SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi and Affiliated to Pondicherry University)

(Accredited by NBA-AICTE, New Delhi and Accredited by NAAC with "A" Grade)

Madagadipet, Puducherry

SCHOOL OF ARTS AND SCIENCE

BACHELOR OF SCIENCE

IN

COMPUTER SCIENCE

ACADEMIC REGULATIONS 2020

(R-2020)

CURRICULUM AND SYLLABI

COLLEGE VISION AND MISSION

Vision

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

Mission

M1: Quality Education:

To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: **Research and Innovation:**

To foster value based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship:

To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values:

To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT OF COMPUTATIONAL STUDIES

VISION AND MISSION

Vision:

To come up with successfully as a high-quality human capital in Computer Science and related areas for the sustainable growth of the IT industry needs of the country.

Mission:

M1: Innovative Skills:

Ensuring deeper understanding of fundamentals and acquiring innovative skills within core areas of Computer Science.

M2: Motivated Graduates:

Producing highly skilled and motivated graduates with the ability of problem solving individually and in teams.

M3: Ethical Responsibilities:

Providing a deep awareness of our ethical responsibilities to our profession and to the society.

STRUCTURE FOR UNDERGRADUATE PROGRAMME

S. No	Course Category	Breakdown of Credits
1	Language Modern Indian Language (MIL)	6
2	English (ENG)	6
3	Discipline Specific Core Courses (DSC)	85
4	Discipline Specific Elective Courses (DSE)	12
5	Inter-Disciplinary Courses (IDC)	12
6	Skill Enhancement Courses (SEC)	12
7	Employability Enhancement Courses (EEC*)	-
8	Ability Enhancement Compulsory Courses (AECC)	4
9	Open Elective (OE)	4
10	Extension Activity (EA)	1
	Total	**142**

SCHEME OF CREDIT DISTRIBUTION – SUMMARY

S. No	Course Category	Credits per Semester						Total Credits
		I	II	III	IV	V	VI	
1	Language Modern Indian Language (MIL)	3	3	-	-	-	-	6
2	English (ENG)	3	3	-	-	-	-	6
3	Discipline Specific Core Courses (DSC)	12	12	12	16	16	17	85
4	Discipline Specific Elective Courses (DSE)	-	-	3	3	3	3	12
5	Inter-Disciplinary Courses (IDC)	4	4	4	4	-	-	16
6	Skill Enhancement Courses (SEC)	2	2	2	2	2	2	12
7	Employability Enhancement Courses (EEC*)	-	-	-	-	-	-	-
8	Ability Enhancement Compulsory Courses (AECC)	2	2	-	-	-	-	4
9	Open Elective (OE)	-	-	2	2	-	-	4
10	Extension Activity (EA)	-	1	-	-	-	-	1
	Total	26	27	23	27	21	22	**146**

**** EEC will not be included for the computation of "Total of Credits" as well as" CGPA"***

SEMESTER – I										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20TAT101/ A20HNT101/ A20FRT101	Tamil - I / Hindi – I / French – I	MIL	3	0	0	3	25	75	100
2	A20GET101	General English – I	ENG	3	0	0	3	25	75	100
3	A20CPT101	Problem Solving using C	DSC	4	0	0	4	25	75	100
4	A20CPT102	Digital Logic and Computer Organization	DSC	4	0	0	4	25	75	100
5	A20CPD101	Computational Mathematics	IDC	3	1	0	4	25	75	100
Ability Enhancement Compulsory Course										
6	A20AET101	Environmental Studies	AECC	2	0	0	2	100	0	100
Practical										
7	A20CPL101	Programming in C Lab	DSC	0	0	4	2	50	50	100
8	A20CPL102	Digital Lab	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
9	A20CPS101	Communication Skills Lab	SEC	0	0	4	2	100	0	100
Employment Enhancement Course										
10	A20CPC101	Web Programming	EEC	0	0	4	0	100	0	100
							26	**525**	**475**	**1000**

SEMESTER – II										
S. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20TAT202/ A20HNT202/ A20FRT202	Tamil - II / Hindi – II / French – II	MIL	3	0	0	3	25	75	100
2	A20GET202	General English-II	ENG	3	0	0	3	25	75	100
3	A20CPT203	Programming in C++	DSC	4	0	0	4	25	75	100
4	A20CPT204	Data Structures and Algorithms	DSC	4	0	0	4	25	75	100
5	A20CPD202	Discrete Mathematics	IDC	3	1	0	4	25	75	100
Ability Enhancement Compulsory Course										
6	A20AET202	Public Administration	AECC	2	0	0	2	100	0	100
Practical										
7	A20CPL203	Programming in C++ Lab	DSC	0	0	4	2	50	50	100
8	A20CPL204	Data Structures Lab	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
9	A20CPS202	Quantitative Aptitude and Logical Reasoning	SEC	0	0	4	2	100	0	100
Extension Activities										
10	A20EAL201	National Service Scheme	EA	0	0	2	1	100	0	100
Employment Enhancement Course										
11	A20CPC202	AngularJS	EEC	0	0	4	0	100	0	100
							27	**625**	**475**	**1100**

SEMESTER – III										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20CPT305	Problem Solving using Java	DSC	4	0	0	4	25	75	100
2	A20CPT306	Microprocessors and Assembly Language Programming	DSC	4	0	0	4	25	75	100
3	A20CPE3XX	Discipline Specific Elective – I	DSE	3	0	0	3	25	75	100
4	A20MAD307	Numerical Methods	IDC	3	1	0	4	25	75	100
5	A20XXO3XX	Open Elective – I	OE	2	0	0	2	25	75	100
Practical										
6	A20CPL305	Programming in Java Lab	DSC	0	0	4	2	50	50	100
7	A20CPL306	Microprocessors Lab	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A20CPS303	Office Automation Tools	SEC	0	0	4	2	100	0	100
Employment Enhancement Course										
9	A20CPC303	Exploring Java	EEC	0	0	4	0	100	0	100
							23	**425**	**475**	**900**

SEMESTER – IV										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20CPT407	Operating Systems	DSC	4	0	0	4	25	75	100
2	A20CPT408	Database Management Systems	DSC	4	0	0	4	25	75	100
3	A20CPD404	Distributed Computing	IDC	3	0	0	4	25	75	100
4	A20CPE4XX	Discipline Specific Elective- II	DSE	3	0	0	3	25	75	100
5	A20XXO4XX	Open Elective – II	OE	2	0	0	2	25	75	100
Practical										
6	A20CPL407	Operating Systems Lab	DSC	0	0	4	2	50	50	100
7	A20CPL408	DBMS Lab	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A20CPS404	Android App Development	SEC	0	0	4	2	100	0	100
Employment Enhancement Course										
9	A20CPC404	Mobile Application Development	EEC	0	0	4	0	100	0	100
							23	425	475	**900**

SEMESTER – V										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20CPT509	Python Programming	DSC	3	1	0	4	25	75	100
2	A20CPT510	Network Technologies	DSC	3	1	0	4	25	75	100
3	A20CPT511	Artificial Intelligence	DSC	3	1	0	4	25	75	100
4	A20CPE5XX	Discipline Specific Elective-III	DSE	3	0	0	3	25	75	100
Practical										
5	A20CPL509	Python and Network Lab	DSC	0	0	4	2	50	50	100
6	A20CPP501	Mini Project (C#/JAVA/PYTHON)	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
7	A20CMS314	Entrepreneurial Skills	SEC	0	0	4	2	100	0	100
Online Certification Course										
8	A20CPX501	NPTEL	OCC	0	0	0	0	0	0	0
Employment Enhancement Course										
9	A20CPC505	PYTHON	EEC	0	0	4	0	100	0	100
							21	400	400	**800**

SEMESTER – VI										
S. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20CPT612	.Net Technology	DSC	3	1	0	4	25	75	100
2	A20CPT613	Software Engineering	DSC	3	1	0	4	25	75	100
3	A20CPT614	Cloud Computing	DSC	3	1	0	4	25	75	100
4	A20CPE6XX	Discipline Specific Elective-IV	DSE	3	0	0	3	25	75	100
Practical										
5	A20CPP602	Project Work & Viva-voce	DSC	0	0	10	5	40	60	100
Skill Enhancement Course										
6	A20CPS606	Research Methodology	SEC	0	0	4	2	100	0	100
Employment Enhancement Course										
7	A20CPC606	Data Science	EEC	0	0	4	0	100	0	100
							22	**340**	**360**	**700**

DISCIPLINE SPECIFIC ELECTIVES										
S. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Discipline Specific Electives (DSE - I) - offered in Third Semester										
1	A20CPE301	Introduction to Data Science using Hadoop	DSE	3	0	0	3	25	75	100
2	A20CPE302	Computer Graphics	DSE	3	0	0	3	25	75	100
3	A20CPE303	Information Security	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - II) - offered in Fourth Semester										
1	A20CPE404	Image Processing	DSE	3	0	0	3	25	75	100
2	A20CPE405	Computer hardware and Trouble Shooting	DSE	3	0	0	3	25	75	100
3	A20CPE406	Data Mining	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - III) - offered in Fifth Semester										
1	A20CPE507	Data Science using R	DSE	3	0	0	3	25	75	100
2	A20CPE508	Intrusion Detection System and Prevention	DSE	3	0	0	3	25	75	100
3	A20CPE509	System Software	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - IV) - offered in Sixth Semester										
1	A20CPE610	Client Server Technology	DSE	3	0	0	3	25	75	100
2	A20CPE611	Data Visualization using MATLAB	DSE	3	0	0	3	25	75	100
3	A20CPE612	Ethical Hacking	DSE	3	0	0	3	25	75	100

Annexure – II

OPEN ELECTIVE COURSES

COMPLETE LIST OF OPEN ELECTIVES OFFERED BY ALL THE DEPARTMENTS

Open Elective – I (Offered in Semester III)				
Sl. No	**Course Code**	**Course Title**	**Offering Department**	**Permitted Departments**
1	**A20BTO301**	Boon and Bane of Microbes	Bioscience	Chemistry, Food Science, Physics
2	**A20BTO302**	Microbial Technology for Entrepreneurship	Bioscience	Chemistry, Food Science, Physics
3	**A20BTO303**	Origin of Life	Bioscience	Chemistry, Food Science, Physics
4	**A20CHO304**	Food Analysis (Practical)	Chemistry	Bioscience, Computational Studies, Food Science, Mathematics, Physics
5	**A20CHO305**	Molecules of Life (Practical)	Chemistry	Bioscience, Computational Studies, Food Science, Mathematics, Physics
6	**A20CHO306**	Water Analysis (Practical)	Chemistry	Bioscience, Computational Studies, Food Science, Mathematics, Physics
7	**A20CMO307**	Fundamentals of Accounting and Finance	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
8	**A20CMO308**	Fundamentals of Management	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
9	**A20CMO309**	Fundamentals of Marketing	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
10	**A20CPO310**	Data Structures	Computational Studies	Mathematics
11	**A20CPO311**	Programming in C	Computational Studies	Commerce and Management, Mathematics, Media Studies
12	**A20CPO312**	Programming in Python	Computational Studies	Commerce and Management, Mathematics, Media Studies
13	**A20ENO313**	Conversational Skills	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics

14	**A20ENO314**	Fine-tune your English	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
15	**A20ENO315**	Interpersonal Skills	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
16	**A20MAO316**	Mathematical Modelling	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics
17	**A20MAO317**	Quantitative Aptitude - I	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics
18	**A20MAO318**	Statistical Methods	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics
19	**A20VCO319**	Event Management	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
20	**A20VCO320**	Graphic Design	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
21	**A20VCO321**	Role of social media	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
22	**A20NDO322**	Basic Food Groups	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil
23	**A20NDO323**	Life Style Management	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil
24	**A20NDO324**	Nutritive Value of Foods	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil

25	**A20PHO325**	Astrophysics	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
26	**A20PHO326**	Basic of Modern Communication System	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
27	**A20PHO327**	Bio-Physics	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
28	**A20TMO328**	அடிப்படைத்தமிழ்	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
29	**A20TMO329**	வாழ்வியல் இலக்கணம்	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
30	**A20TMO330**	புதுக்கவிதைப் பட்டறை	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics

Open Elective – II (Offered in Semester IV)

Sl. No.	Course Code	Course Title	Offering Department	Permitted Departments
1	**A20BTO401**	Fermented Food	Bioscience	Chemistry, Food Science, Physics
2	**A20BTO402**	Herbal Technology	Bioscience	Chemistry, Food Science, Physics
3	**A20BTO403**	Self-Hygiene	Bioscience	Chemistry, Food Science, Physics
4	**A20CHO404**	C++ Programming and its Application to Chemistry	Chemistry	Computational Studies, Mathematics, Physics
5	**A20CHO405**	Computational Chemistry Practical	Chemistry	Computational Studies, Mathematics, Physics
6	**A20CHO406**	Instrumental Methods of Analysis	Chemistry	Computational Studies, Mathematics, Physics
7	**A20CMO407**	Essential Legal Awareness	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics

8	**A20CMO408**	Essentials of Insurance	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
9	**A20CMO409**	Practical Banking	Commerce and Management	Bioscience, Chemistry, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
10	**A20CPO410**	Database Management Systems	Computational Studies	Commerce and Management, Media Studies, Mathematics
11	**A20CPO411**	Introduction to Data Science using Python	Computational Studies	Chemistry, Commerce and Management, English, Media Studies, Mathematics, Physics
12	**A20CPO412**	Web Development	Computational Studies	Commerce and Management, Media Studies, Mathematics
13	**A20ENO413**	English for Competitive Exam	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
14	**A20ENO414**	English Next-India	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
15	**A20ENO415**	Functional English	English	Chemistry, Commerce and Management, Computational Studies, Media Studies, Mathematics, Physics
16	**A20MAO416**	Discrete mathematics	Mathematics	Chemistry, Computational Studies, Physics
17	**A20MAO417**	Operations Research	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics
18	**A20MAO418**	Quantitative Aptitude - II	Mathematics	Chemistry, Commerce and Management, Computational Studies, Physics, Biotechnology, Nutrition and Dietetics

19	**A20VCO419**	Basics of News Reporting	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
20	**A20VCO420**	Scripting for media	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
21	**A20VCO421**	Video Editing	Media Studies	Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Physics
22	**A20NDO422**	Food Labelling	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil
23	**A20NDO423**	Hygiene and Sanitation	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil
24	**A20NDO424**	Nutrition for Adolescent	Food Science	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Mathematics, Media Studies, Physics, Tamil
25	**A20PHO425**	Digital Electronics	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
26	**A20PHO426**	Geo-Physics	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies
27	**A20PHO427**	Space Science	Physics	Bioscience, Chemistry, Computational Studies, Mathematics, Media Studies

28	**A20TMO428**	சிறுகதைப் பயிற்சி	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
29	**A20TMO429**	செய்தி வாசிப்பு பயிற்சி	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics
30	**A20TMO430**	நிகழ்த்துக்கலை	Tamil	Bioscience, Chemistry, Commerce and Management, Computational Studies, English, Food Science, Mathematics, Media Studies, Physics

Inter Disciplinary Course			
Course Code	**Course Title**	**Offering Department**	**Permitted Departments**
A20PD303	Computer Basics	Computer Science	Nutrition and Dietetics

மொழித்தாள்

தமிழ் - I

(B.A., B.Sc., B.Com., B.B.A. & B.C.A., பாடப்பிரிவுகளுக்குமான பொதுத்தாள்)

	L	T	P	C	Hrs
A20TAT101	**3**	**0**	**0**	**3**	**45**

பாடத்திட்டத்தின் நோக்கம்

- இரண்டாயிரம் ஆண்டுகால தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள்,அடையாளங்கள் ஆகியவற்றை காலந் தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கூறுவதற்கு இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- மொழியின் கட்டமைப்பைப் புரிந்துகொள்வதற்கு ஏதுவாக பாடத்திட்டம் வடிவமைக்கப்பட்டுள்ளது.
- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.
- சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணர்த்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

பாடத்திட்டத்தின் வெளிப்பாடுகள்

CO1 - இலக்கியங்கள் காட்டும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.
CO2 - நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.
CO3 - தகவல் தொடர்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்தல்.
CO4 - தாய்மொழியின் சிறப்பை அறிதல்.
CO5 - இலக்கிய இன்பங்களை நுகரும் திறன்களை வளர்த்தல்.

அலகு-1 **(9 Hrs)**

இக்காலக் கவிதைகள்-1

1. பாரதியார் – கண்ணன் என் சேவகன்
2. பாரதிதாசன் – தமிழ்ப்பேறு
3. அப்துல் ரகுமான் – அவதாரம்
4. மீரா – கனவுகள் + கற்பனைகள் = காகிதங்கள்
5. து.நரசிம்மன் – மன்னித்துவிடு மகனே

அலகு-2 **(9 Hrs)**

இக்காலக் கவிதைகள்-2

1.ராஜா சந்திரசேகர் – கைவிடப்பட்ட குழந்தை
2. அனார் – மேலும் சில இரத்தக் குறிப்புகள்
3. சுகிர்தராணி – அம்மா
4. நா.முத்துக்குமார் – தூர்

அலகு-3 **(9 Hrs)**

சிற்றிலக்கியங்கள்

1. கலிங்கத்துப் பரணி – பொருதடக்கை வாள் எங்கே... (பாடல்-485)
2. அழகர்கிள்ளைவிடு தூது – இதமாய் மனிதருடனே...(பாடல்-45)
3. நந்திக் கலம்பகம் – அம்பொன்று வில்லொடிதல்...(பாடல்-77)
4. முக்கூடற் பள்ளு – பாயும் மருதஞ் செழிக்கவே...(பாடல்-47)
5. குற்றாலக் குறவஞ்சி – ஓடக் காண்பதுமே...(பாடல்-9)

காப்பியங்கள்

மணிமேகலை-உலகறவி புக்க காதை- 'மாசுஇல் வால்ஒளி! – இந்நாள் போலும் இளங்கொடி கெடுத்தனை'.(28-அடிகள்)

அலகு-4 **(9 Hrs)**

தமிழ் இலக்கிய வரலாறு

1. சிற்றிலக்கியம்- தோற்றமும் வளர்ச்சியும்
2. புதுக்கவிதை- தோற்றமும் வளர்ச்சியும்

3. சிறுகதை –தோற்றமும் வளர்ச்சியும்
4. புதினம் –தோற்றமும் வளர்ச்சியும்
5. உரைநடை – தோற்றமும் வளர்ச்சியும்

அலகு 5 **(9 Hrs)**

மொழிப்பயிற்சி

1. கலைச்சொல்லாக்கம்
2. அகரவரிசைப்படுத்துதல்
3. மரபுத்தொடர்/பழமொழி
4. கலை விமர்சனம்
5. நேர்காணல்

உரைநடைப் பகுதி

1. உ.வே.சாமிநாதையர் – சிவதருமோத்திரச் சுவடி பெற்ற வரலாறு.
2. தஞ்சாவூர் – கூஜாவின் கோபம்.
3. இரா. பச்சியப்பன் – மாடல்ல மற்றையவை.

பார்வை நூல்கள்

1. கைலாசபதி, க., தமிழ் நாவல் இலக்கியம், குமரன் பதிப்பகம், வடபழனி, 1968.
2. சுந்தரராஜன், பே.கோ. சிவபாதசுந்தரம். சோ., தமிழில் சிறுகதை வரலாறும் வளர்ச்சியும், க்ரியா, சென்னை, 1989.
3. பரந்தாமனார், அ.கி., நல்ல தமிழ் எழுத வேண்டுமா, பாரி நிலையம், சென்னை, 1998.
4. பாக்கியமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.எச். பதிப்பகம், சென்னை, 2011.
5. வல்லிக்கண்ணன், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், அன்னம், சிவகங்கை, 1992.

உரைநடை நூல்கள் :

1. சக்திவேல், சு., தமிழ் மொழி வரலாறு, மாணிக்கவாசகர் பதிப்பகம், சிதம்பரம், 1988.
2. சிற்பி பாலசுப்ரமணியம் மற்றும் நீலபத்மநாபன், புதிய தமிழ் இலக்கிய வரலாறு, தொகுதி–1, 2, 3, சாகித்திய அகாதமி, புதுடெல்லி,2013.
3. பாரதியார், பாரதியார் கவிதைகள், குமரன் பதிப்பகம், சென்னை, 2011.

இணையத்தளங்கள் :

http://www.tamilkodal.com
http://www.languagelab.com
http://www.tamilweb.com.

	FRENCH - I	L	T	P	C	Hrs
A20FRT101	(Common to B.A., B.Sc., B.Com., B.B.A. & B.C.A)	**3**	**0**	**0**	**3**	**45**

OBJECTIVES

- To enable the students read, understand, and write simple sentences.
- To grasp relevant grammar for communication
- To learn about the land, people and culture of France.

UNITÉ - 1

Je m'appelle Elise. Et Vous ?

Vous Dansez ? D'accord

Monica, Yukiko et compagnie

UNITÉ - 2

Les Voisins de Sophie

Tu vas au Luxembourg ?

UNITÉ – 3

Nous Venons pour l'inscription

A Vélo, en tain, en avoin

Pardon, monsieru,le BHV s'il vous plait ?

UNITÉ - 4

Au marche

On déjeune ici ?

UNITÉ - 5

On va chez ma copine ?

Chez Susana

TextBook

PrescribedTextbook : *FESTIVAL 1* - Méthode de Français
Authors : Sylvie POISSON-QUINTON
Michèle MAHEO-LE COADIC
Anne VERGNE-SIRIEYS
Edition : CLE International, Nouvelle Édition révisée : 2009.

Reference Book : Festival 1

		L	T	P	C	Hrs
A20GET101	**GENERAL ENGLISH I** **(Common to B.A., B.Sc. and B.C.A.)**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To recognize the rhythms, metrics and other musical aspects of poetry.
- To read a variety of texts critically and proficiently.
- To enable the students to enjoy the flair of literature through the work of great writer.
- To make the students to know the functions of basic grammar and frame sentences without grammatical error.
- To enable them understanding the intrinsic nuances of writing in English language.

Course Outcomes

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

CO1 – Comprehend and discuss the various facets of selected poems.
CO2 – Analyze and interpret texts written in English.
CO3 – Read drama with graduate-level interpretive and analytical proficiency.
CO4 – Improve the fluency and formation of grammatically correct sentence.
CO5 – Enhance the writing skills for specific purposes.

UNIT I POETRY **(9Hrs)**

1. John Milton: On His Blindness
2. William Wordsworth: Daffodils
3. Percy Bysshe Shelly: Ozymandias
4. Emily Dickinson: Because I could not stop for Death
5. Sarojini Naidu: The Queen's Rival

UNIT II PROSE **(9Hrs)**

1. Francis Bacon: Of Love
2. Charles Lamb: A Dissertation upon Roast Pig

UNIT III DRAMA **(9Hrs)**

1. Oscar Wilde: Lady Windermere's Fan

UNIT IV GRAMMAR **(9Hrs)**

1. Parts of Speech
2. Tenses
3. Subject-Verb Agreement

UNIT V COMPOSITION **(9Hrs)**

1. Essay Writing
2. Email

Text Books

1. James Barrett, "Brookside Musings: A Selection of Poems and Short Stories: Board of Editors", Orient LongmanLimited, 2009.
2. Wilde Oscar, "Lady Windermere's Fan. Published in The Importance of Being Earnest and Other Plays" , London:Penguin, 1940.
3. Wren & Martin, "High School English Grammar & Composition". Blackie ELT Books, 2017.

Reference Books

1. Lalitha Natarajan and SasikalaNatesan, "English for Excellence: Poetry", Anuradha Publications, 2015.
2. Charles Lamb, "Selected Prose", Penguin Classics. United Kingdom, 2013.
3. Usha Mahadevan, "Sunbeams: Empower with English", Emerald Publishers, Chennai. 2016.

