GOVERNMENT COLLEGE OF ENGINEERING - BARGUR KRISHNAGIRI- 635 104, TAMILNADU (An Autonomous Institution Affiliated to Anna University – Chennai)



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING B.E. – CSE – CURRICULUM AND SYLLABUS AUTONOMOUS –

Students admitted during 2018-19

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR Regulations-2018 (AUTONOMOUS) ADMITTED IN 2018-19 Curriculum for B.E. COMPUTER SCIENCE AND ENGINEERING [FULL TIME] I TO VIII SEMESTER CURRICULUM

INDUCTION PROGRAM:

Induction Program(Mandatory)	3 Weeks Duration
Induction program for students to be Offered	Physical activity
right at the start of the first year.	Creative Arts
	Universal Human Values
	• Literary
	Proficiency Modules
	Lectures by Eminent People
	Visits to local Areas
	Familiarization to Dept./Branch
	&Innovations

SEMESTER I

Sl.No	COURSE CODE	COURSE TITLE	CAT	CONTACT PERIOD	L	Т	Р	С
THEORY	Y							
1.	18SLS101	Engineering Chemistry	BSC	4	3	1	0	4
2.	18ZBS102	Engineering Mathematics - I	BSC	4	3	1	0	4
3.	18ZES103	Basic Electrical Engineering	ESC	3	2	1	0	3
4.	18ZES104	Engineering Graphics and	ESC	5	1	0	4	3
		Design						
5,	18ZMC105	Induction Program	MC	-	-	-	1	0
PRACTI	CALS							
5.	18SLS106	Chemistry Laboratory	BSC	3	0	0	3	1.5
6.	18ZES107	Basic Electrical Engineering	ESC	4	0	0	4	2
		Laboratory						
			TOTAL	23	9	3	11	17.5
SEMESTI	ER II							
				CONTRACT	_		_	-

Sl.No	COURSE	COURSE TITLE	CAT	CONTACT	L	Т	Р	С
	CODE			PERIOD				
THEOR	RY							
1.	18SLS201	Engineering Physics	BSC	4	3	1	0	4
2.	18ZBS202	Engineering Mathematics-II	BSC	4	3	1	0	4
3.	18ZES203	Programming in C	ESC	3	3	0	0	3
4.	18ZHS204	Technical English	HSMC	2	2	0	0	2
5.	18ZMC205	Constitution of India	MC	1	1	0	0	0
PRACT	TICALS							
6.	18SLS206	Physics Laboratory	BSC	3	0	0	3	1.5
7.	18ZES207	Programming in C	ESC	4	0	0	4	2
		Laboratory						
8.	18ZES208	Workshop Practices	ESC	5	1	0	4	3
9.	18ZHS209	Communication English	HSMC	2	0	0	2	1
		Laboratory						
			TOTAL	28	13	2	13	20.5

SEMESTER III

Sl.No	COURSE CODE	COURSE TITLE	САТ	CONTACT PERIOD	L	Т	Р	С
THEOF	RY	·						
1.	18ZBS301	Transforms and Partial	BSC	4	3	1	0	4
		Differential Equations						
2.	18SES302	Digital Principles and	ESC	3	3	0	0	3
		Systems Design						
3.	18SPC303	Object Oriented	PCC	4	3	1	0	4
		Programming Using C++						
		and Java						
4.	18SPC304	Fundamentals of Data	PCC	3	3	0	0	3
		Structures						
5.	18ZMC305	Environmental Science and	MC	1	1	0	0	0
		Engineering						
6.	18SHS306	Professional Ethics and	HSMC	3	3	0	0	2
		Human Values						
PRACT	ICALS							
7.	18SES307	Digital Principles and	ESC	3	0	0	3	1.5
		Systems Design Laboratory						
8.	18SPC308	Object Oriented	PCC	4	0	0	4	2
		Programming using C++						
		and Java Laboratory						
9.	18SPC309	Data Structures Laboratory	PCC	4	0	0	4	2
			TOTAL	29	16	2	11	21.5

