory as well as practicals.

DISTRIBUTION

Table - 1(A): The following are the distribution of marks for external and internal for University (external) examination and continuous internal assessment and passing minimum marks for theory papers of UG Programs.

UNI. EXAM TOTAL (ESE)	PASSING MINIMUM FOR UNI.EXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNI.EXAM+CIA)
75	30	25	0	100	40

Note: ESE - End Semester Examination

Table - 1(B): The following are the Distribution of marks for Continuous Internal Assessment in the theory papers of UG Programs.

S.No	For Theory - UG courses	Distribution of Marks	
		Assignments	Tests
1	Assignment-1 (First 2 Units of the Syllabus)	10	-
2	Test-1 (First 2 Units of the Syllabus for 1 Hour duration)	-	50
3	Assignment-2 (3rd& 4th Units of the Syllabus)	10	
4	Test-2 (First 4 Units of the Syllabus for 2 Hours duration)	-	50
5	Assignment-2 (5th Unit of the Syllabus)	10	-
6	Test-3 (Entire Syllabus for 3 Hours duration)	-	100
	TOTAL MARKS	30	200
	Marks to be converted to	5	20
	Total Maximum Marks for CIA	25	

Table – 2(A): The following are the distribution of marks for University (external) examinations and continuous internal assessments and passing minimum marks for the **practical courses of UG Programs**.

UNI. EXAM TOTAL (ESE)	PASSING MINIMUM FOR UNI.EXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNI.EXAM+CIA)
75	30	25	0	100	40

Table – 2(B): The following are the distribution of marks for the Continuous Internal Assessment in UG practical courses.

S.No.	For Practical - UG courses	Distribution of Marks	
		Assignments	Tests
1	Regular maintenance of the Observation note book-1 (Up to the end of I-Semester)	10	-
2	Test-1 (Up to the end of I-Semester for 2 Hours duration)	-	25

3	Regular maintenance of the Observation note book-2 (Up to the end of II-Semester)	10	
4	Test-2 (Up to the end of II-Semester for 2 Hours duration)	-	25
5	Regular maintenance & proper completion of the Record note book	10	-
6	Test-3 (Entire Syllabus following University examination pattern)	-	25
	TOTAL MARKS	30	75
	Marks to be converted to	10	15
	Total Maximum Marks for CIA	25	

QUESTION PAPER PATTERN

The following question paper patterns shall be followed for CBCS pattern syllabi for the candidates admitted from the academic year 2017-2018 onwards.

External Maximum 75 Marks – wherever applicable (Ext.75 + Int.25 = Total. 100)

Section A	Very short answer questions	10X 2=20	10 questions – 2 from each unit
Section B	Short answer questions of either / or type (like 1a (or) 1b)	5X5=25	5 questions – 1 from each unit
Section C	Essay-type questions / Problem (Answer any 3 out of 5)	3X10=30	5 questions – 1 from each unit

NOTE: In Section "C" one of the questions shall be application oriented or a problem, wherever applicable.

GRADING

Once the marks of the CIA and end-semester examinations for each of the courses are available, they shall be added. The mark thus obtained shall then be converted to the relevant letter grade, grade point as per the details given below:

Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/Paper)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	**9.0-10.0**	**O**	Outstanding

80-89	8.0-8.9	D+	Distinction
75-79	7.5-7.9	D	
70-74	7.0-7.4	A+	First Class
60-69	6.0-6.9	A	
50-59	5.0-5.9	B	Second Class
40-49	4.0-4.9	C	Third Class
00-39	0.0	U	Re-appear
Absent	0.0	AAA	Absent

PROGRAMME STRUCTURE

#	SEM	PART	CT	COURSE CATEGORY	HW	CR	CODE	TITLE
1	1	I	T	Language	6	4	23ULT10	Tamil I
2		II	T	English	6	4	23ULE10	General English I
3		III	T	Core	5	5	23UCA11	Python Programming
4		III	T	Foundation	2	2	23UFCA14	Structured Programming in C
5		III	T	Elective	3	4	23UECA13	Numerical Methods
6		III	P	Core	5	5	23UPCA15	Python Programming lab
7		IV	T	Skill	2	2	23USCA13	Fundamentals of Information Technology
8	2	I	T	Language	6	4	FLT20	Tamil II
9		II	T	English	4	4	FLE20	Communicative English II
10		III	T	English	6	3	FPE20C	Professional English II
11		III	T	Core	6	4	FCA21	C++ and Data Structure
12		III	T	Allied	7	5	FAMA25B	Mathematical Foundations II
13		IV	T	Value Education	2	2	FGA20	Value Education

14		IV	T	Soft Skill	2	1	FSS20	Soft Skill
15		III	P	Core	3	2	FPCA23	C++ and Data Structures Lab
16		IV	T	Effective English	4	2	FEE20	Effective English
17	3	I		Language	4	4	FLT30	Tamil-III
18		II		English	6	4	FLE30	English-III
17		III	T	Core	5	4	FCA31	Programming in Java
20		IV	T	NMD ***	3	2	FSCC30	Fundamentals of Coding and Cloud
21		III	P	Core	4	3	FPCA36	Programming in Java Lab
22		III	T	Allied	7	3	FACM15C	Financial Accounting-I
23		IV	T	NME ***	2	2	FNEN34	Language Skills for Communication
	4	I	T	Language	2	4	FLT40	Tamil-IV
		II	T	English	6	4	FLE40	English-IV
24		III	T	Core	5	4	FCA41	Relational Database Management Systems
27		III	P	Core	4	3	FPCA46	RDBMS Lab
28		IV	T	NMD	4	2	FSOF40	Office Fundamentals
29		III	T	Allied	7	5	FACM25C	Financial Accounting-II
30		IV	T	NME ***	2	2	FNCA45	Internet and its Application
31	5	III	T	Core	6	4	FCA 51	Mobile Application Development
32		III	T	Core	6	4	FCA 52	Operating System
33		III	T	Core	4	2	FCA 53	Design and Analysis of Algorithms
34		III	P	Core	4	3	FPCA 56	Mobile Application Development Lab

35		III	P	Core	4	3	FPCA 57	Operating System Lab
36		III	T	Elective 1 ****	3	3	FECA 54A	Data Mining
							FECA 54B	Information Security
							FECA 54C	Software Testing
37		IV	T	NMD***	3	2	FSAM50	Foundations of AI&ML
38	6	III	T	Core	7	4	FCA 61	Open Source Software
39		III	T	Core	6	4	FCA 62	Python Programming
40		III	T	Elective2	3	3	FECA 63A	Big Data Analytics
							FECA 63B	Cryptography
							FECA 63C	Digital Image Processing
41		III	T	Elective3	3	3	FECA 64A	Artificial Intelligence
							FECA 64B	System Software
							FECA 64C	Mobile Computing
42		IV	T	Skill	4	2	FECA 69C	Cyber Security
43		III	P	Core	4	2	FPCA 66	Python Programming lab
44		III	P	Core	4	2	FPCA 67	Open Source Software lab
45		III	P	Project	2	5	FPCA 68	Group / Individual Project
46		V	F W	Extension Activities	0	1	FEA 60	Extension Activities

INTERNAL MARK: 25   EXTERNAL MARK: 75   FOR EXTENSION ACTIVITIES: EXTERNAL MARK: 100

Note: T-Theory, P-Practical, FW-Field Work

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
I	Languages	2	4	8	100	200
II	Communicative English	2	4	8	100	200
	Professional English	2	3	6	100	200
III	Allied(Odd Semester)	2	4	8	100+100	200
	Allied(Even Semester)	2	6+6	12	100+100	200
	Electives	3	3	9	100	900
	Core	13	(3-6)	51	100	1300
	Core Practical	8	(2-3)	22	100	800
IV	Environmental Science	1	2	2	100	100
	Soft Skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Languages & Others/NME	2	2	4	100	200
	Skill Based	5	3	15	100	500
V	Extension	1	1	1	100	100
	Total	42		140		4200

*** NON-MAJOR ELECTIVES (Semesters 3 & 4)

SEM	PART	CODE	TITLE	TYPE	HRS	CREDIT
3	IV	FNBA37	Management Concepts	T		
		FNCP37	Elements of Accountancy	T	**2**	**2**

		FAMA34	Basic Mathematics	T		
		FNEN34	Language Skills and Communication I	T		
4	**IV**	FNCP46	Advertising and Salesmanship	T		
		FAMA44	Foundation Mathematics for Competitive Examination	T		
		FNEN45	Language Skills and Communication II	T		
		FNBA47	Training and Development	T		

LIST OF ELECTIVE PAPERS

Semester 5 - Paper 1		
A	FECA 54A	Data Mining
B	FECA 54B	Information Security
C	FECA 54C	Software Testing
Semester 6 - Paper 2		
A	FECA 63A	Big Data Analytics
B	FECA 63B	Cryptography
C	FECA 63C	Digital Image Processing
Semester 6 - Paper 3		
A	FECA 64A	Artificial Intelligence
B	FECA 64B	System Software
C	FECA 64C	Mobile Computing

PROGRAM EDUCATION OBJECTIVES (PEO)

OB1: EDUCATION - The graduate will be able to continue higher studies in the field of Computer Science / Applications.

OB2: TECHNOLOGY - The graduate will be able to understand, analyze and develop software. applications and become skilled software professionals adopting cutting-edge technologies.

OB3: RESEARCH - The graduate will be able to be involved in research and development to propose computing models or solutions with innovation.

OB4: ETHICAL AND PROFESSIONAL GROWTH - The graduate will be able to articulate one's own value system and live by the values in life and in one's profession.

PROGRAM LEARNING OUTCOMES (PLO)

1. **Problem Solving:** Ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve problems related to Technology, Life and Career.
2. **Individual and Team work:** Ability to work effectively as a member and leader in a team, preferably in any setting.

3. **Communication Skills:** Ability to communicate within the profession and with society at large. Such abilities include reading, writing, speaking, listening, the ability to comprehend and write effective reports and documents.

4. **Professionalism:** Understand the professional ethics and apply the same for public and the public interest.

5. **Ethics and equity:** Ability to apply ethics, accountability, and equity in all dealings.

6. **Life-long learning:** Ability to identify and to address one's educational needs in the changing world in ways sufficient to maintain one's competence and to allow him/her to contribute to the advancement of selected domains.

PROGRAM SPECIFIC OUTCOMES (PSO)

1. **Knowledge of Computer systems**. Students can assess the hardware and software aspects of computer systems and connect the basic principles of its working.

2. **Application of mathematical principles:** Apply mathematical principles to solve real world problems using appropriate data structures and suitable algorithms.

3. **Programming:** Understand, analyze, design and develop *computer programs* using C, C++, Java and upcoming popular technologies.

4. **Software Engineering:** Apply process and life cycle of software engineering to develop software.

5. **Database Design:** Model and design the *database* for any computer system.

6. **Appreciation and Application of Emerging Technologies**: Analyze and appreciate emerging computing systems such as mobile, cloud, decision support, data mining, operating system, IoT, Networks, Information Security and related topics.

MAPPING OF INSTITUTION OBJECTIVES WITH PEOs

COLLEGE / PROGRAMME	EDUCATION	TECHNOLOGY	RESEARCH	ETHICAL AND PROFESSIONAL
OB1 : EDUCATION	√	√	√	√
OB2 : RESEARCH			√	
OB3 : EMPLOYABILITY		√	√	√
OB4 : COMM.SERVICE				√

MAPPING PEOs WITH POs / PSOs

PEO	PO1	PO2	PO3	PO4	PO5	PO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
1: EDUCATION	√	√	√			√	√	√	√	√	√	√
2: TECHNOLOGY	√					√	√		√		√	√
3: RESEARCH	√	√		√		√		√			√	√
4: ETHICAL AND PROFESSIONAL		√		√	√	√				√		√

MAPPING COURSE OUTCOMES WITH POs / PSOs

SEM	COURSE CODE	COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
1	23ULT10	TAMIL I	√	√	√	√	√	√						
	23ULE10	ENGLISH I	√	√	√	√	√	√						
	23UCA11	PYTHON PROGRAMMING	√	√	√	√	√	√						
	23UFCA14	STRUCTURED PROGRAMMING IN C	√	√	√	√	√	√	√	√	√		√	√
	23USCA13	FUNDAMENTALS OF INFORMATION TECHNOLOGY	√	√	√	√	√	√						
	23UECA12B	NUMERICAL METHODS	√	√	√	√	√	√		√	√			√

Sem	Code	Course	1	2	3	4	5	6	7	8	9	10	11	12
	23UPCA15	PYTHON PROGRAMMING LAB	√	√	√	√	√	√	√	√	√		√	√
2	FLT20	TAMIL II	√	√	√	√	√	√						
	FLE20	COMMUNICATIVE ENGLISH II	√	√	√	√	√	√						
	FPE20C	PROFESSIONAL ENGLISH II	√	√	√	√	√	√						
	FCA21	C++ AND DATA STRUCTURES	√	√	√	√	√	√	√	√	√	√	√	√
	FSS20	SOFT SKILLS	√	√	√	√	√	√						
	FGA20	VALUE EDUCATION	√	√	√	√	√	√						
	FPCA23	C++ AND DATA STRUCTURES LAB	√	√	√	√	√	√	√	√	√	√	√	√
	FAMA25B	MATHEMATICS FOUNDATION II	√	√	√	√	√	√		√	√			√
	FEE20	EFFECTIVE ENGLISH	√	√	√	√	√	√						
3	FCA31	JAVA PROGRAMMING	√	√	√	√	√	√	√	√	√	√	√	√
	FSCC30	FUNDAMENTALS OF CODING AND CLOUD	√	√	√	√	√	√		√	√		√	√
	FNEN34	LANGUAGE SKILLS FOR COMMUNICATION	√	√	√	√	√	√						
	FACM15C	FINANCIAL ACCOUNTING I	√	√	√	√	√	√					√	
	FPCA36	JAVA LAB	√	√	√	√	√	√	√	√	√	√	√	√
4	FCA41	RELATIONAL DATABASE MANAGEMENT SYSTEM	√	√	√	√	√	√			√	√	√	√
	FCA42	ENTERPRISE RESOURCE PLANNING	√	√	√	√	√	√					√	√
	FCA43	WIRELESS DATA COMMUNICATION	√	√	√	√	√	√				√	√	√
	FACM25C	FINANCIAL ACCOUNTING II	√	√	√	√	√	√					√	√
	FPCA46	RDBMS LAB	√	√	√	√	√	√	√	√	√	√	√	√
	FSOF40	OFFICE FUNDAMENTALS	√	√	√	√	√		√	√		√	√	√
5	FCA51	MOBILE APPLICATION DEVELOPMENT	√	√	√	√	√	√				√	√	√
	FCA52	OPERATING SYSTEM	√	√	√	√	√	√	√	√	√	√	√	√

Sem	Code	Subject												
	FCA53	DESIGN AND ANALYSIS OF ALGORITHM	√	√	√	√	√	√	√	√				√
	FECA54A	DATA MINING	√	√	√	√	√	√	√	√	√	√	√	√
	FECA54B	INFORMATION SECURITY	√	√	√	√	√	√	√	√	√	√	√	√
	FECA54C	SOFTWARE TESTING	√	√	√	√	√	√	√	√	√	√	√	√
	FSAM50	FOUNDATIONS OF AI&ML	√	√	√	√	√	√					√	√
	FPCA56	MOBILE APPLICATION DEVELOPMENT LAB	√	√	√	√	√	√	√	√	√	√	√	√
	FPCA57	OPERATING SYSTEM LAB	√	√	√	√	√	√	√	√	√	√	√	√
6	FCA61	OPEN SOURCE SOFTWARE	√	√	√	√	√	√	√	√	√	√	√	√
	FCA62	PYTHON PROGRAMMING	√	√	√	√	√	√				√	√	√
	FECA63A	BIG DATA ANALYTICS	√	√	√	√	√	√		√		√	√	√
	FECA63B	CRYPTOGRAPHY	√	√	√	√	√	√	√	√	√	√	√	√
	FECA63C	DIGITAL IMAGE PROCESSING	√	√	√	√	√	√	√					√
	FECA64A	ARTIFICIAL INTELLIGENCE	√	√	√	√	√	√	√			√	√	√
	FECA64B	SYSTEM SOFTWARE	√	√	√	√	√	√	√			√	√	√
	FECA64C	MOBILE COMPUTING	√	√	√	√	√	√	√			√	√	√
	FECA69C	CYBER SECURITY	√	√	√	√	√	√		√	√	√	√	√
	FPCA66	PYTHON PROGRAMMING LAB	√	√	√	√	√	√	√	√	√	√	√	√
	FPCA67	OPEN SOURCE SOFTWARE LAB	√	√	√	√	√	√		√	√	√	√	√
	FPCA68	GROUP/INDIVIDUAL PROJECT	√	√	√	√	√	√	√	√	√	√	√	√
	FEA60	EXTENSION ACTIVITIES	√	√	√	√	√	√						

SEM I	LANGUAGE	Lecture	Practical	Credit
23ULT10	TAMIL I	6	0	3

Course Code	Course Name	Category	L	T	P	S	Credits	Ins.Hrs	CIA	External	Total
	பஉபொதுத்தமிழ் -1 தமிழ் இலக்கிய வரலொறு -1	Supportive	Y	-	-	-	3	6	25	75	100

Pre-Requisite	உன்னிபரண்டொம் வகுப்உில் தமிழை ஒரு உொடமொகப் உயின்றிருக்க வவண்டும்	SV 2023	

Learning Objectives

- முதலொமொண்டுப் உட்ட வகுப்பு மொணவர்களுக்குத் தமிழ் பஉமொரி இலக்கியங்களை அறிமுகம் பெய்தல்
- தமிழ் இலக்கியப் வஉொக்குகளையும், இலக்கணங்களையும் மொணவர் அறியுமொறு பெய்து அவர்கஇன் உடப்உொற்றழலத் தூண்டுதல்
- தமிழ் இலக்கியம் ொொர்ந்த வஉொட்டித் வதர்வுகளுக்கு ஏற்உ கற்உஇத்தல் நழடமுழறகளை

வமற்பகொள்ளுதல்

Expected Course Outcomes

On the Sucessful completion of the Course, Students will be able to

இப்உொடத்ழதக் கற்உதொல் உின்வரும் உயன்களை மொணவர் அழடவர்

CO 1	ொங்க இலக்கியத்தில் கொணப்பஉறும் வொழ்வியல் ொந்தழனகளை அறிந்து பகொள்வர்	K4

CO 2	அற இலக்கியம் மற்றும் தமிழ் கொப்ퟢயங்கைின்வை வொழ்வியல் ꟾந்தழனழயப் பꟾறுவர்	K5, K6
CO 3	ꟾக்தி இலக்கியங்கழைக் கற்ꟾதன் மூலம் ꟾக்தி பꟾறியிꟾனயும், ꟾகுத்தꟾறிவு இலக்கியங்கழைக் கற்ꟾதன் வை நல்லிணக்கத்ꟾதயும் பꟾதரிந்து ꟾꟾன்ꟾற்றுவர்	K3
CO 4	பꟾமெꟾியறிவவொடு ꟾந்தழனத்திறꟾனப் பꟾறுவர்	K3
CO 5	பꟾமெꟾிப்ꟾயிற்ꟾெக்குத் வதꟾழவꟾயொன இலக்கணங்கழைக் கற்ꟾர்.	K2
K1 - Remember; K2 - Undestand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create		

அலகு-1	தமிழ் இலக்கிய, இலக்கண வரலொꟾறு அறிமுகம்.

1. இலக்கணம்;

அ.பதொல்கொப்нியம், இழறயனொர் கைவியல் உழர , நம்нியகப் பнொருள், புறப்பнொருள் பவண்нொ மொழல, நன்னூல், தண்டியலங்கொரம், யொப்нருங்கலக்கொரிழக- நூல்கள்

ஆ.பலமெரிப் нயிற்சி- ஒற்றுப்нிழை தவிர்த்தல்

· வல்லினம் மிகும் இடங்கள்
· வல்லினம் மிகொ இடங்கள்
· ஈபரொற்று வரும் இடங்கள்
· ஒரு, ஓர் வரும் இடங்கள்
· அது, அஃது வரும் இடங்கள்
· தொன், தொம் வரும் இடங்கள்

нயிற்சி : வல்லினம் மிகும் இடங்கள், மிகொ இடங்கள் தவறொக வரும்வழகயில் ஒரு нத்தி பகொடுத்து ஒற்றுப் нிழை திருத்தி எழுதச் பெய்தல்.

2. சங்க இலக்கியம் - எட்டுத்பதொழக, нத்துப்нொட்டு

3. அற இலக்கியம்-нதிபனண்கீழ்கணக்கு நூல்கள்

4. கொப்нிய இலக்கியம் - ஐம்பнருங் கொப்нியங்கள், ஐஞ்சிற நூ கொப்нியங்கள், மெயக் கொப்нியங்கள்

5. нக்தி இலக்கியமும் (нன்னிரு திருமுழறகள், நொலொயிர திவ்வியப்

нரнந்தம் -- нகுத்தறிவு இலக்கியமும் (செத்தர் இலக்கியங்கள், புலவர் கைகுந்தயின் இரொவண கொவியம்)

| அலகு-2 | சங்க இலக்கியம் |

எட்டுத்பதொழக ;எ

1. நற்றிழண-முதல் ஃொடல் -நின்ற பெொல்லர்
2. குறுந்பதொழக 3 ஆம் ஃொடல் -நிலத்தினும் பஃெரிவத
3. ஐங்குறுநூறு –பநல் ஃல பஃொலிக! பஃொன் பஃெரிது ஃிறக்க!' (முதல் ஃொடல்)-வவட்ழகப் ஃத்து
4. கலித்பதொழக- 51 - சுடர்த்பதொடிஇக் வஸகொய் -குறிஞ்ஸெக் கலி
5. புறநொனூறு -189 பதண்கடல் ஸவொகம் பஃொதுழமயின்றி, நொடொ பஃொன்வஸறா -187

ஃத்துப்ஃொட்டு;

1. முல்ழலப்ஃொட்டு (முழுவதும்)

அலகு-3	அற இலக்கியம்

1.திருக்குறள் -அறன் வலியுறுத்தல் அதிகொரம்
2.நொலடியொர்-ஃொடல்: 131 (குஞ்ஸெயைகும்)
3.நொன்மணிக்கடிழக-நிலத்துக்கு அணியென்ப
4.ஃஸைபமஸரி நொனூறு- தம் நழட வஸநொக்கொர்

5.இனியஸவ நொற்ஃது- 37. ஸஈழமழய மூப்பு என்று	
அலகு-4	கொப்ஃிய இலக்கியம்

1. ஸிலப்ஃதிகொரம் – வைக்குழரகொழத
2. மணிவமகழல- ஃொத்திரம் பஃற்ற கொழத
3. பஃெரியபுரொணம் - பூஸலொர் நொயஸனொர்புரொணம்
4. கம்ஃரொமொயணம்- குகப் ஃடலம்
5. ஸீறொப்புரொணம் – மொனுக்குப் ஃிழண நின்ற ஃடலம்
6. இவயசு கொவியம் -ஊஸதொரிப்ஃிள்ஸழ

அலகு-5	ஃக்தி இலக்கியமும், ஃகுத்தறிவு இலக்கியமும்

ʜக்தி இலக்கியம்;

1. திருநொவுக்கரெர் வதவொரம் - நொமொர்க்கும் குடியல்வலம் எனத் பதொடங்கும் ʜொடல் மட்டும்

2. மொணிக்கவொகர் திருவொகம் - நமச்ெிவொய வொஅழ்க நொதன்தொள் வொழ்க முதல் ெிரம்குவிவொர் ஓங்குவிக்கும் ெீவரொன் கைல் பவல்க வழர

3. பʜொய்ழகயொழ்வொர்-ழவயந் தகியொ வொர்கடவல

4. பூதத்தொழ்வொர்-அன்வʜ தகியொ

5. வʜயொழ்வொர்-திருக்கண்வடன் பʜொன்வமனி கண்வடன்

6. ஆண்டொள் – திருப்ʜொழவ மொர்ைகித்

திங்கள் (முதல் ʜொடல்) ʜகுத்தறிவு இலக்கியம்;

· திருமூலர் – திருமந்திரம் (270,271, 274, 275 285)

· ʜட்டினத்தொர் -திருவிழட மருதூர் (கொவட தெிரிந்து – எனத் பதொடங்கும் ʜொடல் ʜொ.எண ;.279, 280)

· கடுபவை ெʜத்தர் - ʜொʜஞ்பெய் யொதிரு மனவம (ʜொடல் முழுவதும்)

· இரொவண கொவியம் – தொய்பைமொிப் ʜடலம் - 18. ஏடுழக யில்லொ ெரில்ழல முதல் - 22.