Web References

1. https://www.englishcharity.com/of-love-by-francis-bacon-explanation/
2. https://www.poetry-archive.com/n/the_queens_rival.html
3. https://www.gradesaver.com/lady-windermeres-fan/study-guide/summary-act-i

		L	T	P	C	Hrs
A20CPT101	**PROBLEM SOLVING USING C** **(Common to B.Sc.CS and B.C.A.)**	**4**	**0**	**0**	**4**	**60**

Course Objectives

- To understand the Fundamentals of Computers and introduction to C language.
- To study the basic terminologies of C language and arrays
- To understand the Functions, Structures and Unions.
- To understand the concepts of Pointers.
- To study about File Management Operations in C.

Course Outcomes

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

CO1 – Describing the basic introduction about C programming.
CO2 - Incorporating the use of sequential, selection and repetition control structures into a program.
CO3 - Develop the concepts of looping and arrays.
CO4 - Design and develop programs using Functions and Pointers.
CO5- Understand the File management Operations and Pre-processor Directives.

UNIT I INTRODUCTION TO C (12 Hrs)

Fundamentals of Computer: Computer Definition – Block Diagram of Computer – Types of Computer – Characteristics of Computer – Applications of Computer.

C programming: Overview of C – Constants – Compiling a C Program - Variables and Data Types - Technical Difference between Keywords and Identifiers -Types of C Qualifiers and format specifies - Operators and Expressions - Operators Precedence -Type conversion - Input-Output Statements.

UNIT II DECISION MAKING (12 Hrs)

Decision making and branching - Relational operators – Logical operators - if – if else - if else if – nested if, Switch-case.

UNIT III LOOPING AND ARRAYS (12 Hrs)

Looping: while - do while – for – break – continue - nested loop. Arrays: One Dimensional Arrays-Two-Dimensional Arrays-Multi-Dimensional Array-Dynamic arrays-Character Arrays and String-Sorting - Searching.

UNIT IV FUNCTIONS, POINTERS (12 Hrs)

Functions: Introduction - Definition – Declaration – Categories of Functions - Nesting of Functions, Recursive functions - Passing Arrays to Functions - Strings – String library function. Pointers: Introduction - Declaring Pointer Variables - Initialization of Pointer Variables - Accessing the address of a variable - Accessing a variable thorough Pointer - Chain of Pointers - Pointer Expressions - Pointers and arrays – Pointers and functions – Call by Reference - Pointers and character strings - Array of Pointers - Pointers and Structures.

UNIT V STRUCTURES AND UNIONS, FILE MANAGEMENT (12 Hrs)

User defined data types: Introduction – Structure: definition - declaration - Arrays of Structures – Nested structures – Passing structures to functions – Union - Enumeration and Typedef. Introduction to File Handling in C, Input and Output operations on a file – Error Handling - Random access to files – Command Line Arguments. Introduction to Pre-Processor – Macro substitution directives – File inclusion directives – Conditional Compilation Directives – Miscellaneous directives.

Text Books

1. Balagurusamy. E, “Programming in ANSI C”, Tata McGraw Hill, 8th Edition, 2019.
2. Byron S Gottfried and Jitendar Kumar Chhabra, “Programming with C”, Tata McGraw Hill Publishing Company, 4th Edition, New Delhi, 2015.
3. Herbert Schildt,” C: The Complete Reference”, McGraw Hill, 4th Edition, 2014.
4. Yashwant Kanetkar, “Let us C”, BPB Publications, 16th Edition, 2017.
5. Archana Kumar, “Computer Basics with Office Automation”, Dream tech Press – Wiley Publisher, 2019.
6. ReemaThareja, “Fundamentals of Computing & C Programming” Oxford University Press, 2012.

Reference Books

1. Ashok N Kamthane, “Computer Programming”, Pearson education, 2rd Impression, 2012.
2. VikasVerma, “A Workbook on C “, Cengage Learning, 2rd Edition, 2012.
3. Dr. P. Rizwan Ahmed, “Office Automation”, Margham Publications, 2016.
4. P.Visu, R.Srinivasan and S.Koteeswaran, “Fundamentals of Computing and Programming”, 4th Edition, Sri Krishna Publications, 2012.
5. PradipDev, ManasGhoush, “Programming in C”, 2rd Edition, Oxford University Press, 2011.

Web References

1. https://www.programiz.com/c-programming
2. https://www.geeksforgeeks.org/c-language-set-1-introduction/
3. https://www.tutorialspoint.com/cprogramming
4. https://www.assignment2do.wordpress.com/.../solution-programming-in-ansi-c
5. https://nptel.ac.in/courses/106/104/106104128/
6. https://www.coursera.org/courses?query=c%20programming
7. https://www.udemy.com/course/c-programming-for-beginners-/

		L	T	P	C	Hrs
A20CPT102	**DIGITAL LOGIC AND COMPUTER ORGANIZATION**					
	(Common to B.Sc.CS and B.C.A.)	**4**	**0**	**0**	**4**	**60**

Course Objectives:

- To understand the basic concepts of Digital design and number systems.
- To expose with the Combinational circuits
- To expose with the Sequential circuits
- To study the fundamentals of Computer systems.
- To be familiar with the memory organization and CPU in a computer systems.

Course Outcomes:

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

CO1 – Explain the concepts of Digital design and number systems.
CO2 – design the digital system using combinational system design.
CO3 – design the digital system using Sequential system design.
CO4 – Explain fundamentals of Computer systems.
CO5 – Explain memory organization and CPU in computer systems.

UNIT I INTRODUCTION TO DIGITAL DESIGN (12 Hrs)

Data Representation - Data Types - Number Systems - Complements - Arithmetic Operations - Representations - Fixed Point, Floating Point - Error detection codes - Binary Codes- Logic Gates - Boolean Algebra - Map Simplification – Karnaugh maps: SOP and POS forms - QuineMcClusky method

UNIT II COMBINATIONAL CIRCUIT DESIGN (12 Hrs)

Combinational Circuits, Half adder - full adder - code converters - combinational circuit design - Multiplexers and Demultiplexers – encoders – decoders - Combinational design using Mux and Demux.

UNIT III SEQUENTIAL CIRCUIT DESIGN (12 Hrs)

Sequential Circuit Design, Flip flops (RS, Clocked RS, D, JK, JK Master Slave, T) - Counters - Shift registers and their types - Counters: Synchronous and Asynchronous counters.

UNIT IV COMPUTER ORGANIZATION (12 Hrs)

Instruction Codes - Computer Registers - Computer Instructions - Timing And Control - Instruction Cycle - Memory Reference Instructions - I/O And Interrupt – Machine Language – Assembly Language - Assembler -. Peripheral Devices - Input-Output Interface - Asynchronous Data Transfer - Modes Of Transfer - Priority Interrupt - DMA - IOP - Serial Communication

UNIT V MEMORY ORGANIZATION AND CPU (12 Hrs)

Memory Hierarchy - Main Memory - Auxiliary Memory - Associative Memory - Cache Memory - Virtual Memory - Memory Management Hardware - CPU: General Register Organization - Control Word - Stack Organization - Instruction Format - Addressing Modes - Data Transfer And Manipulation - Program Control.

Text Books

1. Morris Mano M, “Digital Logic and Computer Design”, Pearson Education, 4th Edition, 2014
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky, “Computer Organization”, 5 th Edition, McGraw Hill, 2002.
3. V.Rajaraman, T. Radhakrishnan, “Digital Logic and Computer Design”, PHI Learning, 2006.

Reference Books

1. B Ram, Computer Fundamentals: Architecture and Organization (TWO COLOUR EDITION), New Age International (P) Ltd Publishers, 6th Edition 2020.
2. FLOYD, Digital Fundamentals, PEARSON INDIA, 11th Edition.
3. Alan B.Marcovitz, “Introduction to Logic design”, Tata McgrawHill, 2rd Edition, 2005.

Web References

1. https://www.sanfoundry.com/best-reference-books-computer-organization-architecture/
2. http://www.cuc.ucc.ie/CS1101/David%20Tarnoff.pdf
3. https://www.tutorialspoint.com/computer_logical_organization/index.htm

A20CPD101	COMPUTATIONAL MATHEMATICS (Common to B.Sc.CS and B.C.A.)	L	T	P	C	Hrs
		3	1	0	4	60

Course objectives

- To develop the use of matrix algebra techniques for practical applications.
- To introduce effective mathematical tools for the solutions of differential equations that model physical processes.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.
- To learn the different concepts of topics in Probability.
- To learn the different concepts of topics in statistics.

Course Outcomes

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

CO1 – Acquire the knowledge about matrices and able to compute Eigen values and Eigen.
CO2 – Analyze and solve Differential Equations.
CO3 – Understand the use of Integrals and able to apply it.
CO4 – Understand the use probability.
CO5 – Understand the use Statistics.

UNIT I MATRICES (12 Hrs)

Rank of a Matrix - Consistency of system of equations. Eigen values and Eigen vectors of a real matrix - Characteristic equation -Properties of Eigen values and Eigenvectors. Cayley-Hamilton Theorem - Diagonalization of matrices - Reduction of a quadratic form to canonical form by orthogonal transformation - Nature of quadratic forms.

UNIT II DIFFERENTIAL EQUATIONS (12 Hrs)

Linear differential equations of higher order - with constant coefficients, the operator D, Euler's linear equation of higher order with variable coefficients, simultaneous linear differential equations, solution by variation of parameters method

UNIT III INTEGRALS AND APPLICATIONS (12 Hrs)

Double integrals and Triple Integrals- Applications: Areas by double integration and volumes by triple integration.

UNIT IV PROBABILITY (12 Hrs)

Discrete Random variable: Introduction Random variables and their event spaces The probability Mass function. Distribution functions Special discrete distributions: The Bernoulli PMF. Bernoulli Poisson, continuous random variable normal distribution.

UNIT V STATISTICS (12 Hrs)

Measures of central tendency- Arithmetic mean, Median, Mode, Geometric mean, Harmonic mean. Skewness and Kurtosis - Simple correlation Karl Pearson's coefficient of correlation, Rank correlation, Regression lines of regression, properties of regression coefficient.

Text Books

1. M.K. Venkataraman, Engineering Mathematics (First Year), 2rd Edition, The National Publishing Company, Madras, 2001.
2. M.K. Venkataraman, Engineering Mathematics (Third Year-Part A), The National Publishing Company, Madras, 2001.
3. T. Veerarajan, —Probability, statistics and Random Processes,‖ Tata Mc.Graw-Hill Publishing Company Ltd.,3rd Edition, 2008.

Reference Books

1. N.P. Bali and Manish Goyal, A Text Book of Engineering Mathematics, Lakshmi Publications, New Delhi, 2007.
2. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 41st Edition, 2011.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, New Delhi.

Web References

1. https://www.youtube.com/watch?v=xyAuNHPsq-g
2. https://link.springer.com/chapter/10.1007/978-1-4757-2024-2_1
3. https://ncert.nic.in/ncerts/l/lemh203.pdf
4. https://users.math.msu.edu/users/gnagy/teaching/ode.pdf
5. https://www.stat.pitt.edu/stoffer/tsa4/intro_prob.pdf
6. https://www.math.arizona.edu/~jwatkins/statbook.pdf
7. http://www.utstat.toronto.edu/mikevans/jeffrosenthal/book.pdf
8. https://homepage.divms.uiowa.edu/~rdecook/stat2020/notes/ch3_pt1.pdf

A20AET101	ENVIRONMENTAL STUDIES (Common for all B.A., B.Sc., B.Com., B.B.A, B.C. A.)	L	T	P	C	Hrs
		2	0	0	2	30

Course Objectives

- To gain knowledge on the importance of natural resources and energy.
- To know the structure and function of an ecosystem
- To imbibe an aesthetic value with respect to biodiversity, understand the threats and its conservation and appreciate the concept of interdependence
- To know the causes of types of pollution and disaster management
- To observe and discover the surrounding environment through field work.

Course Outcomes

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

CO1 – Understand about the various resources
CO2 – Learn about the biodiversity
CO3 – Learn the different types of pollution and to prevent the pollution
CO4 – Know about the pollution Act
CO5 – Observe various environmental issues in surroundings

UNIT I INTRODUCTION TO ENVIRONMENTAL SCIENCES: NATURAL RESOURCES (6 Hrs)

Environmental Sciences - Relevance - Significance - Public awareness - Forest resources - Water resources - Mineral resources - Food resources - conflicts over resource sharing - Exploitation - Land use pattern - Environmental impact - fertilizer - Pesticide Problems - case studies.

UNIT II ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION (6 Hrs)

Ecosystem - concept - structure and function - producers, consumers and decomposers - Food chain - Food web - Ecological pyramids - Energy flow - Forest, Grassland, desert and aquatic ecosystem. Biodiversity - Definition - genetic, species and ecosystem diversity - Values and uses of biodiversity - biodiversity at global, national (India) and local levels - Hotspots, threats to biodiversity - conservation of biodiversity –Insitu & Exsitu.

UNIT III ENVIRONMENTAL POLLUTION AND MANAGEMENT (6 Hrs)

Environmental Pollution - Causes - Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management - Floods, Earth quake, Cyclone and Landslides. Role of individuals in prevention of pollution - pollution case studies.

UNIT IV SOCIAL ISSUES - HUMAN POPULATION (6 Hrs)

Urban issues - Energy - water conservation - Environmental Ethics - Global warming - Resettlement and Rehabilitation issues - Environmental legislations - Environmental production Act. 1986 - Air, Water, Wildlife and forest conservation Act - Population growth and Explosion - Human rights and Value Education - Environmental Health - HIV/AIDS - Role of IT in Environment and Human Health - Women and child welfare - Public awareness - Case studies.

UNIT V FIELD WORK (6 Hrs)

Visit to a local area / local polluted site / local simple ecosystem - Report submission REFERENCES

Text Books

1. Bharucha Erach, “Textbook of Environmental Studies for Undergraduate Courses”, Telangana, India: Orient Black Swan, 2rd Edition, 2013,
2. BasuMahua, Savarimuthu Xavier, “SJ Fundamentals of Environmental Studies”. Cambridge, United Kingdom: Cambridge University Press , 2017.
3. Agarwal, K.C “Environmental Biology”, Nidi Publ. Ltd. Bikaner, 2001 .

Reference Books

1. Kumarasam.K., A. Alagappa Moses AND M.Vasanthy, “Environmental studies”, Bharathidasan university pub, 1, trichy2004.
2. Rajamannar, “Environmental studies”, EVR College PUB, Trichy2004
3. Kalavathy, S. (ED.) ,“Environmental Studies”, Bishop Heber College PUB., Trichy 2004.

Web References

1. https://www.youtube.com/watch?v=78prsPYm98g
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2792934/
3. https://www.frontiersin.org/articles/505570

A20CPL101	PROGRAMMING IN C LAB (Common to B.Sc.CS and B.C.A.)	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To practice the fundamental programming methodologies in the C programming language.
- To apply logical skills for problem solving using control structures and arrays.
- To design, implement, test and debug programs that use different data types, variables, strings, arrays, pointers and structures.
- To design modular programming and provide recursive solution to problems.
- To understand the miscellaneous aspects of C and comprehension of file operations.

Course Outcomes

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

CO1 – Apply and practice logical formulations to solve simple problems leading to specific applications.
CO2 – Develop C programs for simple applications making use of basic constructs, arrays and strings.
CO3 – Develop C programs involving functions, recursion, pointers, and structures.
CO4 – Design applications using sequential and random access file processing.
CO5 – Build solutions for online coding challenges.

List of Exercises

1. Simple programming exercises to familiarize the basic C language constructs.
2. Develop programs using identifiers and operators.
3. Develop programs using decision-making and looping constructs.
4. Develop programs using functions as mathematical functions.
5. Develop programs with user defined functions – includes parameter passing.
6. Develop program for one dimensional and two dimensional arrays.
7. Develop program to illustrate pointers.
8. Develop program with arrays and pointers.
9. Develop program for dynamic memory allocation.
10. Develop programs for file operations.

Reference Books

1. Zed A Shaw," Learn C the Hard Way: Practical Exercises on the Computational Subjects You Keep Avoiding (Like C)", Addison Wesley, 2016.
2. Anita Goel and Ajay Mittal, "Computer Fundamentals and programming in C", 1st Edition, PearsonEducation , 2011.
3. Yashwanth Kanethkar, "Let us C", 13th Edition, BPB Publications, 2008.
4. Maureen Sprankle, Jim Hubbard," Problem Solving and Programming Concepts," 9thEdition, Pearson, 2011.

Web References

1. https://alison.com/course/introduction-to-c-programming
2. https://www.geeksforgeeks.org/c-programming-language/
3. http://cad-lab.github.io/cadlab_data/files/1993_prog_in_c.pdf
4. https://www.tenouk.com/clabworksheet/clabworksheet.html
5. https://fresh2refresh.com/c-programming/
6. http://www.skiet.org/downloads/cprogrammingquestion.pdf

A20CPL102	DIGITAL LAB (Common to B.Sc.CS and B.C.A.)	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To acquire knowledge about basic logic gates.
- To develop the skills in writing assembly programs.
- To develop the skill for error corrections in the micro level.
- To expose with the Combinational circuits.
- To expose with the Sequential circuits.

Course Outcomes

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

CO1 – Acquire knowledge about basic logic gates.
CO2 – Develop the skills in writing assembly programs.
CO3 – Develop the skill for error corrections in the micro level.
CO4 – Design Combinational Logic Circuits.
CO5 – Design Sequential Logic Circuits.

List of Exercises

1. Study of Integrated Circuits and their working Logics.
2. Verification of Boolean Theorems using Digital Logic Gates.
3. Design and Implementation of Combinational Circuits using Basic Gates Code Converters.
4. Design and Implementation of 4-Bit Binary Adder / Subtractor using Basic Gates and MSI Devices
5. Design and Implementation of Parity Generator / Checker using Basic Gates and MSI Devices.
6. Design and Implementation of Magnitude Comparator.
7. Design and Implementation of Application using Multiplexers /Demultiplexers.
8. Design and Implementation of Shift Registers.
9. Design and Implementation of Synchronous and Asynchronous Counters.
10. Design and Implementation of Johnson and Ring Counters.

Reference Books

1. Albert Paul Malvino, Donald P Leach, Digital principles and applications, TMH, 2007.
2. Hayes J. P., “Computer Architecture &Organisation”, McGraw Hill,
3. Hamacher, “Computer Organisationand System Software”, EXCEL BOOKS.
4. Ghosh&Pal,Computer Organization & Architecture (TMH WBUT Series), TMH.

Web References

1. www.geeksforgeeks.org › computer-organization-and-architecture
2. www.javatpoint.com › computer-organization-and-architecture-tutorial
3. www.geeksforgeeks.org › digital-electronics-logic-design-tutorials

A20CPS101	COMMUNICATION SKILLS LAB	L	T	P	C	Hrs
	(Common to B.A., B.Sc., B.Com., B.B.A.& B.C.A.)	0	0	4	2	30

Course Objectives

- To improve the students' speed in reading.
- To decode the correspondence between sound and spelling in English.
- To train students to organize, revise and edit ideas to write clearly and effectively.
- To enhance the sense of social responsibility and accountability of the students.
- To expound the significance of time and stress management.

Course Outcomes

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

CO1 – Understand the pattern to communicate effectively.
CO2 – Impart Speaking skills with confidence.
CO3 – Use writing strategies to improve their drafting skills and comprehending of articles.
CO4 – Demonstrate leadership qualities to Participate in Group Discussion and Interview efficiently.
CO5 – Expertise in Managerial skills.

UNIT I COMMUNICATION SKILLS SPEAKING (6 Hrs)

Aspects of speaking - Process and techniques of effective speech – Presentations - topic to be given to students forshort speech.

UNIT II SELF - MANAGEMENT SKILLS (6 Hrs)

Time Management - Stress management – Perseverance – Resilience - Mind mapping –Self- confidence

UNIT III COMMUNICATION SKILL - READING (6 Hrs)

Phonics – Self-Introduction – Vocabulary – Comprehension - skimming and scanning.

UNIT IV SOCIAL SKILLS (6 Hrs)

Negotiation and Persuasion – Leadership – Teamwork – Problem solving – Empathy – Decision making.

UNIT V COMMUNICATION SKILL - WRITING (6 Hrs)

Descriptive – Narrative – Persuasive – Expository – Picture composition

Text Books

1. Syamala, V," Effective English Communication for you", Chennai: Emerald Publishers, 2002
2. Balasubramanian, T," A Textbook of English Phonetics for Indian Students",New Delhi: Trinity Press 1981
3. Sardana, C.K.," The Challenge of Public Relations",New Delhi: Har- Anand Publications,1995.

Reference Books

1. Morley, David and Philip Neilson, editors", The Cambridge Companion to Creative Writing", Cambridge: 2012.
2. Eastwood, John,"Oxford Grammar", Oxford University Press, 1999.
3. Prasad, Hari Mohan," A Handbook of Spotting Errors:" McGraw Hill Education, 2010.
4. Murphy, John J, "Pulling Together: 10 Rules for High-Performance Teamwork", Simple Truths, 2016.

Web References

1. www.softwaretestinghelp.com › how-to-crack-the-gd
2. www.businessballs.com › communication-skills › prese...
3. www.teachingenglish.org.uk › article › public-speaking...
4. www.teachingenglish.org.uk › article › public-speaking...
5. www.monster.com › career-advice › article › boost-you...

மொழித்தாள்

தமிழ் - II

(B.A., B.Sc., B.Com., B.B.A., & B.C.A. பாடப்பிரிவுகளுக்குமான பொதுத்தாள்)

	L	T	P	C	Hrs
A20TAT202	3	0	0	3	45

பாடத்திட்டத்தின் நோக்கம்

- இரண்டாயிரம் ஆண்டுகால தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள்,அடையாளங்கள் ஆகியவற்றை காலந் தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கூறுவதற்கு இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- மொழியின் கட்டமைப்பைப் புரிந்துகொள்வதற்கு ஏதுவாக பாடத்திட்டம் வடிவமைக்கப்பட்டுள்ளது.
- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.
- சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணர்த்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

பாடத்திட்டத்தின் வெளிப்பாடுகள்

CO1 – இலக்கியங்கள் காட்டும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.
CO2 – நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.
CO3 – தகவல் தொடர்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்தல்.
CO4 – தாய்மொழியின் சிறப்பை அறிதல்.
CO5 – இலக்கிய இன்பங்களை நுகரும் திறன்களை வளர்த்தல்.

அலகு–1 **(9 Hrs)**

1. எட்டுத்தொகை: 1.குறுந்தொகை (படல்–130) 2. நற்றிணை (பாடல்–27) 3. அகநானூறு (பாடல்–86).
2. பத்துப்பாட்டு: சிறுபாணாற்றுப்படை (அடிகள்–126–143).
3. பதினெண் கீழ்க்கணக்கு: திருக்குறள்– வெகுளாமை (அதிகாரம்–31), காதல் சிறப்புரைத்தல் (அதிகாரம்–113).

அலகு–2 **(9 Hrs)**

1. எட்டுத்தொகை: 1. ஐங்குறுநூறு (பாடல்–203), 2. கலித்தொகை– பாலைத்திணை (பாடல்–9), 3. புறநானூறு (பாடல்–235).
2. பத்துப்பாட்டு– முல்லைப்பாட்டு (6–21).
3. பதினெண் கீழ்க்கணக்கு :
   1. நாலடியார் – நல்லார் எனத்தான் (221) .
   2. திரிகடுகம்– கோலஞ்சி வாழும் குடியும் (33).
   3. இனியவை நாற்பது– குழவி தளர்நடை (14).
   4. கார் நாற்பது– நலமிகு கார்த்திகை (26).
   5. களவழி நாற்பது–கவளங்கொள் யானை (14).