SEMESTER IV

Sl.No	COURSE	COURSE TITLE	CAT	CONTACT PERIOD	L	Т	Р	С
THEORY								
1.	18SBS401	Probability and Queuing Theory	BSC	4	3	1	0	4
2.	18SPC402	Computer Organization and Architecture	PCC	3	3	0	0	3
3.	18SPC403	Operating Systems	PCC	3	3	0	0	3
4.	18SPC404	Design and Analysis of Algorithms	PCC	3	3	0	0	3
5.	18SPC405	Database Management Systems	PCC	3	3	0	0	3
PRACT	ICALS							
6.	18SPC406	Operating Systems Laboratory	PCC	3	0	0	3	1.5
7.	18SPC407	Database Management Systems Laboratory	PCC	4	0	0	4	2
			TOTAL	23	15	1	7	19.5

SEMESTER V

Sl.No	COURSE CODE	COURSE TITLE	CAT	CONTACT PERIOD	L	Т	Р	С
THEOF	RY							
1.	18SBS501	Discrete Mathematics	BSC	4	3	1	0	4
2.	18SPC502	Computer Networks	PCC	3	3	0	0	3
3.	18SPC503	Object Oriented Software	PCC	3	3	0	0	3
		Engineering						
4.	18SPC504	Theory of Computation	PCC	3	3	0	0	3
5.		Professional Elective I	PEC	3	3	0	0	3
PRACT	ICALS							
6.	18SPC505	Computer Networks	PCC	3	0	0	3	1.5
		Laboratory						
7.	18HSC506	Soft Skills and Personality	HSMC	3	0	0	3	1.5
		Development Laboratory						
8.	18SPR507	Project I	PROJ	3	0	0	3	1.5
			TOTAL	25	15	1	9	20.5

SEMESTER VI

Sl.No	COURSE CODE	COURSE TITLE	CAT	CONTACT PERIOD	L	Т	Р	С
THEOR	THEORY							
1.	18SPC601	Compiler Design	PCC	3	3	0	0	3
2.	18SES602	Wireless Communication and Networks	ESC	3	3	0	0	3
3.	18SPC603	Embedded Computing Systems	PCC	3	3	0	0	3
4.		Professional Elective II	PEC	3	3	0	0	3
5.		Open Electives I	OEC	3	3	0	0	3
6.		Open Electives II	OEC	3	3	0	0	3
PRACT	ICALS							
7.	18SPC604	Compiler Laboratory	PCC	4	0	0	4	2
8.	18SPC605	Mobile Application development Laboratory	PCC	4	0	0	4	2
9.	18SPC606	Embedded Computing Systems Laboratory	PCC	4	0	0	4	2
			TOTAL	30	18	0	12	24

SEMESTER VII

Sl.No	COURSE	COURSE TITLE	CAT	CONTACT	L	Т	Р	C
	CODE			IERIOD				
THEO	RY							
1.	18SHS701	Management and	HSMC	3	3	0	0	3
		Entrepreneurship						
2	18SPC702	Cloud Computing	PCC	3	3	0	0	3
3.	18SPC703	Cryptography and Network	PCC	3	3	0	0	3
		Security						
4.		Professional Elective III	PEC	3	3	0	0	3
5.		Professional Elective IV	PEC	3	3	0	0	3
6.		Open Elective III	OEC	3	3	0	0	3
PRAC	FICALS							
7.	18SPC704	Cloud Computing Laboratory	PCC	4	0	0	4	2
8.	18SPC705	Network Security Laboratory	PCC	3	0	0	3	1.5
9.	18SPR706	Project II	PROJ	6	0	0	6	3
			TOTAL	31	18	0	13	24.5

SEMESTER VIII

Sl.No	COURSE CODE	COURSE TITLE	CAT	CONTACT PERIOD	L	Т	Р	С
THEO	RY							
1.		Professional Elective V	PEC	3	3	0	0	3
2.		Professional Elective VI	PEC	3	3	0	0	3
3.		Open Elective IV	OEC	3	3	0	0	3
PRACT	TICALS							
4.	18SPR801	Project III	PROJ	12	0	0	12	6
			TOTAL	21	9	0	12	15