பெந்தமிழ் வைர்த்தொர். வரை

Text books

·	·

Reference Books

- மு. வரதரொரன், தமிழ் இலக்கிய வரலொறு, ொகித்ய அக்கொபதமி, புதுபடல்லி.
- மது. ொ. விமலொனந்தன், தமிழ் இலக்கிய வரலொறு, மீனொட்ொ புத்தக நிழலயம், மதுழர.
- தமைண்ணல், புதிய வநொக்கில் தமிழ் இலக்கிய வரலொறு, மீனொட்ொ புத்தக நிழலயம், மதுழர.
- தமிழ் இலக்கிய வரலொறு –முழனவர்.ொற்ந ொலசுப்ரமணியம், முழனவர்.ொபொ.வெதுநதி
- புதிய தமிழ் இலக்கிய வரலொறு– முழனவர்.ொற்ந ொலசுப்ரமணியம்,நீல.நத்மநொஙன்

- தமிழ் இலக்கிய வரலொறு - டொக்டர்.அ.கொ.பநருமொள்
- தமிழ் இலக்கிய வரலொறு –முழனவர். ந.ொ.ஏசுொதொன்
- தமிழ் இலக்கிய வரலொறு – ஸ்ரீ குமொர்
- வழகழம வநொக்கில் தமிழ் இலக்கிய வரலொறு–நொக்கியவமொி
- தமிழ் நயிற்றும் முழற, வநொொரொிரியர் ந. சுப்புரட்டியொர் - மணிொவொகர் நதிப்நகம், ொதம்நரம்

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

Web Sources

- **https://www.chennailibrary.com/**
- **https://www.sirukathaigal.com**
- **https://www.tamilvirtualuniversity.org**
- **https://www.noolulagam.com**
- **https://www.katuraitamilblogspot.com**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	

CLO1	3	2	3	3	3	2	2	2	3	2	3	2	
CLO2	3	3	2	2	2	3	2	3	3	2	2	2	
CLO3	3	2	3	3	2	2	2	3	2	3	3	2	
CLO4		3	3	2	2	2	3	2	3	2	3	3	
. CLO5	3	3	2	2	2	3	3	2	2	2	3	3	

Strong -3,Medium-2,Low-1

SEM I	ENGLISH	Lecture	Practical	Credit
23ULE10	**GENERAL ENGLISH I**	**6**	**0**	**3**

UNIT	CHAPTER	TITLE
1	1	Chapter 1 from Malala Yousafzai, I am Malala
1	2	An Autobiography or the story of my experiments with Truth (C-1,2,3)
1	3	Where the mind is without fear, from Gitanjali, By Tagore
1	4	Love Cycle
2	1	Nine gold medals by David Roth
2	2	Alice fell, or poverty by Wordsworth
2	3	The School for sympathy by edward verall
2	4	Barn burning by William Faulkner
3	1	The things that haven't been done before by Edgar Guest
3	2	Stopping by the woods on a snowy evening
3	3	The Magic brocade - A tale of China
3	4	Three sideways stories from Wayside school by louis sachar

4	1	Articles
4	2	Noun
4	3	Pronoun
4	4	Verb
4	5	Adverb
4	6	Adjective
4	7	Preposition
5	1	Descriptive
5	2	Expository
5	3	Persuasive
5	4	Narrative

SEM I	CORE THEORY	Lecture	Practical	Credit
23UCA11	**PYTHON PROGRAMMING**	**5**	**0**	**5**

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
23UCA11	**PYTHON PROGRAMMING**		**5**	**-**	**-**	**-**	**5**	**25**	**75**	**100**

	Learning Objectives	
LO1	To make students understand the concepts of Python programming.	
LO2	To apply the OOPs concept in PYTHON programming.	
LO3	To impart knowledge on demand and supply concepts	
LO4	To make the students learn best practices in PYTHON programming	
LO5	To know the costs and profit maximization	

UNIT	Contents	No. ofHours
I	BasicsofPythonProgramming:HistoryofPython-FeaturesofPython-Literal-Constants-Variables- Identifiers–Keywords-Built-inDataTypes-OutputStatements –Input Statements-Comments –Indentation-Operators- Expressions-Type conversions. PythonArrays:DefiningandProcessingArrays–Arraymethods.	15
II	ControlStatements:Selection/Conditional Branchingstatements: if,if-else,nestedifand if-elif-else statements. Iterative Statements: whileloop,forloop,elsesuiteinloopand nested loops. Jump Statements:break,continueandpassstatements.	15

III	Functions: Function Definition – Function Call – Variable Scope and itsLifetime- ReturnStatement.FunctionArguments:RequiredArguments,Keyword Arguments, Default Arguments and Variable LengthArguments- Recursion.PythonStrings:Stringoperations- ImmutableStrings - Built-in String Methods and Functions - String Comparison. Modules: import statement- The Python module – dir() function –	15

	ModulesandNamespace–Definingourownmodules.	
IV	Lists:Creatingalist-Accessvalues in List-Updating values in Lists- Nestedlists-Basiclistoperations-List Methods. Tuples: Creating,Accessing,UpdatingandDeletingElementsin atuple–Nestedtuples– Differencebetweenlistsandtuples.Dictionaries:Creating,Accessing,Updatinga ndDeletingElementsinaDictionary–DictionaryFunctions AndMethods-DifferencebetweenListsandDictionaries.	15
V	PythonFileHandling:Typesof files in Python -Opening and Closingfiles- Reading and Writing files: write() and writelines() methods- append()method–read()andreadlines()methods–withkeyword–Splittingword s –Filemethods-FilePositions-Renamingand deleting iles.	15
	TOTALHOURS	75

CourseOutcomes		ProgrammeOut c omes
CO	Oncompletionofthiscourse, studentswill	
CO1	Learnthebasicsofpython,Dosimpleprogramsonpython, Learnhowtouseanarray.	PO1,PO2,PO3, PO4,PO5,PO6
CO2	Developprogramusingselectionstatement,WorkwithLoopin gandjump statements,DoprogramsonLoopsandjumpstatements.	PO1,PO2,PO3, PO4,PO5,PO6

CO3	Concept of function, function arguments, Implementing theconceptstringsinvariousapplication,SignificanceofModules, Work withfunctions,Stringsandmodules.	PO1,PO2,PO3, PO4,PO5,PO6
CO4	WorkwithList,tuplesanddictionary,Writeprogramusinglist, Tuplesanddictionary.	PO1,PO2,PO3, PO4,PO5,PO6
CO5	UsageofFilehandlingsinpython,Conceptofreadingandwritingfiles ,Doprogramsusingfiles.	PO1,PO2,PO3, PO4,PO5,PO6

	Textbooks
1	ReemaThareja,―PythonProgrammingusingproblemsolvingapproach,FirstEdition, 2017,Oxford UniversityPress.
2	Dr.R.NageswaraRao,―CorePythonProgramming‖,FirstEdition,2017,Dreamtech Publishers.

	ReferenceBooks
1.	VamsiKurama,―PythonProgramming:AModernApproach,nPearsonEducation.
2.	MarkLutz,LearningPython,Orielly.
3.	AdamStewarts,―bPythnProgramming,Online.
4.	FabioNelli―PythonDataAnalytics,APress.

5.	KennethA.Lambert,―FundamentalsofPython–FirstPrograms,CENGAGE Publication.

	WebResources
1.	**https://www.programiz.com/python-programming**
2.	**https://www.guru99.com/python-tutorials.html**
3.	**https://www.w3schools.com/python/python_intro.asp**
4.	**https://www.geeksforgeeks.org/python-programming-language/**
5.	**https://en.wikipedia.org/wiki/Python_(programming_language)**

MappingwithProgrammeOutcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	3
CO2	3	2	2	3	2	3
CO3	3	2	2	3	2	2
CO4	3	2	2	3	2	3
CO5	3	2	2	3	3	3
Weightageofcoursec Ontributedtoeach PSO	15	10	10	15	13	14

S-Strong-3   M-Medium-2 L-Low-1

SEM I	CORE PRACTICAL	Lecture	Practical	Credit
23UPCA15	**PYTHON PROGRAMMING LAB**	**0**	**5**	**5**

Subject Code	SubjectName	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
23UPCA15	PYTHON LAB		-	-	4	-	5	25	75	100

CourseObjectives:

1. BeabletodesignandprogramPythonapplications.

2. BeabletocreateloopsanddecisionstatementsinPython.

3. BeabletoworkwithfunctionsandpassargumentsinPython.

4. BeabletobuildandpackagePythonmodulesfor reusability.

5. BeabletoreadandwritefilesinPython.

LAB EXERCISES	RequiredHours

1. Programusingvariables,constants,I/OstatementsinPython. 2. ProgramusingOperatorsinPython. 3. ProgramusingConditionalStatements. 4. ProgramusingLoops. 5. ProgramusingJumpStatements. 6. ProgramusingFunctions. 7. ProgramusingRecursion. 8. ProgramusingArrays. 9. ProgramusingStrings. 10. ProgramusingModules. 11. ProgramusingLists. 12. ProgramusingTuples. 13. ProgramusingDictionaries. 14. ProgramforFileHandling.	**60**

CourseOutcomes
Oncompletion Of This Course, studentsWill

CO1	Demonstrate The Understanding Of Syntax And Semantics Of
CO2	IdentifytheproblemandsolveusingPYTHONprogrammingtechniques.
CO3	Identifysuitableprogrammingconstructsforproblemsolving.
CO4	AnalyzevariousconceptsofPYTHONlanguagetosolvetheprobleminanefficient way.
CO5	DevelopaPYTHONprogramforagivenproblemandtestforitscorrectness.

MappingwithProgrammeOutcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	3	2
CO2	2	1	3	2	-	2
CO3	3	3	1	1	1	2
CO4	2	3	3	1	-	1
CO5	3	2	3	1	1	-
Weightageofcourse contributed to eachPSO	12	11	12	7	5	7

S-Strong-3 M-Medium-2L-Low-1

SEM I	FOUNDATION	Lecture	Practical	Credit
23UFCA14	**STRUCTURED PROGRAMMING IN C**	**2**	**0**	**2**

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
FC	Structured Programming Language in C	FC	2	-	-	-	2	2	25	75	100

Course Objective	
LO1	TofamiliarizethestudentswiththeProgrammingbasicsandthefundamentalsofC, DatatypesinC,Mathematicalandlogicaloperations.
LO2	Tounderstandtheconceptusingifstatementsandloops
LO3	ThisunitcoverstheconceptofArrays
LO4	ThisunitcoverstheconceptofFunctions
LO5	Tounderstandtheconceptofimplementingpointers.

UNIT	Details	No. of Hours	Course Objectives
I	**OverviewofC**:ImportanceofC,sampleCprogram,Cprogramstru cture,executingCprogram. Constants, Variables, and Data Types: Character set, C tokens,keywordsandidentifiers,constants,variables,datatypes,d eclarationofvariables,Assigningvaluestovariables--- Assignmentstatement,declaringavariable and constant,as volatile.OperatorsandExpression.	6	CO1
II	**Decision Making and Branching**:Decision making with If,simpleIF,IFELSE,nestedIFELSE,ELSEIFladder,switch,GOT Ostatement.**DecisionMakingand Looping**:While, Do-While,For,Jumpsinloops.	6	CO2
III	**Arrays**:Declarationandac cessingofone&two-dimensionalarrays,initializ ingtwo-dimensionalarrays,multidi mensional arrays.	6	CO3
IV	**Functions**: The form of C functions, Return values and types,calling a function, categories of functions, Nested functions,Recursion,functionswitharrays,call byvalue,callbyref erence,storageclasses-characterarraysandstri ngfunctions	6	CO4
V	**Pointers:**definition,declaringandinitializ ingpointers,accessing avariablethroughaddressandthroughpoint er,pointer expressions, pointer increments and scale factor,	6	CO5

pointers and arrays, pointers and functions, pointers and structures.		

	Total	30
	Course Outcomes	**Programme Outcome**
	Oncompletionofthiscourse, studentswill	
	RemembertheprogramstructureofCwithitssyntaxands emantics	PO1,PO3,PO5
	UnderstandtheprogrammingprinciplesinC(datatypes, operators, branching and looping, arrays,functions,structures, pointersandfiles)	PO2,PO3,PO6,PO7
	Applytheprogrammingprincipleslearntinreal- timeproblems	PO3,PO4,PO7
	Analyzethevariousmethodsofsolvingaproblemand choosethebestmethod	PO4,PO5,PO6
	Code,debugandtesttheprogramswithappropriate Testcases	PO7,PO8
	Text Book	
	E.Balagurusamy,ProgramminginANSIC,FifthEdition,TataMcGraw-Hill,2010.	
	Reference Books	
	ByronGottfried,Schaum'sOutlineProgrammingwithC,FourthEdition,TataM cGra w-Hill,2018.	

	KernighanandRitchie,TheCProgrammingLanguage,SecondEdition,PrenticeHall, 1998
	YashavantKanetkar,LetUsC,EighteenthEdition,BPBPublications,2021

Web Resources
https://codeforwin.org/
https://www.geeksforgeeks.org/c-programming-language/
http://en.cppreference.com/w/c
http://learn-c.org/
https://www.cprogramming.com/

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	2	2	-
CO2	2	2	2	2	-	2
CO3	3	2	2	1	1	-
CO4	3	2	2	1	-	1

CO5		1	2	2	2	2	3
Weightage Of Course contributed to each PSO		7	10	10	18	15	6

S-Strong-3 M-Medium-2L-Low-1

SEM I	ELECTIVE I	Lecture	Practical	Credit
23UECA12B	**NUMERICAL METHODS**	**2**	**0**	**2**

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	NUMERICAL METHODS	Elective	4	--	-	-	3	4	25	75	100

	Learning Objective
LO1	To solve practical technical problems using various numerical method formulas
LO2	To derive appropriate numerical methods to solve algebraic, transcendental equations.
LO3	To know the numerical methods of solving simultaneous linear equations.
LO4	To acquire knowledge about forward differences and Backward differences and their relationship.
LO5	Knowledge about central difference operators and problems based on various central differences formulae.

UNIT	Contents	No. of Hours
I	**Curve Fitting- Principle of Least square** Fitting of straight line $Y = a\,x + b$, parabola $Y = a\,x^2 + b\,x + c$, exponential curves of forms $Y = a\,x^b$, $Y = a\,e^{bx}$, and $Y = a\,b^x$.	12

II	**The solution of numerical algebraic and transcendental Equations:** Bisection method – Iteration Method – Regula Falsi Method – Newton – Raphson method		12
III	**Solution of simultaneous linear algebraic equations:** Gauss elimination method – Gauss Jordan method – Method of Triangularization –Gauss Jacobi method – Gauss Seidel method		12
IV	**Finite differences** Operators Δ, ∇ and E - relation between them — factorial polynomials. **Interpolation with equal intervals:** Gregory-Newton forward and backward interpolation formulas.		12

V	**Central differences formulae** Operators μ, ð and relation with the other operators. Gauss forward and backward formulae, Stirling's formula and Bessel's formula	12
	Total	
		60

	Course Outcomes	Programme Outcome
CO	Upon completion of the course the students would be Able to:	
1	Solve the problems of fitting of straight lines, parabolas and the different form of exponential curves	PO1
2	Solve algebraic equations using various methods like Bisection method, Iteration method, Regula Falsi method and Newton – Raphson method	PO1, PO2
3	Estimate the solution of simultaneous linear equations using different numerical methds	PO3, PO5

4	Define basic concept of operators Δ, A*andE*, Solving interpolation with equal intervals problems using Gregory Newton‟s forward formula and Newton‟s backward Formula	PO5
5	Estimate the solution of central difference formula using the methods Gauss's forward, backward formula, Stirling's formula and Bessel,s formula	PO3, PO6

Text Book
Kandasamy. P, Thilagavathi. K and Gunavathi. K "Numerical methods" – S. Chandand Company Ltd, New Delhi – Revised Edition 2007. (Chapters:1,3,4,5,6, and 7).
Reference Books
Venkataraman M. K.,"Numerical Methods in Science and Engineering" National Publishing company V Edition 1999.
Sankara Rao K., "Numerical Methods for Scientists and Engineers" 2nd Edition PrenticeHall India 2004
Web Resources
https://nptel.ac.in/courses/111107105

SEM I	SKILL BASED	Lecture	Practical	Credit
23USCA13	**FUNDAMENTALS OF INFORMATION TECHNOLOGY**	2	0	2

Subject Code	SubjectName	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
23USCA13	FUNDAMENTALS OF INFORMATION TECHNOLOGY	Specific Elective	2	-	-	-	2	25	75	100

	Learning Objectives
LO1	Understandbasicconceptsandterminologyofinformationtechnology.
LO2	Have abasicunderstandingofpersonalcomputersandtheiroperation
LO3	Beabletoidentifydatastorageanditsusage
LO4	Get greatknowledgeofsoftwareanditsfunctionalities
LO5	Understandaboutoperatingsystemandtheiruses

UNIT	Contents	No.Of. Hours
I	**IntroductiontoComputers**-GenerationsofComputer–DataandInformation – Components of Computer – Software – Hardware – InputDevices-OutputDevices—TypesofOperatingSystem.	6

II	**MSWord**:Introduction–ElementsofWindow–Files,FoldersandDirectories – Text Manipulating: Cut, Copy, Paste, Drag and Drop – TextFormatting: Font – Style, Size, Face and Colors (Both foreground andbackground)– Alignment-BulletsandNumbering-Headerandfooter- watermark–insertingobjects(images,otherapplicationdocument)– Tablecreation – Mailmerge.	6
III	**MsExcel**:Introduction–Insertingrowsandcolumns–Sizingrowsandcolumns– Implementingformulas–Generating series-Functionsinexcel –CreationofChart–Insertingobjects–Filter–Sorting–Insertingworksheet.	6
IV	**MSPowerPoint**:Introduction– SlidesManipulation(Insertingnew,Copy,paste, delete and duplicate slides) –Slide show– Types of Views – TypesofAnimations–InsertingObjects– Implementingmultimedia(Videoand Audio)–Templates(Built-inandUser-Defined).	6
V	**Internet**: Introductionto Internet and Intranet–Services of Internet-Domain Name – URL – Browser – Types of Browsers – Search Engine -E-Mail – Basic Components of E-Mail –.How to send groupmail.**E-Commerce**:DigitalSignature–DigitalCurrency–Onlineshoppingand transaction.	6
	TOTALHOURS	**30**

CourseOutcomes		**Programme Outcomes**
CO	Oncompletionofthiscourse,studentswill	

CO1	Learnthebasicsofcomputer,Constructthestructureoftherequiredthin gsincomputer,learnhowtouseit.	PO1, PO2, PO3,PO4,PO5, PO6
CO2	Developorganizationalstructureusingforthedevicespresentcurrently underinputor outputunit.	PO1, PO2, PO3,PO4,PO5, PO6

CO3	ConceptofstoringdataincomputerusingtwoheadernamelyRAMand ROMwit hdifferenttypesofROMwithadvancementinstoragebasis.	PO1, PO2, PO3,PO4,PO5, PO6
CO4	Work withdifferentsoftware,Writeprograminthesoftware and applicationsofsoftware.	PO1, PO2, PO3,PO4,PO5, PO6
CO5	UsageofOperatingsystemininformationtechnologywhichreallyacts asainterpreterbetweensoftwareand hardware.	PO1,PO2,PO3, PO4,PO5,PO6

	Textbooks
1	AnoopMathew,S.KavithaMurugeshan(2009),―FundamentalofInformationTechnology‖,Majest icBooks.
2	AlexisLeon,MathewsLeon,‖FundamentalofInformationTechnology‖,2ndEdition.
3	S.KBansal,―FundamentalofInformationTechnology‖.

	ReferenceBooks
1.	BhardwajSushilPuneetKumar,―FundamentalofInformationTechnology‖
2.	GGWILKINSON,―FundamentalsofInformationTechnology‖,Wiley-Blackwell
3.	ARavichandran,―FundamentalsofInformationTechnology‖,KhannaBookPublishing

	WebResources
1.	https://testbook.com/learn/computer-fundamentals
2.	https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html
3.	https://www.javatpoint.com/computer-fundamentals-tutorial

4.	https://www.tutorialspoint.com/computer_fundamentals/index.htm	
5.	https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf	

MappingwithProgrammeOutcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	2	1	1
CO2	3	2	3	2	3	3
CO3	3	2	2	2	2	3
CO4	2	3	3	3	3	1
CO5	3	3	3	3	3	2
Weightage Of Course contributed to each PSO	13	13	13	12	12	10

SEM II	LANGUAGE	Lecture	Practical	Credit
FLT20	**TAMIL II**	**6**	**0**	**4**

Nehf;fk;

1. khzth;fs; tho;f;ifapy; mwnewpAld; tho;tjw;Fk; kdijxUKfgLj;Jtjw;Fk; gf;jp ,yf;fpaq;fSk; rpw;wpyf;fpaq;fSk; khzth;fSf;Fgad;gLfpwJ.

2. gf;jp ,yf;fpaj;jpd; thapyhfGuhzq;fspd; Kf;fpaj;Jtj;ijAk; nja;tq;fspd; ngUikfisAk; khzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.

3. flTsh;fisAk; murh;fisAk; Nguhpyf;fpaq;fs; Ngrpafhyq;fspy; rpw;wpyf;fpaq;fs; vspakf;fspd; tho;f;ifKiwiagw;wpNgRfpwJvd;gijkhzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.

4. khzth;fs; tho;f;ifapy; mwk;>xOf;fk; rhh;e;jnray;ghLfspy; jq;fis ,izj;Jf;nfhs;tjw;Fgf;jpkhh;f;fk; Jizg; Ghpfpd;wj.

5. khzth;fs; ehad;khh;fisfw;gjdhy; rptDilangUikfismwpe;Jf;nfhs;fpd;wdh;.

6. khzth;fs; Mo;thh;fisgbg;gjdhy; jpUkhy; ngUikfisnjhpe;Jf;nfhs;fpd;wdh;.