அலகு–3 **(9 Hrs)**

சைவம்– பன்னிரு திருமுறைகள்

1. திருஞானசம்பந்தர்	–	வேயுறு தோளிபங்கன் (இரண்டாம் திருமுறை).
2. திருநாவுக்கரசர்	–	மனமெனும் தோணி (நான்காம் திருமுறை).
3. சுந்தரர்	–	ஏழிசையாய் இசைப்பயனாய் (ஏழாம் திருமுறை).
4. மாணிக்கவாசகர்	–	ஆதியும் அந்தமும் இல்லா (திருவெம்பாவை).
5. திருமூலர்	–	அன்பு சிவம் இரண்டு (திருமந்திரம்).

வைணவம் – நாலாயிரத் திவ்வியப் பிரபந்தம்

1. பேயாழ்வார்	–	திருக்கண்டேன் பொன்மேனி....
2. பெரியாழ்வார்	–	கருங்கண் தோகை மயிற் பீலி....
3. தொண்டரடிப்பொடிஆழ்வார்	–	பச்சைமாமலை போல்....
4. ஆண்டாள்	–	கருப்பூரம் நாறுமோ? கமலப்பூ....
5. திருமங்கையாழ்வார்	–	வாடினேன் வாடி வருந்தினேன்....

இஸ்லாமியம்
சீறாப்புராணம்– பாடல் நின்ற பிணை மானுக்குப்...5 பாடல்கள் (பாடல் எண்கள் 61–65).

கிருத்துவம்
இரட்சண்ய யாத்ரீகம்– கடைதிறப்புப் படலம் –5 பாடல்கள் (பாடல் எண்கள்: 3,9,10,15,16).

அலகு – 4 **(9 Hrs)**

தமிழ் இலக்கிய வரலாறு
1. சங்க இலக்கியங்கள் 2. நீதி இலக்கியங்கள் 3. பக்தி இலக்கியங்கள் 4. காப்பியங்கள்.

அலகு–5 **(9 Hrs)**

சிறுகதைகள்

1. புதுமைபித்தன்	–	அகலிகை
2. நா. பிச்சமூர்த்தி	–	வேப்பமரம்
3. அகிலன்	–	ஒரு வேளைச்சோறு
4. ஜி.நாகராஜன்	–	பச்சக் குதிரை
5. கி.ராஜநாராயணன்	–	கதவு
6. சா.கந்தசாமி	–	தக்கையின் மீது நான்கு கண்கள்
7. ஆண்டாள் பிரியதர்ஷினி	–	மாத்திரை
8. வண்ணதாசன்	–	ஒரு உல்லாசப் பயணம்
9. சு. தமிழ்ச்செல்வன்	–	வெயிலோடு போய்
10. பாரததேவி	–	மாப்பிள்ளை விருந்து

பார்வை நூல்கள் :
1. அரசு, வீ., இருபதாம் நூற்றாண்டு சிறுகதைகள் நூறு, அடையாளம் பதிப்பகம், திருச்சி, 2013.
2. அருணாச்சலம், பா., பக்தி இலக்கியங்கள், பாரி நிலையம், சென்னை, 2010.
3. தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 2000.
4. பாக்கியமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.பி.எச். பதிப்பகம், சென்னை, 2011.
5. பசுபதி, மா. வே., செம்மொழித் தமிழ் இலக்கண இலக்கியங்கள், தமிழ்ப் பல்கலைக்கழகம், 2010 .

உரைநடை நூல்கள் :
1. அன்பு, பா., மா.பொ.சி யின் ஒரு இலக்கிய நூல்கள் ஒரு மதிப்பீடு, உலக தமிழ் ஆராய்ச்சி நிறுவனம், சென்னை, 1983.
2. பிள்ளை, கே.கே., தமிழக வரலாறும் மக்களும் பண்பாடும், உலக தமிழ் ஆராய்ச்சி நிறுவனம், சென்னை, 2000.
3. ஜெயமோகன், நவீன இலக்கிய அறிமுகம், உயிர்மெய் பதிப்பகம், சென்னை, 1995.

இணையத்தளங்கள் :
http://www.tamilkodal.com
http://www.languagelab.com
http://www.tamilweb.com

	FRENCH – II	L	T	P	C	Hrs
A20FRT202	(Common to B.A., B.Sc., B.Com., B.B.A. & B.C.A)	**3**	**0**	**0**	**3**	**45**

OBJECTIVES

- To enable the students read, understand, and write simple sentences.
- To grasp relevant grammar for communication
- To learn about the land, people and culture of France.

UNITÉ - 1

Qu'est -ce qu'on leur offre ?
On solde !
Découvrir Paris en bus avec l'open Tour

UNITÉ - 2
Si vous gagne vous ferez quoi
Parasol ou parapluie ?

UNITÉ - 3
Quand il est midi á Paris
Vous allez Vivre
L'avenir du Français

UNITÉ - 4
Souvenirs d'enfance
j'ai fait mes études á Lyon 2

UNITÉ – 5
Retour des Antilles
Au voleur ! Au voleur

TextBooks

PrescribedTextbook : *FESTIVAL 1* - Méthode de Français
Authors : Sylvie POISSON-QUINTON
Michèle MAHEO-LE COADIC
Anne VERGNE-SIRIEYS
Edition : CLE International, Nouvelle Édition révisée : 2009.

Reference Book

Festival 1

		L	T	P	C	Hrs
A20GET202	**GENERAL ENGLISH- II** **(Common to B.A, B.Sc. and BCA)**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To recognize poetry from a variety of cultures, languages and historic periods
- To develop the intensive study of language by critical reading
- To identify the various genres and analyze the works of writers in English
- To expand the basic understanding of targeted grammatical structures
- To understand the conventions of writing in English

Course Outcomes

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

CO1 – Understand and appreciate poetry as a literary art form.
CO2 – Comprehend and recognize relationship between ideas, events and facts.
CO3 – Learn to explore characters and their conflicts, dilemmas and extend their response to stories.
CO4 – Apply grammatical structures meaningfully and appropriately in oral and written form.
CO5 – Write effectively and coherently.

UNIT I POETRY (9 Hrs)

1. Lord Byron: She Walks in Beauty
2. Robert Frost: Stopping by Woods on a Snowy Evening
3. Nissim Ezekiel: Night of the Scorpion
4. Rabindranath Tagore: Where the Mind is Without Fear

UNIT II PROSE (9 Hrs)

1. Ernest Hemingway-A Day's Wait
2. Anton Chekhov: The Lottery Ticket

UNIT III FICTION (9 Hrs)

1. Jane Austen - Pride and Prejudice

UNIT IV GRAMMAR (9 Hrs)

1. Voice – Conditionals - Coherence

UNIT V COMPOSITION (9 Hrs)

1. Letter Writing
2. Report Writing

Text Books

1. Wisdom and Experience: An Anthology for Degree Classes. Board of Editors", Orient Longman Limited, 2007
2. "The Approach to Life: A Selection of English Prose", Orient Longman Limited, 2009.
3. "Brookside Musings: A Selection of Poems and Short Stories: Board of Editors", Orient, Longman Limited, 2009.

Reference Books

1. Lalitha Natarajan and Sasikala Natesan, "English for Excellence: Poetry", Anuradha Publications Literary Pursuits: Board of Editors, Orient Longman Limited, 2015.
2. S.C. Gupta, "English Grammar & Composition", Arihant, 2014
3. Rabindranath Tagore, Where the mind is without fear ",London : The India Society,1912.
4. Raymond Murphy and Surai Pongtongcharoen, "English Grammar in Use", Cambridge University, 1985.

Web References

1. https://poets.org/poem/she-walks-beauty
2. https://www.poetryfoundation.org/poems/46467/the-flea
3. https://www.classicshorts.com/stories/lottery.html
4. http://short-storylovers.blogspot.com/2012/07/thief-by-ruskin-bond.html
5. http://www.gutenberg.org/files/1342/1342-h/1342-h.htm

A20CPT203 **PROGRAMMING IN C++**

L	T	P	C	Hrs
4	0	0	4	60

Course Objectives

- Define Encapsulation, Inheritance and Polymorphism.
- Solve the problem with object oriented approach.
- Analyze the problem statement and build object oriented system model.
- Describe the characters and behavior of the objects that comprise a system.
- Explain function overloading, operator overloading and virtual functions.

Course Outcomes

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

CO1 – Learn programming of C++.

CO2 – Understand Object oriented approach for finding Solutions.

CO3 – Create C++ based solutions to Inheritance concepts.

CO4 – Learn various concepts Files and Exception Handling techniques.

CO5 – Develop the applications using object oriented programming with C++.

UNIT I INTRODUCTION TO C++ AND BASICS OF OOPS (12 Hrs)

Basic components of a C++ - Program and program structure - Compiling and Executing C++ Program - Basic Concepts of Object-Oriented Programming: Benefits of OOP – Object Oriented Languages – Applications of OOP.

UNIT II PRINCIPLES OF OBJECT ORIENTED PROGRAMMING (12 Hrs)

Classes objects - data members - member functions –Access Specifiers- this Pointer - Friends - Friend Functions - Friend Classes - Friend Scope - Static Functions - Constructors and Destructors - Static variables and Functions in class - Operator Overloading in C++ - Overloading Unary Operators - Overloading binary operators.

UNIT III INHERITANCE (12 Hrs)

Inheritance in C++ - Types of Inheritance - Multiple Inheritance. Virtual Functions - Polymorphism - Abstract classes. Real time examples in OOPS.

UNIT IV POINTERS, EXCEPTION HANDLING AND FILES (12 Hrs)

Pointers - Objects and Pointers - Exception Handling: Exception – Basics – Exception Handling Mechanism – Throwing Mechanism – Catching Mechanism – Re-throwing Exception. Standard input and output operations: C++ IOstream hierarchy - File input and output: Reading a File - Managing I/O Streams - Opening a File – Different Methods - Checking for Failure with File Commands - Checking the I/O Status Flags - Dealing with Binary Files - Useful Functions.

UNIT V TEMPLATES (12 Hrs)

Class templates: Implementing a class template - Implementing class template member functions - Using a class template - Function templates - Implementing function templates - Using template functions.

Text Books

1. E. Balagurusamy, “Object Oriented Programming with C++”, McGraw Hill, 7th Edition, 2018.
2. Herbert Schildt, “C++ - The Complete Reference”, McGraw Hill Education, 4th Edition, 2017.

Reference Books

1. Herbert Schildt, “C++ - From the Ground Up”, McGraw Hill Education, 2nd Edition, 2010.
2. Thomas L. Floyd, “Electronic Devices”, 9thEdition, Pearson Education, 2012.
3. Stanley B. Lippman, Stanley Lippman, Barbara Moo, “C++ Primer”, Addison-Wesley Professional, 5thEdition 2012.

Web Resources

1. https://www.tutorialspoint.com/cplusplus/index.htm
2. http://www.cplusplus.com/doc/tutorial/
3. https://www.w3schools.com/cpp/
4. https://www.javatpoint.com/cpp-tutorial
5. https://www.geeksforgeeks.org/cpp-tutorial/

A20CPT204	DATA STRUCTURES AND ALGORITHMS (Common to B.Sc. CS and B.C.A.)	L	T	P	C	Hrs
		4	0	0	4	60

Course Objectives

- To introduce the primary data structures and algorithms for their associated operations.
- To understand the applications of data structures.
- To learn the implementation issues of the data structures introduced.
- To understand the concepts of searching and sorting Techniques.
- To understand the basic concepts of stack, queue, List, Trees and Graphs

Course Outcomes

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

CO1 – Analyze algorithms based on time and space complexity.
CO2 – Implement and Apply linear data structures to solve simple problems.
CO3 – Represent and Apply Non-linear data structures to solve complex problems.
CO4 – Use Graphs and Trees to solve various problems.
CO5 – Use Divide and Conquer Method and Greedy techniques to solve real time problems.

UNIT I DATA STRUCTURE AND ALGORITHM (12 Hrs)

Types of data structures – Abstract Data Type (ADT) – Analysis of algorithm – Time and space complexity – Recurrence relation – Asymptotic Notation. Sorting – Searching.

UNIT II LIST AND ADT (12 Hrs)

Static and dynamic Representation – Types – Single Linked List - Doubly Linked List – Circular Linked List – Operations and Applications.

UNIT III STACKADT (12 Hrs)

Static and Dynamic Representation – Operations – Applications- Balancing Parenthesis – Evaluation of Arithmetic Expression- Infix to Postfix conversion. Queue ADT: Static and dynamic Representation – Linear queue – circular queue.

UNIT IV TREE ADT (12 Hrs)

Representation – Types – Binary Tree – Threaded Binary Tree -Binary Search Tree – Operation and Application. Graph: Representation – Types – Graph Traversal – Depth First Search – Breadth First Search – Application – Minimum cost spanning tree – Topological Sorting.

UNIT V ALGORITHM DESIGN TECHNIQUES (12 Hrs)

Divide and Conquer – General method – Finding Minimum Maximum – Greedy Method: General Method– knapsack problem – Single source shortest path – Dijkstra's: Job sequencing.

Text Books

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", 4th Edition, Pearson Education, 2013.
2. E. Horowitz, S. Sahni and S. Rajasekaran, "Computer Algorithms/C++", 2rd Edition, The Orient Blackswan, 2019.
3. A Puntambekar, "Data Structures", Third Revised Edition, Technical Publications Pune, 2008.

Reference Books

1. ReemaThareja, “Data Structures Using C”,1st Edition, Oxford University Press, 2017.
2. Gilles Brassard, “Fundamentals of Algorithms”, Pearson Education, 2015.
3. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint, 2006.
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, “Fundamentals of Data Structures in C”, 2rd Edition, University Press, 2008.

Web References

1. https://www.geeksforgeeks.org/
2. http://opendatastructures.org/
3. https://nptel.ac.in/courses/106/106/106106127

A20CPD202	DISCRETE MATHEMATICS	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To understand the concepts of Logical operations and Prepositions.
- To familiarize the concept of set theory and their relations.
- To understand the basic concepts of functions.
- To familiarize the applications of algebraic structures.
- To understand the concepts and significance of Graph theory.

Course Outcomes

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

CO1 – Acquire the knowledge about the concepts needed to test the logic of a program.
CO2 – Understand to identifying the sets and relations.
CO3 – Understand to identifying the functions and algorithm.
CO4 – Apply the concept of algebraic and groups.
CO5 – Understand the basic concepts of graph theory and colorings.

UNIT I PROPOSITIONAL CALCULUS (12 Hrs)

Propositional calculus: Propositions and compound propositions, connectives, Logical operations - Propositions and Truth tables, Tautologies and contradictions, Logical equivalence - Algebra of proposition - conditional and Bi-conditional statements – Quantifiers - Negation of quantifier statements.

UNIT II SET THEORY (12 Hrs)

Set Theory: Sets Basic concepts, notation, inclusion and equality of sets - Power set, set operations – Relations - composition of relations, Equivalence relations, partial order relation - n-array relations.

UNIT III FUNCTIONS (12 Hrs)

Functions: one-to-one, onto and invertible functions - Mathematical functions, Exponential and Logarithmic functions - Recursively Defined functions - Algorithms and Functions - complexity of Algorithms.

UNIT IV ALGEBRAIC SYSTEMS (12 Hrs)

Algebraic systems - Examples and General properties - semi-groups and Monoids - Definitions and Examples - Groups: Definition and examples – Cosets and Lagrange's theorem -Normal subgroups - Group homomorphism.

UNIT V GRAPH THEORY (12 Hrs)

Graph Theory: Graphs and multi-graphs sub-graph - Isomorphic and Homeomorphic Graphs - Paths connectivity - The Bridges of Knonigsberg, Traversable multigraphs Labeled and weight graphs - complete regular and Bipartite graphs - Tree graphs - planar graphs, Graph colorings, Representation of graph in Computer memory.

Text Books

1. Venkatraman M K, Sridharan N and Chandrasekaran N, Discrete Mathematics, The National Publishing Company, 2000.
2. J.P. Tremblay and R. Manohar Discrete mathematical structures with applications to Computer Science Mc.Graw Hill Book Company, New York, 1975.
3. Rosen, K.H., "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., NewDelhi, Special Indian Edition,2011.
4. Tremblay, J.P. and Manohar. R, "Discrete Mathematical Structures with Applications to Computer Science",TataMcGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.
5. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 5th Edition, Tata McGraw - Hill Publishing Company, Pvt. Ltd., New Delhi, 2003.

Reference Books

1. Grimaldi.R .P."Discrete and Combinatorial Mathematics: An Applied Introduction",4th Edition, PearsonEducation Asia, Delhi, 2007.
2. Lipschutz. S and Mark Lipson, "Discrete Mathematics", Schaum'sOutlines, Tata McGraw Hill Pub.Co. Ltd.,New Delhi, 3rd Edition, 2010.
3. Koshy. T, "Discrete Mathematics with Applications "Elsevier Publications, 2006.
4. C.L. Liu, "Elements of Discrete Mathematics", 3rd Edition, Tata McGraw - Hill Education Pvt. Ltd., 2008.
5. Kenneth H. Rosen," Discrete Mathematics and Its Applications, Published September 9th 2002 by McGraw-Hill Science/Engineering/Math (first published April 1st 2000).

Web References

1. https://nptel.ac.in/courses/111/107/111107058/
2. https://nptel.ac.in/courses/111/104/111104026/
3. https://nptel.ac.in/courses/106/106/106106183/
4. http://www.math-cs.gordon.edu/courses/mat230/notes/graphs.pdf
5. https://www.cs.utexas.edu/~isil/cs311h/lecture-graph1b-6up.pdf

		L	T	P	C	Hrs
A20AET202	**PUBLIC ADMINISTRATION**	**2**	**0**	**0**	**2**	**30**

(Compulsory Course designed as per the directions issued by Government of India, MHRD, Department ofHigher Education (Central University Bureau)

F.No.19-6.2014-Desk U Dated 19-05-2014)

Course Objectives

- To introduce the elements of public administration
- To help the students obtain a suitable conceptual perspective of public administration
- To introduce them the growth of institution devices to meet the need of changing times
- To instill and emphasize the need of ethical seriousness in contemporary Indian Public Administration

Course Outcomes

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

CO1 – Understand the concepts and evolution of Public Administration.
CO2 – Be aware of what is happening in the Public Administration in the country.
CO3 – Explain the Territory Administration in the State and the Centre.
CO4 – Appreciate emerging issues in Indian Public Administration.

UNIT I INTRODUCTION TO PUBLIC ADMINISTRATION (7 Hrs)

Meaning, nature and Scope of Public Administration and its relationship with other disciplines- Evolution of Public Administration as a discipline – Woodrow Wilson, Henry Fayol , Max Weber and others - Evolution of Public Administration in India – Arthashastra – Colonial Administration upto 1947

UNIT II PUBLIC ADMINISTRATION IN INDIA (8 Hrs)

Enactment of Indian Constitution - Union Government – The Cabinet – Central Secretariat -– All India Services – Training of Civil Servants – UPSC – NitiAyog – Statutory Bodies: The Central Vigilance Commission – CBI - National Human Rights Commission – National Women's Commission –CAG

UNIT III STATE AND UNION TERRITORY ADMINISTRATION (8 Hrs)

Differential Administrative systems in Union Territories compared to States Organization of Secretariat: -Position of Chief Secretary, Functions and Structure of Departments, Directorates – Ministry of Home Affairs supervision of Union Territory Administration – Position of Lt.Governor in UT – Government of Union Territories Act 1963 – Changing trend in UT Administration in Puducherry and Andaman and Nicobar Island

UNIT IV EMERGING ISSUES IN INDIAN PUBLIC ADMINISTRATION (7 Hrs)

Changing Role of District Collector – Civil Servants – Politicians relationship – Citizens Charter - Public Grievance Redressal mechanisms –– The RTI Act 2005 – Social Auditing and Decentralization – Public Private partnership.

Text Books

1. Avasthi and Maheswari, “Public Administration”, Lakshmi Narain Agarwal, 1st Edition, 2016.
2. Ramesh K.Arora, “Indian Public Administration: Institutions and Issues”, New Age International Publishers, 3rd Edition, 2012.
3. RumkiBasu, “Public Administration: Concept and Theories”, Sterling, 1st Edition, 2013.

Reference Books

1. Siuli Sarkar, “Public Administration in India”, Prentice Hall of India, 2nd Edition, 2018.
2. M. Laxmikanth, “Public Administration”, McGraw Hill Education, 1st Edition, 2011.
3. R.B.Jain, “Public Administration in India, 21st Century Challenges for Good Governance”, Deep and DeepPublications, 2002.

Web References

1. http://cic.gov.in/
2. http://www.mha.nic.in/
3. http://rti.gov.in/
4. http://www.cvc.nic.in/

A20CPL203	PROGRAMMING IN C++ LAB	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To introduce the concepts of Basic Object Oriented concepts and Programming Basics.
- To gain insight into the Functions and Array usages using C++.
- To understand in depth about the Classes and Objects.
- To study the Operator overloading and Inheritance concepts.
- To acquaint the Files and Exception Handling concepts.

Course Outcomes

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

CO1 – Understand the Object Oriented concepts.
CO2 – Understand the Functions and Arrays.
CO3 – Construct the Classes and Objects.
CO4 – Explain the Operator overloading and Inheritance concepts.
CO5 – Describe Files and Exception Handling Methods.

List of Exercises

Write C++ Programs for the followings:

1. Class Declarations, Definition, and Accessing Class Members.
2. Constructor, parameterized constructor and copy constructors.
3. Friend Function and Friend Class.
4. Function Overloading and Constructor Overloading.
5. Operator Overloading.
6. Inheritances.
7. Virtual Classes and Abstract Classes.
8. Exception Handling.
9. IOStream, IStream, Ostream classes and their usages.
10. FileStream Operations.
11. Template Based Program to Sort the Given List of Elements.

Reference Books

1. Herbert Schildt, “C++ - From the Ground Up”, McGraw Hill Education, 2nd Edition,2010.
2. Stanley B. Lippman, Stanley Lippman, Barbara Moo, “C++ Primer”, Addison-Wesley Professional, 5th Edition 2012.

Web Resources

1. https://www.tutorialspoint.com/cplusplus/index.htm
2. http://www.cplusplus.com/doc/tutorial/
3. https://www.w3schools.com/cpp/
4. https://www.javatpoint.com/cpp-tutorial
5. https://www.geeksforgeeks.org/cpp-tutorial/

	DATA STRUCTURES LAB	L	T	P	C	Hrs
A20CPL204	**(Common to B.Sc. CS and B.C.A.)**	**0**	**0**	**4**	**2**	**30**

Course Objectives

- To learn the basic concepts of Data Structures.
- To learn about the concepts of Searching and Sorting.
- To study about the linear and non-linear Data Structures.
- To study about the linear and non-linear Data Structures.
- To learn about the concepts of ADT including List, stack and Queues.

Course Outcomes

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

CO1 – Analyze the algorithm's / program's efficiency in terms of time and space complexity.
CO2 – Solve the given problem by identifying the appropriate Data Structure.
CO3 – Solve problems in linear and non-linear Data Structures.
CO4 – Develop programs using various searching methods.
CO5 – Sole the problems using Linked List.

List of Exercises

1. Write a C program to implement recursive and non-recursive i) Linear search ii) Binary Search.
2. Write a C program to implement i) Bubble sort ii) Selection sort iii) Insertion sort iv) Shell sort v) Heap sort.
3. Write a C program to implement the following using an array. a) Stack ADT b) Queue ADT
4. Write a C program to implement list ADT to perform following operations.
    a) Insert an element into a list.
    b) Delete an element from list
    c) Search for a key element in list
    d) Count number of nodes in list.
5. Write a C program to implement the following using a singly linked list. a) Stack ADT b) Queue ADT.
6. Write a C program to implement the dequeue (double ended queue) ADT using a doubly linked list and an array.
7. Write a C program to perform the following operations:
    a) Insert an element into a binary search tree.
    b) Delete an element from a binary search tree.
    c) Search for a key element in a binary search tree.
8. Write a C program that use recursive functions to traverse the given binary tree in
    a) Preorder
    b) Inorder and
    c) Postorder.
9. Write a C program to perform the AVL tree operations.
10. Write a C program to implement Graph Traversal Techniques.