TOTAL NUMBER OF CREDITS: 163

S.N o	Subject Area	1	2	Cre 3	edits Pe 4	r Seme 5	ster 6	7	8	Credits Total	% of Total Credits	AICTE Suggested Breakup of Credits(Total 159)
1	HSMC		3	2		1.5		3		9.5	5.83	12
2	BSC	9.5	9.5	4	4	4				31	19.02	24
3	ESC	8	8	4.5			3			23.5	14.42	29
4	PCC			11	15.5	10.5	12	9.5		58.5	35.89	49
5	PEC					3	3	6	6	18	11.04	18
6	OEC						6	3	3	12	7.36	12
7	PROJ					1.5		3	6	10.5	6.44	15
8	MC	\checkmark	\checkmark	\checkmark						(non credit)	-	-
	Total	17.5	20.5	21.5	19.5	20.5	24	24.5	15			
	AICTE semwise	17.5	20.5	23	22	21	22	18	15	163*	100	159*

CREDIT SUMMARY

LIST OF MANDATORY COURSES

S.NO	COURSE	COURSE TITLE	SEMESTER
	CODE		
1.	18ZMC105	Induction Program	Ι
2.	18ZMC205	Constitution of India	II
3.	18SMC305	Environmental Science and Engineering	III

S.NO	COURSE	COURSE TITLE	L	Т	Р	С
	CODE					
1.	18SPE001	Fundamentals of Image Processing	3	0	0	3
2.	18SPE002	Software Project Management	3	0	0	3
3.	18SPE003	Foundations of IT	3	0	0	3
4.	18SPE004	Data Mining	3	0	0	3
5.	18SPE005	C # and .NET Framework	3	0	0	3
6.	18SPE006	Green Computing	3	0	0	3
7.	18SPE007	Agile Software Development	3	0	0	3
8.	18SPE008	Software Defined Networks	3	0	0	3
9.	18SPE009	Social Networks Analysis	3	0	0	3
10.	18SPE010	Pattern Recognition	3	0	0	3
11.	18SPE011	Building Enterprise Applications	3	0	0	3
12.	18SPE012	Natural Language Processing	3	0	0	3
13.	18SPE013	Information Retrieval Techniques	3	0	0	3
14.	18SPE014	GPU Architecture and Programming	3	0	0	3
15.	18SPE015	Business Intelligence and its Applications	3	0	0	3
16.	18SPE016	Game Theory	2	1	0	3
17.	18SPE017	Open Source Systems	3	0	0	3
18.	18SPE018	Big Data and Analytics	2	2	0	3
19.	18SPE019	Machine Learning	2	2	0	3
20.	18SPE020	Geographical Information Systems	3	0	0	3
21.	18SPE021	Service Oriented Architecture	3	0	0	3
22.	18SPE022	Web Technology	3	0	0	3
23.	18SPE023	Computer Graphics and Multimedia	3	0	0	3
24.	18SPE024	Artificial Intelligence	3	0	0	3
25.	18SPE025	Parallel and Distributed Systems	3	0	0	3
26.	18SPE026	Essentials of Python Programming	2	2	0	3
27.	18SPE027	Graph Theory and its Applications.	2	1	0	3
28.	18SPE028	Fundamentals of Signal Processing	3	0	0	3
29.	18SPE029	Advances in Data Structures	3	0	0	3
30.	18SPE030	Operations Research	2	1	0	3

LIST OF PROFESSIONAL ELECTIVES

OPEN ELECTIVES

[Students from other departments can select open electives offered by CSE]