7. khzth;fs; rpw;wpyf;fpaq;fisthrpg;gjdhy; 96 tifahdrpw;wpyf;fpaq;fisg; gw;wpGhpe;Jf;nfhs;fpd;wdh;.

8. nkhopj;jpwd; gapw;rpngngWtjpd; thapyhfkhzth;fs; nghhJf;fl;Liufs; vOJtjw;Fg; gapw;rpg;ngWfpwhh;fs;

myF – 1 ftpij

1. jpUehTf;furh; - jpUtjpif gjpfk;
($w;whpdthW tpsf;fsPh; -
Kjy; 5 ghly;fs;)
2. khzpf;fthrfh; - mr;Nrhgjpfk;
(Kf;jp newpiNa mwpahj –
Kjy; 5 ghly;fs;)
3. jpU%yh; - fy;tp
(Kjy; 5 ghly;fs;)
myF -2
1. Mz;lhs; - ehr;rpahh; jpUnkhop
(fw;G+uk; ehWNkh – vdj; njhlq;Fk;
5 ghly;fs; kl;Lk;)
2. FyNrfuho;thh; - ngUkhs; jpUnkhop (4-Mk; jpUnkhop)
3. ek;kho;thh; - cah;tu cah;eyk; cilatd;
(vdj; njhlq;Fk; 5 ghly;fs;)
myF -3

1. gygl;lil nrhf;fehjg;Gyth; - mofh; fps;is tpL J}J
2. n[aq;nfhz;lhh; - fypq;fj;Jg;guzp (filj;jpwg;G)
3. Kf;$lw;gs;S - Vry;

myF -4

1. fz;zjhrd; - VRfhtpak; (Cjhhpg;gps;is)
2. Fzq;Fb k];jhd; rhfpG - k];jhd; rhfpG ghly;fs;
guh guf;fz;zp (1-40 fz;zpfs;)
3. gl;bdj;jhh; ghly;fs; - jpUtpil kUJ}h;
(fhNl jphpe;J – vdj; njhlq;Fk; ghly;
gh.vz;.279> 280)

myF -5

1. Neh;fhzy;
2. ehspjOf;F mwpf;ifj; jahupj;jy;
3. ghlg;gFjppiaxl;ba ,yf;fpa tuyhW

irt> itzt rka ,yf;fpaq;fs;> fpwp];JtKk; jkpOk;> ,];yhkpaKk; jkpOk;.

SEM II	GENERAL ENGLISH	Lecture	Practical	Credit
FLE20	**COMMUNICATIVE ENGLISH II**	6	0	4

Course Outcome

CO 1 – The students get to learn more about various ways of using LSRW

CO 2 – Able to understand the proper usage of a language

CO 3 – Will build up interpersonal communication by reinforcing basic of pronunciation

CO 4 – Improve conversational skills

CO 5 – Enable to familiar with the sounds of the English vocabulary, grammer

Course objective

1. Enhance and improve the learner's communication skills by given adequate exposure in LSRW listening, speaking, reading and writing skills and the related sub – skills with study skills and basics of grammar.

2. Comprehend how to discover self and others, the vital role of listening and its challenges.

3. Become fluent in reading aloud, able to understand texts and to as and answer questions, interpret diagrammatic information, develop the summarizing, paraphrasing and writing skills.

4. Explore glossary through research tools- online, e-learning, digital resources.

SYLLABUS

Unit I (18 hours)

1. Listening and Speaking

a. Listening and responding to complaints (formal situation)

b. Listening to problems and offering solutions (informal)

2. Reading and writing

a. Reading aloud (brief motivational anecdotes)

b. Writing a paragraph on a proverbial expression/motivational idea.

3. Word Power/Vocabulary

a. Synonyms & Antonyms

4. Grammar in Context

Adverbs Prepositions

Unit II (20 hours)

1. Listening and Speaking

a. Listening to famous speeches and poems

b. Making short speeches- Formal: welcome speech and vote of thanks.

Informal occasions- Farewell party, graduation speech

2. Reading and Writing

a. Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic)

b. Reading poetry

b.i. Reading aloud: (Intonation and Voice Modulation)

b.ii. Identifying and using figures of speech - simile, metaphor, personification etc.

3. Word Power
a. Idioms & Phrases
4. Grammar in Context Conjunctions and Interjection.

Unit III (18 hours)
1. Listening and Speaking
a. Listening to Ted talks
b. Making short presentations – Formal presentation with PPT, analytical presentation of graphs and reports of multiple kinds
c. Interactions during and after the presentations
2. Reading and writing
a. Writing emails of complaint
b. Reading aloud famous speeches
3. Word Power
a. One Word Substitution
4. Grammar in Context:
Sentence Patterns

Unit IV (16 hours)
1. Listening and Speaking
a. Participating in a meeting: face to face and online
b. Listening with courtesy and adding ideas and giving opinions during the meeting and making concluding remarks.
2. Reading and Writing
a. Reading visual texts – advertisements
b. Preparing first drafts of short assignments
3. Word Power
a. Denotation and Connotation
4. Grammar in Context:
Sentence Types

Unit V (18 hours)
1. Listening and Speaking
a. Informal interview for feature writing
b. Listening and responding to questions at a formal interview
2. Reading and Writing
a. Writing letters of application
b. Readers' Theatre (Script Reading)
c. Dramatizing everyday situations/social issues through skits. (writing scripts and performing)
3. Word Power
a. Collocation
4. Grammar in Context:
Working with Clauses

SEM II	GENERAL ENGLISH	Lecture	Practical	Credit
FPE20C	**PROFESSIONAL ENGLISH II**	6	0	3

Course Outcomes

CO1 - Recognize their own ability in using the language for speaking with confidence in an intelligible and acceptable manner

CO 2 - Understand the importance of reading for life

CO 3 - Read independently unfamiliar texts with comprehension

CO 4 - Understand the importance of writing in academic life

Write simple sentences without committing error of spelling or grammar

Course Objectives

To develop the language skills of students by offering adequate practice in professional contexts.

To enhance the lexical, grammatical and socio-linguistic and communicative competence of first year physical sciences students

To focus on developing students' knowledge of domain specific registers and the required language skills.

To develop strategic competence that will help in efficient communication

To sharpen students' critical thinking skills and make students culturally aware of the target situation.

Syllabus

UNIT 1: COMMUNICATION

"1. Listening: Listening to instructions

2. Speaking: Telephone etiquette and Official phone conversations

3. Reading short passages (3 passages, one from each – Physics, Chemistry, Mathematics/Computer Science)

5. Writing: Letters and Emails in professional context

6. Grammar in Context:

🎬 Wh and yes or no,

🎬 Q tags

🎬 Imperatives

7, Vocabulary in Context: Word formation - .

i) Creating antonyms using Prefixes

ii) Intensifying prefixes (E. g inflammable)

Changing words using suffixes

A) Noun Endings

B) Adjective Endings

C) Verb Endings "

UNIT 2: DESCRIPTION

"Listening – Listening to process description

Speaking - Role play

Formal: With faculty and mentors in academic environment, workplace communication

Informal: With peers in academic environment, workplace communication
Reading –Reading passages on products, equipment and gadgets
Writing – Writing sentence definitions (e.g. computer) and extended definitions (e.g. artificial intelligence)
 Picture Description – Description of Natural Phenomena
Grammar in Context: Connectives and linkers.
Vocabulary – Synonyms (register) - Compare & contrast expressions.
+"

UNIT 3: NEGOTIATION STRATEGIES

"Listening - Listening to interviews of specialists / inventors in fields (Subject specific)
Speaking – Brainstorming. (mind mapping). Small group discussions (subject specific)
Reading – longer Reading text. (Comprehensive passages)
Writing – Essay Writing (250 words essay on topics related to subject area, like pollution, use of pesticides in cultivation, merits and demerits of devices like mobile phones, merits and demerits of technology in development)
Grammar in Context: Active voice & Passive voice – If conditional - Collocations –Phrasal verbs "

UNIT 4: PRESENTATION SKILLS

"Listening - Listening to presentation. Listening to lectures. Watching – documentaries (discovery / history channel)
Speaking –Short speech
- Making formal presentations (PPT)
Reading – Reading a written speech by eminent personalities in the relevant field /Short poems / Short biography.
Writing - Writing Recommendations
Interpreting visuals - charts / tables/flow diagrams/charts
Grammar in Context – Modals
Vocabulary (register) - Single word substitution "

UNIT 5: CRITICAL THINKING SKILLS

"Listening - Listening to advertisements/news and brief documentary films (with subtitles)
Speaking – Simple problems and suggesting solutions.
Reading: Motivational stories on Professional Competence, Professional Ethics and Life Skills (subject-specific)
Writing Studying problem and finding solutions- (Essay in 200 words)
Grammar-Make simple sentences
Vocabulary -Fixed expressions"

Text Book
NIL

References
NIL

SEM II	CORE THEORY	Lecture	Practical	Credit
FCA21	**C++ AND DATA STRUCTURES**	5	0	6

Objectives:

1. To understand the concepts of object-oriented programming and master OOP using C++.

2. To understand the concepts of Inheritance, polymorphism and templates.

3. To understand the concepts of different view of data, stack and queues.

4. To understand the concepts of Programming with Recursion, Binary Search Tree and graphs.

5. To understand the concepts of Sorting and Searching Algorithms.

Course Outcomes:

- The Student will be able to understand the concepts of object oriented programming, apply structure and inline functions.

- The Student will be able to understand the concepts of the types of inheritances and applying various levels of Inheritance for real time problems

- Apply the OOPs concepts class and object. Understand Explain the file concept and exception handlings in C++

- The Student will be able to understand the concepts of Stacks and Queue using array and pointers.

- The Student will be able to understand the concepts of Recursion, Binary Search Tree and graphs.

- The Student will be able to understand the concepts of Sorting and Searching Algorithms.

UNIT-I:

Principles of Object Oriented Programming – Beginning with C++ – Token, Expressions and Control Structures- Functions in C++ – Classes and Objects – Constructors and Destructors.

UNIT-II:

Operator Overloading and Type Conversions – Inheritance: Extending Classes – Pointers, Virtual Functions and Polymorphism - Managing Console I/O Operations. Working with Files - Templates – Exception Handling – Manipulating Strings.

UNIT-III:

Data Design & implementations: Different views of data – Abstraction and Built-in Types – Arrays ADTs Stacks and Queue (Linear and Linked), Stack (Array and Pointer)- Applications- Infix to Postfix Conversions – Queue(Array and Pointer) – List(Array and Pointer) – Applications: (Polynomial Addition) - Doubly Linked Lists.

UNIT – IV:

Programming with Recursion: Recursion – Verifying and Writing Recursive Functions – Binary Search Tree: Implementation – Tree Traversal – Graphs: Implementations – BFS – DFS – Dijkstra's Shortest Path Algorithm. (Chapter 7: Section 7.1,7.4 7.5, Chapter 8: Section 8.1,8.4, Chapter 9: Section 9.3)

UNIT-V:

Sorting and Searching Algorithms: Sorting – Searching – Hashing (Chapter 10: Section 10.1, 10.2, 10.3)

TEXT BOOK:

1. Object Oriented Programming with C++, E Balagurusamy, Tata McGraw Hill, 6th Edition, 2014.

(Units I, II)

2. C++ Plus Data Structure, Nell Dale, Jones & Bartlett Publishers, 4th Edition, 2010. (Units III, VI & V)

REFERENCES:

1. C++ The Complete Reference, Herbert Schildt, Tata McGraw Hill, 4th Edition, 2003.

2. OOP In ANSI C and Turbo C, Ashok N.Kamthene, Pearson Education, 6th Edition, 2008.

3. Data Structures and Algorithms, Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, Addison Wesley Longman Inc., 2nd Edition, 1999.

SEM II	VALUE EDUCATION	Lecture	Practical	Credit
FGA20	**VALUE EDUCATION**	2	0	2

LEARNING OBJECTIVES
To know the values of human, social, local and global life in the context of one's own setting.
After completing this course, the students will be able to
1. Appreciate human values and gain self-esteem
2. Realize the importance of family and its members particularly women in the society
3. Interpret the ethical values in the context of profession, media, family and personal life.
4. Recognize the values of the society and its impact
5. Formulate the ethical system at the international level and modern trends.

SYLLABUS

UNIT 1 - Value Education - Definition - relevance to present day - Concept of Human Values – self introspection - Self-esteem.

UNIT 2 - Family values - Components, structure and responsibilities of family – Neutralization of anger - Adjustability - Threats of family life - Status of women in family and society - Caring for needy and elderly - Time allotment for sharing ideas and concerns.

UNIT 3 - Ethical values - Professional ethics - Mass media ethics - Advertising ethics – Influence of ethics on family life - psychology of children and youth - Leadership qualities - Personality development.

UNIT 4 - Social values - Faith, service and secularism - Social sense and commitment – Students and Politics - Social awareness, Consumer awareness, Consumer rights and responsibilities Redressal mechanisms.

UNIT 5 - Effect of international affairs on values of life/ Issue of Globalization – Modern warfare Terrorism. Environmental issues - mutual respect of different cultures, religions and their beliefs.

REFERENCES
1. T. Anchukandam and J. Kuttainimathathil (Ed), "**Grow Free Live Free**", Kristu Jyoti Publications, Bangalore (1995)
2. Mani Jacob (Ed), "**Resource Book for Value Education**", Institute for Value Education, New Delhi 2002.
3. DNBI, NCERT, SCERT, Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.

4. Daniel and Selvamony - Value Education Today, (Madras Christian College, Tambaram and ALACHE, New Delhi, 1990)

5. S. Ignacimuthu - Values for Life - Better Yourself Books, Mumbai, 1991.

6. M.M.M.Mascarenhas Centre for Research Education Science and Training for Family Life Promotion - Family Life Education, Bangalore, 1993

SEM II	SOFT SKILLS	Lecture	Practical	Credit
FSS20	**SOFT SKILLS**	**2**	**0**	**1**

LEARNING OBJECTIVES
After completing this course, the students will be able to
1. Demonstrate the skills for listening, writing, reading and writing
2. Read and respond to instruction
3. Seek and respond to information in day to day life
4. Correct grammatical and spelling errors
5. Actively engage in formal, in-formal and non-verbal communication

SYLLABUS
UNIT 1 - 1.1. Skills in Listening and Writing 1.2. Skills in Reading and Understanding

UNIT 2 - 2.1. Skills to Read and Respond to Instructions 2.2. Skills of Interpretation and Transcoding Information

UNIT 3 - 3.1. Skills in Seeking and Responding to Information 3.2. Skills of Day-to-Day communication

UNIT 4 - 4.1. Grammatical skills and Spelling rules 4.2. Career skills

UNIT 5 - 5.1. Skills of formal and in-formal rules 5.2. Skills of non-verbal communication

REFERENCES
NIL

SEM II	CORE PRACTICAL	Lecture	Practical	Credit
FPCA26	**C++ AND DATA STRUCTURES LAB**	0	3	2

Objectives:

1. To develop C++ programming skills in design

2. To understand the basic concepts of different abstract types and structure of data.

3. To understand the concepts of Function Overloading

4. To understand the concepts of Stack, Queue, List, Doubly Linked List - using Pointers using Arrays.

5. To understand the concepts of Searching and Sorting Algorithms.

Course Outcomes:

● Understand the Creating and Deleting the Objects with the Concepts of Constructors and Destructors.

● Demonstrate the Polymorphism Concepts and Operator Overloading.

● Understand basic Data Structures such as Arrays, Linked Lists, Stacks, Queues, Doubly Linked List and Infix to Postfix Conversion.

● Apply Algorithms for solving problems like Sorting and Searching.

● Apply Algorithms and use Graphs and Trees as tools to visualize and simplify Problems

LIST OF LAB EXERCISES

1. Constructors & Destructors, Copy Constructor.

2. Friend Function & Friend Class.

3. Inheritance.

4. Polymorphism & Function Overloading.

5. Virtual Functions.

6. Overload Unary & Binary Operators Both as Member Function & Non Member Function.

7. Class Templates & Function Templates.

8. Exception Handling Mechanism.

9. Standard Template Library concept.

10. File Stream Classes.

11. Array implementation of Stack, Queue: Infix to postfix

12. Implementation of Stack, Queue, List, Doubly Linked List - using Pointers- Polynomial Addition

13. Implementation of Binary Search Tree, Traversal

14. Implementation of Searching and Sorting Algorithms.

15. Graph Implementation of shortest path (Djikstras)

REFERENCE:

1. Object Oriented Programming with C++, E Balagurusamy, Tata McGraw Hill, 6th Edition, 2014.

2. C++ Plus Data Structure, Nell Dale, Jones & Bartlett Publishers, 4th Edition, 2010.

SEM II	ALLIED I	Lecture	Practical	Credit
FAMA25B	**MATHEMATICAL FOUNDATIONS II**	7	0	5

Objectives

To know about Matrix Operations, Symmetric, Skew-Symmetric, Hermitian, Skew-Hermitian, Orthogonal, Unitary Matrices. Rank of a Matrix Solutions of linear equations Consistency and Inconsistency, Characteristic roots and Characteristics Vectors, Cayley - Hamilton Theorem, Integration of rational functions, Integration by parts, Reduction formulae, Area and volume using integration, Planes, Straight lines, Spheres, Curves, Cylinders.

Course Outcomes
1. After completion of unit 1 the student can able to understand the basic concept of Matrices.
2. After completion of unit 2 the student can able to understand the basic concept of Matrices
3. After completion of unit 3 the student can able to understand the basic concept of Integration
4. After completion of unit 4 the student can able to understand the basic properties of definite integrals
5. After completion of unit 5 the student can able to understand the basic concept of analytical geometry of three dimension

UNIT-I: MATRICES

Multiplication of matrices, Singular and Non-Singular matrices, Adjoint of a Matrix, Inverse of a matrix Symmetric and Skew-Symmetric, Hermitian and Skew-Hermitian, Orthogonal and unitary matrices, Rank of a matrix, Solution of Simultaneous Linear equations by

(i) Cramer's rule.

(ii) Matrix Inversion Method.

UNIT-II: MATRICES

Test for Consistency and Inconsistency of linear equations, (Rank Method),characteristic roots and characteristic vectors, Cayley - Hamilton theorem, matrix of linear transformations: reflection about the x, y axes and the line y=x, rotation about the origin through an angle, expansion or compression, shears, translation.

UNIT-III

Integration Simple problems, integration of rational function involving algebraic expressions of the form

$$\frac{1}{ax^2+bx+c}, \quad \frac{1}{\sqrt{ax^2+bx+c}}, \quad \frac{px+q}{ax^2+bx+c}, \quad \frac{px+q}{\sqrt{ax^2+bx+c}}$$

integrations using simple substitutions integrations involving trigonometric functions of the form

$$\frac{1}{a+b\cos x}, \qquad \frac{1}{a^2\sin^2 x + b^2\cos^2 x},$$

Integration by parts.

UNIT-IV

Properties of definite integrals. Reduction formulae for

$x^n e^{ax} dx$, sin nx dx, cos nx dx , $x^m (1-x)^n dx$, applications of integration for (i) Area under plane curves, (ii) Volume of solid of revolution.

UNIT-V:

ANALYTICAL GEOMETRY OF THREE

DIMENSION

Planes, straight lines.

Text Book.

P.R.Vittal, Mathematical Foundations - Margham Publication, Chennai.

Reference Books

1. U. Rizwan, Mathematical Foundation - SciTech, Chennai

2. V.Sundaram& Others, Discrete Mathematical Foundation - A.P.Publication, sirkali.

3. P. Duraipandian & Others, Analytical Geometry 3 Dimension – Emerald publication 1992 Reprint.

4. Manicavachagompillay & Natarajan. Analytical Geometry part II – three Dimension - S.Viswanathan (printers & publication) Put Ltd., 1991.

SEM II	SKILL BASED	Lecture	Practical	Credit
FEE20	**EFFECTIVE ENGLISH**	**4**	**0**	**2**

POLITE CONVERSATION

SESSION 1

TOPICS

• Using polite phrases

• Engaging in small talk

• Asking and answering politely

LOOKING BACK

SESSION 2

TOPICS

• Discussing biographical information

• Discussing things that happened

• Discussing things that happened

TECHNOLOGY

SESSION 3

TOPICS

• Referring to common devices

• Saying what things are for

• Understanding instructions

EXPERIENCES

SESSION 4

TOPICS

• Describing experiences and feelings

• Making comparisons

• Talking about extremes

ARRANGEMENTS

SESSION 5

TOPICS

• Arranging to meet someone

• Locations of workplaces

• Summing up arrangements

JOBS PEOPLE DO

SESSION 6

TOPICS

• Talking about jobs

• Rules at work

• Leisure

EXPLAINING

SESSION 7

TOPICS

• The meaning of words

• Describing quantities

• Referring to large and small quantities

RULES AND ABILITIES

SESSION 8

TOPICS

• Requirements and abilities at work

• Describing actions

• Talking about precautions

HEALTH AND HAPPINESS

SESSION 9

TOPICS

• Discussing good and bad points

• Giving advice

• Discussing food

DECISIONS AND PLANS

SESSION 10

TOPICS

• Making decisions

• Making plans

• Discussing plans

COMMUNICATION

SESSION 11

TOPICS

• Talking about communication

• Making phone calls

• Writing emails

DESCRIBING EXPERIENCES

SESSION 12

TOPICS

• Having fun

• Describing what you've done

• Details of experiences

PREPARATION AND PROGRESS

SESSION 13

TOPICS

• Checklists

• Talking about progress

• Travel preparations

TRANSPORTATION

SESSION 14

TOPICS

• Talking about transportation

• Positions and directions of movement

• Processes

THE FUTURE

SESSION 15

TOPICS

• Making predictions

• Giving opinions

• Skills for future careers

BREAKING THE ICE

SESSION 1

TOPICS

• Greeting people

• Discussing current situations

• Talking about different situations

BACKGROUND

SESSION 2

TOPICS

• Discussing biographical information

• Discussing past events

• Discussing education experiences

ACHIEVEMENT

SESSION 3 TOPICS

• Talking about experiences

• Discussing progress towards goals

• Talking about competition

NEWS

SESSION 4

TOPICS

• Discussing news stories

• Discussing recent events

• Talking about memories

SEEKING EMPLOYMENT

SESSION 5

TOPICS

• Understanding job adverts

• Researching the workplace

• Interviewing well – first steps

PLANNING

SESSION 6

TOPICS

• Deciding arrangements

• Describing arrangements

• Discussing plans and decisions

MAKING PREDICTIONS

SESSION 7

TOPICS

• Discussing predictions

• Describing the weather

• Discussing forecasts

ABILITIES AT WORK

SESSION 8 TOPICS

• Talking about yourself

• Answering awkward questions

• Making a mark at the end

PURCHASING

SESSION 9

TOPICS

• Buying and selling

• Advantages and disadvantages

• Comparisons

LEISURE

SESSION 10

TOPICS

• Talking about leisure

• Discussing likes and dislikes

• Describing feelings about experiences

LIFESTYLE

SESSION 11

TOPICS

• Time

• Giving advice

• Imaginary situations

NATURAL FORCES

SESSION 12

TOPICS

• Describing the environment

• Describing systems

• Describing positions and movement

TRANSPORTATION

SESSION 13

TOPICS

• Talking about cars and roads

- Explaining rules

- Discussing transportation

LANGUAGE FOR THE WORKPLACE

SESSION 14

TOPICS

- Plans and prospects

- Discussing situations at work

- Looking back

CONSUMER SOCIETY

SESSION 15

TOPICS

- Understanding advertisements

- Discussing precautions

- Describing trends

SEM III	LANGUAGE	Lecture	Practical	Credit
FLT30	**TAMIL-III**	**2**	**0**	**4**

Nehf;fk ;:
1. jpUf;Fws; Kjyhd mf ,yf ;fpaq;fisg; gw ;wp njspthf mwpe;J nfhs;syhk;.
2. fhg ;gpaq;fspy; ngUikfis Ghpe;J nfhs;syhk ;.
3. fk;ghpd; rpwg;igAk; fhg ;gpaj;jpd; rpwg ;igAk ; mwpe;J nfhs;s KbAk ;.
4. rka ,yf;fpaq;fs ; gw;wpa mwptpid ngw;Wf; nfhs;s KbAk ;.
5. khzth;fs; tpz;zg;gk; vOjTk; tptuf; Fwpg;Gfis vOjk ; KiwAk ; mwpe;J
nfhs;syhk;.
myF -1 Teaching Hours : 18
jpUf;Fws ;

1. thd;rpwg ;G
2. tho ;f;ifj ; Jiz eyk ;
3. el;G
4. xOf;fKilik
5. nghOJ fz ;L ,uq;fy;
myF -2 Teaching Hours : 18

rpyg ;gjpfhuk;
kJiuf; fhz;lk; - milf;fy fhij
kzpNkfiy
MGj ;jpud; jpwk; mwptpj;j fhij
gjp%d;;whtJ fhij
myF -3 Teaching Hours : 18

r Ptfrpe;jhkzp
ehkfs; ,yk;gfk ;
Vkhq;fj ehL tu;zid
fk ;guhkhazk;
ke;jiu #o;r;rp glyk ;
mNahj ;jpa fhz;lk;
myF -4 Teaching Hours : 18
nghpaGuhzk ; - nka;g;nghUs; ehadhh; Guhzk ;
rPwhg;Guhzk ; - tplk; k Pl;l glyk;
,ul;rz;a ahj;jphpfk; - rpYitg; ghLfs;

myF -5 Teaching Hours : 18

nkhopj;jpwd;
1. tpz;zg;gk ; vOJjy;
2. jd; tptuf; Fwpg;G vOJjy;

,yf;fpa tuyhW
Gjpndz;fPo ;f;fzf;F E}y;fspy; mw ,yf;fpaq ;fs;

fhg;gpa ,yf;fpaq ;fs;.

gad; :

1. cyfg;nghJkiw jpUf;Fwis Mu;tKld; fw;Wg; gad; ngwyhk;.