Reference Books

1. Ellis Horowitz, SartajSahni, ”Fundamentals of Data Structures”, Illustrated Edition, Computer Science Press, 2018
2. Rohit Khurana, “Data structures using C”, 1st Edition, Vikas Publishing, 2014.
3. S.K.Srivastava, Deepali Srivastava, “Data Structures through C in Depth” BPB Publications in the year 2011.

Web References

1. https://www.tutorialspoint.com/data_structures_algorithms/
2. https://www.w3schools.in/data-structures-tutorial/intro/
3. https://nptel.ac.in/courses/106103069/
4. https://swayam.gov.in/nd1_noc20_cs70/preview

A20CPS202	QUANTITATIVE APTITUDE AND LOGICAL REASONING	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To understand the concepts of basic aptitude.
- To learn about average and profits
- To learn about series.
- To learn the concept of logical reasoning.
- To know about mathematical reactions

Course Outcomes

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

CO 1 - understand the concepts of basic aptitude.
CO 2 - Understand the basic concepts of average and profits
CO 3 - Usage of series.
CO 4 - Basics of logical reasoning.
CO 5 - Basic concepts of mathematical reactions.

UNIT I APTITUDE BASICS (6 Hrs)

HCF - LCM - permutations and Combinations - Permutations and combinations - probability

UNIT II PROGRESSION AND SEQUENCE (6 Hrs)

Ratio and proportion - Percentage - Average - Problem based on ages - Profit and loss Square roots - Cube roots - Series - Progression and sequence

UNIT III RELATIONS (6 Hrs)

Fractions - simple interest - compound interest - time and work - Analogy - Classifications - Series Completion - Coding and Decoding - Blood relations

UNIT IV LOGICAL SEQUENCES (6 Hrs)

Puzzle test - Direction sense test - logical venn diagram -number ranking and time sequence test - Situation reaction test -

UNIT V STATEMENTS AND ARGUMENTS (6 Hrs)

Mathematical reaction - logical sequences of words - Statements and arguments

Text Books

1. Quantitative aptitude by Dr RS Aggarwal

Reference Books

1. SURA`S Quantitative Aptitude and Arithmetic Competitive Exam Book by Prof Abhilasha Khanna MA CTE BEd Arvind Sharma MSc MEd
2. Quantitative Aptitude for Competitive Examination by Abhijit Guha
3. Quantitative Aptitude and Reasoning by by Shyam Saraf/Abhilasha Swarup

Web References

1. https://www.indiabix.com/
2. https://www.careerbless.com/aptitude/qa/home.php
3. https://www.fresherslive.com/online-test/aptitude-test/questions-and-answers
4. https://testbook.com/aptitude
5. https://www.greatlearning.in/academy/learn-for-free/courses/quantitative-aptitude-basics

A20EAL201	NATIONAL SERVICE SCHEME	L	T	P	C	Hrs
	(Common to all B.A., B.Sc., B.Com., B.B.A., B.C.A.)	0	0	2	1	30

Course Objectives

- To introduce about various activities carried out by national service scheme.
- To gain life skills through community service.
- To gain awareness about various service activities performed in higher educational institutions.
- To give exposure about the use of technology to uplift the living standards of rural community.
- To induce the feeling of oneness through harmony of self and society.

Course Outcomes

After the end of the course, the students will able to

CO1 – Recognize the importance of national service in community development.
CO2 – Convert existing skills into socially relevant life skills.
CO3 – Differentiate various schemes provided by the government for the social development.
CO4 – Identify the relevant technology to solve the problems of rural community.
CO5 – Associate the importance harmony of nation with long term development.

UNIT I INTRODUCTION TO NATIONAL SERVICE SCHEME (6 Hrs)

History and objectives, NSS symbol, Regular activities, Special camping activities, Village adaptation programme, Days of National and International Importance, Hierarchy of NSS unit in college. Social survey method and Data Analysis. NSS awards and recognition. Importance of Awareness about Environment, Health, Safety, Genderissues, Government schemes for social development and inclusion policy etc.,

UNIT II LIFE SKILLS AND SERVICE LEARNING OF VOLUNTEER (6 Hrs)

Communication and rapport building, problem solving, critical thinking, effective communication skills, decisionmaking, creative thinking, interpersonal relationship skills, self- awareness building skills, empathy, coping with stressand coping with emotions. Understanding the concept and application of core skills in social work practice, Team work, Leadership, Event organizing, resource planning and management, time management, gender equality, understanding rural community and channelizing the power of youth.

UNIT III EXTENSION ACTIVITIES FOR HIGHER EDUCATIONAL INSTITUTIONS (6 Hrs)

Objective and functions of Red Ribbon Club, Swatchh Bharath Abhiyan, Unnat Bharat Abhiyan, Jal Shakthi Abhiyan, Road Safety Club, Environmental club and Electoral literacy club.

UNIT IV USE OF TECHNOLOGY IN SOLVING ISSUES OF RURAL INDIA (6 Hrs)

Understanding community issues, economic development through technological development. Selection of appropriate technology, Understanding issues in agriculture, fishing, artisans, domestic animals, health and environment.

UNIT V NATIONAL INTEGRATION AND COMMUNAL HARMONY (6 Hrs)

The role of Youth organizations in national integration, NGOs, Diversity of Indian Nation, Importance of National integration communal harmony for the development of nation, Indian Constitution, Building Ethical human Relationships, Universal Human Values, Harmony of self and Harmony of nation.

Reference Books

1. Joseph, Siby K and Mahodaya Bharat (Ed.), " Essays on Conflict Resolution", Institute of Gandhian Studies, Wardha,2007.
2. Barman Prateeti and Goswami Triveni (Ed.), " Document on Peace Education", Akansha Publishing House, New Delhi, 2009
3. Sharma Anand and G. Davi," Gandhian Way, Academic Foundation", New Delhi Myers SocialPsychology. New Delhi: Tata Mc.Graw Hill, 2007.
4. Taylor E. Shelly et.al , "Social Psychology ",12th Edition New Delhi, Pearson Prentice Hall Singh, 2006.
5. Madhu, "Understanding Life Skills, background paper prepared for education for all: The leap to equality, Government of India report", New Delhi, 2003.
6. Sandhan " Life Skills Education, Training Module, Society for education and development",2005.
7. Jaipur. Radakrishnan Nair and Sunitha Rajan , "Life Skill Education: Evidences form the field", RGNIYD publication,Sriperumbudur,2012.
8. National Service Scheme Manual (Revised), Government of India, Ministry of Youth Affairs and Sports, New Delhi.
9. M. B. Dishad, "National Service Scheme in India: A Case study of Karnataka , Trust Publications, 2001.

Web References

1. http://www.thebetterindia.com/140/national-service-scheme-nss/
2. http://en.wikipedia.org/wiki/national-service-scheme 19=http://nss.nic.in/adminstruct
3. http://nss.nic.in/propexpan
4. http://nss.nic. in
5. http://socialworknss.org/about.html

A20CPT305	PROBLEM SOLVING USING JAVA	L	T	P	C	Hrs
		4	0	0	4	60

Course Objectives

- To gain and explore the knowledge of java programming.
- To know the principles of Inheritances, Packages and Interfaces.
- To get familiarized to generic programming, Multithreading concepts.
- To gain and explore the advanced concepts in Java.
- To explore database connectivity

Course Outcomes

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

CO1 – Write a maintainable java program for a given algorithm and implement the same.
CO2 – Demonstrate the use of inheritance, interface and package in relevant applications.
CO3 – Create java applications using exception handling, thread and generic programming.
CO4 – Build java distributed applications using Collections and IO streams.
CO5 – Exemplify simple graphical user interfaces using GUI components and database programs.

UNIT I INTRODUCTION TO JAVA PROGRAMMING (12Hrs)

The History and Evolution of Java – Byte code – Java buzzwords – Data types – Variables – Arrays – operators – Control statements – Type conversion and casting - Basic Concepts of OOPs – Concepts of classes and objects - Constructors – static keyword – Final with data – Access control – This key word – Garbage collection – Nested classes and inner classes – String class

UNIT II INHERITANCE, PACKAGES AND INTERFACES (12 Hrs)

Inheritance: Basic concepts – Forms of inheritance – Super key word – method overriding – Abstract classes – Dynamic method dispatch – The Object class. Packages: Defining – Creating and Accessing – importing packages. Interfaces: Defining – Implementing – Applying – Variables and extending interfaces

UNIT III EXCEPTION HANDLING AND MULTITHREADING (12Hrs)

Concepts of Exception handling – Types of exceptions – Creating own exception – Concepts of Multithreading – creating multiple threads – Synchronization – Inter thread communication. Enumeration: Auto boxing – Generics.

UNIT IV COLLECTIONS AND I/OSTREAM (12Hrs)

Collections: List – Vector – Stack – Queue – De queue – Set – Sorted Set. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files.

UNIT V EVENT DRIVEN PROGRAMMING AND JDBC (12Hrs)

Events – Delegation event model – Event handling – Adapter classes. AWT: Concepts of components – Font class – Color class and Graphics - Introduction to Swing - Layout management - Swing Components - Java Database Connectivity – JDBC Connections – JDBC Create Databases - Develop real time applications.

Text Books

1. Herbert Schildt, “Java: The Complete Reference”, TMH Publishing Company Ltd,11th Edition, 2018.
2. Sagayaraj, Denis, Karthik, Gajalakshmi, “JAVA Programming for core and advanced learners”, Universities Press Private Limited, 2018.
3. Herbert Schildt, “The Complete Reference JAVA 2”, TMH, Seventh Edition, 2006.

Reference Books

1. H.M.Dietel and P.J.Dietel, “Java How to Program”, 11th Edition, PearsonEducation/PHI, 2017.
2. Nageshvarrao, “Core Java and Integrated Approach”, 1st Edition, Dreamtech, 2016.
3. Cay S. Horstmann, Gary cornell, “Core Java Volume –I Fundamentals”, Prentice Hall,9th Edition, 2013.
4. P.J. Dietel and H.M Dietel, “Java for Programmers”, Pearson Education, 9th Edition, 2011.
5. Cay.S.Horstmann and Gary Cornell, “Core Java 2”, Pearson Education, 8th Edition,2008.

Web References

1. http://www.ibm.com/developerworks/java/
2. http://docs.oracle.com/javase/tutorial/rmi/.
3. IBM’s tutorials on Swings, AWT controls andJDBC.
4. https://www.edureka.co/blog
5. https://www.geeksforgeeks.org

A20CPT306	MICROPROCESSORS AND ASSEMBLY LANGUAGE PROGRAMMING	L	T	P	C	Hrs
		4	0	0	4	60

Course Objectives

- To understand and learn the architecture and assembly language program of 8085.
- To understand and learn the architecture and assembly language program of 8086.
- To explore the interfacing the peripherals and other chips to 8085.
- To explore the architecture of 8086.
- To understand the interfacing the peripherals and other chips to 8086.

Course Outcomes

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

CO1 – Explain the basic architecture of 8085 microprocessors.
CO2 – Articulate the knowledge of Communication based Interfacing with 8085.
CO3 – Summarize the interfacing of various program based peripherals to 8085.
CO4 – Illustrate the architecture of the 8086 microprocessors.
CO5 – Summarize the interfacing of various peripherals with 8086.

UNIT I INTEL 8085 MICROPROCESSORS (12Hrs)

Introduction – Need for Microprocessor – Evolution – 8085 Architecture – Pin diagram - Timing Diagram – Addressing Modes – Instruction Formats – Instruction Set.

UNIT II COMMUNICATION BASED INTERFACING TO 8085 (12Hrs)

Parallel Communication Interface (8255) – Serial Communication interface (8251) – D/A and A/D Interface.

UNIT III PROGRAM BASED INTERFACING TO 8085 (12Hrs)

Programmable Timer Controller (8254) – Keyboard/display controller (8279) – Programmable Interrupt Controller (8259) – DMA controller (8237).

UNIT IV INTEL 8086 MICROPROCESSORS (12Hrs)

Introduction to 8086 Microprocessor – 8086 Architecture – Pin diagram – Addressing Modes – Instruction Format – Instruction Set – Interrupts – Assembler Directives – Assembly Language Programming.

UNIT V INTERFACING 8086 MICROPROCESSORS (12Hrs)

8086 Functional Units – I/O Interfacing - D/A and A/D Interface – Stepper Motor interfacing - Serial communication standards, serial data transfer schemes, 8251 USART architecture and interfacing -

Text Books

1. Ramesh S. Gaonkar, “Microprocessor - Architecture, Programming and Applications with 8085”, Penram International Publications, Sixth Edition, 2013.
2. Krishna Kant, “Microprocessors and Microcontrollers – Architectures, Programming and system Design 8085, 8086, 8051, 8096”, PHI, 2014.
3. Yu-Cheng Liu, Glenn A.Gibson, “Microcomputer Systems: The 8086 / 8088 Family Architecture, Programming and Design”, Prentice Hall of India, Second Edition, 2015.

Reference Books

1. Doughlas V.Hall, “Microprocessors and Interfacing, Programming and Hardware”, TMH2012.
2. A.K. Mukhopadhyay, "Textbook on Microprocessor-based Laboratory Experiments and Projects", I.K.International Pulications, ISBN: 9789380578040, 3rd Edition, 2010.
3. A.P.Godse, D.A.Godse, “Microprocessors and Microcontrollers system”, Technical Publications, Pune, 2nd Edition, 2015.

Web References

1. https://swayam.gov.in/nd1_noc20_ee42/microprocessors-and-microcontrollers/
2. https://www.classcentral.com/course/swayam
3. https://freevideolectures.com/course/3018/microprocessors
4. https://www.arduino.cc/

A20MAD307 NUMERICAL METHODS

L	T	P	C	Hrs
3	1	0	4	60

Course Objectives

- To know the solution of algebraic and transcendental equations.
- To learn the techniques of solving simultaneous equations.
- To introduce the numerical techniques of differentiation and integration.
- To solve ordinary differential equations by using numerical methods.
- To know the solution of partial differential equations by using numerical methods.

Course Outcomes

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

CO 1 – Use of Numerical techniques to solve algebraic and transcendental equations.
CO 2 – Find the solution of simultaneous equations.
CO 3 – Apply the knowledge of differentiation and integration by using numerical methods.
CO 4 – Solve the ordinary differential equations by using various methods.
CO 5 – Solve the partial differential equations by numerical methods.

UNIT I SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS AND EIGEN VALUE PROBLEMS (12Hrs)

Bisection method – Method of false position – Newton Raphson method – Eigen value and Eigen vector by power method.

UNIT II LINEAR SIMULTANEOUS EQUATIONS (12 Hrs)

Solution of linear simultaneous equations and matrix inversion – Gauss elimination method – Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel.

UNIT III INTERPOLATION (12 Hrs)

Interpolation: Finite Differences – Relation between operators – Interpolation by Newton's forward and backward difference formula for equal intervals – Newton's divided difference method and Lagrange's method for unequal intervals – Differentiation based on finite differences – Integrations by Trapezoidal and Simpson's rules.

UNIT IV SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS (12 Hrs)

Single step methods – Taylor series method – Picard's method – Euler and Improved Euler methods – RungeKutta method of fourth order only.

UNIT V SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS (12 Hrs)

Solution of Laplace and Poisson equations – Leibmann's iterative method – Diffusion equation: Bender-Schmitt method and Crank-Nicholson implicit difference method – Wave equation: Explicit difference method

Text Books

1. Rajesh Kumar Gupta, "Numerical Methods, Fundamentals and its applications", Cambridge University Press, April 2019.
2. M.K. Jain, R.K. Jain, S.R.K. Iyengar, "Numerical Methods for Scientific and Engineering computation", Published by New Age International Pvt. Ltd., (Seventh Edition) 2019.
3. B.S. Grewal, "Numerical Methods in Engineering and Science", Mercury learning and Information, Kindle Edition, 2018.

Reference Books

1. Timo Heister, Leo G. Rebholz, FeiXue, “Numerical Analysisan Introduction”, Publisher De Gruyter, 2019.
2. K. SankaraRao, “Numerical Methods for Scientists and Engineers”, 3rd Edition, PHI Learning Pvt.Ltd, New Delhi, 2018.
3. P. Siva Ramakrishna Das, “Numerical Analysis”, Kindle Edition, 2016.
4. Steven C. Chapra, Raymond P. Canale, "Numerical Methods for Engineers" McGraw – Hill Higher Education, 2010.
5. C. Xavier, “C Language And Numerical Methods”, New Age International, 2007.

Web References

1. http://nptel.ac.in/courses/111107063
2. http://nptel.ac.in/courses/122102009
3. http://nptel.ac.in/courses/111/107/111107105
4. http://www.math.iitb.ac.in/~baskar/book.pdf
5. https://www.math.ust.hk/~machas/numerical-methods.pdf

A20CPL305	PROGRAMMING IN JAVA LAB	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To acquire programming skill in core java.
- To learn how to design java program and applications.
- To acquire object oriented skills in java.
- To develop the skill of designing applications.
- To explore database connectivity.

Course Outcomes

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

CO1 – Apply and practice logical formulations to solve simple problems leading to specific applications.
CO2 – Demonstrate the use of inheritance, interface and package in relevant applications.
CO3 – Create java applications using exception handling multithread.
CO4 – Build java distributed applications using Collections and IO streams**.**
CO5 – Develop simple database programs.

List of Exercises

1. Develop simple programs using java technologies and testing tools.
2. Develop a java program that implements class and object.
3. Write a java program to demonstrate inheritance.
4. Develop a simple program to illustrate the use of Multithreads.
5. Implement simple applications using Collections.
6. Create java applications using Exception Handling for error handling.
7. Develop a java program that implements the Packages.
8. Develop a simple application and use JDBC to connect to a back-end database.
9. Create a student application with Add, Edit, Delete, Show functions using JDBC.
10. Create a Bill Application to store sales details using JDBC.

Reference Books

1. Sagayaraj, Denis, Karthik, Gajalakshmi, “JAVA Programming for core and advanced learners”, Universities Press Private Limited, 2018.
2. Paul Deitel Harvey Deitel**, “**JAVA How to program (Early Objects)”,19th Edition, 2011
3. Cay.S.Horstmann and Gary Cornell, “Core Java 2”, Vol 2, Advanced Features, Pearson Education, Seventh Edition, 2010.
4. HerbertSchildt, “The Complete Reference JAVA 2”, TMH, Seventh Edition, 2006.
5. E. Balaguruswamy, “Programming with Java”, TMH, 2nd Edition, 2005.

Web References

1. http://www.ibm.com/developerworks/java/
2. http://docs.oracle.com/javase/tutorial/rmi/.
3. IBM’s tutorials on Swings, AWT controls andJDBC.
4. https://www.edureka.co/blog
5. https://www.geeksforgeeks.org

A20CPL306	MICROPROCESSORS LAB	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To write assembly language programs using 8085 trainer kit.
- To be familiar with the interfacing 8085 with various devices.
- To be familiar with MASM-8086.
- To write basic assembly language programs using 8051 trainer kit.
- To be familiar with the interfacing 8086 with various devices.

Course Outcomes

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

CO1 – Demonstrate simple programs with 8085.
CO2 – Implement the interfacing with 8085.
CO3 – Implement assembly language program using 8086 MASM.
CO4 – Execute the interfacing with 8086.

List of Exercises

1. 8 bit Addition & Subtraction using 8085.
2. 8 bit Multiplication & Division using 8085.
3. Searching operation using 8085.
4. 16 bit Addition & Subtraction using 8085.
5. 16 bit Multiplication & Division using 8085.
6. Code conversions using 8085.
7. DAC and ADC interfacing using 8085.
8. 16 bit addition and subtraction using 8086.
9. 16 bit multiplication and division using 8086.
10. Interfacing stepper motor with 8086.
11. Interfacing ADC and DAC with 8086.

Reference Books

1. Krishna Kant, “Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096”, PHI, 2014.
2. Ramesh S.Gaonkar, “Microprocessor Architecture, Programming and Applications with the 8085”, Penram International publishing, 2013.
3. A.K. Ray, K.M. Bhurchandi, “Advanced Microprocessor and Peripherals”, Tata McGraw-hill, Second edition, 2010.

Web References

1. https://nptel.ac.in/courses/108/103/108103157/
2. https://www.geeksforgeeks.org/microprocessor-tutorials/
3. https://swayam.gov.in/nd1_noc20_ee42/microprocessors-and-microcontrollers/
4. https://www.classcentral.com/course/swayam
5. https://freevideolectures.com/course/3018/microprocessors

		L	T	P	C	Hrs
A20CPS303	**OFFICE AUTOMATION TOOLS**	**0**	**0**	**4**	**2**	**30**

Course Objectives

- To practice the MS Word application.
- To practice the MS Excel application.
- To practice the MS Power point application.
- To practice the MS Access application.
- To practice the MS Picture Manager application.

Course Outcomes

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

CO 1 - Creating a document in MS Word.
CO 2 - Creating a spread sheet in MS Excel.
CO 3 - Creating a presentations in MS Power Point.
CO 4 - Creatinga database in MS Access
CO 5 - Editing a picture in MS Picture Manager.

UNIT I MS WORD (6 Hrs)

Introduction – Working with MS Word- Creating a New Document-Different Page Views and layouts - Working with Styles - Text Attributes - Paragraph and Page Formatting - Text editing using variousfeatures – Header and Footer – Inserting – Page Numbers, Pictures,Files, Auto texts, Symbols - Working with Columns, Tabs & Indents - Creation &Working with Tables - Margins & Space management in document - Mail Merge.

UNIT II MS EXCEL (6 Hrs)

Introduction –Working with MS Excel - Concepts of Workbook & Worksheets - Working with Data & Ranges - Different Views of Worksheets - Column Freezing, Labels, Hiding, Splitting -Using different features with Data and Text - Use of Formulas, Calculations & Functions-Cell Formatting including Borders & Shading - Working with Different Chart Types -Printing of Workbook & Worksheets with various options.

UNIT III MS POWERPOINT (6 Hrs)

Introduction – Creating and Viewing Presentations – Editing a Presentation – Inserting styles – Working with Presentation- Animations - Slide transitions and Special Effects -

UNIT IV MS ACCESS (6 Hrs)

Introduction – Creating database, table, fields & its properties - Data types - Adding primary key into table – Relationship - Adding/Editing data – Sorting – Indexing - Designing queries - Using forms - Report generation.

UNIT V ADOBE PHOTOSHOP (6 Hrs)

Introduction – Creating custom work spaces – Opening images – Image magnification – Moving the image – Bitmap images – Vector images – Color modes and models – Painting tools – Brush settings.

Text Books

1. Archana Kumar, “Computer Basics with Office Automation”, Dream tech Press,Wiley Publisher, 2019.
2. Dr. P. Rizwan Ahmed, “Office Automation”, Margham Publications, 2016.
3. Omani Kellogg , “Adobe Photoshop For Beginners: 2021”

Reference Books

1. Dinesh Maidasani , Straight to the Point – MS Office 2010, Laxmi Publications, 2010.
2. Sherry Kinkoph Gunter, Master Visually Microsoft Office 2010, WILEY, 2010.
3. hector grant , “adobe photoshop for beginners 2021: learn the amazing features of photoshop”

Web References

1. https://www.tutorialspoint.com/word/index.htm
2. https://en.wikipedia.org/wiki/Office_automation
3. https://www.tutorialspoint.com/excel/index.htm
4. https://www.tutorialspoint.com/powerpoint/index.htm
5. https://www.tutorialspoint.com/ms_access/index.htm
6. https://www.groovypost.com/howto/stop-yahoo-scanning-your-email-to-sell-data/
7. https://www.guru99.com/photoshop-tutorials.html

A20CPT407	OPERATING SYSTEMS	L	T	P	C	Hrs
		4	0	0	4	60

Course Objectives

- To grasp a fundamental understanding of Operating Systems.
- To learn the concepts of process and Multithreaded Programming
- To understand the concept CPU scheduling and deadlock.
- To understand memory management concepts in Operating System.
- Understand the concepts of file systems and System Security.