CSE:						
S.NO	COURSE	COURSE TITLE	L	Т	Р	С
	CODE					
1.	18SOE001	Programming in C++	3	0	0	3
2.	18SOE002	Java Programming	3	0	0	3
3.	18SOE003	Database Concepts	3	0	0	3
4.	18SOE004	Web Designing	3	0	0	3
5.	18SOE005	Android Application Development	3	0	0	3
6.	18SOE006	Computer Architecture	3	0	0	3
7.	18SOE007	Fundamentals of Computer Networks	3	0	0	3
8.	18SOE008	Linux and RTOS	3	0	0	3
9.	18SOE009	Introduction to Python	3	0	0	3
10.	18SOE010	Introduction to Data Analytics	3	0	0	3

MANDATORY INDUCTION PROGRAM (3 WEEKS DURATION)

- Physical activity
- Creative Arts
- Universal Human Values
- ➤ Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovations

1. INDUCTION PROGRAM

When new students enter an institution, they come with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose. Precious little is done by most of the institutions, except for an orientation program lasting a couple of days.

It is proposed a 3-week long induction program for the UG students entering the institution, right at the start. Normal classes start only after the induction program is over. Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The time during the Induction Program is also used to rectify some critical lacunas, for example, English background, for those students who have deficiency in it. The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

1.1 PHYSICAL ACTIVITY

This would involve a daily routine of physical activity with games and sports. It would start with all students coming to the field at 6 am for light physical exercise or yoga. There would also be games in the evening or at other suitable times according to the local climate. These would help develop team work. Each student should pick one game and learn it for three weeks. There could also be gardening or other suitably designed activity where labour yields fruits from nature.

1.2 CREATIVE ARTS

Every student would chose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it everyday for the duration of the program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, flow into engineering design later.

1.3 UNIVERSAL HUMAN VALUES

It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting staff in the hostel and department, be sensitive to others, etc. Need for character building has been underlined earlier. A module in Universal Human Values provides the base.

Methodology of teaching this content is extremely important. It must not be through dos and don'ts but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing. The role of group discussions, however, with clarity of thought of the teachers cannot be overemphasized. It is essential for giving exposure, guiding thoughts, and realizing values.

The teachers must come from all the departments rather than only one department like HSS or from outside of the Institute.

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It is to open thinking towards the self. Universal Human Values discussions could even continue for rest of the semester as a normal course, and not stop with the induction program.

Besides drawing the attention of the student to larger issues of life, it would build relationships between teachers and students which last for their entire 4-year stay and possibly beyond.

1.4 LITERARY

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

1.5 PROFICIENCY MODULES

This period can be used to overcome some critical lacunas that students might have, for example, English, computer familiarity etc. These should run like crash courses, so that when normal courses start after the induction program, the student has overcome the lacunas substantially. We hope that problems arising due to lack of English skills, wherein students start lagging behind or failing in several subjects, for no fault of theirs, would, hopefully, become a thing of the past.

1.6 LECTURES BY EMINENT PEOPLE

This period can be utilized for lectures by eminent people, say, once a week. It would give the students exposure to people who are socially active or in public life.

1.7 VISITS TO LOCAL AREA

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the underprivileged.

1.8 FAMILIARIZATION TO DEPT./ BRANCH & INNOVATIONS

The students should be told about different method of study compared to coaching. They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other faculties.

2. SCHEDULE

The activities during the Induction Program would have an Initial Phase, a Regular Phase and a Closing Phase. The Initial and Closing Phases would be two days each.

2.1 INITIAL PHASE

Time	Activity
Day 0	Students arrive - Hostel allotment. (Preferably do pre allotment)
Whole day	
Day 1	
09:00 am - 03:00 pm	Academic registration
04:30 pm - 06:00 pm	Orientation
Day 2	
09:00 am - 10:00 am	Diagnostic test (for English etc.)
10:15 am - 12:25 pm	Visit to respective depts.
12:30 pm - 01:55 pm	Lunch
02:00 pm - 02:55 pm	Director's address
03:00 pm - 05:00 pm	Interaction with parents
03:30 pm - 05:00 pm	Mentor-mentee groups - Introduction within group
	(Same as Universal Human Values groups)

2.2 REGULAR PHASE

After two days is the start of the Regular Phase of induction. With this phase there would be regular program to be followed every day.