2. rpyg;gjpfhuj;jpd; ngUikia mwpe;J nfhs;syhk;.

3. fhg ;gpaq;fspd; mikg;igAk;> rpwg;igAk ; Mu;tKld; gbf;fyhk;.

4. ,];yhkpa ,yf ;fpaq;fs;> fpUj ;Jt ,yf ;fpaq;fs; nra ;j jkpopO;F nra ;j njhz ;il mwpjy;.

5. nkhopj;jpwid tsu ;j;Jf; nfhs;Sjy;.

SEM III	ENGLISH	Lecture	Practical	Credit
FLE30	**ENGLISH-III**	6	0	4

OBJECTIVES
1. To enhance students to learn and enjoy literary values
2. To expose students to different writing styles of eminent writers
3. To make them understand the implied irony and humor in the prescribed text
4. To make them relish the beauty of Shakespearian poem and other literary works
5. To understand the basic grammar and learn to write sentences

UNIT 1-PROSE
1. From Harrow– Winston Churchill
2. Tolerance –E.M. Forster

Course outcome
Unit I
To
1. Understand the narrative technique present in the essay
2. Learn new words and phrases
3. Comprehend the humor and irony implied in the text
4. Learn the philosophy of life that everybody has his own time to succeed in life.
5. Understand tolerance is the best policy

UNIT 2 -POETRY
1. Shall I Compare Thee to a Summer's Day (Sonnet 18)–William Shakespeare
2. The Queen's Rival – Sarojini Naidu
3. A Psalm of Life–Henry Wordsworth Longfellow

Unit II
Outcome
Students learn to
1. Appreciate the elements and language of poetry
2. Critically analyze the features of poetry
3. Understand psychological conflict between the characters mother and daughter
4. Understand the comedy and irony present in the poem
5. Realize the importance of the values of life

UNIT 3 -SHORT STORY
1. Where Love is, There God is – Leo Tolstoy
2. The Child–Prem Chand

Unit III
Outcome
Students learn to
1. Evaluate the values of good and bad
2. Recognize the outcome of good deeds
3. Appreciate the moral values of life
4. Be generous and accept people around
5. Understand that a every child is gift from God

UNIT 4 - ONE ACT PLAY
1. Refund – Frintz Karinthy Adapted by Perceval Wilde (Hungarian Literature) (Book of Plays)

Unit IV
Outcome
Students learn to
1. Appreciate the sense of homour present in the play
2. Understand the nuances of dialogue and structure of sentences
3. Understand expression related to the situations
4. Analyse and critically evaluate the play as a whole and try to enact on stage

UNIT 5 –I GRAMMAR
1. Noun
2. Adjective
3. Singular/ Plural
4. Order of Adjectives
II- COMPOSITION
1. Letter Writing - Formal
2. Preparing Resume, Bio- data, and Curriculum Vitae

Unit 5:
Outcome
Studens will able to
1. Learn the basics of grammar
2. Differentiate noun from adjective
3. Understand the different places and functions of adjective
4. Practice letter writing
5. Write resume, Bio-data and curriculum Vitae

REFERENCE:
Krishnaswamy. N. Modern English- A Book of Grammar Usage and Composition, Macmillan, 2001. Print.
Active English Grammar and Composition. Board of Editors, Macmillan, 1981.

SEM III	CORE THEORY	Lecture	Practical	Credit
FCA31	**JAVA PROGRAMMING**	5	0	4

LEARNING OBJECTIVES
- Knowing about a General-purpose and Purely object-oriented programming language including data types, control statements, and classes
- Secured, well-suited for internet programming using applets and GUI-based

After completing this course, the students will be able to
1. Describe Object oriented programming concepts.
2. Write Java Programs using Arrays, Inheritance, Interface and Packages based on requirements.
3. Use String handling, exception handling and Multithreading concepts in Java programs
4. Create a simple application with the use of AWT controls and GUI Tools.
5. Develop a JDBC enabled Java Application.

Course Outcomes:
- Students are able to know about a General-purpose and Purely object-oriented programming language including data types, control statements, and classes
- Students are able to Secured, well-suited for internet programming using applets and GUI-based

SYLLABUS

UNIT I
Declarations and Access Control: Identifiers and Keywords: Oracle's Java Code Conventions. Define Classes: Import Statements and the Java API - Static Import Statements. Use Interfaces: Declaring an Interface-Declaring Interface Constants. Declare Class Members: Access Modifiers - Non access Member Modifiers - Constructor Declarations - Variable Declarations. Declare and Use enums: Declaring enums. Object Orientation: Encapsulation - Inheritance and Polymorphism- Polymorphism - Overriding / Overloading: Overridden Methods -Overloaded Methods.

UNIT II
Object Orientation: Casting - Implementing an Interface - Legal Return Types: Return Type Declarations - Returning a Value. Constructors and Instantiation: Overloaded Constructors - Initialization Blocks. Statics: Static Variables and Methods. Assignments: Stack and Heap - Literals, Assignments, and Variables: Literal Values for All Primitive Types. Scope - Variable Initialization - Passing Variables into Methods: Passing Object Reference Variables - Passing Primitive Variables. Garbage Collection. Operators: Java Operators - Assignment Operators - Relational Operators - instanceof Comparison - Arithmetic Operators -
Conditional Operator - Logical Operators.

UNIT III
Working with Strings, Arrays, and Array Lists: Using String and StringBuilder: The String

Class - The StringBuilder Class - Important Methods in the StringBuilder Class. Using Arrays: Declaring an Array -Constructing an Array - Initializing an Array. Using ArrayList:ArrayList Methods in Action - Important Methods in the ArrayList Class. Flow Control and Exceptions: Using if and switch Statements -Creating Loops Constructs - Handling Exceptions - Catching an Exception Using try and catch - Using finally. String Processing, Data Formatting Resource Bundles: String, StringBuilder, and StringBuffer -Dates, Numbers, Currencies, and Locales.

UNIT IV

I/O and NIO: File Navigation and I/O: Creating Files Using the File
Class - Using FileWriter and FileReader. File and Directory Attributes -DirectoryStream - Serialization. Generics and Collections: toString(), hashCode(), and equals(): The toString() Method - Generic Types -Generic Methods - Generic Declarations. Inner Classes: Method – Local. Inner Classes - Static Nested Classes - Threads: Defining, Instantiating, and Starting Threads - Thread States and Transitions - Synchronizing Code, Thread Problems - Thread Interaction. Concurrency: Concurrency with the java.util.concurrent Package - Apply Atomic Variables and Locks - Use java.util.concurrent Collections - Use Executors and ThreadPools.

UNIT V

Applets: Applet fundamentals - Applet class - Applet life cycle - Steps for developing an applet program - Passing values through parameters - Graphics in an applet - Event-handling. GUI Applications - Part 1: Graphical user interface - Creating windows - Dialog boxes - Layout managers - AWT component classes - Swing component classes. GUI Applications - Part 2: Event handling - Other AWT components - AWT graphics classes - Other swing controls.

TEXT BOOK(S):

1. Kathy Sierra, Bert Bates ─ OCA/OCP Java SE 7 Programmer I & II Study Guide, Oracle Press. (Unit I,II,III,IV).

2. Sagayaraj, Denis, Karthik and Gajalakshmi, 2018, Java Programming - For Core and Advanced Learners, University Press (India) Private Limited, Hyderabad.(Unit V).

REFERENCE BOOKS:

1. Hebert Schild, 2002, The Complete Reference Java2, [Fifth Edition]. Tata McGraw-Hill, New Delhi.

2. John Hubbard, R.2004. Programming with Java. [Second Edition]. Tata McGraw-Hill,New Delhi.

3. Debasish Jana. 2005. Java and Object-Oriented Programming Paradigm, [Second Printing]. Prentice-Hall of India, New Delhi.

4. Sagayaraj, Denis, Karthik and Gajalakshmi 2018, Java Programming for core and advanced Learners, University Press India Pvt. Ltd., Hyderabad.

SEM III	NMD	Lecture	Practical	Credit
FSCA34	**FUNDAMENTALS OF CODING AND CLOUD**	2	0	2

Fundamentals of Coding and Cloud
COURSE OBJECTIVE
• Understand the fundamentals of Python programming, including syntax, data types, and control flow, to build a solid foundation in the language.
• Gain proficiency in object-oriented programming concepts such as classes, objects, inheritance, and polymorphism to write modular and reusable code.
• Develop problem-solving skills by working with data structures like arrays, lists, dictionaries, and implementing searching and sorting algorithms.
• Learn how to handle file input/output operations, perform string manipulation, and apply regular expressions for efficient data processing.
• Define cloud computing and explain its basic principles.
• Understand the benefits and advantages of adopting cloud computing.
• Identify and differentiate between the cloud service & Deployment models.
• Enhance quantitative aptitude through topics like mathematics,

COURSE OUTCOMES
• Gain a strong command over Python programming language, including its syntax, data types, and control flow, to develop robust and efficient code.
• Understand and apply object-oriented programming principles, such as encapsulation, inheritance, and polymorphism, to design and implement modular and reusable code.
• Develop skills in manipulating data structures like arrays, lists, and dictionaries, and implement common algorithms such as searching and sorting for efficient data processing.
• Enhance problem-solving abilities by applying quantitative aptitude, and algorithmic thinking to tackle complex coding challenges and develop optimal solutions.
• Prepare for coding interviews by gaining exposure to a variety of problem-solving scenarios, practicing coding techniques, and developing effective communication skills to articulate programming concepts and solutions.

COURSE CURRICULUM
UNIT - I
Fundamentals of Python 05 hours
Introduction to Python: history, features, and Applications-Setting up the development environment for Python-Basic syntax
Variables and data types: numbers-strings-lists-tuples-dictionaries
Operators: arithmetic-assignment-comparison-logical-bitwise operators
Control flow: conditional statements (if, Elif, else) and loops (for and while)
Functions: defining functions, function parameters, return values, and recursion
File handling: reading from and writing to files

Basic input and output operations

Challenges: -

1- Implement a recursive function to calculate the factorial of a given number.

2- Write a program that determines whether a year entered by the user is a leap year or not using if-elif-else statements.

UNIT - II

Object-Oriented Programming (OOP) 05 hours Introduction to OOP: principles-concepts-benefits. Classes and objects: defining classes-creating objects-accessing attributes and methods. Encapsulation: data hiding and access modifiers (public, private, protected). Inheritance: creating derived classes- method overriding-super keywords. Polymorphism: method overloading-method overriding-abstract classes. Advanced OOP concepts: interfaces, composition, and static methods.

Challenges: -

1- Implement a class called BankAccount that represents a bank account. The class should have private attributes for account number, account holder name, and account balance. Include methods to deposit money, withdraw money, and display the account balance. Ensure that the account balance cannot be accessed directly from outside the class. Write a program to create an instance of the BankAccount class and test the deposit and withdrawal functionality.

2- Implement a class called Player that represents a cricket player. The Player class should have a method called play() which prints "The player is playing cricket. Derive two classes, Batsman and Bowler, from the Player class. Override the play() method in each derived class to print "The batsman is batting" and "The bowler is bowling", respectively. Write a program to create objects of both the Batsman and Bowler classes and call the play() method for each object.

UNIT - III

Data Structures and Manipulation 10 Hours Arrays and lists: indexing-slicing-common list operations. String manipulation: string methods-formatting-regular expressions. Dictionaries and sets: manipulating dictionary -set objects. Stack and queue data structures. Searching algorithms: linear search-binary search. Sorting algorithms: bubble sort- insertion sort- selection sort.

Challenges: -

1-Write a function called linear_search_product that takes the list of products and a target product name as input. The function should perform a linear search to find the target product in the list and return a list of indices of all occurrences of the product if found, or an empty list if the product is not found.

2- Implement a function called sort_students that takes a list of student objects as input and sorts the list based on their CGPA (Cumulative Grade Point Average) in descending order. Each student object has the following attributes: name (string), roll_number (string), and cgpa (float). Test the function with different input lists of students.

UNIT - IV

Fundamentals of Cloud Computing 05 Hours

Cloud Computing – Need of Cloud Computing- Cloud Service Models-Cloud Deployment Models-Essential Characteristics of Cloud Computing- Cloud Computing Providers-Fundamental Course

UNIT - V

Quantitative Aptitude 05 Hours Basic Mathematics - LCM & HCF - Divisibility - Numbers, decimal fractions and power –Averages - Ratio & Proportion – Algebra Applied Mathematics- Profit and Loss - Simple and Compound Interest - Time, Speed and Distance – Inverse - Time and Work - Allegation & Mixtures – Percentage - Area, shape, and perimeter

Total: 30 Periods
REFERENCE

Python Programming: - https://developers.google.com/edu/python
Python OOPs: - https://realpython.com/python3-object-oriented-programming/
Competitive Programming: - https://www.codewars.com/kata/python
Aptitude: - https://www.indiabix.com/aptitude/questions-and-answers/

SEM III	CORE PRACTICAL	Lecture	Practical	Credit
FPCA36	**JAVA PROGRAMMING LAB**	0	4	3

Course Objectives

1. To use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.

2. To read and make elementary modifications to Java programs that solve real-world problems.

3. To be able to create an application using string concepts.

4. To be able to create a program using files in application.

5. To be able to create an Applet to create an application and identify and fix defects and common security issues in code.

Course Outcomes

1. CO1. After studying unit-1, the student will be able to know about the working of object-oriented concepts in java.
2. CO2. After studying unit-2, the student will be able to practically know about primitive data types and operators.
3. CO3. After studying unit-3, the student will be able to practically work with arrays, control structures and handling exceptions.
4. CO4. After studying unit-4, the student will be able to practically work with files and packages.
5. CO5. After studied unit-5, the student will be able to practically know about Applets and GUI concepts

SYLLABUS

1. Implementation of Classes and Objects
2. Implementation of Inheritance and Polymorphism
3. Implementation of Interface and Package concepts
4. Implementation of Flow, Border, Grid Layouts
5. Implementation of Tic-Tac Toe Application Using Applets
6. Implementation of Frames, Menus, Dialog
7. Implementation of Swing concepts
8. Implementation of Exception Handling
9. Implementation of Multi-Threading
10. Implementation of I/O Streams
11. Implementation of Java Networking concepts
12. Implementation of Java Servlets (Connecting Database)
13. Implementation of RMI
14. Implementation of Java Beans

REFERENCES

NIL

SEM III	ALLIED II	Lecture	Practical	Credit
FACM15C	**FINANCIAL ACCOUNTING I**	7	0	3

OBJECTIVES

1. To understand the basic concepts and conventions and Users of Accounting Information.
2. To acquire knowledge about the Double entry system and Rectification of Errors in Accounting.
3. To acquire knowledge about Final Accounts (Trading & Profit & Loss A/c and Balance Sheet).
4. To acquire knowledge about the Single entry system (incomplete records of Accounts).
5. To acquire knowledge about Average Due Date and Preparation of in the preparation of Bank Reconciliation Statement.

COURSE OUTCOMES

Unit 1

After studying unit-1, to introduce the basic concepts and conventions to the students, this would help in the development of accounting knowledge.

Unit2

After studying unit-2, to understand the concept of the Double entry system this helps in preparation of various books of accounts.

Unit3

After studying unit-3 , to develop the capability of students to prepare the Final Accounts of a Small Business Concern.

Unit 4

After studying unit 4, To introduce the concept of Single entry system of Accounting which helps them to prepare the accounts from incomplete records.

Unit 5

After studying unit 4, To enhance the Accounting Knowledge by introducing the practical uses of Average Due Date and Bank Reconciliation Statement.

SYLLABUS

UNIT 1 - Introduction Meaning of accounting – objectives of accounting – advantages and limitations of accounting- Accounting concepts and conventions - Methods of accounting -Rules of debit and credit- Journal - Ledger accounts– Trial Balance - Errors and their rectification - Rectification of Errors without suspense a/c - Rectification errors with suspense a/c (effect of rectification on profit and rectification during subsequent accounting year are excluded) - Bank Reconciliation Statement.

UNIT 2 - Depreciation, Provisions and Reserve Meaning of depreciation – causes for depreciation – need for charging depreciation – Methods of calculating depreciation: straight line method and written down value method (change in method of depreciation is excluded) – Methods of recording depreciation: by charging depreciation to assets account or by creating provision for depreciation account.

UNIT 3 - Bills of exchange Meaning of bill of exchange - features and advantages of bill of exchange- types of bill of exchange: Trade bills and accommodation bills - Accounting treatment of trade bills (accommodation bills are excluded).

UNIT 4 - Final Accounts Meaning of final accounts – adjustments in preparation of final accounts – preparation of trading, profit & loss account and balance sheet of sole proprietorship concern.

UNIT 5 - Accounts from incomplete records Meaning of single-entry system – features and limitations of single-entry system – Distinction between single entry system and double entry system - Methods of calculation of profit: Statement of affairs method and Conversion method – Distinction between statement of affairs and balance sheet.

Note: Questions in section A, B and C shall be in the proportion of 20: 80 between theory and problems

REFERENCES
1. Jain &Narang, "**Financial Accounting**", KalyaniPublishers, New Delhi.
2. T.S. Reddy &Dr.A.Murthy, "**Financial Accounting**", Margham Publications, Chennai.
3. Gupta,R.L&Gupta, V.K, "**Advanced Accounting**", Sultan Chand & Sons, NewDelhi.
4. Shukla & Grewal, "**Advanced Accounting**", S.Chand & Co, NewDelhi.
5. Parthasarathy, S.& Jaffa RullaA, "**Financial Accounting**", Kalyani Publishers, NewDelhi.
6. Murugadoss, Jaya, Charulatha and Baskar, "**Financial Accounting**", Vijay Nicholes Imprint Pvt. Ltd., Chennai.

SEM III	NME	Lecture	Practical	Credit
FNEN34	**LANGUAGE SKILLS FOR COMMUNICATION**	2	0	2

Course Objectives
To improve the students ability of speaking skills.
To provide training in developing interpersonal skills.
To develop communicative skills
To make students confident in dealing with communicative skills
To facilitate students practical and social knowledge through conversations

UNIT - I
1. Meeting people
2. Exchanging greetings
3. Introducing, others, giving personal information, taking about people animals and places

UNIT - II
1. Answering telephone, asking for someone
2. Making enquiries on the phone
3. Dealing with wrong number
4. Taking and leaving messages

COURSE OUTCOMES
UNIT - I
1. Students will be able to know how to behave while meeting people.
2. Students will be able to understand the ways of exchanging greetings.
3. Students will be able to introduce them to a group of people.
4. Students will be able to understand how to introduce others in any situation.
5. Students will be able to understand how to give personal information in a coherent way.
UNIT - II
1. Students will be able to know how to converse over the phone.
2. Students will be able to know how to enquire over phone in formal situation
3. Students will be able to know how to deal with wrong numbers on the telephone.
4. Students will be able to know how to take and leave message after a telephonic conversation.
5. Students will be able to develop the skill of answering over the phone.

Textbooks:
Mastering communication skills and soft skills
N.Krishnaswamy, ManjuDariwal, LalithaKrishnaswamy(Bloomsbury)

SEM IV	LANGUAGE	Lecture	Practical	Credit
FLT40	**TAMIL-IV**	**6**	**0**	**4**

Nehf;fk ;:
1. rq;f ,yf;fpaq;fspy; njhd;ikfisAk ; rpwg;gpidAk ; mwpe;J nfhs;Sjy;.
2. gz;ilj;jkpou; gz;ghl;ilAk ;> epyg;ghFghl;ilAk ; njhpe;J nfhs;syhk;.
3. gz;ilj;jkpou;fspd; mf xOf;fq;fisAk ;> Gw xOf;fq ;fisAk ; mwpe;Jf;
nfhs;syhk;.
4. gj;Jg;ghl;L E}y;fspd; rpwg;gpid njhpe ;J nfhs;syhk;.
5. jkpo; ,yf;fpa tuyhw;wpid gbf;Fk; Mu;tj;ij J}z;Ljy;.

myF – 1 Teaching Hours : 18

1. FWe;njhif - jpizf;F 1 ghly; tPjk; 5 ghly;fs; - (3> 7> 145> 275> 364)
2. ew;wpiz - jpizf;F 1 ghly; tPjk; 5 ghly;fs; - (72> 110> 216> 238> 310)
3. Iq;FWE}W - Ntl;ifg; gj ;J

myF -2 Teaching Hours : 18
1. GwehD}W - (ghly;fs; - 114> 138> 163> 204> 205)
2. gjpw;Wg;gj ;J - (Ie;jhk ; gj;J ghly;fs; - 42> 45)

myF -3 Teaching Hours : 18
1. fypj;njhif - Ky ;iyf;fyp (ghly; vz ;.111)
nea;jw;fyp (ghly; - 136)
2. ghpghly; - jpUkhy; - 1 : 36 – 73
itia – 6 : 1 – 24
myF -4 Teaching Hours : 18
gj ;Jg;ghl;L - FwpQ;rpg;ghl;L (KOtJk ;)

myF -5 Teaching Hours : 18
rq;f ,yf;fpa tuyhW
1. vl;Lj;njhif E}y;fs;
2. gj ;Jg;ghl;L E}y;fs;.
gad; :
1. Kr;rq;fk; gw;wpa nra ;jpfis njhpe;J nfhs;Sjy;.
2. jkpou;fspd; xOf;fq;fyhd fhjy;> tPuk ; gw;wp mwpe;J gad ;ngwyhk;.
3. rq;f fhy ts;sy;fspd; rpwg;gpid mwpe;J nfhs;syhk;.
4. Mw;Wg;gil ,yf;fpaq;fs; gw;wpa Ghpjiy ngwyhk;.
5. ,yf;fpa tuyhw;iw mwpe;J nfhs;Sjy; %yk; murpd; Nghl;bj; Nju;Tfspd ;
ntw;wp ngwyhk;.