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Course Outcomes

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

CO1 – Define the concepts of operating systems operations.
CO2 – Apply the concepts of processes and multithreaded.
CO3 – Examine the concept of CPU scheduling and deadlock techniques.
CO4 – Simulate the principles of memory management.
CO5 – Identify appropriate file system and disk organizations for a variety of computing scenario.

UNIT I INTRODUCTION (12Hrs)

Introduction to Operating System - Classification of Operating System - Operating System generation - Operating system operations - Operating system services and systems calls, System programs - Operating system structure - Distributed Systems.

UNIT II PROCESS MANAGEMENT (12Hrs)

Introduction to Process - Process State - Process control block - Process Scheduling - Context Switching - Operations on a Process - Interprocess Communication – Basic concept of Multithreaded Programming.

UNIT III CPU SCHEDULING AND DEADLOCK (12Hrs)

CPU Scheduling: Introduction - Types of CPU Scheduler – Scheduling criteria – Scheduling algorithms - Multiple processor scheduling - Deadlock - Basic Concept of Deadlock- Deadlock Prevention - Deadlock Avoidance - Deadlock - Detection and Recovery.

UNIT IV MEMORY MANAGEMENT (12Hrs)

Basic Concept of Memory Management - Swapping and Overlays - Contiguous Memory Allocation - Paging - Structure of the Page Table - Segmentation - Virtual Memory Management - Demand paging - Page Replacement Algorithms.

UNIT V FILE MANAGEMENT AND SYSTEM SECURITY (12Hrs)

File Management - File concept - File operations - Access methods - Directory Structure - File Protection - Allocation Methods – Various Disk Scheduling algorithms. System Security: Security issues – Program Threats - System and Network Threats – Cryptography as a Security Tool.

Text Books

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, John Wiley & Sons Ninth Edition, 2017.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Prentice Hall of India, 3rd Edition, 2015.
3. Gary Nutt, “Operating Systems - A Modern Perspective”, Pearson Education, Second Edition, 2013.

Reference Books

1. William Stallings, “Operating System”, Prentice Hall of India, 6th Edition, 2015.
2. Thomas Anderson and Michael Dahlin, “Operating Systems principles and practice”, Wiley, 2nd Edition, 2014.
3. Harvey M. Deitel, “Operating Systems”, Pearson Education, Third Edition, 2013.
4. Silberschatz, Galvin, “Operating System Concepts”, Wiley, Student Edition, 2006.
5. William Stallings, “Operating System: Internals and design Principles”, New Edition (7), Pearson Education

Web References

1. https://nptel.ac.in/courses/106108101/
2. http://www.tcyonline.com/tests/operating-system-concepts
3. http://www.galvin.info/history-of-operating-system-concepts-textbook
4. https://www.cse.iitb.ac.in/~mythili/teaching/cs347_autumn2016/index.html
5. https://www.cse.iitk.ac.in/pages/CS330.html

A20CPT408 DATABASE MANAGEMENT SYSTEMS

L	T	P	C	Hrs
4	0	0	4	60

Course Objectives

- To learn about Database Structure and Data Models.
- To study SQL Commands for storing and retrieving data into the database.
- To study the Relational database system design
- To understand the concept of Transactions
- To understand the concept of procedural language/Structured Query Language

Course Outcomes

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

CO1 – Design conceptual data model using Entity Relationship Diagram.

CO2 – Design conceptual and logical database models for an application.

CO3 – Normalize relational database design of an application.

CO4 – Explain the need for Indexing, Hashing in database.

CO5 – Understand the strategies for procedural language/Structured Query Language.

UNIT I INTRODUCTION (12Hrs)

Introduction: Database System – Database-System Applications – Purpose of Database Systems – Advantages of using DBMS approach - View of Data – Relational Database – Database Design – System Structure – Database Architecture.

UNIT II DATABASE DESIGN AND E-RMODEL (12Hrs)

Database Design and E-R Model: Overview of the Design Process – The E-R Model – Constraints – E-R Diagrams – Relational Algebra – Tuple Relational Calculus – Domain Relational Calculus.

UNIT III RELATIONAL DATABASE DESIGN (12Hrs)

Relational Database Design: Features of Good Relational Designs – Normalization Using Functional Dependencies - First Normal Form - Second Normal Form - Third Normal Form - Fourth Normal Form and BCNF.

UNIT IV SQL (12Hrs)

SQL Statements: Data Retrieval: SELECT, Data Definition Languages: CREATE, ALTER, DROP, RENAME, and TRUNCATE - Data Manipulation Language: INSERT UPDATE, DELETE - Transactional Control: COMMIT ROLLBACK, SAVEPOINT, and Data Control Language: GRANT, REVOKE.

UNIT V PL/SQL (12Hrs)

PL/SQL blocks – PL/SQL - Basic programs - Procedures – Functions – Cursor – Triggers - Exception Handling.

Text Books

1. Abraham Silberschatz, Henry F Korth, S Sudharshan, “Database System Concepts”, McGraw-Hill, 7th Edition, 2019.
2. RamezElmasri and ShamkantNavathe, Durvasula V L N Somayajulu, Shyam K Gupta, “Fundamentals of Database Systems”, Pearson Education, 2018.
3. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom, “Database Systems The Complete Book” Prentice Hall, 2nd Edition, 2014.

Reference Books

1. Raghu Ramakrishna, Johannes Gehrke, “Database Management Systems”, McGraw Hill,

3rd Edition,2014.
2. G.K.Gupta,"Database Management Systems", Tata McGraw Hill, 2011.
3. Date CJ, Kannan A, Swamynathan S, "An Introduction to Database System", Pearson Education, 8th Edition,2006.
4. Paul Beynon-Davies, "Database Systems", Palgrave Macmillan, 3rd Edition, 2003.
5. Mukesh Chandra Negi, "Fundamentals of Database Management Systems", BPB Publications, 2019.

Web References

1. https://docs.oracle.com/cd/E11882_01/server.112/e41084/toc.htm MySQL Online Documentation
2. http://dev.mysql.com/doc/
3. http://www.rjspm.com/PDF/BCA-428%20Oracle.pdf
4. https://nptel.ac.in/courses/106/106/106106095/
5. https://www.tutorialspoint.com/dbms/index.htm

		L	T	P	C	Hrs
A20CPD404	**DISTRIBUTED COMPUTING**	**4**	**0**	**0**	**4**	**60**

Course Objectives

- To know about basic distributed systems
- To learn the concepts of network virtualization.
- To understand the concept of remote invocation.
- To understand the concepts of memory approaches in computing.
- To learn about the file systems.

Course Outcomes

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

CO1 – Understand the basic concepts of distributed systems.
CO2 – Analyzing the network virtualization.
CO3 – Appling the concept of remote invocation methods.
CO4 – Understand the concept of shared memory and objects.
CO5 – Understand the concept of file systems.

UNIT I INTRODUCTION (12 Hrs)

Introduction – Examples of Distributed Systems–Trends in Distributed Systems– Focus on resource sharing – Challenges

UNIT II SYSTEM MODEL (12 Hrs)

System Model – Inter process Communication - the API for internet protocols –External data representation and Multicast communication – Network virtualization: Overlay networks.

UNIT III REMOTE INVOCATION (12 Hrs)

Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation - Group communication

UNIT IV DISTRIBUTED SYSTEMS (12 Hrs)

Publish-subscribe systems - Message queues - Shared memory approaches - Distributed objects.

UNIT V FILE SYSTEM (12 Hrs)

Distributed File Systems –Introduction - File service architecture – Distributed mutual exclusion – Elections.

Text Books

1. George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design”, Addison Wesley, 5th edition, 2011.
2. Ajay D. Kshemkalyani , Mukesh Singhal Distributed Computing: Principles, Algorithms, and Systems
3. George Coulouris , “Distributed Systems “ , Pearson Education.

Reference Books

1. Nancy Lynch “Distributed Algorithms” Old Edition(7), Pearson Education,2013.
2. Jie Wu , “Distributed Systems” , Pearson Education Pvt, Third Edition, 2013
3. Hagit Attiya and Jennifer Welch “Distributed Computing: Fundamentals, Simulations and Advanced Topics” .

Web References

1. https://lecturenotes.in/subject/360/distributed-computing-dc
2. https://www.tutorialspoint.com/Distributed-Systems
3. http://shyleshblog.blogspot.com/2017/07/distributed-computing-notes-chapterwise.html
4. http://www.cs.yale.edu/homes/aspnes/classes/465/notes.pdf
5. https://www.javatpoint.com/distributed-operating-system

A20CPL407	OPERATING SYSTEMS LAB	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To learn basic UNIX / LINUX commands
- To develop programs in Linux environment using system calls.
- To implement the CPU scheduling algorithms.
- To implement Deadlock handling algorithm.
- To develop solutions for synchronization problems using semaphores

Course Outcomes

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

CO1 – Understand the basic commands for UNIX / Linux.
CO2 – Develop simple shell programs**.**
CO3 – Implement different Scheduling Algorithms.
CO4 – Apply the basic concepts of Deadlock Handling procedures.
CO5 – Simulate Critical Section problem using Semaphore.

List of Exercises

1. **SHELL PROGRAMS - I**
    a) Write a Shell program to check the given number is even or odd
    b) Write a Shell program to check the given year is leap year or not
2. **SHELL PROGRAMS - II**
    a) Write a Shell program to swap the two integers
    b) Write a Shell program to find the factorial of a number
3. To write a C program for implementation of Priority scheduling algorithms
4. To write a C program for implementation of Round Robin scheduling algorithms
5. To write a C program for implementation of FCFS and SJF scheduling algorithms.
6. To write a C program to implement banker's algorithm for deadlock avoidance.
7. To write a C program to implement algorithm for deadlock detection.
8. To write a C program for implementation of FIFO AND LRU page replacement algorithm.
9. Simulate file Allocation strategies: Sequential
10. Simulate file Allocation strategies: Indexed

Reference Books

1. William Stallings, "Operating System", Pearson Education, Sixth edition, 2015.
2. Andrew S. Tanenbaum, Modern Operating Systems,3rd edition Prentice Hall of India Pvt. Ltd, 2015.
3. Harvey M. Deitel, "Operating Systems", Pearson Education Pvt, Third Edition, 2013
4. William Stallings, "Operating System: Internals and design Principles", Old Edition(7), Pearson Education,2013.
5. Silberschatz, Galvin, "Operating System Concepts", Wiley, Student Edition,2006.

Web References

1. https://www.geeksforgeeks.org
2. http://avanthioslab.blogspot.com/2016/08/file-organization-techniques.html
3. https://www.programming9.com/programs/c-programs/285-page-replacement-programs-in-c

A20CPL408	DBMS LAB	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To learn and understand DDL & DML
- To learn and understand Aggregate Function.
- To implement Basic Built-in functions.
- To execute various Join operations and Sub queries.
- To develop PL/SQL programs.

Course Outcomes

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

CO1 – Implement DDL and DML commands.
CO2 – Implement Aggregate Function.
CO3 – Analyze Built-in functions.
CO4 – Understand Join operations and Sub queries.
CO5 – Implement PL/SQL programs.

List of Exercises

1. Table creation and simple Queries using Data Definition Language (DDL).
2. Insert, update and delete the table using Data Manipulation Language (DML).
3. Write SQL queries using the concept of Aggregate Function and Set Operations
4. Write SQL queries using the concept of Built-in functions.
5. Develop SQL queries to implement various Join operations.
6. Implement Simple SQL queries for Sub queries.
7. PL/SQL program to perform the basic arithmetic operations.
8. Write PL/SQL program using cursor.
9. Write PL/SQL programs using functions.
10. Write PL/SQL programs using triggers.

Reference Books

1. Ramez Elmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, Pearson Education, 7th Edition, 2016.
2. Raghu Ramakrishna, Johannes Gehrke, Database Management Systems, McGraw Hill,3rd Edition, 2014.
3. Abraham Silberschatz, Henry F Korth, S Sudharshan, Database System Concepts", McGraw-Hill Indian Edition, 7th Edition, 2013.
4. Kuhn,"RMAN Recipes for Oracle Database", Apress, 2nd Edition,2013.
5. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System, Pearson Education, 8th Edition, 2006.

Web References

1. https://docs.oracle.com/cd/E11882_01/server.112/e41084/toc.htm MySQL Online Documentation
2. http://dev.mysql.com/doc/
3. http://www.rjspm.com/PDF/BCA-428%20Oracle.pdf

A20CPS404	ANDROID APP DEVELOPMENT	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To facilitate students to understand android SDK
- To help students to gain a basic understanding of Android application development
- To inculcate working knowledge of Android Studio development tool
- To know about the testing.
- To describe the Android applications

Course Outcomes

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

CO 1 - Identify various concepts of mobile programming.
CO 2 – Know about essentials of android application.
CO 3 - Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces
CO 4 – Manipulate the testing in all the android application.
CO 5 - Deploy applications to the Android marketplace for distribution.

UNIT I INTRODUCTION TO ANDROID (6 Hrs)

The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.

UNIT II ANDROID APPLICATION DESIGN ESSENTIALS (6 Hrs)

Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.

UNIT III ANDROID USER INTERFACE DESIGN ESSENTIALS (6 Hrs)

User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

UNIT IV TESTING (6 Hrs)

Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

UNIT V USING COMMON ANDROID APIS (6 Hrs)

Using Android Data and Storage APIs, Managing data using SQLite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

Text Books

1. Lauren Darcey and Shane Conder, “Android Wireless Application Development”, Pearson Education, 2nd ed. (2011)

Reference Books

1. Reto Meier, “Professional Android 2 Application Development”, Wiley India Pvt Ltd 2.
2. Mark L Murphy, “Beginning Android”, Wiley India Pvt Ltd 3.
3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

Web References

1. https://www.udemy.com/course/learn-android-application-development-y/
2. https://www.coursera.org/specializations/android-app-development
3. https://developer.android.com/
4. https://www.androidauthority.com/android-app-development-1128595/

A20CPT509	PYTHON PROGRAMMING	L	T	P	C	Hrs
		4	0	0	4	60

Course Objectives

- To acquire programming skill in core python.
- To learn the basic looping and functions.
- To learn how to design python program and applications.
- To acquire the basic packages.
- To develop the object oriented programming.

Course Outcomes

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

CO1 – Define the structure and components of a python program.
CO2 – Illustrate the concepts of Python decision statements.
CO3 – Use list, tuple, Set and dictionary in python program.
CO4 – Read / write data from/to files and structure a program using Exceptions and Modules.
CO5 – Knowing the basic oops concepts.

UNIT I INTRODUCTION TO PYTHON PROGRAMMING LANGUAGE (12 Hrs)

Introduction to Python Language –- Strengths and Weaknesses – IDLE – Operators – Data Types – Introduction List , Tuple, Set, Dictionary. String : Slicing ,Basic operations on strings- Built in methods -

UNIT II DECISION MAKING ,LOOPING & FUNCTIONS (12 Hrs)

Control Flow: Introduction – Control Flow and Syntax – Indenting – Relational Expressions – Logical Expressions – If Statement – If else – else if – Nested if. Loop: The while Loop– Nested while Loop – For Loop – Nested for Loop- –Break and continue Functions: parameters – Return values – Local and global scope – Function composition – Recursion and lambda functions.

UNIT III LIST, TUPLE, SET, DICTIONARY AND ARRAYS (12 Hrs)

Lists: List operations – List slices – List methods – List loop – Mutability – Aliasing – Cloning lists – List parameters – Tuples: Tuple assignment – Tuple as return value – Advanced list processing – List comprehension – Sets – Dictionaries: Operations and methods – Arrays.

UNIT IV FILES, EXCEPTIONS, MODULES AND PACKAGES (12 Hrs)

Built In Functions. Files and Exception: Text Files – Reading and writing files – Format operator – Command line arguments – Errors and exceptions – Handling exceptions – Modules – Standard modules – Packages.

UNIT V OBJECT ORIENTED PROGRAMMING IN PYTHON (12 Hrs)

Classes and Objects – Constructors – Inheritance – Abstraction – Polymorphism – Encapsulations – Dynamic Binding.

Text Books

1. Martin C Brown, “Python The Complete Reference”, McGraw-Hill Education, 4th Edition,2018
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, Shroff/O‘Reilly Publishers, 2nd edition, 2016(http://greenteapress.com/wp/thinkpython/).
3. ReemaThareja, “Python Programming Using Problem Solving Approach”, ISBN:9780199480173, Oxford University Press, First edition, 2017.

Reference Books

1. Robert Sedgewick, “Kevin Wayne, Robert Dondero – Introduction to Programming in Python: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. 2016.
2. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd.,2015.
3. Ben Stephenson, “The Python Workbook A Brief Introduction with Exercises and Solutions”, Springer International Publishing, Switzerland2014.

Web References

1. https://www.learnpython.org/
2. https://pythonprogramming.net/introduction-learn-python-3-tutorials/
3. https://www.codecademy.com/learn/learn-python
4. https://nptel.ac.in/courses/106/106/106106182/

A20CPT510 **NETWORK TECHNOLOGIES**

L	T	P	C	Hrs
3	1	0	4	60

Course Objectives

- To understand the basic concepts of Data Communications.
- To understand the functionalities and components involved in the physical layer.
- To learn the basic concepts of data link layer services and network layer communication protocols
- To understand various load characteristics and network traffic conditions, decide the transport protocols to be used.
- To analyze and compare the different protocols available in the application layer.

Course Outcomes

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

CO1 - Analyze the network components and network standards.
CO2 - Determine the Physical layer functionalities, Transmission modes and media**.**
CO3 - Analyze the Error correction and detection techniques and determine the proper usage of IP address, subnet mask and default gateway in a routed network.
CO4 - Describe, analyze and compare different protocols in transport layer**.**
CO5 - Analyze the functional working of different protocols of application layer**.**

UNIT I DATA COMMUNICATIONS (12Hrs)

Overview of Data Communications – Networks and its types – Network topologies. Transmission technologies: Signal Transmission – Digital signaling – Analog Signaling. Networks Models: Protocol Layering – OSI reference model – TCP/IP Protocol suite.

UNIT II PHYSICAL LAYER (12Hrs)

Physical layer functionalities – Analog to digital conversion using PCM, Transmission Modes: Parellel–Serial.Transmission Media: Guided and unguided media.Switching: Introduction. Circuit Switching and Packet switching Networks.

UNIT III DATA LINK LAYER AND NETWORK LAYER (12Hrs)

Data link layer services – Error Detection and Correction – Sliding window protocols – Network devices. Network layer functionality. Routing Algorithms: The Optimality Principle – Shortest path algorithm, Distance vector routing – Classful Addressing – Subnetting – Network layer protocols: IPV4, IPV6.

UNIT IV TRANSPORT LAYER (12Hrs)

The Transport Services - Connection management – Transport layer Congestion Control – Transport Layer Protocols: User Datagram Protocol (UDP) – Transmission Control Protocol (TCP).

UNIT V WIRELESS TECHNOLOGIES (12Hrs)

Wireless Technologies: Wi-fi, Bluetooth, Li-fi, Cellular Internet: 3G, 4G, 5G, Wireless Home Automation: ZigBee and Z-Wave.

Text Books

1. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.
2. Tanenbaum,A.S. and David J. Wetherall “Computer Networks”, 5th ed., Prentice Hall, 2011
3. James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach: International Edition”, Pearson Education, Sixth edition, 2013.

Reference Books

1. Larry L. Peterson and Bruce S. Davie, “Computer Networks- A system approach”, 5th edition, Elsevier, 2012.
2. Stallings, W., “Data and Computer Communications”, 10th Ed., Prentice Hall Int. Ed., 2013.
3. DayanandAmbawade, Deven Shah, "Advanced Compter Networks", Dreamtech Press, 1st edition, 2011.
4. PallapamanviV , "Data Communications and Computer Networks", PHI, 4th edition, 2014.
5. Andre S.Tanenbaum, "Computer Networks", Pearson Publication, 4th Edition, 2018.

Web References

1. https://www.geeksforgeeks.org/last-minute-notes-computer-network/
2. https://lecturenotes.in
3. https://www.cse.iitk.ac.in/users/dheeraj/cs425/
4. https://nptel.ac.in/courses/106/105/106105183/
5. https://nptel.ac.in/courses/106/105/106105081/

A20CPT511 **ARTIFICIAL INTELLIGENCE**

L	T	P	C	Hrs
3	1	0	4	60

Course Objectives

- To understand the basic concepts of applications of AI.
- To understand the functionalities of predicate calculus.
- To learn the basic concepts of natural language processing
- To understand various developments of expert system.
- To analyze and compare the case studies.

Course Outcomes

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

CO1 - Know about the applications of artificial intelligence.
CO2 - Determine the predicate calculus and knowledge based systems.
CO3 - Very good knowledge in NLP process.
CO4 - Describe the knowledge representation and expert systems.
CO5 - Analysis the case studies..

UNIT I INTRODUCTION (12Hrs)

Artificial Intelligence - definition-Underlying Assumption A.I. Technique space search Production systems-Control Strategies-Heuristic search Problem characteristics-Production system characteristics.

UNIT II PREDICATE CALCULUS (12Hrs)

Predicate calculus & Knowledge Representation: Predicate calculus - Answer extraction - knowledge based systems - knowledge processing, inference technique.

UNIT III SOFTWARE AGENTS (12Hrs)

Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent system

UNIT IV APPLICATIONS (12Hrs)

AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing - Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving

UNIT V EXPERT SYSTEMS (12Hrs)

Experts Systems Definition of Expert Systems Characteristics of an Expert Systems Architecture of Expert Systems role of expert system knowledge acquisition - advantages and limitation of expert system-example expert System: MYCIN.

Text Book

1. N. J. Nilsson, Artificial Intelligence – A New Synthesis, Morgan Kaufmann, 1998.
2. Artificial Intelligence - Elaine Rich, Kevin Knight, ShivasankarB.Nair–Thirdedition- McGraw Hill- 2017
3. Stuart Russel, Peter Norvig “AI – A Modern Approach”, 2nd edition, PearsonEducation, 2007

Reference Books

1. E. Rich, K. Knight, S.B. Nair, Artificial Intelligence, 3/e, TMH, 2008.
2. S.J. Russel, P. Norvig Artificial Intelligence: A Modern Approach, 3 /e, PrenticeHall, 2009.
3. Ivan Bratka, “PROLOG Programming for Artificial Intelligence”, Addison Wesley, 1986.

Web References

1. https://www.sitesbay.com/ai/artificial-intelligence-types-of-artificial-intelligence
2. https://www.tutorialspoint.com/artificial_intelligence/index.htm
3. https://tutorialspoint.dev/computer-science/machine-learning/artificial-intelligence-an-introduction
4. https://www.javatpoint.com/artificial-intelligence-tutorial
5. https://www.tutorialandexample.com/artificial-intelligence-tutorial/

A20CPL509	PYTHON AND NETWORK LAB	L	T	P	C	Hrs
		0	0	4	2	30

Course Objectives

- To practice the fundamental programming methodologies in the Python programming language.
- Toapplylogicalskillsforproblemsolvingusingcontrolstructuresandarrays.
- Toimplement,testanddebugprogramsthatusedifferentdatatypes,variables,strings,arrays,pointersand structures.
- To design basic networking styles and provides recursive solution to problems.
- To understand the miscellaneous aspects of networking.

Course Outcomes

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

CO1 – Apply and practice logical formulations to solve simple problems leading to specific applications.

CO2 – Develop python programs for simple applications making use of basic constructs, arrays and strings.

CO3 – Develop the networking programs using IP.

CO4 – Design the module for Client and Server.

CO5 – Construct the network specializations.

List of Exercises

1. Finding Area of a Triangle, Rectangle and Square.
2. Checking whether a given number is Prime or not.
3. Implementation of User defined functions.
4. Various operations on List and Tuples.
5. Various operations on string and dictionary.
6. Various types of inheritance using python..
7. Detect Network Changes Automatically.
8. Log Management with Python and Network Monitoring with Cacti.
9. NetFlow and sFlow Based Monitoring.
10. Alerting and Email Notification.
11. Testing DHCP Server and Client.
12. Test Network Speed with Python.