2.2.1 DAILY SCHEDULE

Some of the activities are on a daily basis, while some others are at specified periods within the Induction Program. We first show a typical daily timetable.

Session	Time	Activity	Remarks
	Day 3 onwards	Wake up call	
	06:00 am		
Ι	06:30 am - 07:10 am	Physical activity (mild exercise /	
		yoga)	
II	09:00 am - 10:55 am	Creative Arts / Universal Human	Half the Groups
		Values	do Creative Arts
III	11:00 am - 12:55 pm	Universal Human Values / Creative	Complementary
		Arts	Alternate
	01:00 pm - 02:25 pm	Lunch	
IV	02:30 pm - 03:55 pm	Afternoon Session	See below
V	04:00 pm - 05:00 pm	Afternoon Session	See below
	05:00 pm - 05:25 pm	Break / light tea	
VI	05:30 pm - 06:45 pm	Games / Special Lectures	
	06:50 pm - 08:25 pm	Rest and Dinner	

VII	08:30 pm - 09:25 pm	Informal interactions (in hostels)	
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Sundays are off. Saturdays have the same schedule as above or have outings.

2.2.2 AFTERNOON ACTIVITIES (NON-DAILY)

The following five activities are scheduled at different times of the Induction Program, and are not held daily for everyone:

- 1. Familiarization to Dept./Branch & Innovations
- 2. Visits to Local Area
- 3. Lectures by Eminent People
- 4. Literary
- 5. Proficiency Modules

Here is the approximate activity schedule for the afternoons (may be changed to suit local needs):

Activity	Session	Remarks
Familiarization with	IV	For 3 days (Day 3 to 5)
Dept/Branch & Innovations		
Visits to Local Area	IV, V and	For 3 days - interspersed (e.g., 3
	VI	Saturdays)
Lectures by Eminent People	IV	As scheduled - 3-5 lectures
Literary (Play / Book Reading /	IV	For 3-5 days
Lecture)		
Proficiency Modules	V	Daily, but only for those who need it

2.3 CLOSING PHASE

Time	Activity
Last But One Day	Discussions and finalization of presentation within each group
08:30 am - 12 noon	
02:00 am - 05:00 pm	Presentation by each group in front of 4 other groups besides their
	own (about 100 students)
Last Day	Examinations (if any). May be expanded to last 2 days, in case
Whole day	needed

2.4 FOLLOW UP AFTER CLOSURE

A question comes up as to what would be the follow up program after the formal 3weekInduction Program is over? The groups which are formed should function as mentor-mentee network. A student should feel free to approach his faculty mentor or the student guide, when facing any kind of problem, whether academic or financial or psychological etc. (For every 10 undergraduate first year students, there would be a senior student as a student guide, and for every 20 students, there would be a faculty mentor.) Such a group should remain for the entire 4-5 year duration of the stay of the student. Therefore, it would be good to have groups with the students as well as teachers from the same department/discipline. Here we list some important suggestions which have come up and which have been experimented with.

2.4.1 FOLLOW UP AFTER CLOSURE - SAME SEMESTER

It is suggested that the groups meet with their faculty mentors once a month, within the semester after the 3-week Induction Program is over. This should be a scheduled meeting shown in the timetable. (The groups are of course free to meet together on their own more often, for the student groups to be invited to their faculty mentor's home for dinner or tea, nature walk, etc.)

2.4.2 FOLLOW UP - SUBSEQUENT SEMESTERS

It is extremely important that continuity be maintained in subsequent semesters. It is suggested that at the start of the subsequent semesters (upto fourth semester), three days be set aside for three full days of activities related to follow up to Induction Program. The students are shown inspiring films, do collective art work, and group discussions be conducted. Subsequently, the groups should meet at least once a month.