SEM IV	ENGLISH	Lecture	Practical	Credit
FLE40	**ENGLISH-IV**	6	0	4

OBJECTIVES
1. To enhance students to understand literary values
2. To expose students to different writing styles of eminent writers
3. To make them understand the implied irony and humour in the prescribed text
4. To make them relish the lyrical beauty of Tagore's poem and other literary works
5. To understand the basic grammar and learn to write sentences

UNIT – 1 PROSE
1. My Financial Career– Stephen Leacock
2. Secret of Work–Swami Vivekananda

Outcome
Students are able to
1 Understand and appreciate the style of Leacock
2 Enjoy the humour and wit presented in the prescribed text
3 Comprehend the philosophy of Swami Vivekananda
4 Learn new words and phrases
5 Understand the moral values and practise in personal life

UNIT -2 POETRY
1. Where the Mind is Without Fear –Rabindranath Tagore
2. Stopping by Woods on a Snowy Evening – Robert Frost
3. The World is Too Much With Us – William Wordsworth

Outcome
Students are able to
1. Grasp the lyrical beauty of the poem of Tagore
2. Identify the mysticism present in Tagore poem
3. Understand the patriotic values and sense of integration Grasp the lyrical beauty of the poem of Robert Frost
4. Identify the rhythm present in Frost poetry and understand its philosophical meaning
5. Realize how the nature is being depleted
6. Understand the cyclic nature of life

UNIT-3 SHORT STORY
1. The Gift of the Magi - O Henry
2. Rip Van Winkle - Irving Washington

Outcome
Students are able to
1. Appreciate the value of true love
2. Learn the narrative style

3. Assess the flow of language
4. Enjoy the twist of the story
5. Enjoy the aesthetic sense of the story and learn to appreciate the imaginary world.

UNIT -4 ONE ACT PLAY
1. Marriage Proposal – Anton Chekov
Outcome
Students are able to
1. Appreciate the sense of humour present in the play
2. Understand the nuances of dialogue and structure of sentences
3. Learn new expression related to the situations
4. Study the stage directions and background
5. Analyse and critically evaluate the play as a whole and try to enact on stage

UNIT-5: I- GRAMMAR
1. Verb
2. Adverb
3. Concord
4. Tenses
II COMPOSITION
5. Report Writing
6. Reading Comprehension

Outcome
Students are able
1. Learn the basics of grammar
2. To learn verb and adverb and know to differentiate them
3. To write reports
4. To comprehend a passage and answer the specific questions

REFERENCE:
Krishnaswamy. N. Modern English- A Book of Grammar Usage and Composition, Macmillan, 2001. Print.
Active English Grammar and Composition. Board of Editors, Macmillan, 1981. Print.

SEM IV	CORE THEORY	Lecture	Practical	Credit
FCA41	**RELATIONAL DATABASE MANAGEMENT SYSTEM**	5	0	4

Objective:
✔ The students are able to understand database concepts and database management system software and have a high-level understanding of major DBMS components and their function.
✔ The students are able to understand the E R model and relational model.
✔ The students are able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
✔ The students are able to Understand Functional Dependency and Functional Decomposition.
✔ The students are able to understand the architecture of database management systems and also understand the various different architectures such as server system architecture, parallel systems and distributed database systems.

Course Outcomes:
● Describe the database architecture and its applications Sketch the ER diagram for real world applications Uses various ER diagrams for a similar concept from various sources.
● Discuss about relational algebra and calculus Construct various queries in SQL and PL/SQL Compiles various queries in SQL, Relational Calculus and Algebra.
● Describe the various normalization forms Apply the normalization concepts for a table of data Practices a table and implement the normalization concepts.
● Explain the storage and accessing of data.
● Illustrate the query processing in database management. Define the concurrency control and deadlock concept

UNIT- I: DATABASE ARCHITECTURE AND ER DIAGRAM   **12 Hours**
Database system applications - Purpose of database systems - View of data- Database languages - Database architecture - Database users and administrators - History of database systems-Entity relationship modeling: entity types, entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, sub classes; super classes, inheritance, specialization and generalization

UNIT- II: RELATIONAL DATA MODEL   **12 Hours**
Relational model concepts, Relational constraints, Relational Languages: Relational Algebra, The Tuple Relational Calculus - The Domain Relational Calculus - SQL: Basic Structure-Set Operations- Aggregate Functions-Null Value-Nested Sub Queries-Views Complex Queries Modification Of Database-Joined Relations-DDL-Embedded SQL-Dynamic SQL-Other SQL Functions- -Integrity and Security.

UNIT – III: DATA NORMALIZATION   12 Hours

Pitfalls in relational database design – Decomposition – Functional dependencies – Normalization – First normal form – Second normal form – Third normal form – Boyce-codd normal form – Fourth normal form – Fifth normal form

UNIT- IV: STORAGE AND FILE ORGANIZATION   12 Hours

Disks - RAID -Tertiary storage - Storage Access -File Organization – organization of files - Data Dictionary storage

UNIT- V: QUERY PROCESSING AND TRANSACTION MANAGEMENT   12 Hours

Query Processing - Transaction Concept - Concurrency Control –Locks based protocol Deadlock Handling -Recovery Systems

TEXT BOOK:
   1. Abraham Silberschatz, Henry Korth, S.Sudarshan, Database Systems Concepts, Sixth Edition, McGraw Hill, 2010. 2. Raghu Ramakrishnan and Johannes Gehrke, Database management systems, Third Edition,2002

REFERENCES
   1. Bipin Desai, An Introduction to database systems, Galgotia Publications, 2010. 2. RamezElamassri, Shankant B-Navathe, Fundamentals of Database Systems, Pearson, 7th Edition, 2015

E - REFERENCES
   1. NPTEL, Introduction to database design, Dr P Sreenivasa Kumar Professor CS&E, Department, IIT, Madras
   2. 2. NPTEL, Indexing and Searching TechniquesinDatabasesDr. ArnabBhattacharya,IIT Kanpur

SEM IV	CORE PRACTICAL	Lecture	Practical	Credit
FPCA46	**RDBMS LAB**	0	4	3

Objectives:
- ✔ To understand the concepts of DDL/DML/DCL/TCL commands.
- ✔ To understand the concepts of Join queries.
- ✔ To understand the concepts of exception handling.
- ✔ To understand the concepts of cursors.
- ✔ To understand the concepts of packages.

Course Outcomes:
- Design and Implement a database schema for a given problem domain.
- Populate and Query a database using SQL, DDL/DML Commands.
- Build well formed in String Date/Aggregate Functions.
- Design and Implement a database query using Joins, Sub-Queries and Set Operations.
- Program in SQL including Objects (Functions, Procedures, Triggers)

LAB EXERCISES:

1. Execute a single line query and group functions.

2. Execute DDL Commands.

3. Execute DML Commands

4. Execute DCL and TCL Commands.

5. Implement the Nested Queries.

6. Implement Join operations in SQL

7. Create views for a particular table

8. Implement Locks for a particular table.

9. Write PL/SQL procedure for an application using exception handling.

10. Write PL/SQL procedure for an application using cursors.

11. Write a PL/SQL procedure for an application using functions

12. Write a PL/SQL procedure for an application using package

REFERENCE BOOK:
1. Abraham Silberschatz, Henry Korth, S.Sudarshan, Database Systems Concepts, Sixth Edition, McGraw Hill, 2010. 2. Raghu Ramakrishnan and Johannes Gehrke, Database management systems, Third Edition,2002

SEM IV	SKILL BASED SUBJECT	Lecture	Practical	Credit
FSOF40	**Office Fundamentals**	**4**	**0**	**2**

Session	**Module**	**Name**	**Subitems**
1.1	Microsoft Word	Introduction	a. Starting MS Word b. Different Templates in MS Word
1.2		Ribbons – Introduction and options available.	a. Home Ribbon Menu b. Insert Ribbon Menu c. Draw Ribbon Menu d. Design Ribbon Menu e. Layout Ribbon Menu f. References Ribbon Menu g. Mailings Ribbon Menu h. Review Ribbon Menu i. View Ribbon Menu j. Help Ribbon Menu
1.3		Using Rulers in Word	a. Aligning images with Ruler b. Aligning Tabs with Ruler
1.4		Navigation Pane and GoTo in Word	a. Navigation Pane b. Go To
1.5		AutoCorrect in Word	Checking Spelling, Grammar, and Conciseness
1.6		Grouping Objects in Word	Aligning Objects in Word
1.7		Picures & Images	a. Inserting Captions b. Filling Shapes with Pictures in Word c. Quick Parts d. Compressing Pictures in Word, e. Icons and 3D Models

1.8	The View Tab in Word	a. Web Layout View in Word b. Reading & Focusing on Documents in Word c. Draft and Outline View in Word
1.9	Paragraph Editing	a. Indenting, b. Bookmarks, c. Index of any document d. Track changes e. Inserting Bullets f. Sub-bullets in a para
1.10	Page Layout	a.Page break b. Page Numbering c. Page Orientation d. Page Size
1.11	Table Style in Word	Breaks and Repeat Headings in Word Formulas in Tables in Word
1.12	Find and Replace	a. Find & Replace Formatting b. Find & Replace Special Characters
1.13	Formatting WordArt in Word	a. WordArt b. Editing WordArt
1.14	Creating Table of Figures	a. Adding Table of Figures b. Modifying Table of Figures

1.15		Tab Stops via Dialog Launcher	a. Set Tabs using Tab Dialog Box b. Adding Dialog Box Launcher
1.16		Applying Paragraph Styles	Customizing and Modifying Paragraph Styles
1.17		Wrapping Words Around Pictures	Understanding how to wrap words around Pictures
2.1	Microsoft PowerPoint	Navigate a PowerPoint Presentation	a. Overview of the Screen and Views b. Presentation Tips and Guidelines c. Creating a New Presentation d. Working with Slides e. Saving a Presentation
2.2		Formatting Text	a. Adding text to slide b. Format Painter
2.3		Working with Bullets and Numbered Lists	a. Adding Bullets or Numbers b. Bulleting Sub Items

2.4	Inserting Items	a. Inserting Shapes b. Inserting Graphics c. Inserting Icons and 3D Models d. Inserting Pictures
2.5	Zoom	Using the zoom function
2.6	Charts	a. Adding Charts b. Editing charts c. Copying Charts from Excel
2.7	Editing Images	a. Picture Options b. Cropping Pictures c. Formatting Pictures d. Things You Can Do with Pictures
2.8	Working with Objects	a. Selecting Objects b. Editing Objects c. Formatting Objects d. Arranging Objects e. Grouping Objects
2.9	Saving Presentations as Templates	Custom templates to be saved as Presentation
2.10	Slide Master	a. Introduction to the Slide Master b. Formatting the Slide Master c. Adding Slide Layouts to the Slide Master
2.11	Transitions	a. Different ways of transition for slide shows b. Applying Timings
2.12	Introduction to Additional Advanced Topics	a. Comments b. Eyedropper c. Advanced Animations d. Screen Recordings e. Hyperlinking f. Exporting to PDF

			g. Uploading and Sharing via OneDrive
2.13		SmartArt	a. Creating SmartArt b. Modifying SmartArt c. Creating a Flowchart using SmartArt d. Editing SmartArt
3.1	Microsoft Excel	Introduction to Excel	a. Starting up b. Recent documents and pinning documents c. Templates
3.2		Layout - Tabs, ribbons, and groups in Microsoft Excel	a. Rows b. Columns c. Cells and Ranges
3.3		Worksheets in Microsoft Excel	a. View and zooming b. Inputting Data c. Formatting Data d. Wrapping Text e. Insert Row/ Merge & Center cells f. Currency formatting g. Print view h. Sorting i. Format Painter j. Wrap Text k. Text orientation
3.4		Basic formulas in Microsoft Excel	a. Copy formula b. Formula Based Formatting c. Average, Sum, Subtraction, Multiplication, Division, Percentage
3.5		Freeze Pane	Freezing Rows
3.7		"Tell Me" in Microsoft Excel	How to use "Tell Me" to make your work a bit easier?
3.8		Inserting charts in Microsoft Excel	a. Charts from the data set in one dimension (x or y) or two-dimension (xy)

			b. Comparative analysis
3.9		AutoFilling cells in Excel	a. Drag Fill b. Fill Command c. Recognizing a Pattern
3.10		Add your own autofill	Add cell borders colors Fill Fonts Formatting
3.12		Sorting data in Excel	Using filters in Microsoft Excel
3.13		Simple copy/paste	a. Transpose paste in Excel b. Copy and paste formulas in Excel c. Paste a link d. Special paste in Microsoft Excel
		Saving/ Printing Excel	a. Print a big excel sheet using page break preview b. Print a selection part only c. Saving Excel in different formats d. Protecting Excel
3.14		How to use Flash Fill in Excel	Different ways to use Flash Fill
3.15		Hyperlinks in Excel (link to websites)	a. Create Hyperlink b.Fix Hyperlink Error
3.16		Create a directory or table of contents with internal links	Creating Table of Contents
3.17		Formatting Lists as Tables	a. Formatting lists as table b. Converting a list to a table
3.18		Filtering Records from Lists or Tables	Removing Duplicates from Lists or Tables

3.19		Single & Multi-Level Sorting	a. Single Level Sorting b. Multi-level Sorting
3.20		Inserting Automatic Subtotals in Lists	Insert Automatic Subtotals
3.22		Inserting Data Charts Using Recommended Charts	a. Inserting Data Charts using recommended charts b. Formatting and Editing Chart Elements c. Creating and Applying Custom Chart Elements d. Adding and Removing Data from Charts e. Inserting Sparklines f. Printing Charts
3.23		Pivot Table	a. Inserting b. Filtering c. Using Report Layouts d. Refreshing & Changing Source Data e. Pivo Charts
3.24		Data Validation	a. Applying Built-In Conditional Formatting b. Creating Custom Conditional Formats c. Linking Data
3.25		Dynamic Array	a. Dynamic Array functions b.Dynamic Array formulas
3.26		Excel Macros	a, Creating Excel Macros b. Macros in single workbook c. Absolute References d.Relative References

3.27		VLOOKUP & Reference Functions	a. VLOOKUP True b.VLOOKUP Error c. Match Data in Excel d. Excel Match Function e. Excel lookup Function f. Excel Index Function g. Excel offset Formula
3.28		Conditional Formatting	Applying Conditional Formatting in Formulas
4.1	Microsoft Teams	Introduction	a. Set-Up MS Teams b. Chat on MS Teams c. Different features of MS Teams
4.2		Calendar	a. Schedule a call on MS Teams b. Scheduling Assistant c. Out of Office
4.3		Teams	a. How to setup Teams b. Make multiple channels on Teams
4.4		Approvals	Using approvals on MS Teams
5.1	OneDrive and SharePoint	Introduction	a. Setting up One Drive in your system b. Uploading files and folders
5.2		Sharing Access on One Drive	a. Different Sharing Access b.Password protect for sharing purpose

5.3		Creating Shared Library	Creating a shared library on One Drive
5.4		Recycle Bin	Deleting a file/folder on One Drive
5.5		Introduction to SharePoint	a. Understanding the different features of SharePoint
5.6		Create Site	Creating a site on SharePoint
5.7		Different features of SharePoint	a. My Files b.My Lists c. My News d. My Sites
6.1	Outlook	Introduction to Outlook	a. Installing Outlook b. Features of Outlook
6.2		Create new meetings, appointments, tasks, and contacts	a. Schedule new meetings b. Prepare a task list c. Add your contacts
6.3		Send Email with Quick Parts	a. Create Quick Parts b. Add Quick Parts c. Use Quick Parts
6.4		Sharing Calendars	Understanding Calendars in Outlook

| 6.5 | Creating and Managing Rules | a. Create Rules
b. Manage Rules |
| 6.6 | Folders in Outlook | Manage different folders in Outlook |

SEM IV	ALLIED II	Lecture	Practical	Credit
FACM25C	**FINANCIAL ACCOUNTING II**	7	0	5

Course Objectives:

1. To understand the branch accounts and its types
2. To have practical knowledge in the preparation departmental accounting
3. To draft the Hire purchase systems
4. To acquire practical knowledge in Partnership accounts of fundamentals and reconstitution of partnership.
5. To acquire practical knowledge in Partnership accounts of Dissolution of partnership firms.

Course Outcomes

Unit1
  - After studied unit-1, the student will be able to
  - Understand the basic fundamentals of branch accounting

Unit2
  - After studied unit-2, the student will be able to
  - Understand the basic fundamentals of Departmental accounting

Unit3
  - After studied unit-3, the student will be able to
  - Understand the Hire Purchase System of accounting

Unit4
  - After studied unit-4, the student will be able to
  - Prepare the accounts partnership in fundamentals and reconstitution of partnership.

Unit 5
  - After studied unit-5, the student will be able to
  - Understand the accounts of Dissolution of partnership firms.

SYLLABUS

UNIT 1 - BRANCH ACCOUNTS Meaning – objects of branch accounts – accounting in respect of dependent branches: debtors' system; stock and debtors' system; wholesale branch system and final accounts system - Independent branches – incorporation of branch trial balance in head office books.

UNIT 2 - DEPARTMENTAL ACCOUNTING Meaning of departments and departmental accounting – Distinction between departments and branches- need for departmental accounting – advantages of departmental accounting - Apportionment of indirect expenses – Inter departmental transfers at cost and selling price - preparation of departmental trading, profit & loss account and balance sheet.

UNIT 3 - HIRE PURCHASE AND INSTALLMENT PURCHASE SYSTEMS Meaning and features of hire purchase system - calculation of interest – books of hire purchaser and books of hire vendor - default and repossession (Hire purchase trading account excluded)

Meaning of installment system -distinction between hire purchase system and installment system - calculation of interest – books of buyer and books of seller.

UNIT 4 - PARTNERSHIP ACCOUNTS (FUNDAMENTALS AND RECONSTITUTION OF PARTNERSHIP) Meaning and features of partnership – Partnership deed - calculation of Interest on capital and interest on drawings – preparation of profit & loss appropriation account – preparation of capital accounts (fixed and fluctuating) – admission of a partner – retirement of a partner – death of a partner – treatment of goodwill as per AS 10.

UNIT 5 - PARTNERSHIP ACCOUNTS (DISSOLUTION OF PARTNERSHIP FIRMS) Dissolution of a firm – insolvency of a partner (Garner Vs Murray rule) – Insolvency of all the partners – Piecemeal distribution: proportionate capital method and maximum loss method.

NOTE - Questions in section A, B and C shall be in the proportion of 20: 80 between theory and problems.

REFERENCES
1. Jain &Narang , "**Financial accounting**", Kalyani publishers, New Delhi
2. T.S. Reddy & Dr.A.Murthy, "**Financial accounting**", Margham publications, Chennai
3. Gupta,R.L&Gupta,V.K, "**AdvancedAccounting**",SultanChand&Sons,NewDelhi.
4. Shukla & Grewal, "**AdvancedAccounting**", S.Chand & Co.NewDelhi.
5. Parthasarathy,S.&Jaffarulla,A. "**FinancialAccounting**", KalyaniPublishers,NewDelhi.
6. Murugadoss, Jaya, Charulatha and Baskar, "**Financial Accounting**", Vijay Nicholes Imprint Pvt. Ltd., Chennai.

SEM V	CORE THEORY	Lecture	Practical	Credit
FCA51	**MOBILE APPLICATION DEVELOPMENT**	6	0	4

Objectives
1. To understand the basics concept of mobile applications
2. To understand the structure of mobile applications
3. To understand simple mobile applications
4. To understand the mobile application services
5. To understand real life mobile application development.

Course Outcomes (five outcomes for each unit should be mentioned)
1. After studying unit-1, the student will be able to understand the basics of smartphones and android platforms**.**
2. After studying unit-2, the student will be able to understand the basic concepts of user interface related to app development.
3. After studying unit-3, the student will be able to understand the importance of data persistence in a mobile environment.
4. After studying unit-4, the student will be able to understand the various services and network facilities provided by android platform.
5. After studying unit-5, the student will be able to understand the various apps deployed and developed on a mobile platform.

SYLLABUS
UNIT 1 - INTRODUCTION TO MOBILE APPLICATIONS: Native and web applications - Mobile operating systems and applications - Mobile Databases. Android: History of Android - Android Features – OSS – OHA - Android Versions and compatibility - Android devices - Prerequisites to learn Android -– Setting up software – IDE - XML. Android Architecture: Android Stack - Linux Kernel - Android Runtime - Dalvik VM - Application Framework - Android emulator - Android applications.

UNIT 2 - ANDROID DEVELOPMENT: Java - Android Studio – Eclipse – Virtualization – APIs and Android tools – Debugging with DDMS – Android File system – Working with emulator and smart devices - A Basic Android Application - Deployment. Android Activities: The Activity Lifecycle – Lifecycle methods – Creating Activity. Intents – Intent Filters – Activity stack.

UNIT 3 - ANDROID SERVICES: Simple services – Binding and Querying the service – Executing services - Broadcast Receivers: Creating and managing receivers – Receiver intents – ordered broadcasts. Content Providers: Creating and using content providers – Content resolver. Working with databases: SQLite – coding for SQLite using Android – Sample database applications – Data analysis.

UNIT 4 - ANDROID USER INTERFACE: Android Layouts – Attributes – Layout styles - Linear – Relative – Table – Grid – Frame. Menus: Option menu – context menu - pop-up menu – Lists and Notifications: creation and display. Input Controls: Buttons-Text Fields-Checkboxes-alert Dialogs-Spinners-rating bar-progress bar.

UNIT 5 - PUBLISHING AND INTERNATIONALIZING MOBILE APPLICATIONS: Live mobile application development: Game, Clock, Calendar, Convertor, Phone book. App Deployment and Testing: Doodle app – Tip calculator app – Weather viewer app.

REFERENCES
1. Barry Burd, "**Android Application Development – All-in-one for Dummies**", 2nd Edition, Wiley India, 2016.
2. Paul Deitel, Harvey Deitel, Alexander Wald, "**Android 6 for Programmers – An App-driven Approach**", 3rd edition, Pearson education, 2016.
3. Jerome (J. F) DiMarzio, "**Android – A Programmer's Guide**", McGraw Hill Education, 8th reprint, 2015.
4. **http://www.developer.android.com**

SEM V	CORE THEORY	Lecture	Practical	Credit
FCA52	**OPERATING SYSTEM**	6	0	4

Course Objectives
1. To understand the structure and functions of operating systems.
2. To understand the principles of scheduler, scheduler algorithms and Deadlock.
3. To learn various memory management schemes.
4. To understand the memory management services
5. To study I/O management, File system and Mass Storage Structure.