Reference Books

1. Stallings, W., “Data and Computer Communications”, 10th Ed., Prentice Hall Int. Ed., 2013.
2. John V Guttag, “Introduction to Computation and Programming Using Python’’, MIT Press, Revised and expanded Edition, 2013.

Web References

1. https://pythonprogramming.net/introduction-learn-python-3-tutorials/
2. ttps://www2.mvcc.edu/users/faculty/jfiore/CP/labs/LaboratoryManualForComputerProgramming.pdf
3. https://www.codecademy.com/learn/learn-python
4. https://www.geeksforgeeks.org/last-minute-notes-computer-network/
5. https://lecturenotes.in

A20CPP501 **MINI PROJECT (C# / JAVA / PYTHON)**

L	T	P	C	Hrs
0	0	4	2	30

Table: 10 CAM & ESM break-up for Mini Project

Sl. No	Description			Weightage
1	**Continuous Assessment Marks**			
a	Review 1	Review Committee#	5	10
		Guide	5	
b	Review 2	Review Committee#	5	10
		Guide	5	
c	Review 3	Review Committee#	15	30
		Guide	15	
			Total CAM	50
2	**End Semester Marks**			
a	Evaluation of Mini Project report	Internal Examiner	20	40
		External Examiner	20	
b	Outcome*	Conference Presentations / Publication of papers /prototypes /patents etc	10	10
			Total ESM	**50**
			Total Marks	**100**

A20CPT612	.NET TECHNOLOGY	L	T	P	C	Hrs
		3	0	0	4	60

Course Objectives

- To understand the fundamentals of developing modular application by using object oriented concepts.
- To utilize the .NET Controls to build distributed enterprise applications.
- To develop Console Application, Windows Application and Web Applications using object oriented concepts.
- To learn the State Management.
- To connect to multiple data sources and managing them effectively.

Course Outcomes

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

CO1 - Learn about MS.NET framework developed by Microsoft.
CO2 - Develop and implement Applications with C#.
CO3 - Design the interface for application development.
CO4 - Understand the State Management and deployment in the .NET.
CO5 - Explore Assemblies and Deployment in Data Access with ADO.NET.

UNIT I INTRODUCTION (12 Hrs)

Introduction to .NET – .NET Framework – Common language Runtime (CLR) – Common Type System (CTS) – Common language Specification (CLS) – Compilation process – Assemblies – Namespaces – Command line compiler.

UNIT II CONTROLS (12 Hrs)

Controls: HTML Server Controls – Web Server Controls – Web User Controls – Validation Controls – Custom Web Controls – Ad rotator Control – Internet Explorer Control – Calendar Control.

UNIT III C# FUNDAMENTALS (12 Hrs)

C# class - object - string formatting - Types - scope - Constants - C# iteration - Control flow - Operators - Array - String - Enumerations - Structures - Custom namespaces. Programming constructs – value types and reference types – object oriented concepts – Encapsulation – Inheritance – polymorphism – Interfaces – collections – Multithreading.

UNIT IV STATE MANAGEMENT (12 Hrs)

State Management: View State – Control State – Hidden Fields – Cookies – Query Strings – Application State – Session State.

UNIT V DATABASE PROGRAMMING (12 Hrs)

Data Access with ADO.NET – Architecture – Data reader – Data Adapter – Command – Connection – Data set – Data binding – Data Grid Control – XML based Data sets.

Text Books

1. David Chappell, “Understanding .NET – A Tutorial and Analysis”, Addison Wesley, 2002.
2. Herbert Schildt, “C# 3.0 The Complete Reference”, McGraw-Hill Professional, Third Edition, 2009.
3. Keogh, “J2EE The Complete Reference”, Tata McGraw-Hill, 2015.

Reference Books

1. Andrew Troelsen, Pro C# 5.0 and the .NET 4.5 Framework, Sixth edition, A Press, 2012.
2. Joh Skeet, C# in depth, Manning publications, Third Edition, 2014. .
3. AdrewStellman and Jennifer Greene, Head First C#, Third Edition, O’Reilly, 2013.

Web Resources

1. https://www.c-sharpcorner.com/csharp-tutorials
2. https://www.guru99.com/c-sharp-tutorial.html
3. https://www.sitesbay.com/csharp/index
4. https://www.sitesbay.com/interview/dot-net

A20CPT613	SOFTWARE ENGINEERING	L	T	P	C	Hrs
		3	1	0	4	60

Course Objectives

- To understand the various models and methods.
- To gain about software development life cycle models.
- To develop the software design.
- To connect the coding techniques.
- To learn the testing of software.

Course Outcomes

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

CO1 - Learn about the various models and methods.
CO2 - Develop and implement the software life cycle models.
CO3 - Design the software models.
CO4 - Analyze the coding techniques.
CO5 – Explore the testing of software.

UNIT INTRODUCTION (12Hrs)

Software-Software characteristics-software applications -Software Engineering a Generic view-Software process-Software process model-The Linear sequential - Model-Prototyping Model-RAD Model-Fourth Generation Techniques.

UNIT II SOFTWARE MEASURES AND METRICS (12Hrs)

Measures, Metrics and Indicators-Software metrics Process metrics Project metrics. Software measurement size oriented metrics Function oriented metrics Measurin Quality Metrics for small organization Establishing a software metrics program.

UNIT III SOFTWARE PROJECT PLANNING (12Hrs)

Software Project Planning-objectives-Feasibility-Software project Estimation Empirical Estimation models. The structure of Estimation models-COCOMO model.-Software Risks-Software Quality Assurance.

UNIT III SOFTWARE DESIGN (12Hrs)

Software Design: Fundamental Design Concepts - Modules and Modularization Criteria –Design Notations –Design Techniques -Detailed Design Considerations -Real-Time and Distributed System-Design -Test Plans -Milestones, walkthroughs, and Inspections.

UNIT IV SOFTWARE TESTING (12Hrs)

Software Testing Technique - Software Testing Fundamentals Testing objectives Testing Principles - Testability - Test case Design-White Box Testing - Basic path testing-Control Structure Testing-Black Box Testing.

Text Books

1. R. Fairley, “Software Engineering Concepts”, Tata McGraw Hill Edition -2017.
2. Roger S. Pressman, “Software Engineering: A Practitioner’s Approach”, McGraw Hill, 7th edition, 2010. (Module 1 & Module 5)
3. Software Engineering , Tenth Edition , Pearson by Ian Sommerville

Reference Books

1. Software Engineering: A Practitioner’s Approach by Bruce R. Maxim
2. Pankaj Jalote's Software Engineering: A Precise Approach
3.Software Engineering 0th Edition, Kindle Edition by Suraiya Hussain

Web References

1. https://www.sitesbay.com/software-engineering/index
2. https://www.sitesbay.com/software-engineering/se-software-project-management-tools
3. https://www.sitesbay.com/software-engineering/se-risk-management-in-software-engineering
4. https://www.tutorialspoint.com/software_engineering/index.htm

A20CPT614 **CLOUD COMPUTING**

L	T	P	C	Hrs
3	1	0	4	60

Course Objectives

- To define the fundamental ideas behind Cloud Computing.
- To classify the basic ideas and principles in cloud information system.
- To relate cloud storage technologies and relevant distributed file systems
- To understand the Big Data Platform and its Use cases
- To provide an overview of Apache Hadoop, Provide HDFS Concepts and Interfacing with HDFS

Course Outcomes

After completion of the course, the students should be able to:

CO1 –Explain the core concepts of the cloud computing paradigm.
CO2 –Apply fundamental concepts in cloud infrastructures.
CO3 –Illustrate the fundamental concepts of cloud storage such as Amazon S3 and HDFS.
CO4 – Explain the Utility Computing concepts.
CO5 – Understand the Amazon Web Services concepts.

UNIT I INTRODUCTION (12Hrs)

Introduction to Cloud Computing- The Evolution of Cloud Computing – Hardware Evolution – Internet Software Evolution – Server Virtualization - Federation in the Cloud - Presence in the Cloud.

UNIT II SERVICES (12Hrs)

Web Services Deliver from the Cloud – Communication-as-a-Service – Infrastructure-as-a-Service – Monitoring-as-a-Service – Platform-as-a-Service – Software-as-a-Service – Building Cloud Network.

UNIT III CLOUD INFRASTRUCTURE (12Hrs)

Introduction - Advancing towards a Utility Model – Evolving IT infrastructure – Evolving Software Applications – Continuum of Utilities- Standards and Working Groups – Standards - Bodies and Working Groups – Service Oriented Architecture – Business Process Execution Language

UNIT IV UTILITY COMPUTING (12Hrs)

Utility Computing Technology – Virtualization – Hyper Threading – Blade Servers - Automated Provisioning - Policy Based Automation – Application Management – Evaluating Utility Management Technology

UNIT V AMAZON WEB SERVICES (12Hrs)

Identity and Access Management(IAM) – Elastic Compute Cloud(EC2) – EC2 Instance Storage – S3 – Database & Analytics.

Text Books

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. Ritting house, John W., and James F. Ransome, —Cloud Computing: Implementation, Management and Security, CRC Press, 2017.

Reference Books

1. 1. John W. Rittinghouse and james F. Ransome, “Cloud Computing Implementation, Management and Security”, 2010, CRC Press, Taylor & Francis Group, Boca Raton London New York. [Unit -11 and Unit II]
2. Alfredo Mendoza, “Utility Computing Technologies, Standards, and Strategies”, Artech House INC, 2007. [Unit -11I to Unit V]
3. Bunker and Darren Thomson, “Delivering Utility Computing”, 2006, John Wiley & Sons Ltd.
4. Pete Warden, “Big Data Glossary”, O’Reily, 2011.

Web References

1. www.coltdatacentres.net/Cloud Technology.
2. https://www.zdnet.com/article/what-is-cloud-computing-everything-you-need-to-know-about-the-cloud/
3. www.digitalocean.com/community/tutorials/an-introduction-to-big-data-concepts-and-terminology

A20CPP602	PROJECT WORK & VIVA VOCE	L	T	P	C	Hrs
		0	0	10	5	75

The Project work is to be evaluated as follows:

1. The internal assessment (40 marks) is awarded as follows:

15 marks is awarded based on two internal project reviews conducted in periodic intervals by a panel comprising of members of the Department during the tenure of the project.

The student's project guide awards 15 marks for the project work and 10 marks for attendance (attendance marks as specified in the Pondicherry University UG CBCS regulations).

2. The End Semester Examination assessment (60 marks) is evaluated under two aspects

i) Project Work – (40 marks)
ii) Project Report and Viva-Voce (20 marks)

Table: 10 CAM & ESM break-up for Project work

Sl. No	Description			Weightage
1	**Continuous Assessment Marks**			
a	Review 1	Review Committee#	5	10
		Guide	5	
b	Review 2	Review Committee#	5	10
		Guide	5	
c	Review 3	Review Committee#	10	20
		Guide	10	
			Total CAM	40
2	**End Semester Marks**			
a	Evaluation of final report and Viva-voce	Internal Examiner	25	50
		External Examiner	25	
b	Outcome*	Conference Presentations / Publication of papers /prototypes /patents etc	10	10
			Total ESM	**60**
			Total Marks	**100**

A20CPS606 **RESEARCH METHODOLOGY**

L	T	P	C	Hrs
0	0	4	2	30

Course Objectives

- To facilitate science and research
- To introduce research and methodology concepts
- To inculcate data collection
- To implement the scientific writing
- To construct the basic ethics

Course Outcomes

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

CO 1 - Identify various concepts science and research
CO 2 – Describing research and methodology concepts
CO 3 - Utilize the data collection
CO 4 – Managing the scientific writing
CO 5 – Deploy the basic ethics.

UNIT I SCIENCE AND RESEARCH (6 Hrs)

Definition – History – Evolution of Scientific Inquiry, Scientific Research: Definition, Characteristics, types, need of research. Identification of the problem, assessing the status of the problem, formulating the objectives

UNIT II INTRODUCTION TO RESEARCH METHODOLOGY (6 Hrs)

Meaning and importance of Research – Types of Research – Selection and formulation of Research Problem Research Design – Need – Features – Inductive, Deductive and Development of models Developing a Research Plan – Exploration, Description, Diagnosis, Experimentation, Determining Experimental and Sample Designs

UNIT III DATA COLLECTION AND ANALYSIS (6 Hrs)

Sources of Data – Primary, Secondary and Teritary – Types of Data – Categorical, nominal & Ordinal. Methods of Collecting Data : Observation, field investigations, Direct studies – Reports, Records or Experimental observations. Sampling methods – Data Processing and Analysis strategies- Graphical representation.

UNIT IV SCIENTIFIC WRITING (6 Hrs)

Structure and components of Scientific Reports – types of Report – Technical Reports and Thesis – Significance – Different steps in the preparation – Layout, structure and Language of typical reports - Illustrations and tables – Bibliography, Referencing and foot notes –Importance of Effective Communication.

UNIT V ETHICS (6 Hrs)

Ethical Issues – Ethical Committees – Commercialization – copy right – royalty – Intellectual Property rights and patent law – Track Related aspects of intellectual property Rights – Reproduction of published material – Plagiarism – Citation and Acknowledgement – Reproducibility and accountability.

Text Books

1. Garg.B.L., Karadia, R., Agarwal,F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
3. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.

Reference Books

1. Gupta S.P. (2008). Statistical Methods. 37 th ed. (Rev)Sultan Chand and Sons. New Delhi. 1470 p.
2. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
3. Wadehra, B.L.2000. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing.
4. Research Methodology Dr P M Bulakh,Dr P. S. Patki and Dr A S Chodhary 2010 Published by Expert Trading Corporation Dahisar West, Mumbai 400068

Web References

1. https://gradcoach.com/what-is-research-methodology/
2. https://www.guide2research.com/research/how-to-write-research-methodology
3. https://www.tutorialspoint.com/thematic_apperception_test/thematic_apperception_test_research_methods.htm
4. https://www.wisdomjobs.com/e-university/research-methodology-tutorial-355.html

DISCIPLINE SPECIFIC ELECTIVES
Discipline Specific Electives – I (DSE - I) – offered in Third Semester

		L	T	P	C	Hrs
A20CPE301	INTRODUCTION TO DATA SCIENCE USING HADOOP	3	0	0	3	45

(Common to B.Sc CS and BCA)

Course Objectives

- To understand the concepts of Data Science.
- To learn about Hadoop Technology.
- To learn about Hadoop Architecture.
- To learn the concept of Eco System in Hadoop.
- To know about Hive.

Course Outcomes

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

CO 1 - Understand the basic concepts of Data Science.
CO 2 - Understand the basic concepts of Hadoop.
CO 3 - Usage of Hadoop Techniques.
CO 4 - Basics of Eco System.
CO 5 - Basic concepts of Hive.

UNIT I INTRODUCTION TO DATA SCIENCE (9 Hrs)

Introduction to Data Science – Evolution of Data Science – Data Science Roles – Stages in a Data Science Project – Applications of Data Science in various fields – Data Security Issues. Data Collection Strategies – Data Pre-Processing Overview – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization

UNIT II INTRODUCTION TO HADOOP (9 Hrs)

Introduction to Hadoop - Hadoop Distributed File System – Map Reduce Paradigm – Moving Data in and out of Hadoop – Understanding inputs and outputs of Map Reduce – Data Serialization.

UNIT III HADOOP TECHNIQUES (9 Hrs)

Hadoop Architecture - Common Hadoop Shell Commands – Name Node, Secondary Name Node and Data Node – Job Tracker and Task Tracker – Cluster Setup – SSH and Hadoop Configuration.

UNITIV ECO SYSTEM (9 Hrs)

Hadoop Ecosystem - Hadoop Ecosystem Concepts – Schedulers – New Features of Hadoop 2.0 – Name Node High Availability – HDFS Federation – Map Reduce Version 2 – YARN – Use Cases.

UNIT V HIVE (9 Hrs)

Hive, HiveQL and HBase Hive Architecture and Installation – Comparison with Traditional Data Bases – Hive SQL – Querying Data – Sorting and Merging – Joins and Subqueries – HBase Concepts – Schema Design – Advanced Indexing – Use cases.

Text Books

1. JojoMoolayil, “Smarter Decisions : The Intersection of IoT and Data Science”, PACKT, 2016.
2. Cathy O’Neil and Rachel Schutt , “Doing Data Science”, O'Reilly, 2015.
3. Tom White “ Hadoop: The Definitive Guide” Third Edition, O'reilly Media, 2011

Reference Books

1. Prajapati, V. Big data analytics with R and Hadoop. Packt Publishing Ltd, 2013
2. Gates, A. Programming Pig. " O'Reilly Media, Inc.", 2011.
3. Capriolo, E., Wampler, D., & Rutherglen, J., Programming hive. " O'Reilly Media,Inc.", 2012.
4. Zikopoulos, P., Parasuraman, K., Deutsch, T., Giles, J., & Corrigan, D.v Harness thePower of Big Data The IBM Big Data Platform. McGraw Hill Professional, 2012.

Web References

1. https://www.mastersindatascience.org/data-scientist-skills/hadoop/
2. https://towardsdatascience.com/big-data-analysis-spark-and-hadoop-a11ba591c057
3. https://www.discoverdatascience.org/training/hadoop/
4. https://www.tutorialspoint.com/hadoop/hadoop_big_data_overview.htm
5. https://www.javatpoint.com/hadoop-tutorial
6. https://www.guru99.com/bigdata-tutorials.html

A20CPE302 **COMPUTER GRAPHICS**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To grasp the fundamental Computer Graphics concepts.
- To learn the concepts of Output Primitives.
- To understand the 2D and 3D transformation methods.
- Understand the concepts of Basic Multimedia.
- To learn different productions of Multimedia.

Course Outcomes

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

CO1–Define the concepts of Computer Graphics.
CO2– Apply the concepts of Output Primitives.
CO3 –Simulate the 2D and 3D transformation methods.
CO4– Identify the Basic Multimedia concepts.
CO5– Examine the different productions of Multimedia.

UNIT I INTRODUCTION TO COMPUTER GRAPHICS (9 Hrs)

Introduction to computer graphics: Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random-Scan Systems – Input Devices – Hard-Copy Devices – Graphics Software.

UNIT II OUTPUT PRIMITIVES AND THEIR ATTRIBUTES (9 Hrs)

Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Ellipse-Generating (Midpoint) Algorithms- Area-Filling (Boundary-Fill and Flood-Fill) Algorithms – Pixel Address Line Attributes - Color and Grayscale Levels – Character Attributes.

UNIT III 2D TRANSFORMATIONS (9 Hrs)

Two-Dimensional: Basic Transformations (Scaling, Rotation, Translation) – Other Transformations (Reflection and Shear) – 2D Viewing – Matrix Representations and Homogeneous Coordinates – Composite Transformations.

UNIT IV 3D TRANSFORMATIONS (9 Hrs)

Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Viewing – Three-Dimensional Transformations: Translation – Rotation - Scaling - Other Transformations – Sweep representation – Modeling & Coordinate transformations.

UNIT V 3D VIEWING RENDERING AND ANIMATION (9 Hrs)

Projections – View Volumes – Illuminations methods – Half Tone Patterns – Polygon Rendering methods – Ray tracing. Animation Sequences and Function – Morphing – Motion Animations Sequences

Text Books

1. D. Hearn and M.P. Baker, "Computer Graphics", Pearson Education, Prentice Hall, 2ndEdition, 19th Reprint, 2005.
2. Steve Marschner and Peter Shirley, "Fundamendals of Computer Graphics", A K peters/CRC Press, 4thEdition, 2018

Reference Books

1. W.M. Newman and R.F. Sproull , "Principles of Interactive Computer Graphics", Tata McGraw-Hill, 2nd Edition,1997.
2. D.P. Mukherjee, "Fundamentals of Computer Graphics and Multimedia" , Prentice-Hall of India Pvt. Ltd.,1st Edition, 1997.

Web References

1. https://nptel.ac.in/courses/106108101/
2. http://www.tcyonline.com/tests/operating-system-concepts
3. http://www.galvin.info/history-of-operating-system-concepts-textbook
4. https://www.cse.iitb.ac.in/~mythili/teaching/cs347_autumn2016/index.html
5. https://www.cse.iitk.ac.in/pages/CS330.html

A20CPE303 **INFORMATION SECURITY**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To provide an understanding of principals.
- To understand the technologies.
- To explore the basic ethics.
- To navigate the risk management.
- To observe the control strategies.

Course Outcomes

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

CO1 – Understand the history of information security.
CO2 - Acquire knowledge about legal and ethical aspects.
CO3 - Providing basic approaches in information security.
CO4 – Observing the major issues in risk management
CO5 – Description of control strategies.

UNIT I INTRODUCTION (9 Hrs)

Introduction – History of Information Security – defining security – CNSS Security Model – Components of an Information Security – Approaches to Information Security Implementation – System Development Life Cycle.

UNIT II NEED FOR SECURITY (9 Hrs)

The Need for Security – Introduction - Business Needs First – Threats – Attacks – Secure Software Development

UNIT III ETHICS (9 Hrs)

Legal, Ethical, and Professional Issues in Information Security - Law and Ethics in Information Security - Relevant U.S. Laws - International Laws and Legal Bodies.

UNIT IV RISK MANAGEMENT (9 Hrs)

Ethics and Information Security - Codes of Ethics and Professional Organizations – Risk Management - Introduction - An Overview of Risk Management – Risk Identification – Risk Assessment.

UNIT V CONTROL STRATEGIES (9 Hrs)

Risk Control Strategies - Selecting a Risk Control Strategy - Quantitative Versus Qualitative Risk Control Practices - Risk Management Discussion Points

Text Books

1. Michael E. Whitman & Herbert J. Mattord, “Principles of Information Security”, Course Technology, Cengage Learning, 4thedition, 2011. (Chapters 1,2,3,4,5)
2. James M. Stewart, Ed Tittel, Mike Chapple ‘CISSP: Certified Information Systems Security Professional Study Guide’, Wiley 2008.
3. Network Security Strategies by Aditya Mukherjee

Reference Books

1. Software-Defined Networking and Securityby Dijiang Huang, Ankur Chowdhary, Sandeep Pisharody
2. Security Engineering A Guide to Building Dependable Distributed Systemsby Ross Anderson
3. Jan Killmeyer Tudor, " Information Security Architecture: An Integrated Approach to Security in the Organization," CRC Press, September 2000
4. Thomas R. Peltier, " Information Security Risk Analysis," Auerbach Publications, January 2001
5. Arnaud de Borchgrave, Frank J. Cilluffo, Sharon L. Cardash, " Cyber Threats and Information Security : Meeting the 21st Century Challenge," Center for Strategic & Int'l Studies, May 2001

Web References

1. https://www.sitesbay.com/cyber-security/index
2. https://www.baynetworks.com/security/
3. https://bayshorenetworks.com/
4. https://www.baycollege.edu/academics/programs/computer-network-systems-security.php

DISCIPLINE SPECIFIC ELECTIVES
Discipline Specific Electives – II (DSE - II) – offered in Fourth Semester

A20CPE404	IMAGE PROCESSING	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To study the various concepts
- To Explore the methods and algorithms of image processing
- To represent the image transformation
- To enhance the image enhancement
- To describe the image restoration, image compression techniques

Course Outcomes

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

CO1 - Study the various concepts
CO2 - Explore the methods and algorithms of image processing
CO3 - Represent the image transformation
CO4 - Enhance the image enhancement
CO5 - Describe the image restoration, image compression techniques

UNIT I CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS (9 Hrs)

Light, Luminance ,Brightness and Contrast, Eye, The Monochrome Vision Model, Image Processing Problems and Applications, Vision Camera, Digital Processing System, 2-D Sampling Theory, Aliasing, Image Quantization, Lloyd Max Quantizer, Dither, Color Images, Linear Systems And Shift Invariance, Fourier Transform, Z Transform, Matrix Theory Results, Block Matrices and Kronecker Products

UNIT II IMAGE TRANSFORMS (9 Hrs)

2-D orthogonal and Unitary transforms, 1-D and 2-DDFT, Cosine, Sine, Walsh, Hadamard, Haar, Slant, Karhunen - loeve, Singular value Decomposition transforms

UNIT III IMAGE ENHANCEMENT (9 Hrs)

Point operations - contrast stretching, clipping and thresholding density slicing, Histogram equalization, modification and specification, spatial operations – spatial averaging, low pass, high pass, bandpass filtering, direction smoothing, medium filtering, generalized cepstrum and homomorphic filtering, edge enhancement using 2-D IIR and FIR filters, color image enhancement.