SEMESTER I

	LS101	ENGINEERING CHEMISTRY L	Τ	Р	(
		3	1	0	4
OBJEC	CTIVES:				1
•	To make stu	udents conversant with water parameters, boilers, need for w	vater		
	treatment an	nd its merits and demerits.			
٠	Students ou	ight to be aware of fundamental principles behind different			
	electrochem	nical reactions, corrosion of materials and methods to preven	nt cor	rosio	on.
•	To learn the	e chemistry behind polymers, synthesis, merits, demerits and	l its		
	applications	s in various field.			
•	To acquire	basic knowledge in renewable, non renewable and alternate	energ	gy	
	resources an	nd the chemical reactions involved in cell, batteries and its a	pplic	atior	ıs.
•	To learn the	e working principle of various spectroscopy and its application	ons.	То	
	acquire basi	ic knowledge in Nano materials, synthesis, properties and us	ses.		
UNIT I	WAT	TER TECHNOLOGY		9	+.
Character	ristics – alka	alinity and its significance – hardness (problems) - types an	d est	imat	io
by EDTA	A method –	specifications of drinking water (BIS and WHO standard	s) –	pota	bl
water tre	atment – bo	iler feed water - requirements - disadvantages of using h	ard v	vatei	i
boilers (S	Scales & Slu	udge, Boiler corrosion, Priming & Foaming, Caustic embr	rittle	ment)
water trea	atment – Inte	ernal treatment – external treatment – zeolite method - Demi	neral	iztio	n
process -	desalination	n – reverse osmosis.			
UNIT I	I ELE	CTROCHEMISTRY AND CORROSION		9	+.
Electroc	hemistry: E	Electrochemical cells – reversible and irreversible cells	—	EMF	7
measurer					
measurer	nent of EMI	F – single electrode potential – Nernst equation (Problems)) – re	efere	nc
electrode	nent of EMI – standard	 F – single electrode potential – Nernst equation (Problems) hydrogen electrode and calomel electrode – ion selective) – re elec	efere ctrod	nc e
electrode glass elec	nent of EMI – standard strode and m	F – single electrode potential – Nernst equation (Problems) hydrogen electrode and calomel electrode – ion selective easurement of pH – electrochemical series and its application) — re elec ons.	efere ctrod	nc e
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electrode glass elec Corrosio electroch	nent of EMH – standard ctrode and m on: Corrosic emical corro	F – single electrode potential – Nernst equation (Problems) hydrogen electrode and calomel electrode – ion selective leasurement of pH – electrochemical series and its applicatio on – Pilling Bedworth rule - dry corrosion and its m osion and its mechanism – types (galvanic, pitting, different) – re elec ns. necha ial ae	efere ctrod anisn eratio	nc e n
electrode glass elec Corrosio electroch – factors	nent of EMF – standard ctrode and m on: Corrosic emical corro influencing	F – single electrode potential – Nernst equation (Problems) hydrogen electrode and calomel electrode – ion selective easurement of pH – electrochemical series and its application on – Pilling Bedworth rule - dry corrosion and its mosion and its mechanism – types (galvanic, pitting, different g corrosion – corrosion control methods – sacrificial anot) – re elec ns. necha ial ae le m	efere etrod misn eratio ethoo	nc e n on d
electrode glass elec Corrosio electroch – factors impressed	nent of EMF – standard ctrode and m on: Corrosic emical corro influencing d current me	F – single electrode potential – Nernst equation (Problems) hydrogen electrode and calomel electrode – ion selective easurement of pH – electrochemical series and its application on – Pilling Bedworth rule - dry corrosion and its mosion and its mechanism – types (galvanic, pitting, different g corrosion – corrosion control methods – sacrificial anote ethod – corrosion inhibitors – protective coatings – paints –) – re elecons. necha ial ae le m cons	efere etrod mism eratic ethoo titue	nc e n on d nt