Course Out Comes (five outcomes for each unit should be mentioned)
1. After studying unit-1, the student will be able to understand the basics of smartphones and android platforms**.**
2. After studying unit-2, the student will be able to understand the basic concepts of user interface related to app development.
3. After studying unit-3, the student will be able to understand the importance of data persistence in a mobile environment.
4. After studying unit-4, the student will be able to understand the various services and network facilities provided by android platform.
5. After studying unit-5, the student will be able to understand the various apps deployed and developed on a mobile platform.

SYLLABUS
UNIT 1 - Operating System Basics - Services of Operating System-Classification of Operating System- Architecture and Design of an Operating System-Process Management -Introduction to Process-Process State -PCB - Process Scheduling - Interprocess Communication

UNIT 2 - Operating System Scheduling CPU Scheduling: Introduction - Types of CPU Scheduler - Scheduling Criteria - Scheduling Algorithms - FCFS Scheduling – SJF Scheduling; -Priority Scheduling - Round-Robin Scheduling- Multilevel Queue Scheduling - Deadlock - Basic Concept of Deadlock- Deadlock Prevention - Deadlock Avoidance- Deadlock - Detection and Recovery

UNIT 3 - Memory management - Address Binding; Logical and Physical Address Space-Memory Partitioning - Memory Allocation-Protection-Fragmentation and Compaction

UNIT 4 – Swapping - Using Bitmaps - Using Linked Lists- Paging-Mapping of Pages to Frames - Hierarchical Page Tables- Segmentation - Virtual Memory - Basic Concept of Virtual Memory-Demand Paging - Transaction Lookaside Buffer (TLB) - Inverted Page Table-Page Replacement Algorithms

UNIT 5 - File Management File Management - Basic Concept of File-Directory Structure-File Protection-Allocation Methods – Various Disk Scheduling algorithms

REFERENCES

1. Abraham Silberschatz Peter B. Galvin, G. Gagne, "**Operating System Concepts**", Sixth Edition, Addison Wesley Publishing Co., 2003.
2. W. Stallings, "**Operating systems - Internals and Design Principles**", 6th Edition, Pearson
3. William - Stalling "**Operating System**" Fourth Edition, Pearson Education, 2003.

SEM V	CORE THEORY	Lecture	Practical	Credit
FCA53	**Design and Analysis of Algorithms**	4	0	2

Course Objectives
1. To learn about the basics of various algorithms.
2. To understand the fundamentals of divide and conquer techniques.
3. To understand the basic algorithms that use greedy methods.
4. To apply the concept of traversal and searching algorithms.
5. To understand the concept of backtracking methods.

Course Outcomes (five outcomes for each unit should be mentioned)
1. After studying unit-1, the student will be able to understand various algorithm design techniques.
2. After studying unit-2, the student will be able to understand the basis of efficient algorithms for all kinds of problems**.**
3. After studying unit-3, the student will be able to use a simple approach which tries to find the best solution at every step.
4. After studying unit-4, the student will be able to provide a general insight into the dynamic programming approach.
5. After studying unit-5, the student will be able to understand the algorithm design paradigm for discrete and combinatorial optimization problems.

UNIT – I: ALGORITHM AND ANALYSIS
Objective: Understanding various algorithm design techniques.
Elementary Data Structures: Stack – Queues – Trees – Priority Queue – Graphs – What is an Algorithm? – Algorithm Specification – Performance Analysis: Space Complexity – Time Complexity – Asymptotic Notation – Randomized Algorithms.

UNIT – II: DIVIDE AND CONQUER
Objective: This technique is the basis of efficient algorithms for all kinds of problems**.**
General Method – Binary Search – Recurrence Equation for Divide and Conquer – Finding the Maximum and Minimum— Merge Sort – Quick Sort – Performance Measurement – Randomized Sorting Algorithm – Selection Sort – A Worst Case Optimal Algorithm – Implementation of Select2 – Stassen's Matrix Multiplications.

UNIT – III: THE GREEDY METHOD
Objective: This is a simple approach which tries to find the best solution at every step.
The General Method – Container Loading – Knapsack Problem – Tree Vertex Splitting – Job Sequencing with Deadlines – Minimum Cost Spanning Trees – Prim's Algorithm – Kruskal's Algorithm – An optimal Randomized Algorithm – Optimal Storage on Tapes – Optimal Merge Pattern – Single Source Shortest Paths.

UNIT – IV: DYNAMIC PROGRAMMING, TRAVERSAL & SEARCHING
Objective: Providing a general insight into the dynamic programming approach.
The General Method – Multistage Graphs – All Pair Shortest Path – Optimal Binary Search Trees – String Editing – 0/1 Knapsack – Reliability Design – The Traveling Salesperson Problem. Techniques for Binary Trees – Techniques for Graphs – BFS – DFS.

UNIT – V: BACKTRACKING & BRANCH AND BOUND
Objective: Algorithm design paradigm for discrete and combinatorial optimization problems.
The General Method – The 8– Queens Problem – Sum of Subsets– Graph Coloring – Hamiltonian Cycles – Branch and Bound: General Method – LC Branch and Bound – FIFO Branch and Bound.

TEXT BOOKS:
1. "Fundamentals of Computer Algorithms", Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, Galgotia Publications, Second Edition 2015.
2. "Introduction to Algorithms", Coremen T.H., Leiserson C.E. and Rivest R.L., PHI Publications, Third Edition, 1998.

REFERENCES:
1. "Introduction to the Design and Analysis of Algorithms", AnanyLevitin, Pearson Education, 2nd Edition.
2. "Introduction to Algorithms" Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Prentice Hall of India, New Delhi, Second Edition, 2007.
3. "Computer Algorithms – Introduction to Design & Analysis" Sara Baase and Allen Van Gelder, Pearson Education New Delhi, Third Edition, 2000.

SEM V	CORE PRACTICAL	Lecture	Practical	Credit
FPCA56	**MOBILE APPLICATION DEVELOPMENT LAB**	0	4	3

Course Objectives
1. To learn about the basics of developing android applications.
2. To understand the usage of the controls in android application.
3. To understand the advanced controls that are used in android applications.
4. To understand how the alerts are worked in application.
5. To understand the concept of connecting a database into the application.

Course Outcomes:
1. Able to understand about the basic developments of android applications
2. Able to understand the usage of the controls in android application.
3. Able to understand the advanced controls that are used in android applications.
4. Able to understand how the alerts are worked in application.
5. Able to understand the concept of connecting a database into the application.

SYLLABUS

1. Develop an application that uses GUI components, Font and Colors.

2. Develop an application that uses Intent and Activity.

3. Develop an application that uses Layout Managers and event listeners.

4. Write an application that draws basic graphical primitives on the screen.

5. Develop an application that makes use of RSS Feed.

6. Implement an application that implements Multi-threading.

7. Develop an application that creates an alarm clock.

8. Develop an application Using Widgets.

9. Implement an application that writes data to the SD card.

10. Implement an application that creates an alert upon receiving a message.

11. Develop an application that makes use of databases.

REFERENCES
NIL

SEM V	CORE PRACTICAL	Lecture	Practical	Credit
FPCA57	**OPERATING SYSTEM LAB**	0	4	3

Course Objectives

1. To learn about the basics of UNIX commands and shell programming.
2. To understand the programming knowledge of scheduling algorithms.
3. To understand the working of semaphores in an operating system.
4. To understand how to code various algorithms used in operating systems.
5. To understand how to code and the working procedure of file management concepts in the operating system.

Course Outcomes:

1. Able to understand the basics of UNIX commands and shell programming.
2. Able to understand the programming knowledge of scheduling algorithms.
3. Able to understand the working of semaphores in an operating system.
4. Able to understand how to code various algorithms used in operating systems.
5. Able to understand how to code and the working procedure of file management concepts in operating systems.

SYLLABUS

1. Basics of UNIX commands.
2. Shell Programming.
3. Implement the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
4. Implement all file allocation strategies
   a) Sequential b) Indexed c) Linked
5. Implement Semaphores
6. Implement all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG
7. Implement Bankers Algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection
9. Implement e all page replacement algorithms
   a) FIFO b) LRU c) LFU
10. Implement Shared memory and IPC
11. Implement Paging Technique of memory management.
12. Implement Threading & Synchronization Applications.

REFERENCES
NIL

SEM V	ELECTIVE I	Lecture	Practical	Credit
FECA54A	DATA MINING	3	0	3

Course Objectives

1. To learn about the basics of data and data mining concepts.
2. To understand the fundamentals of analytical and data warehousing concepts
3. To understand the techniques that are followed in data mining.
4. To understand the basics of outlier detection and clustering concepts
5. To understand the tools that are used in data mining.

Course Outcomes (five outcomes for each unit should be mentioned)

1. After studying unit-1, the student will be able to understand the basics of data mining and data.
2. After studied unit-2, the student will be able to understand about the methods of Data Warehousing
3. After studied unit-3, the student will be able to understand about the techniques of Data Mining
4. After studied unit-4, the student will be able to understand about the importance of Cluster and outlier detection
5. After studied unit-5, the student will be able to improve the student's knowledge with recent trends and tools

SYLLABUS

UNIT 1 - Data Mining Basics Introduction: Definition of data mining - data mining vs. query tools - machine learning - steps in data mining process - overview of data mining techniques.

UNIT 2 - Data Models Multidimensional Data Model - Data Cube - Dimension Modeling - OLAP Operations - Meta Data - Types of Metadata.

UNIT 3 - Data Editing Data Pre-Processing and Characterization: Data Cleaning - Data Integration and Transformation - Data Reduction - Data Mining Query Language - Generalization - Summarization - Association Rule Mining

UNIT 4 - Classification: Classification - Decision Tree Induction - Bayesian Classification - Prediction - Back Propagation - Cluster Analysis - Hierarchical Method - Density Based Method - Grid Based Method - Outlier Analysis.

UNIT 5 - Analysis Cluster analysis: Types of data - Clustering Methods - Partitioning methods - Model based clustering methods - outlier analysis. Advanced topics: Web Mining - Web Content Mining - Structure and Usage Mining - Spatial Mining - Time Series and Sequence Mining.

REFERENCES

1. PaulrajPonnaiah, "**Data Warehousing Fundamentals"**, Wiley Publishers, 2001.

2. Jiawei Han, MichelineKamber, "**Data Mining: Concepts and Techniques**",Morgan Kaufman Publishers, 2006.

3. Usama.Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth RamasamyUthurusamy, "**Advances in Knowledge Discovery and Data Mining**", the M.I.T. Press, 2007.

4. Ralph Kimball, Margy Ross, "**The Data Warehouse Toolkit, John Wiley and Sons Inc**"., 2002

5. Alex Berson, Stephen Smith, Kurt Thearling, "**Building Data Mining Applications for CRM**", Tata McGraw Hill, 2000.

6. Margaret Dunham, "**Data Mining: Introductory and Advanced Topics**", Prentice Hall, 2002.

7. Daniel T. Larose John Wiley & Sons, Hoboken, "**Discovering Knowledge in Data: An Introduction to Data Mining**", New Jersey, 2004.

SEM V	ELECTIVE I	Lecture	Practical	Credit
FECA54B	**Information Security**	**3**	**0**	**3**

Course Objectives

1. To learn about the basics of information security.
2. To understand the fundamentals of information security.
3. To understand the risk management techniques.
4. To understand the current techniques that are used in information security.
5. To understand the concept of networking concepts and techniques.

Course out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to understand the basic concepts of Information Security
2. After studied unit-2, the student will be able to understand the legal, ethical and professional issues in Information Security
3. After studied unit-3, the student will be able to know about risk management
4. After studied unit-4, the student will be able to understand the technological aspects of Information Security
5. After studied unit-5, the student will be able to understand the concepts of Cryptography and Hacking methods

UNIT I: INFORMATION SECURITY BASICS

Objective: To understand the basic concepts of Information Security

Introduction –History – What is Information Security? – Critical Characteristics of Information – NSTISSC Security Model – Components of an Information System – Securing the Components – Balancing Security and Access – The SDLC – The Security SDLC.

UNIT II SECURITY INVESTIGATION

Objective: To understand the legal, ethical and professional issues in Information Security

Security – Business Needs – Threats – Attacks – Legal – Ethical and Professional Issues – Relevant U.S. Laws – International Laws and Legal Bodies – Ethics and Information Security – Codes of Ethics and Professional Organizations

UNIT III SECURITY ANALYSIS

Objective: To know about risk management

Risk Management – Introduction – An Overview of Risk Management – Risk Identification – Risk Assessment – Risk Control Strategies – Selecting a Risk Control Strategy –Quantitative versus Qualitative Risk Control Practices – Risk Management Discussion Points

UNIT IV SECURITY MODELS

Objective: To understand the technological aspects of Information Security

Logical Design – Blueprint for Security – Information Security Policy – Standards and Practices– ISO 17799/BS 7799– NIST Models– VISA International Security Model – Design of Security Architecture – Planning for Continuity – Security Physical Design –Firewalls –Security Technology – IDS – IPS – Honey Pots – Honey Nets – Padded cell Systems Scanning and Analysis Tools – Access Control Devices.

UNIT V: CRYPTOGRAPHY AND ETHICAL HACKING

Objective: To understand the concepts of Cryptography and Hacking methods

Cipher methods – Cryptographic Algorithms and Tools – Attacks on Cryptosystems–Hacking – Effects of Hacking – Hacker – Types of Hacker– Ethical Hacker –Hacktivism– Networking & Computer Attacks – Malicious Software (Malware) – Protection Against Malware – Intruder Attacks on Networks and Computers – Wireless Hacking– Windows Hacking – Linux Hacking Session.

TEXT BOOKS:

1. "Principles of Information Security", Michael E Whitman and Herbert J Mattord, 5th Edition, Vikas Publishing House, New Delhi, 2003.

2. "Fundamentals of Information Systems Security", David Kim,MichaelG.Solomon, 3rd Edition ,Jones & Bartlett Learning, October 2016.

3. "The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy", Patrick Engebretson, 2nd Edition, Syngress Basics Series – Elsevier, 2011.

4. "Hands‑On Ethical Hacking and Network Defense", Michael T. Simpson, Kent Backman, James E. Corley, Second Edition, CENGAGE Learning, 2010.

REFERENCES:

1. "Handbook of Information Security Management", Micki Krause, Harold F. Tipton, sixth Edition, CRC Press LLC, 2004.

2. "Hacking Exposed", Stuart McClure, Joel Scrambray, George Kurtz, Tata McGraw–Hill, 2003.

3. "Computer Security Art and Science", Matt Bishop, 2ndEdition , Pearson/PHI, 2002.

SEM V	ELECTIVE I	Lecture	Practical	Credit
FECA54C	**SOFTWARE TESTING**	**3**	**0**	**3**

Course Objectives

1. To understand the basics of software testing.

2. To understand the fundamentals of software development models.

3. To understand the structural testing methods.

4. To understand the current techniques that are used in object oriented testing models.

5. To understand the concept of software testing quality details.

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to understand the concept of software testing, and software quality

2. After studied unit-2, the student will be able to learn to inspect and detect errors by going through each and every code segment

3. After studied unit-3, the student will be able to gain knowledge of various functional and structural testing techniques

4. After studied unit-4, the student will be able to understand basic concept of Software Management tools and object oriented testing

5. After studied unit-5, the student will be able to understand basic concept of Software quality and software quality assurance

UNIT I: INTRODUCTION TO SOFTWARE TESTING

Objective: To understand the concept of software testing, and software quality

Fundamentals of software testing – need for software testing– Psychology of testing – various approaches – characteristics of testing – principles of testing – testing strategies – verification and validation – Defect and Prevention strategies.

UNIT II: SOFTWARE DEVELOPMENT MODEL AND TESTING

Objective: To learn to inspect and detect errors by going through each and every code segment

Waterfall model– V–model– Spiral model– Agile model – Life cycle of testing– Static Testing – dynamic testing – White box testing – Block box testing – Regression testing – Integration Testing – System and Performance Testing – Usability Testing

UNIT III: FUNCTIONAL AND STRUCTURAL TESTING

Objective: To gain knowledge of various functional and structural testing techniques

Boundary Value Analysis – Equivalence Class Testing – Decision Table – Based Testing – Cause Effect Graphing Technique – Path testing –Cyclomatic Complexity – Graph Metrics – Data Flow Testing – Slice based testing

UNIT IV: TEST MANAGEMENT AND TOOLS

Objective: To understand basic concept of Software Management tools and object oriented testing

Test planning – cost–benefit analysis of testing – monitoring and control– test reporting – test control – Specialized testing – Object Oriented Testing – Automated Tools for Testing – Tool Selection and Implementation – Challenges in test automation– GUI Testing

UNIT V: SOFTWARE QUALITY AND SOFTWARE QUALITY ASSURANCE

Objective: To understand basic concept of Software quality and software quality assurance

Introduction to software quality and software quality assurance – basic principles about the software quality and software quality assurance – Planning for SQA – various models for software product quality and process quality – SCM – RAD – System Documentation

TEXT BOOKS:

1. "Software Testing– A Craftsman's Approach" – Paul C. Jorgensen – Second Edition – CRC Press 2008

2. "Software Testing", – Ron Patton, Second Edition –Sams Publishing, Pearson Education, 2007.

3. "Software Testing– A Craftsman's Approach" – Paul C. Jorgensen, Second Edition – CRC Press, 2008

REFERENCES:

1. "Software Testing and Analysis: Process, Principles and Techniques" – Mauro Pezze, Michal Young – Wiley India , 2008

2. "Software Engineering" – K.K. Aggarwal&Yogesh Singh – New Age International Publishers – New Delhi, 2003.

3. "Software Testing – Principles and Practices" –SrinivasanDesikan and Gopalaswamy Ramesh, Pearson Education, 2006.

SEM V	NMD	Lecture	Practical	Credit
FSAM50	**FOUNDATIONS OF AI&ML**	4	2	2

COURSE OBJECTIVE

The objective of this course is to provide an insight into the Artificial Intelligence domain and the various applications. It also lays focus on the generative AI / GPT which is the order of the day. This course introduces Artificial intelligence to learners using various use cases and real life examples. It also provides a brief overview of the various aspects of AI and delves deeper into various Machine learning concepts that form the fundamental building blocks. The course also introduces deep learning techniques, how computer vision uses AI and the AI-First strategy in the industry. Learners also get a point of view of the ethics to be followed and how prompt engineering has emerged as part of generative AI.

Total : 42 Periods

COURSE OUTCOMES

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

CO1 :

Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.

CO2 :

Comprehend the applications of AI in in business and real world use case scenarios

CO3 :

Comprehend the OpenAI and generative models with their applications

CO4 :

Gain awareness of usage of AI in computer vision related applications

UNIT-I

Introduction to Artificial Intelligence 7 hours

Introduction to Artificial Intelligence(AI)- Need – The What of AI- Types – Introduction to supervised/unsupervised learning, reinforcement learning-Timeseries forecasting- AI architecture

- -Applications of AI(Business – Retail, banking, Energy, manufacturing), -AI in platforms, Auto encoders, Vision

UNIT-II

Introduction to Deep Learning 5 hours

Deep Learning - Evolution and Business Potential - Introduction to Artificial Neural Network - Convolution Neural – Networks Recurrent Neural Networks – Autoencoders - Deep Learning & Business - Deep learning Frameworks and Products - Course Summary - Self-Assessment - Deep Learning

UNIT-III

Computer Vision & Ethical AI 9 hours

Prelude - Concepts and Techniques in Computer Vision - Computer Vision Tools and Platforms –AI and Ethics - Guidelines, Regulations & Standards for Ethical AI - Building Blocks of Responsible AI - Core Ethical Requirements of AI Systems

UNIT-IV

AI-First approach to Software Engineering & OpenAI GPT Models 10 hours

AI First – a paradigm shift - AI-First Interpretations - AI First SDLC Phases -Limitations of Large Language Models – generative vs. discriminative models – Language, transformer, pre-trained models – GPT, use case, applications -Code demo

UNIT-V

NLP, Prompt Engineering 11 hours

NLP & its applications – Challenges – NLP pipeline – Deep learning for NLP – Tools & platforms - Generative Pre-trained Models -Large Language Models - Need for Prompt Engineering - Prompt Engineering Guidelines - Text Completion - Code Completion -Troubleshooting - Limitations of Large Language Models - Chat GPT - Language Model Applications

FOR FURTHER READING

Saroj Kaushik, Artificial Intelligence, Cengage learning, 2014

Elaine Rich, Kevin Knight, Artificial Intelligence, Tata McGraw Hill

Nils J. Nilsson, Principles of Artificial Intelligence, Elsevier, 1980

StaurtRussel, Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson Education, 3rd Edition,2009

REFERENCE

Curriculum related:

Introduction to Artificial Intelligence

Introduction to Deep Learning

Computer Vision

AI-First approach to software engineering

Ethical AI

Introduction to OpenAI GPT Models

Natural Language processing

Further reading:

Generative models for developers

COURSE OBJECTIVE

The objective of this course is to provide a view of data science, machine learning, basic implementation using Python and how machine learning is applied in various domains in the industry. The course outlines the importance of data engineering, data and its analysis, in today's business world. It also enables the participants to comprehend various scenarios where data science can be applied to solve business problems. The participants will also learn how a typical data science project is implemented.

PRE-REQUISITE KNOWLEDGE :

Learners who undergo this course would need to understand the following pre-requisites to be able to appreciate and undergo the contents:

• Python programming language

• Probability and statistics using Python

Total : 53 Periods

COURSE OUTCOMES

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

CO1 :

Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.

CO2 :

Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

CO3 :

Assess and select appropriate data analysis models for solving real-world problem.

CO4 :

Demonstrate the importance of data visualization, design, and use of visual components.

UNIT-I

Introduction to Data Science 4 hours

Data Science: The Data Revolution - Components of Data Science - Data Science in Action

UNIT-III

Python for Data Science 16 hours

Why Python Libraries – NumPy - Introduction to NumPy - Operations on NumPy – Pandas – Introduction to Pandas – Introduction to Pandas Object – Working with datasets – Pandas Plots - Matplotlib – Introduction to Matplotlib – Types of Plots – Scikit-learn – Machine Learning using sklearn. [Practical hands-on exercises using NumPy, Pandas, Matplotlib]

UNIT-II

Explore Machine Learning Using Python 17 hours

Introduction to Machine Learning – Types of Machine Learning – Machine Learning Process - Regression – Classification – Clustering – Introduction to Artificial Neural Network- Capstone project

UNIT-IV

Data visualization Using Python 9 hours

Data visualization using Python: Data Visualization: Developing insights from data using Basic Plots using Matplotlib (Box, Scatter, Line, Bar, Pie, Histogram), Statistical analysis using

Heatmap, Kernel Density plot using Seaborn, Network Graphs, Choropleth Map Using Ploty, Word Cloud. [Practical hands-on exercises for creating charts]

UNIT-V

Exploratory Data Analysis 7 hours

Collecting and Organizing Data - Importing Data – Pre-processing Data -Exploring and Summarizing Data - Exploring and Summarizing Data – Developing Insights from Data - Capstone Project

FOR FURTHER READING

Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems by Aurelien Geron

Machine Learning using Python by Manaranjan Pradhan and U Dinesh Kumar

REFERENCE

Curriculum related:

Introduction to Data Science

Python for Data Science

Explore Machine Learning using Python

Exploratory Data Analysis

Further reading:

Regression Analysis

Clustering using Python

SEM VI	CORE THEORY	Lecture	Practical	Credit
FCA61	**Open Source Software**	4	0	4

Course Objectives

1. To understand about using pre-existing code to improve the software and even come up with their own innovations.

2. To understand the fundamentals of the LINUX operating system.

3. To understand the concept of scripting code for a website.

4. To understand the fundamentals of PHP language combined with HTML.

5. To understand the fundamentals of PERL languages.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studying unit-1, the student will be able to understand the concept of HTML, HTML5 and CSS.