UNIT IV IMAGE RESTORATION (9 Hrs)

Image observation models, sources of degradation, inverse and Wiener filtering, geometric mean filter, nonlinear filters, smoothing splines and interpolation, constrained least squares restoration.

UNIT V IMAGE DATA COMPRESSION (9 Hrs)

Image data rates, pixel coding, predictive techniques transform coding and vector DPCM, Block truncation coding, wavelet transform coding of images, color image coding. Random transform, back projection operator ,inverse random transform, back projection algorithm, fan beam and algebraic restoration techniques

Text Books

1. Anil K. Jain, “Fundamentals of Digital Image Processing”, PHI, 1995.
2. Sid Ahmed M.A., “Image Processing”, McGraw Hill Inc, 1995.
3. Gonzalaz R. and Wintz P., “Digital Image Processing”, Addison Wesley, 2nd Ed,1987.

Web References

1. http://www.imageprocessingplace.com/root_files_V3/tutorials.htm
2. https://www.geeksforgeeks.org/digital-image-processing-basics/
3. https://www.tutorialspoint.com/dip/index.htm
4. https://www.javatpoint.com/digital-image-processing-tutorial
5. https://www.mathworks.com/learn/tutorials/image-processing-onramp.html

A20CPE405	COMPUTER HARDWARE AND TROUBLE SHOOTING	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

To define the fundamental ideas behind computer hardware.
To classify the basic ideas and principles in Peripheral Devices.
To relate storage device and relevant memory systems
To understand the installation and preventive maintenance
To provide an overview of troubleshooting

Course Outcomes

After completion of the course, the students should be able to:

CO1 –Explain the core concepts of computer hardware.
CO2 –Apply fundamental concepts in Peripheral Devices.
CO3 –Illustrate the fundamental concepts of storage device such as ram, rom, cache memory.
CO4 – Explain the system configuration concepts installation.
CO5 – Understand the troubleshooting.

UNIT I COMPUTER HARDWARE (9 Hrs)

Introduction to computer hardware – components of mother boards & its types – ports – slots – connectors – add on cards – Power supply units – cabinet types – Storage devices. Primary & secondary storage medium.

UNIT II PERIPHERAL DEVICES (9 Hrs)

Introduction – Keyboard – CRT Display Monitor – Printer – Magnetic Storage Devices – FDD – HDD – Special Types of Disk Drives – Mouse and Trackball – Modem – Fax
Modem.

UNITIII STORAGE DEVICE (9 Hrs)

Magnetic disc – RAM – ROM – PROM – EPROM – Floppy – CD Rom – CDRW – DVD – Virtual memory – Cache memory – Linear & Physical memory – video memory.

UNIT IV INSTALLATION AND PREVENTIVE MAINTENANCE (9 Hrs)

Introduction – system configuration – pre installation planning – Installation practice – routine checks – PC Assembling and integration – BIOS setup – Engineering versions and compatibility – preventive maintenance – DOS – Virus – Data Recovery..

UNIT V TROUBLESHOOTING (9 Hrs)

Introduction – computer faults – Nature of faults – Types of faults – Diagnostic programs and tools – Hardware Trouble Shooting: Printers – floppy drive – Microphone – Scanner – Network – Hardware failure – Testing – CMOS.

Text Books

1. The Complete Reference PC Hardware: Craig Zacker, John Rourke – Tata McGrawHill, 2001.
2. G.Dalin. M.Sc software engineering, HSI PUBLICATIONS
3. Govindarajalu, “IBM PC Clones Hardware, Troubleshooting and Maintenance”, 2/E, TMH, 2002.

Reference Books

1. Govindarajulu. B, IBM PC and clones : Hardware, Trouble shooting and Maintenance. Second edition, Tata-McGraw Hill, (ISBN 0-07-048286-1).
2. Rosch. Winn L., Hardware bible, Sixth edition, Que/Techmedia publishers, 2003 (ISBN 81-7635-696-4).
3. Peter Abel, Niyaz Nizamuddin, “IMB PC Assembly Language and Programming”, Pearson Education, 2007
4. Scott Mueller, “Repairing PC's”, PHI,1992
5. Wayne W. Kawamoto, "Ultimate Upgrade and Repair PCs Black Book: A Hands-on Guide to Troubleshooting Your Computer Hardware (Black Book (Coriolis Group Books Paperback))" Coriolis Group,U.S. (1 September 1999)

Web References

1. https://www.edx.org/learn/computer-hardware.
2. https://www.javatpoint.com/computer-network-tutorial
3. https://www.w3schools.com/cybersecurity/cybersecurity_networking.php

A20CPE406 **DATA MINING**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To understand the concepts of Data Mining.
- To learn about Data types.
- To learn about Preprocessing.
- To learn the basics of classification.
- To know about Cluster analysis.

Course Outcomes

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

CO 1 - Understand the basic concepts of Data Mining.
CO 2- Understand the basic data types and visualization.
CO 3- Usage of preprocessing techniques.
CO 4 - Basics of classification.
CO 5 - Basic concepts of cluster analysis.

UNIT I INTRODUCTION TO DATA MINING (9 Hrs)

Introduction to Data Mining: Definition of data mining - Stages of the Data Mining Process –Basic data types – Major building blocks –Scope of Data Mining – Data Mining working –Data Mining Architecture – Data Mining implementation process – Data Mining Techniques– Advantages & Disadvantages.

UNITII WHY DATA MINING? (9 Hrs)

Data: Types of Data, Data quality, Data preprocessing- Measures of similarity and dissimilarity – Exploring data: summary statistics, visualization, OLAP and multidimensional data analysis.

UNIT III DATA PREPROCESSING (9 Hrs)

Data preprocessing: Data preprocessing introduction, Data cleaning - Data integration – Data reduction – Data transformation and data Discretization.

UNITIV CLASSIFICATION – BASIC CONCEPTS (9 Hrs)

Classification: Problem definition - General approach - Decision tree induction - Rule based classifiers – nearest neighbor - Bayesian classifiers - Pattern Mining – Introduction- pattern mining in multilevel, multi-dimensional space - Frequent Pattern Mining Model.

UNITV CLUSTER ANALYSIS (9 Hrs)

Cluster analysis basic concepts and methods: Introduction – requirements for cluster analysis– Over view of clustering methods. Data mining Applications – Data Mining Tools

Text Books

1. Data Mining: Concepts and Techniques by Jiawei Han and Micheline Kamber, Elsevier, 2010.
2. Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach and Vipin Kumar,2005.
3. Data Mining: Practical Machine Learning Tools and Techniques, Fourth Edition, by Ian H. Witten , Eibe Frank , Mark A. Hall , Christopher Pal

Reference Books

1. Data Mining by Charu C Aggarwal, Springer.
2. Introduction to Data Mining by Pang-Nang Tan , Michael Steinbach , Vipin Kumar , Pearson.
3. Principles of Data Mining , by David Hand , HeikkiMannila , Padhraic Smyth , The MIT press , Cambridge
4. Data Mining: The Textbook 2015th Edition by Charu C. Aggarwal
5. Data Mining and Predictive Analytics (Wiley Series on Methods and Applications in Data Mining) 2nd Editionby Daniel T. Larose

Web References

1. https://www.sciencedirect.com/book/9780123814791/data-mining-concepts-and-techniques
2.https://www.tutorialspoint.com/data_mining/index.htm#:~:text=Data%20Mining%20is%20defined%20as,is%20mining%20knowledge%20from%20data.
3.https://www.tutorialspoint.com/dm/dm_quick_guide.htm
4.https://www.javatpoint.com/data-mining

DISCIPLINE SPECIFIC ELECTIVES
Discipline Specific Electives – III (DSE - III) – offered in Fifth Semester

		L	T	P	C	Hrs
A20CPE507	**DATA SCIENCE USING R**	**3**	**0**	**0**	**3**	**45**

Course Objectives

- To understand the concepts of Data Science.
- To learn about Data analytics.
- To learn about Relational database.
- To learn the concept of Map reduce.
- To know about Machine Learning.

Course Outcomes

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

CO 1 - Understand the basic concepts of Data Science.
CO 2 - Understand the basic concepts of Data Analytics.
CO 3 - Usage of Relational Databases.
CO 4 - Basics of Map Reduce Method.
CO 5 - Basic concepts of machine Learning.

UNIT I INTRODUCTION TO DATA SCIENCE (9 Hrs)

Introduction to Data Science: Definition of Data Science, Need for Data Science, components of data science - Data science process – Introduction to NoSQL

UNIT II DATA ANALYTICS (9 Hrs)

Business Intelligence Systems Application and Development: BIG DATA Overview: Types, Characteristics, Architecture, BI vs Data Science - Data Analytics Life Cycle - Big Data Analytics: Methodology - Technologies – Advantages

UNITIII RELATIONAL DATABASE (9 Hrs)

Big data Management - Operational Databases: importance of RDBMS in Big DataEnvironment, Non-Relational databases, key value pair database, document database, columnar database, graph database, spatial database

UNITIV MAP REDUCE (9 Hrs)

Map Reduce Fundamentals: Tracing the Origins of MapReduce, Understanding the mapFunction, Adding the reduce Function, Putting map and reduce Together, Optimizing Map Reduce Tasks.

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UNIT V MACHINE LEARNING (9 Hrs)

Introduction to Machine Learning for Data Analysis: Introduction: Need, Types of MLlearning algorithms: Supervised and Semi-supervised, Unsupervised, reinforcement.

Text Books

1.Davy Cielen, Arno D. B. Meysman, Mohamed Ali, “Introducing Data Science”,manning publications, 2016 (Chapter 1 to 3 for Module I &Module V)
2. “Data Science and Big Data Analytics”, EMC Education Service, Wiley. 2015 (Chapter1 & Chapter 2 for module II)
3.Alan Nugent, Dr. Fern Halper, Marzia Kaufman, “Big Data for Dummies”, by Judith Hurwitz, , Wiley pub, 2013. (Chapter 7 & 8 for module III and IV)

Reference Books

1.R for Data Science , Hadley Wickham & Garrett Grolemund , O’Reilly
2.R for everyone , Advance Analytics and Graphics , by Jared P.Lander , Second Edition.
3.R in Action : Data Analysis and Graphics with R , by Dr. Rob Kabacoff , Second Edition.
4 Rudolph Russell, “Machine Learning Step-by-Step Guide To Implement Machine Learning algorithms with Python”, 2018. (Chapter I for module V)

Web References

1. https://r4ds.had.co.nz/introduction.html
2. https://online-learning.harvard.edu/course/data-science-r-basics?delta=2
3. https://www.analyticsvidhya.com/blog/2016/02/complete-tutorial-learn-data-science-scratch/
4. https://www.tutorialspoint.com/r/index.htm
5. https://www.tutorialspoint.com/data_science_machine_learning_data_analysis_python_and_r/index.asp
6. https://www.tutorialspoint.com/r/r_overview.htm

A20CPE508	INTRUSION DETECTION SYSTEM AND PREVENTION	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To provide a solid foundation to the students in network security
- To provide a solid foundation to the students in intrusion detection and prevention.
- To enable the students to master the knowledge about intrusion detection and prevention in the context of real-life applications.
- To prepare the students for understanding and evaluating critically
- To prepare the students for understanding and assimilating new knowledge and emerging technology in network security

Course Outcomes

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

CO1 - Understand the physical location, the operational characteristics and the various functions performed by the intrusion detection and prevention system.

CO2 - Describe how components in different layers inter-operate in the intrusion detection and prevention system.

CO3 - Learn new techniques and to align new security technologies to existing network infrastructure

CO4 - Understand the current and effective architecture to deal with network security threats.

CO5 - Apply intrusion detection alerts and logs to distinguish attack by using SNORT tool..

UNIT I INTRODUCTION (9 Hrs)

History of Intrusion detection, Audit, Concept and definition , Internal and external threats to data, attacks, Need and types of IDS, Information sources Host based information sources, Network based information sources.

UNIT II INTRUSION DETECTION AND NETWORK TRAFFIC SIGNATURE (9 Hrs)

Components of IDS, Steps of implementation and monitoring, Host- and network-based IDS, Implementing and evaluating IDS, intrusion detection versus intrusion prevention, Signature analysis, Detecting traffic signatures, Identifying suspicious events, Creating custom traffic signatures, Common Vulnerability and Exposures (CVE) standards

UNIT III INTRUSION DETECTION AND PREVENTION TECHNIQUES (9 Hrs)

Host-based intrusion detection system (IDS) / intrusion prevention system (IPS), networkbased IDS/IPS. Data collection for IDS/IPS. Intrusion detection techniques, misuse detection: pattern matching, rule-based and state-based; anomaly detection: statistical based, machine learning based, data mining based; hybrid detection.

UNIT IV IDS and IPS ARCHITECTURE (9 Hrs)

Tiered architectures, single-tiered, multi-tiered, peer-to-peer. Sensor: sensor functions, sensor deployment and security. Agents: agent functions, agent deployment and security. Manager component: manager functions, manager deployment and security. Information flow in IDS and IPS, defending IDS/IPS.

UNIT V IDP TOOLS (9 Hrs)

Introduction to Snort, Snort Installation Scenarios, Installing Snort, Running Snort on Multiple Network Interfaces, Snort Command Line Options. Step-By-Step Procedure to Compile and Install Snort Location of Snort Files, Snort Modes Snort Alert Modes.

Text Books

1. Ali A. Ghorbani, Network intrusion detection and prevention concepts and techniques, Springer, 2010
2. C. Endorf, E. Schultz and J. Mellander, Intrusion Detection & Prevention, McGrawHill/Osborne, 2004.
3. Rafeeq Rehman : " Intrusion Detection with SNORT, Apache, MySQL, PHP and ACID," 1st Edition, Prentice Hall , 2003

Reference Books

1. Christopher Kruegel,Fredrik Valeur, Giovanni Vigna: “Intrusion Detection and Correlation Challenges and Solutions”, 1st Edition, Springer, 2005.
2. Carl Endorf, Eugene Schultz and Jim Mellander “ Intrusion Detection & Prevention”, 1st Edition, Tata McGraw-Hill, 2004.
3. Stephen Northcutt, Judy Novak : “Network Intrusion Detection”, 3rd Edition, New Riders Publishing, 2002

Web References

1. https://opensourceforu.com/2017/04/best-open-source-network-intrusion-detectiontools/
2. https://security.berkeley.edu/intrusion-detection-guideline
3. https://www.snort.org/

A20CPE509 **SYSTEM SOFTWARE**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To understand the various concepts of system software.
- To gain about the Assembler.
- To learn about Macro and Macro processors
- To learn about Loaders
- To learn the Compilers.

Course Outcomes

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

CO1 - Learn about the various concepts of system software.
CO2 – Learn about various types of Assembler.
CO3 – Learn about Macros and Macro processor
CO4 - Analyze the working of loaders.
CO5 – Explore the working of compiler.

UNIT I INTRODUCTION MACHINE STRUCTURE (9 Hrs)

Machine structure-memory-register data-instructions special features -Assembly languages: Address modifications-Using instruction-Using index register looping-simple assembly language programs.

UNIT II ASSEMBLER (9 Hrs)

Assemblers: Purpose-pass 1 and pass 2 of assembly with flow chart-symbol table-literal table-base table generation.

UNIT III MACROS (9 Hrs)

Macros: Concept-definition macro call-macro call with arguments conditional - nested macros.- Macro processor: Definition-generation of macro definition table macro name table argument list array-two pass-macro processors -simple two-pass algorithms.

UNIT IV LOADERS (9 Hrs)

Loaders: concept - General-loader scheme-four functions of a loader allocation-relocation-linking and loading as accomplished by absolute-relocating and direct-linking loader.

UNIT V COMPILER (9 Hrs)

Definition-lexical analysis-syntax analysis –interpretation-parse tree storage allocation-code generation-optimization-structure of compiler. Features of High level languages: PL/1 language data types and structure storage allocation and scope of names accessing flexibility - functional modularity asynchronous operation.

TEXT BOOK

1.John J. Donavan , System programming
2.Leland L.Beck “System Software-Introduction to system program
3.Damdhare., Introduction to system software

Reference books

1.“ System Software: An Introduction to Systems Programming” by Leland L Beck. ...
2.“ System Software” by M Joseph.
3.“ System Software: An Introduction to Systems Programming for VTU” by Leland L Beck. ...

Web references

1.https://www.tutorialspoint.com/basics_of_computers/basics_of_computers_software_concepts.html
2.https://www.geeksforgeeks.org/introduction-of-assembler/
3.https://www.geeksforgeeks.org/macro-processor/
4.http://www.tezu.ernet.in/~utpal/course_mat/ss_compil.html
5.https://www.techopedia.com/definition/8104/loader

DISCIPLINE SPECIFIC ELECTIVES
Discipline Specific Electives – IV (DSE - IV) – offered in Sixth Semester

		L	T	P	C	Hrs
A20CPE610	**CLIENT / SERVER TECHNOLOGY**	**3**	**0**	**0**	**3**	**45**

Course Objectives
- To learn about objective evaluations and details of Client/Server development tools.
- To know about the network structures.
- Toused in operating system and database management system
- To learn the basics of applications in client server technology.
- To know about system development and web services

Course Outcomes
After completion of the course, the students will be able to

CO 1 - Understand the objective evaluations and details of Client/Server development tools.
CO 2 - Get andetailed networking concepts.
CO 3 - Used in operating system and database management system.
CO 4 - Basics of applications in client server technology.
CO 5 –Web services developments.

UNIT I INTRODUCTION TO CLIENT SERVER (9 Hrs)
Introduction – defining client/server computing – Classification of client/server systems – clients/server – advantages & disadvantages –driving forces behind client/server computing

UNIT II TCP/IP (9 Hrs)
Introduction – two approaches of network communication – Ethernet technology – fiber distributed data interconnect(FDDI) – internet architecture – interconnection through IP routers – UDP. Related TCP – Segment format –TCP checksum computation – TCP connection reset – TCP state machine – TCP performance – TCP/IP over ATM network – VPN

UNIT III CLIENT SERVER DATABASE (9 Hrs)
Client/Server databases – Introduction – client/server in respect of databases – client/server database architecture – database middleware component – access to multiple databases – distributed client/server database systems – distributed DBMS – web/database system for client/server applications

UNIT IV CLIENT SERVER APPLICATION (9 Hrs)
Client/server application components – introduction – technologies for client/server application – services of a client/server application – categories of client/server applications – client services – server services – client/server application connectivity – client/server application: Layered Architecture

UNIT V WEB SERVICES (9 Hrs)
System development – hardware & software requirements – communication interface technology – client/server technology & web services – what are web services – web services & client/server/browser – server technology – client/server technology & web applications

Text Book
1. Subhash Chandra Yadav & Sanjay Kumar Singh,"An Introduction to Client/ServerComputing", New Age International Publishers, 2009.
2. Douglas E Comer, "Internetworking with TCP/IP-Principles, Protocols and Architecture", Pearson Education.
3. Dawana Travis Dewire, "Client/Server Computing", Tata McGraw -Hill Publishing Company Limited, New Delhi, 2003.

Reference Books

1. Patrick Smith,Client/server computing (Professional reference series), Paperback .
2. Robert Orfali, Dan Harkey and Jeri Edwards, “Essential Client/Server Survival Guide”, Galgotia Publications, New Delhi, 2001.
3. Joel P Kaster, “Understanding Thin Client/Server Computing”, Prentice Hall of India, New Delhi,2001.
4. Jein Edwards, “3 tier Client/server at Work”, Wiley Computer Publishing, USA, 1999. 4. AshhofaiolTomy Martin, “Building N - tier Applications with COM and VB 6.0”, Wiley Computer Publishing, Singapore, 1999.
5. Travis Derive D, “Second - generation Client/Server Computing” McGraw Hill, New Delhi, 1997.

Web References

1. https://www.tutorialspoint.com/Client-Server-Computing
2. https://www.eukhost.com/blog/webhosting/client-server-technology/
3. https://www.quora.com/What-are-client-server-technology

A20CPE611 **DATA VISUALIZATION USING MATLAB**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To Understand course policies and mechanics
- To Understand how this course fits into the curriculum
- To Visualize a data set using MATLAB
- To Interpret a graph
- To Think about data sources and their reliability

Course Outcomes

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

CO 1 - Understand course policies and mechanics
CO 2 - Understand how this course fits into the curriculum
CO 3 - Visualize a data set using MATLAB
CO 4 - Interpret a graph
CO 5 - Think about data sources and their reliability

UNIT I MATLAB BASICS (9 Hrs)

Input and Output – Arithmetic – Algebra - Managing Variables- Errors in Input- Variables and Assignments- Solving Equations- Vectors and Matrices- Functions- Graphics

UNITII MATLAB GRAPHICS (9 Hrs)

Two-Dimensional Plots- Three-Dimensional Plots- Special Effects- Customizing and Manipulating Graphics

UNITIII MATLAB PROGRAMMING (9 Hrs)

Branching- More about Loops- Other Programming Commands- Interacting with Other Operating System - Numerical Arrays- Other Types of Arrays

UNIT IV PLOT 2D AND IMAGE (9 Hrs)

Plot 2-D - The objects hierarchy- The PLOT and SUBPLOT commands- Commands complementary to PLOT- Resize, print and export of a plot- Interactive control over graphical objects- The Image Object- Image as array- The image functions- Image types- Examples

UNITV SIMULINK AND GUIs (9 Hrs)

Graphical User Interfaces (GUIs)- Applications- Illuminating a Room- Monte Carlo Simulation- Population Dynamics- Linear Economic Models- Linear Programming

Text Books

1.A guide to MATLAB for beginners and experience users , by Brain R Hunt , Ronald L. Lipsman,Jonathan M. Rosenberg with Kevin R. Coombes , John R. Osborn , Garrett J. Stuck .
2. Data Analysis and Visualization , by Antonio Siciliano , University of Bari, Italy
3. MatlabData Analysis and Visualization ByAntonio Siciliano

Reference Books

1. MATLAB for beginners , A gentle Approach , by Peter I. Katan
2. Beginnining MATLAB with Simulink , by SulaymonEshkabilov
3.MATLAB Graphics and Data Visualization Cookbook by NiveditaMajumdar , Swapnonil Banerjee
4. MATLAB Guide, Third Edition Desmond J. Higham, Nicholas J. Higham

Web References

1. https://www.javatpoint.com/what-is-data-visualization
2. https://www.tutorialspoint.com/business_writing_skills/data_visualization.htm
3. https://www.tutorialspoint.com/matlab/index.htm
4. https://www.javatpoint.com/matlab
5. https://in.mathworks.com/support/learn-with-matlab-tutorials.html

A20CPE612 **ETHICAL HACKING**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- Investigate how to attack a computer system.
- Explore low tech hacking techniques Investigate web-based hacking.
- Explore wireless network hacking.
- Investigate Trojans and other attacks.
- Perform penetration testing.

Course Outcomes

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

CO1 - Identify and analyze the stages an ethical hacker requires to take in order to compromise a target system.
CO2 - Identify tools and techniques to carry out a penetration testing.
CO3 - Critically evaluates security techniques used to protect system and user data.
CO4 - Demonstrate systematic understanding of the concepts of security at the level of policy and strategy in a computer system.
CO5 - Develop a practical understanding of the current cyber security issues.