electrode glass elec Corrosio electroch – factors impresse – functio	nent of EMF – standard ctrode and m on: Corrosic emical corro influencing d current me ns – metallic	F – single electrode potential – Nernst equation (Problems) hydrogen electrode and calomel electrode – ion selective easurement of pH – electrochemical series and its applicatio on – Pilling Bedworth rule - dry corrosion and its m osion and its mechanism – types (galvanic, pitting, different g corrosion – corrosion control methods – sacrificial anot ethod – corrosion inhibitors – protective coatings – paints – c coatings – electroplating (Cu) and electro less plating (Ni).) – re elec ns. necha ial ae le m cons	efere ctrod unisn eratio ethoo titue	nc e n on d nt
electrode glass elec Corrosio electroch – factors impresse – functio UNIT I	nent of EMF – standard ctrode and m on: Corrosic emical corro influencing d current me ns – metallic II POL	F – single electrode potential – Nernst equation (Problems) hydrogen electrode and calomel electrode – ion selective easurement of pH – electrochemical series and its application on – Pilling Bedworth rule - dry corrosion and its mosion and its mechanism – types (galvanic, pitting, different g corrosion – corrosion control methods – sacrificial anot ethod – corrosion inhibitors – protective coatings – paints – c coatings – electroplating (Cu) and electro less plating (Ni). LYMERS AND COMPOSITES) – re elec ns. necha ial ac le m cons	efere etrod anisn eratic ethoo titue 9	nc e n d nt +
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electrode glass elec Corrosio electroch – factors impressed – functio UNIT I Polymer radical) – uses of f rubber – v devices – and thei	nent of EMH – standard ctrode and m on: Corrosic emical corro influencing d current me ns – metallic II POL s: Definitio zation – ty - plastics – t individual p vulcanizatior - conducting r difference	F – single electrode potential – Nernst equation (Problems) hydrogen electrode and calomel electrode – ion selective easurement of pH – electrochemical series and its application on – Pilling Bedworth rule - dry corrosion and its mechanism – types (galvanic, pitting, different posion and its mechanism – types (galvanic, pitting, different g corrosion – corrosion control methods – sacrificial anot ethod – corrosion inhibitors – protective coatings – paints – coatings – electroplating (Cu) and electro less plating (Ni). LYMERS AND COMPOSITES on – classification – functionality – polymerization – ropes (addition, condensation, copolymerization) – mech thermoplastics and thermosetting plastics – preparation, pr oolymers (PVC, TEFLON, Nylon-6,6, Nylon-6, PET, epon n of rubber – applications - Advanced polymeric materials are g and semiconducting polymers – liquid crystal properties – e from polymers. Composites: definition – types poly) – re electrons. necha ial ad le m cons cons de m cons de m cons de m cons de m	efere trod unisn eratic ethoo titue gree m (f ties a resin ectro drim ma	nc e n n n d +
electrode glass elec Corrosio electroch – factors impresse – functio UNIT I Polymer radical) – uses of rubber – v devices – and thei composit	nent of EMF – standard ctrode and m on: Corrosic emical corro influencing d current me ns – metallic II POL s: Definition zation – ty – plastics – t individual p vulcanization – conducting r difference	F – single electrode potential – Nernst equation (Problems) hydrogen electrode and calomel electrode – ion selective easurement of pH – electrochemical series and its applicatio on – Pilling Bedworth rule - dry corrosion and its m osion and its mechanism – types (galvanic, pitting, different g corrosion – corrosion control methods – sacrificial anoc ethod – corrosion inhibitors – protective coatings – paints – e coatings – electroplating (Cu) and electro less plating (Ni). ZYMERS AND COMPOSITES on – classification – functionality – polymerization – rpes (addition, condensation, copolymerization) – mech thermoplastics and thermosetting plastics – preparation, pr olymers (PVC, TEFLON, Nylon-6,6, Nylon-6, PET, epo n of rubber – applications - Advanced polymeric materials and g and semiconducting polymers – liquid crystal properties – e from polymers. Composites: definition – types poly einforced Polymers – applications – advanced composite materials) – re electors. necha ial ad le m cons de m cons de anisi roper oxy m nd elector den vmer ateria	efere trod unisn eratic ethoo titue gree m (f ties a resin ectro drim ls –	nc e n nt +. c re an) ni en tri