2. After studied unit-2, the student will be able to learn to inspect and detect errors by going through each and

every code segment.

3. After studying unit-3, the student will be able to understand the basic concept of Java Script and MySQL.

4. After studied unit-4, the student will be able to understand basic concept of PHP

5. After studied unit-5, the student will be able to understand basic concept of PERL

UNIT I: INTRODUCTION TO HTML, CSS

Objective: To understand the concept of HTML, HTML5 and CSS.

Need of Open Source –Advantages of Open source –Application of Open Source – HTML – HTML tags –Dynamic Web content– HTTP Request and Response Procedure–Introduction to HTML5– HTML5 Canvas – HTML5 Audio and Video–Introduction to CSS– CSS Rules–Style Types–CSS Selectors– CSS Colors.

UNIT II: LINUX

Objective: To learn to inspect and detect errors by going through each and every code segment.

Introduction: Linux Essential Commands – Kernel Mode and user mode –File system Concept – Standard Files – The Linux Security Model – Vi Editor – Partitions Creation – Shell Introduction – String Processing – Investigation and Managing Processes – Network Clients – Installing Application.

UNIT III: JAVA SCRIPT AND MYSQL

Objective: To understand the basic concept of Java Script and MySQL.

Java script: Advantages of JavaScript –JavaScript Syntax–Data type– Variable– Array – Operators and Expressions– Loops – functions – Dialog box– MySQL – The show Databases and Table – The USE command –Create Database and Tables – Describe Table – Select, Insert, Update, and Delete statement.

UNIT IV: PHP

Objective: To understand basic concept of PHP

PHP Introduction – General Syntactic Characteristics – PHP Scripting – Commenting your code – Primitives, Operations and Expressions – PHP Variables – Operations and Expressions Control Statement – Array – Functions – Basic Form Processing – File and Folder Access – Cooking – Sessions – Database Access with PHO.

UNIT V: PERL

Objective: To understand basic concept of PERL

PERL : Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules– Working with Files – Data Manipulation.

TEXT BOOKS:

1. "The Complete Reference Linux", Peterson, Tata McGraw HILL–2010
2. "Perl: The Complete Reference", Martin C. Brown, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2009.
3. "MYSQL: The Complete Reference", VikramVaswani, 2nd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2009
4. "PHP: The Complete Reference", Steven Holzner, 2nd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2009.
5. "Complete Reference HTML", T. A. Powell, 3rd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2002.
6. "Mastering Java script" –J. Jaworski, BPB Publications, 1999

REFERENCES:

1. "Fundamentals of Open Source Software", by M.N. Rao, PHI publishers.
2. "MySQL Bible", Steve Suchring, John Wiley, 2002
3. "The Linux Kernel Book", Remy Card, Eric Dumas and Frank Mevel, Wiley Publications, 2003
4. Ivan Byross, HTML, DHTML, Javascript, Perl, BPB Publication

SEM VI	CORE THEORY	Lecture	Practical	Credit
FCA62	**PYTHON PROGRAMMING**	4	0	4

Course Objectives:

1. To understand the basic building blocks for PYTHON programming.
2. Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and
functions
3. Work with user input to create fun and interactive programs
4. To acquire Object Oriented Skills in Python
5. To develop the skill of designing Graphical user Interfaces in Python

Course OutComes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the basic building blocks for creating PYTHON
programming in detail.
2. After studied unit-2, the student will be able to understand the control statements and basic methods used in
PYTHON programming
3. After studying unit-3, the student will be able to understand the basic built- in functions.
4. After studied unit-4, the student will be able to understand some advanced methods to use in PYTHON
5. After studied unit-5, the student will be able to understand the concept of objects used in PYTHON

UNIT I:
Identifiers – Keywords - Statements and Expressions – Variables – Operators – Arithmetic operators – Assignment operators – Comparison operators – Logical operators – Bitwise operators - Precedence and Associativity – Data types - Number – Booleans – Strings - Indentation – Comments – Single line comment – Multiline comments - Reading Input – Print Output – Type Conversions – int function – float function – str() function – chr() function – complex() function – ord() function – hex() function – oct() function - type() function and Is operator – Dynamic and Strongly typed language.

UNIT II:
Control Flow Statements – If statement – If else statement – If elif else statement – nested if statement - while loop – for loop – continue and break statements – catching exceptions using try and except statement – syntax errors – exceptions – exception handling – Strings – str() function - Basic string operations – String comparison – Built in functions using strings – Accessing characters in string – String slicing – String joining – split() method – string traversing.

UNIT III:
Functions – Built in functions – function definition and calling - return statement – void function – scope and lifetime of variables – args and kwargs – command line arguments - Tuples – creation

– basic tuple operations – tuple() function – indexing – slicing – built-in functions used on tuples – tuple methods – packing – unpacking – traversing of tuples – populating tuples – zip() function - Sets – Traversing of sets – set methods – frozenset.

UNIT IV:
Lists: Using List- List Assignment and Equivalence – List Bounds- Slicing - Lists and Functions- Prime Generation with a List. List Processing: Sorting-Flexible Sorting- Search- List Permutations- Randomly Permuting a List- Reversing a List.

UNIT V:
Objects: Using Objects- String Objects- List Objects. Custom Types: Geometric Points- Methods- Custom Type Examples- Class Inheritance. Handling Exceptions: Motivation- Exception Examples- Using Exceptions - Custom Exceptions.

TEXT BOOKS:

1. Gowrishankar S, Veena A, "Introduction to Python programming", 1st Edition, CRC Press/Taylor & Francis, 2008. (Units 1-3)
2. Learn to Program with Python, 3th Edition, Richard L. Halterman, Southern Adventist University. (Units 4-5)

REFERENCE BOOKS:
1. Core Python Programming, 2thEdition, Wesley J. Chun, Prentice Hall.
2. Jake VanderPlas,"Python Data Science Handbook:Essential Tools for working with Data",1st edition, O'Reilly Media, 2016.

SEM VI	ELECTIVE I	Lecture	Practical	Credit
FECA63A	**BIG DATA ANALYTICS**	**3**	**0**	**3**

Course Objectives
1. To explore the fundamental concepts of big data analytics.

2. To learn to use various techniques for mining data streams.

3. To learn the Big Data Business Perspective

4. To understand the applications using Map Reduce Concepts.

5. To introduce programming tools HIVE in the Hadoop ecosystem.

Course Outcomes
1. After studying unit-1, the student will be able to understand the key issues in big data management.

2. After studying unit-2, the student will be able to outline big data planning, processing.

3. After studying unit-3, the student will be able to Acquire fundamental enabling techniques and be scalable.

4. After studying unit-4, the student will be able to examine various big data tools and techniques.

5. After studying unit-5, the student will be able to achieve adequate perspectives of Big Data Analytics in various Applications like recommender systems, Social Media Applications, etc.

UNIT–I: INTRODUCTION TO BIG DATA
Objective: To explore the fundamental concepts of big data analytics.
Introduction to big data: Introduction to Big Data Platform – Challenges of Conventional Systems – Intelligent data analysis – Nature of Data – Characteristics of Data – Evolution of Big Data – Definition of Big Data – Challenges with Big Data – Volume, Velocity, Variety – Other Characteristics of Data – Need for Big Data–Analytic Processes and Tools – Analysis vs. Reporting.

UNIT–II: MINING DATA STREAMS
Objective:To learn to use various techniques for mining data streams.

Mining data streams: Introduction To Streams Concepts – Stream Data Model and Architecture – Stream Computing – Sampling Data in a Stream – Filtering Streams –Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window – Real time Analytics Platform(RTAP) Applications – Case Studies – Real Time Sentiment Analysis– Stock Market Predictions.

UNIT III: BIG DATA FROM DIFFERENT PERSPECTIVES
Objective: To learn the Big Data Business Perspective
Big data from business Perspective: Introduction of big data–Characteristics of big data–Data in the warehouse and data in Hadoop– Importance of Big data– Big data Use cases– Patterns for Big

data deployment. Big data from Technology Perspective: –Application Development in Hadoop–Getting your data in Hadoop.

UNIT –IV:HADOOP AND MAP REDUCE
Objective: To understand the applications using Map Reduce Concepts.
Hadoop: The Hadoop Distributed File System – Components of Hadoop Analysing the Data with Hadoop– Scaling Out–Hadoop Streaming– Design of HDFS–Java interfaces to HDFS Basics–Developing a Map Reduce Application–How MapReduce Works–Anatomy of a Map Reduce Job run–Failures–Job Scheduling–Shuffle andSort – Task execution – Map Reduce Types and Formats– Map Reduce Features–Hadoop environment.

UNIT – V: FRAMEWORKS
Objective: To introduce programming tools HIVE in the Hadoop ecosystem.
Frameworks: Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive – fundamentals of HBase and ZooKeeper– IBM InfoSphereBigInsights and Streams.

TEXT BOOKS:
1. "Intelligent Data Analysis", Michael Berthold, David J. Hand, Springer, 2007.
2. "Hadoop: The Definitive Guide ", Tom White Third Edition, Oreilly Media, 2012.

REFERENCES:

1. "Big Data and Analytics" SeemaAcharya, Subhasini Chellappan, Wiley 2015.
2. "Mining of Massive Datasets",AnandRajaraman and Jeffrey David Ullman,CUP,2012.
3. "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data" .Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos,McGrawHill Publishing, 2012.
4. "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", Bill Franks, John Wiley& sons, 2012.
5. "Making Sense of Data", Glenn J. Myatt, John Wiley & Sons, 2007.

SEM VI	ELECTIVE II	Lecture	Practical	Credit
FECA63B	**CRYPTOGRAPHY**	**3**	**0**	**3**

Course Objectives
1. Understand OSI security architecture and classical encryption techniques.

2. Understand the different cryptographic operations of symmetric cryptographic algorithm**s.**

3. Understand the different cryptographic operations of Public key cryptographic algorithms.

4. To make use of application protocols to design and manage a secure system.

5. To learn the configuration and manage E–mail and WLAN Security.

Course Outcomes
1. After studying unit-1, the student will be able to know the security attacks and services.

2. After studying unit-2, the student will be able to understand the concept of Encryption Standards.

3. After studying unit-3, the student will be able to understand public key cryptographic algorithms.

4. After studying unit-4, the student will be able to learn the concept of hash functions.

5. After studying unit-5, the student will be able to understand Email security.

UNIT – I: COMPUTER AND NETWORK SECURITY
Objective: Understand OSI security architecture and classical encryption techniques**.**
Computer Security Concepts –OSI security architecture –Security trends–Security attacks – Security Services– Security Mechanisms –Fundamental Security Design Principles – Attack Surfaces and Attack Trees – Model for Network Security – Network Standards.

UNIT – II:SYMMETRIC CRYPTOGRAPHY
Objective: Understand the different cryptographic operations of symmetric cryptographic algorithm**s.**
Symmetric Cipher – Classical Encryption Technique – Symmetric Cipher Model – Substitution Techniques, Transposition Technique – Steganography – Block Cipher and the Data Encryption Standard – The Data Encryption Standard – Differential and Linear Cryptanalysis – Block Cipher Principles.Advanced Encryption Standard – AES Structure – AES Transformation Function.

UNIT – III:PUBLIC KEY CRYPTOGRAPHY
Objective: Understand the different cryptographic operations of Public key cryptographic algorithms.
Public Key Cryptography and RSA Principles– RSA Algorithm, Key Management and other Public Key Cryptosystems Key Management, Diffie–Hellman Key Exchange, Elliptic Curve Arithmetic – Elliptic Curve Cryptography – Pseudorandom Number Generation**.**

UNIT –IV:HASH FUNCTIONS AND DIGITAL SIGNATURES
Objective: To make use of application protocols to design and manage a secure system.
Cryptographic Hash Functions – Application of Hash Functions – Two Simple Hash Functions – Secure Hash Algorithm(SHA) –Message Authentication Codes –Authentication requirement – Authentication function – MAC – HMAC – CMAC – Digital signature and authentication protocols – Digital Signature Standards –Digital Signatures Schemes– Digital Certificate – Key Management and Distribution.

UNIT –V: SECURITY APPLICATIONS
Objective: To learn the configuration and manage E–mail and WLAN Security.
Intrusion Detection System– Password Management – Introduction to Firewall– Firewall Generations– Web Security – Wireless network Security – Electronic Mail Security– Internet Mail Architecture–S/MIME – Pretty Good Privacy (PGP).
.
TEXT BOOKS:
1. "Cryptography and Network security Principles and Practices",William Stallings,Pearson/PHI,Seventh Edition, 2017.
2. "CRYPTOGRAPHY & NETWORK SECURITY" – Principles and Practices, William Stallings, Pearson Education, Third Edition.

REFERENCES:

1. "Modern Cryptography Theory and Practice", Wenbo Mao, Pearson Education, 2004.
2. "Cryptography and Network Security ",BehourzForouzan, DebdeepMukhopadyay,Tata McGraw Hill Education Pvt. Ltd, New Delhi, 2010.
3. "Quantum Cryptography and Secret–Key Distillation", Gilles van Assche, Cambridge University Press, 2010.

SEM VI	ELECTIVE II	Lecture	Practical	Credit
FECA63C	**DIGITAL IMAGE PROCESSING**	3	0	3

Course Objectives
1. To know the basics of Digital image and techniques.

2. To understand various Image enhancement ideas.

3. To understand Image restoration techniques.

4. To understand degrees of image resolution and compression methods.

5. To understand concepts of image representation and recognition.

Course Outcomes
1. After studying unit-1, the student will be able to understand the concepts like MatLab, DIP, electromagnetic spectrum, etc.

2. After studying unit-2, the student will be able to analyze smoothing and sharpening techniques.

3. After studying unit-3, the student will be able to know about image filters.

4. After studying unit-4, the student will be able to gain knowledge about compression techniques.

5. After studying unit-5, the student will be able to know about image representation.

UNIT – I: FUNDAMENTALS
Objective: To know the basics of Digital image and techniques.
Introduction – Origin – Steps in Digital Image Processing – Components – Applications of DIP – Elements of Visual Perception – Light and Electromagnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – Images in Matlab– Pixels – Color models – Digital Image Processing in Multimedia.

UNIT – II: IMAGE ENHANCEMENT
Objective: To understand various Image enhancement ideas.
Spatial Domain – Gray level transformations – Histogram Quantization – Histogram matching and processing – Basics of Spatial Filtering – Smoothing and Sharpening Spatial Filtering – Introduction to Fourier Series – Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal – Butterworth and Gaussian filters

UNIT – III: IMAGE RESTORATION AND SEGMENTATION
Objective: To understand Image restoration techniques.
Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation– Active Contour Models – Snakes – Fuzzy Connectivity – Morphological processing– erosion and dilation.

UNIT – IV: WAVELETS AND IMAGE COMPRESSION
Objective: To understand degrees of image resolution and compression methods.
Wavelets – Subband coding – Multi resolution expansions – Compression: Fundamentals – Image Compression models – Error Free Compression – Predictive Compression Methods – Vector Quantization – Variable Length Coding – Bit–Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards

UNIT – V: IMAGE REPRESENTATION AND RECOGNITION
Objective: To understand concepts of image representation and recognition.
Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Fuzzy Systems – Chain Code – Polygonal approximation, signature, boundary segments – Shape number – Fourier Descriptor moments – Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

TEXT BOOKS
1. "Digital Image Processing," Rafael C. Gonzalez, Richard E.Woods, Prentice Hall, Third Edition, 2008.
2. "Digital Image Processing and Computer Vision," Sonka, Hlavac, Boyle, Cengage Learning, 2009
3. "Fundamentals of Digital Image Processing", Anil Jain K, PHI Learning Pvt. Ltd., 2011.

REFERENCES:
1. **"Digital Image Processing", S. Sridhar, Oxford University Press; Second edition, 2016.**
2. **"Digital Image Processing", Gonzalez & woods, Pearson Education India, 2016.**

SEM VI	ELECTIVE III	Lecture	Practical	Credit
FECA64A	**ARTIFICIAL INTELLIGENCE**	**3**	**0**	**3**

Course Objectives
1. To know the basics of Artificial Intelligence.

2. To Understand the Methods and Algorithms in AI.

3. To learn to represent knowledge in solving AI problems.

4. To Understand Statistical logics and know about Software agents.

5. To learn how Machine learning is related to AI.

Course Outcomes
1. After studied unit-1, the student will be able to recall the fundamentals of artificial intelligence

2. After studied unit-2, the student will be able to understand the techniques used for AI

3. After studying unit-3, the student will be able to know about knowledge representation.

4. After studying unit-4, the student will be able to gain knowledge about fuzzy logic.

5. After studied unit-5, the student will be able to evaluate the design of new artificial intelligence and machine learning applications

UNIT I: INTRODUCTION TO ARTIFICIAL INTELLIGENCE:
Objective: To know the basics of Artificial Intelligence.
History of AI – Artificial Narrow Intelligence (ANI) – Artificial General Intelligence (AGI) – Artificial Super Intelligence (ASI) – Characteristics – Types of AI – Domains – Programming Languages of AI – Applications of AI – Future of AI.

UNIT II: AI – PROBLEM SOLVING METHODS:
Objective: To Understand the Methods and Algorithms in AI.
Problem solving Methods – Search Strategies: Uninformed – Informed – Heuristics – Generate and test – hill climbing – Best first search – problem reduction – Local Search Algorithms and Optimization – Game Playing mini–max procedure – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games

UNIT III: AI – KNOWLEDGE REPRESENTATION:
Objective: To learn to represent knowledge in solving AI problems.
Procedural Versus declarative knowledge – logic programming – Forward Versus backward reasoning – Matching – Control knowledge – Ontological Engineering– Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories –Reasoning with Default Information.

UNIT IV: STATISTICAL REASONING AND AGENTS:
Objective: To Understand Statistical logics and know about Software agents.
Probability and Bayes Theorem – Certainty factors – Probabilistic Graphical Models – Bayesian Networks – Markov Networks – Fuzzy Logic. Architecture for Intelligent Agents – Agent

communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi–agent systems.

UNIT V: MACHINE LEARNING AND APPLICATIONS

Objective: To learn how Machine learning is related to AI.

Types of Machine Learning – Neural Networks – Deep Learning – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving.

TEXT BOOKS:

1. "Artificial Intelligence", Elaine Rich, Kevin Knight, Tata McGraw Hill, II Edition.
2. "Artificial Intelligence: A Modern Approach," Stuart Russell, Peter Norvig, Third Edition, Prentice Hall of India, New Delhi, 2010.
3. "Prolog: Programming for Artificial Intelligence", I. Bratko, Addison – Wesley Educational Publishers Inc., Fourth edition 2011.

REFERENCES:

1. "Machine Learning for Beginners 2019", Matt Henderson, This Is Charlotte, 2019
2. "Introduction to Artificial Intelligence and Expert Systems", Dan W. Patterson, Pearson, 2015

SEM VI	ELECTIVE III	Lecture	Practical	Credit
FECA64B	SYSTEM SOFTWARE	3	0	3

Course Objectives
1. To understand the basic concepts of system software
2. Ability to trace the path of a source code to object code and to executable file
3. To design and implementation of loaders and linkers
4. To understand the concepts of macro processor
5. Ability to analyze the functions of compilers

Course Outcomes (five outcomes for each units should be mentioned)
1. After studying unit-1, the student will be able to analyze CISC and RISC machines.
2. After studying unit-2, the student will be able to know how assemblers are working.
3. After studying unit-3, the student will be able to distinguish Linker and Loader.
4. After studying unit-4, the student will be able to learn macro processor.
5. After studying unit-5, the student will be able to understand the functions of compilers**.**

SYLLABUS
UNIT 1 - LANGUAGE PROCESSORS
Language Processing Activities – Fundamentals of Language Processing – Fundamentals of Language Specification – Language Processor Development Tools.

UNIT 2 - ASSEMBLERS AND MACRO
Elements of Assembly Language Programming – Overview of Assembly Process - Design of a Two – Pass Assembler - Macro Definition and Call – Macro Expansion – Nested Macro Calls.

UNIT 3 - COMPILER I
Scanning: Finite State Automata – Regular Expressions – Building DFA – Performing Semantic Action – Writing a Scanner – Parsing: Parse Tree and Abstract Syntax Trees – Top Down Parsing – Bottom-Up Parsing.

UNIT 4 - COMPILER II AND INTERPRETERS
Aspects of Compilation –Memory Allocation - Compilation of Expressions-Compilation of Control Structure-Code Optimization - Interpreters.

UNIT 5 - LINKERS
Relocation and Linking Concepts – Design of a Linker – Self-Relocating Programs – Linking for Overlays - Loader.

REFERENCES
D.M. Dhamdhere, "**System Programming and Operating Systems**",Tata McGraw-Hill Publishing Company Limited, New Delhi,1993.

SEM VI	ELECTIVE III	Lecture	Practical	Credit
FECA64C	**MOBILE COMPUTING**	**3**	**0**	**3**

Course Objectives

1. To understand basic concepts of mobile computing.

2. To learn the basics of mobile telecommunication system

3. To comprehend wireless LAN and cellular systems.

4.To understand protocols at the network and transport layer.

5. To learn development of applications in mobile computing platforms.

Course Outcomes (five outcomes for each unit should be mentioned)

1. After studying unit-1, the student will be able to understand basic concepts of mobile computing.

2. After studying unit-2, the student will be able to learn the basics of mobile telecommunication systems.

3. After studying unit-3, the student will be able to comprehend wireless LAN and cellular systems.

4. After studying unit-4, the student will be able to understand protocols at the network and transport layer.

5. After studying unit-5, the student will be able to learn development of applications in mobile computing platforms.

UNIT I: WIRELESS COMMUNICATION FUNDAMENTALS

Objective: To understand basic concepts of mobile computing.

Introduction–Applications–A short History of wireless Communications–Wireless Transmission – Frequencies for Radio transmission–Signals–Antennas–Signal Propagation–Multiplexing–Modulations–Amplitude shift keying–Frequency shift keying–Phase shift keying–Spread Spectrum.

UNIT II: MEDIUM ACCESS CONTROL AND TELECOMMUNICATION SYSTEM

Objective: To learn the basics of mobile telecommunication systems.

SDMA–FDMA–TDMA–Fixed TDM–Classical Aloha–CDMA–Global System for Mobile Communications –GPRS–Satellite Systems –Basics –Applications–Broadcast Systems – Digital Audio Broadcasting – Digital Video Broadcasting.

UNIT III: WIRELESS NETWORKS

Objective: To comprehend wireless LAN and cellular systems.

Infrared vs. Radio Transmission– Infrastructure Networks–Ad hoc Networks – IEEE 802.11 –System Architecture–Protocol Architecture–Bluetooth–User scenarios–Bluetooth Architecture–Introduction to Wireless ATM –Services–Location Reference Model.