UNIT I INTRODUCTION (9 Hrs)

Ethical Hacking Introduction - Attack Scenarios - Emulating Cyber Attacks - Cyber Laws - Programming (C, Python, Assembly Language Basics, Computer Memory)

UNIT II SCOPE (9 Hrs)

Scope of Hacking - Red Team Operations - Purple Team Operation - Bug Bounty Programs

UNIT III EXPLOITATION (9 Hrs)

System Exploitation Basic System Exploits - Windows Exploits – Power shell Exploitation - Web Application Exploitation

UNIT IV MALWARE (9 Hrs)

Malware Analysis Study of Malware - Mobile Malware – Ransomware.

UNIT V ETHICAL HACKING MOTION (9 Hrs)

Putting Ethical Hacking in Motion: Social Engineering, Why Hackers Use Social Engineering, Understanding the Implications, Performing Social-Engineering Attacks: Fishing for information, Building trust, exploiting the relationship. Social-Engineering Countermeasures: Policies, awareness

Text Books

1. Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, Gideon Lenkey, and Terron Williams, “Gray Hat Hacking The Ethical Hacker's Handbook”, McGraw-Hill, 5th Edition, 2018.
2. Kenneth C.Brancik “Insider Computer Fraud” Auerbach Publications Taylor & Francis Group– 2008.
3. Kimberly Graves, “Certified Ethical Hacker STUDY GUIDE”, Wiley publication, 2010.

Reference Books

1. Sean-Philip Oriyano, “Hacker Techniques, Tools, and Incident Handling, Jones and Bartlett Learning LLC”, 3rd Edition, 2018.
2. AnkitFadia, “The Unofficial Guide to Ethical Hacking”, Premier Press, 2nd Edition 2006.
3. LakshayEshan, “Ethical Hacking A Beginners Guide to Learning the World of Ethical Hacking”,Amazon Digital Services LLC - KDP Print US, 2018.
4. RafayBaloch, “Ethical Hacking and Penetration Testing Guide”, CRC Press, 2017.
5. Adidas Wilson, “Hacking Essentials The Beginner's Guide To Ethical Hacking And Penetration Testing”, Adidas Wilson, 2019.

Web References

1. https://freedomhacker.net › Internet Security.
2. https://www.guru99.com/c-sharp-tutorial.html.
3. https://www.hackthissite.org/
4. https://www.eccouncil.org/programs/certified-ethical-hacker-ceh/

OPEN ELECTIVES
Open Electives – I (OE - I) – offered in Third Semester

		L	T	P	C	Hrs
A20CPO310	**DATA STRUCTURES**	**2**	**0**	**0**	**2**	**30**

(Permitted Department – Mathematics, Bio Technology, Nutrition and Dietetics)

Course Objectives
- To understand the concept of data structure and arrays.
- To learn about Stack and List.
- To learn about Queue and Tree.
- To learn the concept of Graph.
- To know about Sorting.

Course Outcomes
After completion of the course, the students will be able to

CO 1 - Descriptions about the concept of data structure and arrays.
CO 2- Understand the Stack and List.
CO 3 - Usage of Queue and Tree.
CO 4 - Usage of Graph.
CO 5 - Explain the types of Sorting.

UNIT I DATA STRUCTURE AND ARRAY (6 Hrs)

Introduction – Types of data structure – Arrays - Representation of arrays- Applications of arrays- Searching - Linear search and Binary Search .

UNIT IISTACK AND LIST (6 Hrs)

Introduction – Representation- Operations on stack - Implementation of stack using array- Application – Evaluation of Expression – List – Representations - Implementing the list operations- Single Linked List - Doubly Linked List – Circular Linked List -Operations and Applications.

UNIT III QUEUE AND TREE (6 Hrs)

Introduction – Representation, Operations on Queues, Implementation of queues using array – Tree - Basic terminology - Binary tree - Representation – Traversal - Binary search tree .

UNIT IVGRAPH (6 Hrs)

Introduction – Definition and Terminology – Representation, Traversal – Depth First and Breadth First traversal - Applications

.

UNIT VSORTING (6 Hrs)

Introduction –Selection sort - Bubble Sort - Insertion Sort - Merge Sort - Quick Sort

Text Books
1. Ellis Horowitz, SartajSahni and Anderson, “Fundamentals of Data Structure in C”,University Press, 2nd edition, 2008.
2. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, 4th Edition, Pearson Education, 2013.
3. APuntambekar,“DataStructures”,ThirdRevisedEdition,TechnicalPublications Pune, 2008.

Reference Books

1. A Puntambekar, “Data Structures”, Third Revised Edition, Technical Publications Pune, 2008.
2. E. Horowitz, S. Sahni and S. Rajasekaran, “Computer Algorithms/C++”, 2rd Edition, The Orient Blackswan, 2019.
3. ReemaThareja,“DataStructuresUsingC”,1st Edition,OxfordUniversityPress, 2017.
4. GillesBrassard,“FundamentalsofAlgorithms”,PearsonEducation, 2015.
5. AlfredV.Aho,JohnE.Hopcroft,JeffreyD.Ullman,“DataStructuresandAlgorithms”,PearsonEducation,Reprint, 2006.
6. EllisHorowitz,SartajSahni,SusanAnderson-Freed,“FundamentalsofDataStructuresinC”,2rdEdition,UniversityPress, 2008.

Web References

1. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2. https://www.javatpoint.com/data-structure-tutorial
3. https://www.coursera.org/specializations/data-structures-algorithms
4. https://www.geeksforgeeks.org/data-structures/
5. https://www.codechef.com/certification/data-structures-and-algorithms/prepare

A20CPO311 **PROGRAMMING IN C**

L	T	P	C	Hrs
2	0	0	2	30

(Permitted Departments - Commerce and Management, Mathematics, Media Studies, Bio Technology, Nutrition and Dietetics)

Course Objectives

- To understand the Fundamentals of Computer and basic concepts of C programming.
- To learn about decision making and branching techniques.
- To learn about Arrays and Functions.
- To learn the concept of Structures and Unions.
- To know about Pointer and File management.

Course Outcomes

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

CO 1 - Understand the Fundamentals of Computer and basic concepts of C programming.
CO 2 - Understand the decision making and branching techniques.
CO 3 - Usage of Arrays and Functions.
CO 4 - Usage of Structures and Unions.
CO 5 - Usage of Pointer and File management.

UNIT I OVERVIEW OF C (6 Hrs)

Fundamentals of Computer: Computer Definition – Block Diagram of Computer – Types of Computer – Characteristics of Computer – Applications of Computer.

History of C –Importance of C – Programming style – Executing a c program – C tokens – Keywords and identifiers – Constants – variables – Data types – Operators and Expressions - Sample exercises .

UNIT II DECISION MAKING AND BRANCHING (6 Hrs)

Introduction – IF statement – The If..Else statement – Nesting of If.. Else statements – The Else if ladder – The switch statement – The goto statement – Looping statements – The while statement – Do – While statement – For loop statement – Sample exercises .

UNIT III ARRAYS AND FUNCTIONS (6 Hrs)

Introduction – One dimensional arrays – Declaration and Initialization – Two dimensional arrays - Declaration and Initialization – Multidimensional array – Dynamic array – Functions – Introduction – Types of functions – Built in functions – User defined functions – String functions – Mathematical functions – Recursion - Sample exercises.

UNIT IV STRUCTURES AND UNIONS (6 Hrs)

Introduction – Defining Structure – Declaring structure variable – Accessing structure members - Structure initialization – Arrays of structure – Unions – Size of structure - Sample exercises.

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UNIT V PONITER AND FILE MANAGEMENT (6 Hrs)

Introduction – Understanding pointer – Accessing the address of a variable – Declaring pointer variables – Initialization of pointer variables – Pointers and array – Pointer to functions – Pointer to structure – File management in C – Introduction – Defining and opening a file – Closing a file – Input and output operations on file - Sample exercises.

Text Books

1. E. Balagurusamy, “Programming in ANSI C ”, Fourth edition , Tata McGraw Hill Publishing company limited .
2. Brian W. Kernighan,Dennis Ritchie, “The C Programming Language”,Second Edition , Pearson.
3. Byron S Gottfried and Jitendar Kumar Chhabra, “Programming with C”, Tata McGraw Hill Publishing Company, 4th Edition, New Delhi, 2015.
4. Herbert Schildt,” C: The Complete Reference”, McGraw Hill, 4th Edition, 2014.
5. YashwantKanetkar, “Let us C”, BPB Publications, 16th Edition, 2017.

Reference Books

1. Peter van der Linden, “Expert C Programming: Deep Secrets”, 1st Edition, Kindle Edition.
2. Herbert Schildt ,C: The Complete Reference , Tata McGraw Hill.
3. AshokNKamthane,“ComputerProgramming”,Pearsoneducation,2rdImpression,2012.
4. VikasVerma,“AWorkbookonC“,CengageLearning,2rdEdition,2012.
5. Dr.P.RizwanAhmed,“OfficeAutomation”,MarghamPublications,2016.
6. P.Visu, R.Srinivasan and S.Koteeswaran, “Fundamentals of Computing and Programming”, 4th Edition, SriKrishnaPublications,2012.
7. PradipDev,ManasGhoush,“ProgramminginC”,2rdEdition,OxfordUniversityPress,2011.

Web References

1. https://www.tutorialspoint.com/cprogramming/index.htm
2. https://www.cprogramming.com/
3. https://www.javatpoint.com/c-programming-language-tutorial
4. https://www.geeksforgeeks.org/c-programming-language/
5. https://www.w3schools.in/c-tutorial/

A20CPO312 **PROGRAMMING IN PYTHON**

L	T	P	C	Hrs
2	0	0	2	30

(Permitted Departments - Commerce and Management, Mathematics, Media Studies, Bio Technology , Nutrition and Dietetics)

Course Objectives

- To understand an introduction to python.
- To learn about control structures.
- To derivate a concept of List.
- To know about the concept of functions.
- To manage the string and file process.

Course Outcomes

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

CO 1 - Observing the introduction to python.
CO 2 - Develop the programs using control structures.
CO 3 - Presenting the concept of List.
CO 4 - Develop the programs in Functions**.**
CO 5 - Maintaining the files.

UNIT I INTRODUCTION TO PYTHON (6 Hrs)

Introduction - The Python Standard Library - Literals - Numeric Literals - String Literals - Control Characters - String Formatting - Variables and Identifiers - Variable Assignment and Keyboard Input- Identifier- Keywords and Other Predefined Identifiers in Python – Operators – Various Operators - Relational Operators- Membership Operators – Boolean Operators - Expression and Data Types.

UNIT II CONTROL STRUCTURE (6 Hrs)

Introduction - Control Structure -Selection Control- If Statement - Indentation in Python - Multi-Way Selection - Iterative Control - For Loops- While Loops- Definite vs. Indefinite Loops

UNIT III LIST (6 Hrs)

Introduction – List Structures - Common List Operations - List Traversal - Lists (Sequences) in Python- Python List Type - Tuples- Sequences- Nested Lists Iterating Over Lists (Sequences) in Python .

UNIT IV FUNCTIONS (6 Hrs)

Introduction – Defining Functions - Calling Value-Returning Functions - Calling Non-Value-Returning Functions - Keyword Arguments in Python - Default Arguments in Python - Variable Scope - Recursive functions - Exception Handling - Catching and Handling.

UNIT V STRING AND FILE PROCESS (6 Hrs)

Introduction – String Processing - String Traversal – String-Applicable Sequence Operations -String Methods - Using Text Files - Opening Text Files - Reading Text Files - Writing Text Files

Text Books

1. Charles Dierbach, Introduction to Computer Science using Python , Wiley First Edition (2015)
2. LjubomirPerkovic, “Introduction to Computing Using Python: An Application Development Focus”, John Wiley & Sons, 2012
3. Learning with python , by Allen Downey, Jeffrey Elkner

Reference Books

1. Zed A.Shaw, Learn Python the Hard Way Paperback, Pearson Education, Third Edition
2. Paul Barry, Head First Python, O' Reilly Publishers, First Edition, 2010
3. Python for Everybody: Exploring Data in Python 3 by Charles R. Severance
4. Think Python: How to Think Like a Computer Scientist by Allen B. Downey

Web References

1. https://www.tutorialspoint.com/python/index.htm
2. https://www.javatpoint.com/python-tutorial
3. https://www.javatpoint.com/python-basic-programs

OPEN ELECTIVES
Open Electives – II (OE - II) – offered in Fourth Semester

	DATABASE MANAGEMENT SYSTEMS	L	T	P	C	Hrs
A20CPO410	(Permitted Departments - Commerce and Management, Mathematics, Media Studies, Bio Technology , Nutrition and Dietetics)	**2**	**0**	**0**	**2**	**30**

Course Objectives

- To learn about Database Structure and Data Models.
- To study SQL Commands for storing and retrieving data into the database.
- To study the Relational database system design
- To understand the concept of Transactions
- To understand the concept of Concurrency Control and Recovery System

Course Outcomes

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

CO1– Design conceptual data model using Entity Relationship Diagram.

CO2– Design conceptual and logical database models for an application.

CO3– Normalize relational database design of an application.

CO4– Explain the need for Indexing, Hashing in database**.**

CO5 – Understand the strategies for Transactions and Management.

UNIT I INTRODUCTION (6 Hrs)

Database System Application – Purpose of Database Systems – View of Data – Database Languages – Relational Database – Database Design – System Structure – Database Architecture. Database Design and E-R Model: Overview of the Design Process – The E-R Model – Constraints – E-R Diagrams

UNIT II RELATIONAL MODEL (6 Hrs)

Structure of Relational Database – Fundamental Relational Algebra Operations – Extended Relational Algebra Operations – Modification of the Database - Structured Query Language: Introduction – Basic Structure of SQL Queries – Set Operations – Additional Basic Operations – Aggregate Functions

UNIT III RELATIONAL DATABASE DESIGN (6 Hrs)

Features of Good Relational Designs – 1NF – 2NF – 3NF and 4NF with Examples - Atomic Domains and first Normal form – Decomposition using Functional Dependencies – Functional Dependency Theory – Algorithm for Decomposition – Decomposition using Multi valued Dependencies.

UNIT IV SQL LANGUAGES (6 Hrs)

Structured Query Language - Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Data Manipulation Language, Data Control Language - Table Modification Commands – primary & foreign keys

UNIT V PL/SQL (6 Hrs)

Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, steps to Create a PL/SQL, steps to create a Cursors, Procedure, Function, Triggers.

Text Books

1. Abraham Silberschatz, Henry F Korth, S Sudharshan, “Database System Concepts”, McGraw-Hill, 7th Edition, 2019.
2. RamezElmasri and ShamkantNavathe, Durvasula V L N Somayajulu, Shyam K Gupta, “Fundamentals of Database Systems”, Pearson Education, 2018.
3. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom, “Database Systems The Complete Book” Prentice Hall, 2nd Edition, 2014.

Reference Books

1. Raghu Ramakrishna, Johannes Gehrke, “Database Management Systems”, McGraw Hill, 3rdEdition,2014.
2. G.K.Gupta,"Database Management Systems”, Tata McGraw Hill, 2011.
3. Date CJ, Kannan A, Swamynathan S, “An Introduction to Database System”, Pearson Education, 8thEdition,2006.
4. Paul Beynon-Davies, “Database Systems”, Palgrave Macmillan, 3rdEdition, 2003.
5. Mukesh Chandra Negi, “Fundamentals of Database Management Systems”, BPB Publications, 2019.

Web References

1. https://docs.oracle.com/cd/E11882_01/server.112/e41084/toc.htm MySQL Online Documentation
2. http://dev.mysql.com/doc/
3. http://www.rjspm.com/PDF/BCA-428%20Oracle.pdf
4. https://nptel.ac.in/courses/106/106/106106095/
5. https://www.tutorialspoint.com/dbms/index.htm

	INTRODUCTION TO DATA SCIENCE USING PYTHON	L	T	P	C	Hrs
A20CPO411	(Permitted Departments - Commerce and Management, Mathematics, Media Studies, Bio Technology and Nutrition & Dietetics)	2	0	0	2	30

Course Objectives

- To understand the concepts of programming.
- To learn about flow statements and loops.
- To learn about object oriented programming.
- To learn the concept of advance python.
- To know about data science.

Course Outcomes

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

CO 1 - Understand the basic concepts of programming.
CO 2 - Understand the basic concepts of flow and loops.
CO 3 – implementations of object oriented programming.
CO 4 - Basics of advance python.
CO 5 - Basic concepts of data science.

UNIT I INTRODUCTION TO PROGRAMMING (6 Hrs)

History of computers – Understanding hardware – Writing first program – Variables and Data types – assigning variables – operators

UNIT II CONTROL FLOW & LOOPS (6 Hrs)

If, If-Else, Else if, Switch Statements - For, While, Do-While, For Each loops

UNIT III OBJECT ORIENTED PROGRAMMING (6 Hrs)

Introduction to O.O.P paradigm - Introduction to Objects, Classes, Instances - Inheritance, Abstraction, and Sets

UNIT IV ADVANCED PYTHON (6 Hrs)

File Input - User Input- List Comprehension - Packages

UNIT V DATA SCIENCE (6 Hrs)

Introduction to Data Science - Review Python Fundamentals - Understanding the data science discipline- Pandas - Data set reading - Filtering, Cleaning, Manipulating Data - Excel vs Python - Matplotlib Package- Understanding motivations between different graphs - Sci-Kit Learn package - Understand motivation and definition of machine learning

Text Books

1. Cathy O'Neil and Rachel Schutt , "Doing Data Science", O'Reilly, 2015.
2. Davy Cielen, Arno D. B. Meysman, Mohamed Ali, "Introducing Data Science",manning publications, 2016 (Chapter 1 to 3 for Module I &Module V)
3.Martin C Brown, "Python The Complete Reference", McGraw-Hill Education, 4th Edition,2018

Reference Books

1. Data Science and Big Data Analytics", EMC Education Service, Wiley. 2015 (Chapter1 & Chapter 2 for module II)
2.Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd.,2015.
3. Ben Stephenson, "The Python Workbook A Brief Introduction with Exercises and Solutions", Springer International Publishing, Switzerland2014.

Web References

1. https://pythonprogramming.net/introduction-learn-python-3-tutorials/
2. https://www.mastersindatascience.org/data-scientist-skills/hadoop/
3. https://towardsdatascience.com/big-data-analysis-spark-and-hadoop-a11ba591c057
4. https://www.discoverdatascience.org/training/hadoop/

	WEB DEVELOPMENT	L	T	P	C	Hrs
A20CPO412	(Permitted Departments - Commerce and Management, Mathematics, Media Studies, Bio Technology , Nutrition and Dietetics)	**2**	**0**	**0**	**2**	**30**

Course Objectives

- To study the fundamentals of web application development
- To understand the design components and tools using CSS
- To learn the concepts JavaScript and programming fundamentals.
- To study about advance scripting and Ajax applications.
- To understand the working procedure of XML

Course Outcomes

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

CO1 - Develop basic web applications.
CO2 - Design the web applications using CSS.
CO3 - Validate the web pages using java scripts functions.
CO4 - Demonstrate the web 2.0 application to advance scripts.
CO5 - Update the knowledge of XML Data.

UNIT I INTRODUCTION TO WWW & HTML (6 Hrs)

Protocols– Secure Connections– Application and development tools– Web browser– Server definition – Dynamic IP.Web Design: Web site design principles–Planning the site and navigation. HTML: Development process– Html tags and simple HTML forms– Web site structure.

UNIT II STYLE SHEETS (6 Hrs)

Introduction to CSS: Need for CSS– Basic syntax and structure using CSS–Background images– Colors and properties–Manipulating texts using fonts, borders and boxes–Margins, padding lists, positioning using CSS

UNIT III JAVASCRIPTS (6 Hrs)

Client side scripting :Basic JavaScript – Variables–Functions–Conditions– Loops. Application : Page Validation – Reporting.

UNIT IV ADVANCE SCRIPT (6 Hrs)

JavaScript and objects– DOM and Web browser environments–Forms and Validations–DHTML. AJAX: Introduction– Web applications –Alternatives of AJAX.

UNIT V XML (6 Hrs)

Introduction to XML– Uses of XML–Simple XML– XML key components– DTD and Schemas– Well-formed XML document – Applications of XML– XSL and XSLT.

Text Books

1. Keith Wald, Jason Lengstorf," Pro PHP and jQuery", Paperback, 2016.
2. SemmyPurewal, "Learning Web App Development", O'Reilly Media, 2014.
3. P.J. Deitel AND H.M. Deitel," Internet and World Wide Web - How to Program", Pearson Education, 2009.

Reference Books

1. Yakov Fain, Victor Rasputnis, Anatole Tartakovsky and Viktor Gamov, “Enterprise Web Development “, O’Reilly Media, 2014.
2. Steven Suehring, Janet Valade, “PHP, MySQL, JavaScript& HTML5 All-in-One”, John Wiley & Sons, Inc, 2013.
3. UttamK.Roy, “Web Technologies”, Oxford University Press, 2010.
4. Rajkamal, “Web Technology”, Tata McGraw-Hill, 2009.
5. Shklar, Leon, Rosen, Rich, “Web Application Architecture: Principles, Protocols and Practices”, Wiley Publication, 2009.

Web References

1. https://www.w3schools.com
2. https://www.geeksforgeeks.org/web-technology/
3. https://www.guru99.com/cakephp-tutorial.html
4. https://www.ithands.com/blog/cms-or-php-framework-which-technology-is-better-for-my-business
5. http://Oriel.ly/learning-web-app

INTER DISCIPLINARY COURSE

A20CPD301	**COMPUTER BASICS**	**L T P C Hrs**
	(Permitted to Nutrition and Dietetics)	**2 0 2 4 60**

Objectives:
To enable the students to
1. Understand the basics of computer
2. Acquire the in depth knowledge of MS Word
3. Determine the basic features of MS EXCEL
4. Know the basic ideas of Power Point Presentation
5. Understand the usability of Software and Browsing

Course Outcomes
After the completion of the course, the students will be able to

CO1 – Operate the basics of computer
CO2 – Get acquainted with the knowledge of MS Word
CO3 – Determine the in depth knowledge of MS EXCEL
CO4 – Get an in depth knowledge of Power Point Presentation
CO5 – Understand the thorough knowledge of Browsing

UNIT I INTRODUCTION TO COMPUTERS (12 hrs)

History of Computers - Components of Computer – Generations of Computers - Input & Output device - Hardware – Software - Starting up and shutting down - Secondary Storage Devices.

UNIT II MS WORD (12 hrs)

Starting MS-Word - Creating and formatting a document - Changing Fonts and Point size - Table creation - Auto correct- auto text - Spell check – Thesaurus – Chart Preparation - Page Layout – Mail Merge.

UNIT III MS EXCEL (12 hrs)

Starting Excel - Work Sheet - Inserting data into rows or columns – Alignment - Text wrapping - Sorting data - Auto Sum - Generating Graphs – Financial Formula – Logical Formula – Text Formula – Filter – Text to Columns – Page Break Preview – Freeze Panes -

UNIT IV MS – POWERPOINT (12 hrs)

Starting MS PowerPoint - Auto Wizard - Creating a Presentation - Adding a slide to a Presentation - Slide Sorter- Slide Show - Editing Slides – Designs - Slide Orientation – Colors – Fonts – Effects – Transitions - Use of Clip Art - Animation Effects - Setting Timings for Slide Show.

UNIT V INTERNET (12 hrs)

Genesis and use of Internet - Types of Connection - Software & Hardware requirements - Search Engines – Web Browsers - Subject Gateways - Setting up email account - Social Media.

Text Books

1. Subramanian, S, Introduction to Computers, S. Chand Publishers, 1999
2. Norton P: Introduction to computer, Tata Mc GrawHillPublishing Co Ltd., New Delhi, 2017
3. Nagpal, D. P, Mastering Microsoft Office 2000, Wheeler Publishing, New Delhi, 2000

References:

1. Saxena. S, MS Office 2000 for Everyone, Vikas Publishing House; First Edition 2000
2. Ahilya. R, Computer, Lucent Publications; VIII Edition, 2016