UNIT IV: MOBILE NETWORK LAYER

Objective: To understand protocols at the network and transport layer.

Mobile IP–Goals– Assumption–Entities and Terminology– IP Packet delivery – Agent advertisement and discovery–Registration–Tunneling and encapsulation–Optimizations–Dynamic Host Configuration Protocol (DHCP) –Routing –DSDV–DSR – Alternative Metrics.

UNIT V: WIRELESS APPLICATION PROTOCOL

Objective: To learn development of applications in mobile computing platforms.

Introduction–Protocol Architecture–Wireless Markup Language(WML)–WML Script– Applications–Wireless Telephony Application (WTA) – Wireless Telephony Application Architecture.

TEXT BOOKS:

1. "Mobile Communications", Jochen Schiller –PHI/Pearson Education, Second Edition, 2003.

2. "Mobile Computing", Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal –Tata McGraw Hill Publications, Second edition, 2010.

REFERENCES:

1. "Principles of Wireless Networks", KavehPahalavan, PrasanthKrishnamoorthy, PHI/Pearson Education, 2003.

2. "Fundamentals of Mobile and Pervasive Computing", Frank Adelstein, ,SandeepK.S.Gupta, Golden G.Richard III, Loren Schwiebert –Tata McGraw Hill Publications, 2005.

3. "Wireless Communications and Networks", Williams Stallings–Pearson Education, Second Edition, 2009.

SEM VI	NMD	Lecture	Practical	Credit
FECA69C	**Cyber Security**	**4**	**0**	**2**

Cyber Security course contents
1. Course 1: Information Security Fundamentals
2. Course 2: Cyber Security Introduction
3. Course 3: Technologies in Cybersecurity eco-system
4. Course 4: Core Threat Intelligence Engineering
5. Course 5: Core Vulnerability Management Engineering
6. Course 6: Core Penetration Management Techniques
7. Course 7: Core Cyber Exploitations
8. Course 8: Global Cyber Attack Trends
9. Course 9: Security Operations Management
10. Course 10: Incident Management
11. Course 11: Web and Mobile security Techniques
12. Course 12: Privacy and Online Rights
13. Course 13: Best Practices for keeping Systems and Data safe
14. Course 14: Cloud Security Engineering
15. Course 15: Industry Infosec Governance

Course 1 - Information Security Fundamentals : Broad Overview of Information Security will cover the following topics:
• 1.1 Information Security, 1.2 Computer Security, 1.3 CIA Triad/Principles, 1.4 Non-repudiation, 1.5 Risk Management
• 1.6 Cryptography Basics, 1.7 Authentication, 1.8 Authorization, 1.9 Access Control, 1.10 Security Policies
• 1.11 Security Auditing, 1.12 Security Laws and Regulations, 1.13 Defense, 1.14 Security Monitoring, 1.15 ISO 27000 framework
• 1.16 Information Security use case demonstration as per industry verticals, 1.17 Policy, Process, Procedures, Standards, Guidelines, Baselines
Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:
• Case structure – Objectives, Target audience, Executive summary, Background, Your evaluation, Proposed solution, Conclusion
• Case Study #1: List Foundations of HealthCare Industries
• Patient medical records contain sensitive information that must be protected from unauthorized access.
• Case Study #2: List Strong Foundations of Fintech Industries
• Financial institutions handle large amounts of sensitive financial data, such as account numbers and transaction history, which must be protected from cyber threats
• Demo
• Scenario based role play (Cybersecurity strategy development, Incident response plan)
• Group discussion
• Quiz

Course 2 - Cyber Security Introduction : Broad Overview of Cyber Security will cover the following topics:

• 2.1 Cybersecurity, 2.2 Cybers attacks, 2.3 Social Engineering, 2.4 Cybersecurity Defences (Firewall, AV, SIEM, Patch, Password etc), 2.5 Cloud security, 2.6 Endpoint security, 2.7 Mobile security, 2.8 Zero trust, 2.9 IOT, 2.10 Layers of cybersecurity, 2.11 Hacking, 2.12 Incident management, 2.13 Security operations

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:
• Case Study #3: Define cyber security governance structure for CISO in bank
• Case Study #4: Define cyber security structure for CISO in Auto manufacturing
• Scenario based role play (Cybersecurity strategy development, Incident response plan)
• Group discussion
• Quiz

Course 3 - Technologies in Cybersecurity eco-system: Broad Overview of Technologies will cover the following topics:

• 3.1 Network security – Architecture and Standards, Wireless security, Network Vulnerabilities, Threats – Password cracking, Spoofing, Packet sniffing, Port scanning, Poisoning

• 3.2 System security - Asset classification, Asset accountability, Configuration management, Privilege access control, Virtualization security, System hardening, End-point security, System upgrades and patches, Backup and recovery, Systems Auditing, Threats – Denial of Service (DOS), DHCP spoofing, Dictionary attack, Email spoofing

• 3.3 Software security – Secure Design, Secure Coding, Static Security, Dynamic Security, Open source governance, Software composition analysis, Log and audit trail ,OWASP Top10 Threats - SQL Injection, Cross Site Scripting (XSS), Cross Site Request Forgery (CSRF)

• 3.4 Cryptography Basics – Security by Obscurity, Cryptographic Keys, Asymmetric, Symmetric, Hashing, Public Key Infrastructure (PKI), Challenges in cryptography

• 3.5 Application of Cryptography – Virtual Private Network (VPN), Secure Socket Layer (SSL), Digital Signature

• 3.6 Cloud security – Identity and Access management (IAM), Key management, Governance, Risk and Compliance (GRC), Legal, Data sovereignty, Business continuity, Disaster recovery, Cloud security models

• 3.7 Block chain security, 3.8 Zero Trust, 3.9 XDR, 3.10 AI, 3.11 MUD, 3.12 Context aware

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:
• Case Study #5: What are the Fundamental Network protections used in Any Industry
• Firewalls, IDS, IPS, VPN, Antivirus, SIEM
• Case Study #6: List methods to Secure Data in transit and Data at rest
• Encryption, Hashing,
• Case Study #7: How many ways can you protect any user account in applications
• 2FA, MFA, Password Management
• Demo
• Scenario based role play (Cybersecurity strategy development, Incident response plan)
• Group discussion
• Quiz

Course 4 - Core Threat Intelligence Engineering: Broad Overview of threat intelligence will cover the following topics:

• 4.1 Threat model, 4.2 Tactical, operations and strategic threat intelligence, 4.3 How to detect, respond and defeat threats, 4.4 Adversary data, 4.5 Reactive and proactive threat approach , 4.6 IOC, 4.7 Cyber kill chain,. 4.8 MITRE ATT@ACK

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:
• Case Study #8: How many Levels of User expertise are involved to form an Threat Intel team
• Case Study #9: What are the roles included in Threat Intelligence at Industry level
• Demo
• Scenario based role play (Cybersecurity strategy development, Incident response plan)
• Group discussion
• Quiz

Course 5 - Core Vulnerability Management Engineering: Broad Overview of Vulnerability management will cover the following topics:
• 5.1 what is vulnerability, Threats, Risks, Exploitation, 5.2 Computer ports / protocols, 5.3 Ethical hack, Recon, Enumeration, Port Scanning, 5.4 Tools, 5.5 Attack Toolset – Metasploit, Nessus, nmap, Burpsuite, 5.6 Basic defence measures - Antivirus, Intrusion Detection / Prevention systems
Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:
• Case Study #10: What are few examples of an Vulnerability as per Industry oriented applications
• Case Study #11: Explain RACI Matrix in banking environment
• Demo
• Scenario based role play (Cybersecurity strategy development, Incident response plan)
• Group discussion
• Quiz

Course 6 - Core Penetration test techniques: Broad Overview of penetration test techniques will cover the following topics:
• 6.1 what is penetration testing, vulnerability, Threats, Risks, Exploitation, 6.2 Computer ports / protocols, 6.3 Port Scanning, 6.4 Tools, 6.5 Attack Toolset – Metasploit, Nessus, nmap, Burpsuite, 6.6 Basic defence measures - Antivirus, Intrusion Detection / Prevention systems, 6.7 Penetration test approach, tools, 6.8 Pen test reporting, 6.9 Pen test rules, 6.10 Gray box, White box, Black box , 6.11 Sniffing, 6.12 DOS, 6.12 Social engineering, 6.13 Session hijacking, SQL Injection
Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:
• Case Study #12: How to do network scanning in banking industry
• Case Study #13: How to do social engineering (email phishing) in auto manufacturing
• Demo
• Scenario based role play (Cybersecurity strategy development, Incident response plan)
• Group discussion
• Quiz

Course 7 - Core Cyber Exploitations: Broad Overview of cyber exploitation will cover the following topics:
• 7.1 Exploitation, 7.2 Types of exploits, 7.3 Identify, Protect, Detect, Respond, Recover, 7.3 Honey pot, 7.4 Data collection, analytics 7.5 Proactive and reactive exploitation, 7.6 Red , blue team, and purple team, 7.7 Incident management, 7.8 Data breach, 7.9 Ransomware, 7.10 Zero day attack, 7.11 Man in the middle
Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

• Case Study #14: Difference between Vulnerability and Exploitations. How to identify exploitation in banking industry

• Case Study #15: What Network vectors are considered for exploitation. How to implement in healthcare

• Demo

• Scenario based role play (Cybersecurity strategy development, Incident response plan)

• Group discussion

• Quiz

Course 8 – Global attack trends: Broad Overview of cyber-attack trends will cover the following topics:

• 8.1 Past, present & future trends of cyber threat landscape (Worldwide)

• 8.2 Cybercrime landscape in Asia Pacific

• 8.3 Organizational processes, Security roles and responsibilities, Due care and Due diligence

• 8.4 Cybersecurity threats – Malware, Viruses and Worms, Trojan horses, Botnets, Zero-day exploits, Phishing, Spear phishing, Whaling, Social engineering, etc.

• 8.5 Risk management concepts, Personnel security policies, Information security training and awareness

• 8.6 Critical infrastructure protection, Privacy by design

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

• Case Study #16: Explain Ransomware behaviour and impact within the industries.

• Case Study #17: What is a Malware and how to setup malware protection in hospital

• Case Study #18: Will Linux and Mac have any Attacks and Malware. Consider ecommerce services

• Demo

• Scenario based role play (Cybersecurity strategy development, Incident response plan)

• Group discussion

• Quiz

Course 9 – Security Operations Management : Broad Overview of SOC will cover the following topics:

• 9.1 SOC security operations centre concept, 9.2 Logging, Attack methodology and monitoring, 9.3 Incident detection and Reporting, 9.4 SIEM, 9.5 Threat intelligence feed , 9.6 24x7 monitoring

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

• Case Study #19: What is Security posture for any healthcare industry

• Case Study #20: What is SOC in food chain industry

• Demo

• Scenario based role play (Cybersecurity strategy development, Incident response plan)

• Group discussion

• Quiz

Course 10 – Security Incident Management : Broad Overview of incident management will cover the following topics:

• 10.1 Incident handling and response, 10.2 Incident RACI, 10.3 Forensic package , critical incident package, 10.4 Malware incidents, 10.5 Email security and phishing incidents , 10.6 Threat reporting, 10.7 Third party incidents, 10.8 Feedback process, 10.9 TTX

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:
• Case Study #21: What is Zero Day? Does it have any impact on any industry applications. Define process framework
• Case Study #22: How are Incidents managed for HealthCare , FinTech, SCADA and Automotive industries
• Demo
• Scenario based role play (Cybersecurity strategy development, Incident response plan)
• Group discussion
• Quiz

Course 11 – Web and Mobile security Techniques: Broad Overview of web and mobile security techniques will cover the following topics:
• 11.1 Web environment setup for scan and tools, 11.2 Scan web application, 11.3 Exploit vulnerabilities, 11.4 Deep analysis, 11.5 Reporting
• 11.6 Mobile environment setup for scan and tools, 11.7 Scan mobile application, 11.8 Exploit vulnerabilities, 11.9 Deep analysis, 11.10 Reporting

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:
• Cyber breach case study (Equifax, Uber, Target, Stuxnet, SWIFT)
• Case Study #23: What's the Top standard followed in Web Applications
• Case Study #24: What the Top standard followed in Mobile Applications
• Case Study #25: List secure frameworks used in Mobile App Development
• Demo
• Scenario based role play (Cybersecurity strategy development, Incident response plan)
• Group discussion
• Quiz

Course 12 – Privacy and online rights: Broad Overview of privacy techniques will cover the following topics:
• 12.1 Privacy concept, 12.2 Privacy regulations, 12.3 GDPR, 12.4 Online privacy challenges 12.5 Online marketing/ sales privacy challenges, 12.6 Privacy protection and penalties

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:
• Cyber breach case study (Equifax, Uber, Target, Stuxnet, SWIFT)
• Case Study #26: What data is considered as Privacy issue in online ecommerce
• Case Study #27: Whats the impact if your company related data is available online?
• Demo
• Scenario based role play (Cybersecurity strategy development, Incident response plan)
• Group discussion
• Quiz

Course 13 – Best Practices for keeping Systems and Data safe: Broad overview of Security best practices will cover the following topics:
• 13.1 Understand your data and risk, 13.2 Protect your systems, 13.3 Cyber Insurance, 13.4 AV, 13.5 Data leakage , 13.6 Security guidelines – NIST, ISO 27001, GDPR, 13.7 Risk Management Frameworks and Security Standards

▪ NIST SP800-30: Evaluating security risks
▪ ISO 27000 - Information Security Management Standards (ISMS)
▪ DO-178C - Software Considerations in Airborne Systems and Equipment Certification
▪ ISO/IEC 27034 – Application security guidelines
▪ SS 584 : Singapore Standard for Multi Tier Cloud Security

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

• Case Study #28: How can you assure your data is safe in Public network and corporate network

• Case Study #29: List 3 simple methods to keep your system safe from malware

• Demo

• Scenario based role play (Cybersecurity strategy development, Incident response plan)

• Group discussion

• Quiz

Course 14 – Cloud security engineering: Broad Overview of cloud security will cover the following topics:

• 14.1 Cloud security fundamentals, 14.2 Cloud providers, 14.3 Tools for cloud security, 14.4 Cloud recovery, 14.5 Cloud Monitoring, 14.6 Cloud compliance, certification, audit and compliance, Pen test

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

• Case Study #30: How the Cloud services or applications can be targeted to hackers

• Case Study #31: What are the Different methods to store data safe

• Demo

• Scenario based role play (Cybersecurity strategy development, Incident response plan)

• Group discussion

• Quiz

Course 15 – Industry Infosec Governance: Broad Overview of Industry security governance will cover the following topics:

• 15.1 Industry roles and student skill identification, 15.2 Industry training, certification, 15.3 Industry career path, 15.4 How to become industry cybersecurity expert, 15.5 Job application process, 15.6 Salary / perks, 15.7 Working in healthcare industry

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

• Cyber breach case study (Equifax, Uber, Target, Stuxnet, SWIFT)

• Case Study #32: Abbreviated CIA and give one example for Healthcare industry

• Case Study #33: Are Policies, procedures and standards important to protect CIA for an Industry

• Demo

• Scenario based role play (Cybersecurity strategy development, Incident response plan)

• Group discussion

• Quiz

SEM VI	CORE PRACTICAL	Lecture	Practical	Credit
FPCA66	**PYTHON PROGRAMMING LAB**	0	4	2

Course Objectives
1. To know about basic data types, operators in Python.
2. To understand Loops in Python.
3. To understand the concepts of Arrays.
4. To understand how to handle strings.
5. To know about functions.

Course Outcomes (five outcomes for each unit should be mentioned)
1. After studying unit-1, the student will be able to write a program using operators.
2. After studying unit-2, the student will be able to develop a program using loops.
3. After studying unit-3, the student will be able to implement a program using Arrays.
4. After studying unit-4, the student will be able to implement the concept of String functions.
5. After studying unit-5, the student will be able to build application with basic expressions

1. Write a Python program to find the area and perimeter of a circle.
2. Write a Python program to generate Fibonacci series.
3. Write a Python program to compute the GCD of two numbers.
4. Write a Python program to generate first n prime numbers.
5. Write a Python program to find the sum of squares of n natural numbers.
6. Write a Python program to find the sum of the elements in an array.
7. Write a Python program to find the largest element in the array.
8. Write a Python program to check if the given string is a palindrome or not.
9. Write a Python program to store strings in a list and print them.
10. Write a Python program to find the length of a list, reverse it, copy it and then clear it.

REFERENCES
NIL

SEM VI	CORE PRACTICAL	Lecture	Practical	Credit
FPCA67	**OPEN SOURCE SOFTWARE LAB**	0	4	2

Course Objectives

1. To understand the basic HTML Tags.

2. To understand the types of CSS.

3. To learn Javascript functions.

4. To know about PHP form elements.

5. To learn PHP with MYSQL database connectivity.

Course Outcomes

1. After studying unit-1, the student will be able to design static web pages.

2. After studying unit-2, the student will be able to link common style to the web pages using CSS.

3. After studying unit-3, the student will be able to validate form controls using javascript.

4. After studying unit-4, the student will be able to design dynamic web pages using PHP.

5. After studying unit-5, the student will be able to develop a PHP program with MYSQL database connection.

SYLLABUS

1. Create a web page with Frames and Tables.

2. Create a web page incorporating CSS (Cascading Style Sheets).

3. Write a shell program to find the factorial of an integer positive number.

4. Write a shell program to find the details of a user session.

5. Create a simple calculator in JavaScript.

6. Write a JavaScript program to scroll your name in the scrollbar.

7. Develop a program and check message passing mechanisms between pages.

8. Application for Email Registration and Login using PHP and MySQL.

9. Program to Create a File and write the Data into it using PHP.

10. Program to perform the String Operation using Perl.

REFERENCES

NIL

CURRICULUM ENRICHMENT COURSES

SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is the online education platform developed by MHRD, Govt. Of India. It offers numerous courses with transferable credits. All courses are offered free of cost under this program;however, fees are levied in case the learner requires a certificate.

The students register themselves in a course which they like and produce the certificate after their completion of the course.

Every BCA Student is asked to attend at least a single SWAYAM course per year.

PROFESSIONAL EDUCATION COURSES which enrich the curriculum and provide exposure to recent technologies are offered by Bosco Institute of Information Technology (BIIT). All these courses are conducted from third semester to sixth semester, with three contact hours per week (12 weeks). A student can opt for any course. Combination of courses lead to a diploma program of study for the students.

1. OPEN SOURCE PHP TOOLS
2. ROBOTICS
3. WEB DEVELOPMENT USING HTML (Basic Level)
4. .NET PROGRAMMING(C# and Win Apps)
5. PROGRAMMING WITH PYTHON
6. WEB TECHNOLOGY
7. LAMP TECHNOLOGY
8. MULTIMEDIA AND WEB DESIGN
9. WEB DEVELOPMENT USING PYTHON
10. MS OFFICE APPLICATIONS
11. PYTHON PROGRAMMING
12. MASTERING MS-EXCEL
13. TALLY 9.0
14. TECHNICAL WRITING

Students who qualify in at least four courses are given additional post-graduate diplomas in Computer Applications. The offered diplomas are:

1. Diploma in Software Technology(.Net, Python, LAMP)
2. Diploma in Multimedia and Web Design
3. Diploma in Technical Writing

BRIDGE COURSES

Bridge Courses for first year students are conducted intensely at the beginning of every year and throughout the year. It is based on the performance of the students in CIE and Semester

examinations. The main objective is to enable the students to understand the basic concepts and frameworks related to English, Computing fundamentals and mathematics.

The following bridge courses are conducted in the department
1. English for Life (for all first-year students, two semesters)
2. PC Software (for first-year students, first semester as association activity)
3. Computer Fundamentals (for slow learners)
4. Mathematical Foundation (for slow learners)

VOCATIONAL COURSES
Vocational courses aim at equipping the students with practical skills for a specific profession or field which helps them to upgrade their skills for that particular career.

The following vocational courses are offered
1. Music
2. Craftwork
3. Bridal
4. Cell Phone Repairing
5. Tailoring
6. Mushroom Cultivation

VALUE ADDED COURSES
The university curriculum may not cover all areas of importance or relevance of industry. It is important for higher education institutions to supplement the curriculum to make students better prepared to meet industry demands as well as develop their own interests and aptitudes. These courses are conducted after the class hours to add value to their resume.

The following value-added courses are offered
1. Life Skills
2. Information Literacy (from second semester to sixth semester)
3. General Knowledge
4. Professional Aptitude

SEM - ALL	VALUE ADDED COURSES	Seminar	Workshop	Test
IL01-IL04	**INFORMATION LITERACY**	**1**	**1**	**1**

OVERVIEW

Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.

An information literate individual is able to:
- Determine the extent of information needed
- Access the needed information effectively and efficiently
- Evaluate information and its sources critically
- Incorporate selected information into one's knowledge base
- Use information effectively to accomplish a specific purpose
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally

REALIZATION

This course is realized through Students@ITAssociation (Technology For Life – TFL) Meets which is organized by the students with a faculty member as its President.

STUDY DOMAINS

Technology, Systems, Applications, Environment

EVALUATION SCHEME
- Technical Report   30 Mks
- Technical Notes   30 Mks
- Participation   10 Mks
- Online Test   30 Mks

REFERENCES

Information Literacy Competency Standards for Higher Education, American Library Association, 2000

http://www.ala.org/acrl/ilcomstan.html

BIIT Quality Manual-2009, BICS InfoTech, Yelagiri Hills

SEM – III, IV, V,VI	VALUE ADDED COURSES	LECTURE	TEST
PRA	PROFESSIONAL APTITUDE	1	1

LEARNING OBJECTIVE

After the completion of this course, the student shall develop one's competency in reasoning and general aptitude.

REASONING
Statements and Conclusions – Statements – Arguments - Letter Coding – Number Coding – Mixed Letter Coding.
Statements – Assumptions – Courses of action – Syllogism using venn diagram – Analytical Decision making.
Blood Relations – Coded Relations – Analogy Figures, Series, Grouping – Coded Binary Numbers – Water Images.
Data sufficiency – Evaluating courses of action – mirror images – Figures series.
Evaluating Inferences – Forcefulness of the Argument – Punch Line – Analogy (Figures)
QUANTITATIVE APTITUDE
Numbers – HCF and LCM of Numbers - Decimal Fractions – Simplification – Square Roots and Cube Roots
Average – Problems on numbers – Problems of ages – Surds and Indices – Percentage
Profit and Loss – Ratio & Proportion – Partnership – Chain Rule – Time and Work
Pipes and Cisterns – Time and Distance – Problem on trains – Problem on boats – Allegation or Mixture
Simple Interest – Compound Interest – Logarithms – Area – Volume and Surface Areas – Races and Games of Skill
Calendar – Stocks and Shares – True Discount – Banker's Discount – Odd Man Out & Series – Data Interpretation

REFERENCES

R.S. Agarwal, *Quantitative Aptitude for Competitive Examinations*, 7th Revised Ed., S. Chand and Co. Ltd, New Delhi, 2005

Barron's Guide for GMAT, Galgotia Publications, New Delhi, 2006

Edgar Thorpe, *Course in Mental ability and quantitative aptitude*, Tata McGraw-Hill publishing company o9limited, New Delhi, 2000

R.S. Agarwal, *A modern approach to verbal and non-verbal reasoning*, S. Chand and Co. Ltd, New Delhi, 2004.

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