 UNIT IV
 ENERGY SOURCES AND STORAGE DEVICES

9+3

Nucl	ear en	ergy -	- fissio	on fusi	on rea	ctions	s – ligł	nt wate	er nuc	lear re	actor	for po	wer ge	enerati	ion –
breed	ler rea	actor -	– sola	r ener	gy co	nversi	on –	solar o	cells -	- wind	ener	gy – ł	oatterie	es: alk	caline
batter	ries –	lead -	-acid,	Ni-Cd	l, and	Li-ior	h batte	ries –	fuel c	ells –	princi	iples a	nd app	plicati	ons –
advar	ntages	and c	lisadv	antage	s.										
UNI	TV	A	ANA	LYT	ICAI	TE	CHN	IOU	ES A	ND				9	9+3
	-	I	NAN	OMA	TER	RIAL	S	C -							
Spec	trosco	opy: E	Electro	magne	etic sp	ectrur	n - Fu	ndame	entals	of spec	ctrosc	opy –	Instru	menta	tion,
work	ing p	rincip	le and	l appli	cation	ns of	UV-V	isible	spect	rophot	omete	er. Ato	omic A	Absorl	bance
Spect	tropho	otomet	ter. Fl	ame pl	hotom	eter.			1	1		,			
Nano	Nanomaterials: Introduction to nanotechnology in electronics - nanomaterials – fullerernes														
carbo	on na	notube		nanow	vires -	- Eleo	etronic	es and	1 mec	hanica	al pro	pertie	s - sv	vnthes	sis of
nanomaterials – topdown and bottomup approach – applications of nanomaterials in															
electi	ronic	device	s (Se	micon	ductor	s LE	D & (DI ED) – el	ectron	ics an	d tele	comm	unicat	ion –
electronic devices (Semiconductors, LED & OLED) – electronics and telecommunication –															
medicines.															
COI			TCC		2						1	UIA		IEN	UD5
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	ne er		the c	Jadas	e stuc	ients	snou	lla De				40.0md	40.001		
1.	App	ny the	know	blome	of bas	ac scie	ence ir	1 ident	irying	, to 10	rmula	te and	to sol	ve the	>
2	Δna	lyze y	ig più vater l	orne r		ms fac	red in	hoiler	s need	d for u	vater t	reatm	ent and	l vario	2016
4.	met	hods a	and tec	chniau	es for	treatir	ng har	d wate	s, need er.	101 w		icatiin			Jus
3.	Und	lerstan	d poly	vmeriz	ation	reaction	ons an	d elec	troche	mical	reacti	ons an	d its		
	appl	licatio	ns.												
4.	Acq	uire K	Inowl	edge a	bout e	nergy	conve	ersion	and cl	nemica	al reac	tion ta	ıking p	place i	n
	nuc	lear, so	olar, v	vind er	nergy,	Batte	ries, fu	iel cel	ls and	its ap	plicati	ions			
5.	Obt	ain in-	depth	know	ledge	on vai	rious r	anom	aterial	s and	its app	plicati	ons in	electr	onic
		ices. S	tuden	ts get	Dasic H	cnowl	eage c	on adv	anced	analyt	ical te	echniq	ues.		
CO	URS	E AR	TIC	ULA		N IVLA	TRI	X:							
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	P01	P01	P01	PSO	PSO	PSO
CO1	3					1	1			U	1	2	1	2	3
	Ŭ												Ŭ		
CO2		2	2			1	1						3	1	
CO3	2	1											3	2	
CO4	2	1				2							3	1	
CO5	3					2	2						1		
(1-Lo	w, 2- N	Ioderat	e, 3-Hi	gh)											
TEX	T R	OOK	S.												
1	Vai	ram S	Kalv	/ani P	and Si	uba Ra	amesh	."Eno	ineeri	ng Ch	emist	rv" V	Vilev I	ndia	
	PvtI	_tdN	ew De	elhi., 2	011			., בווע	,			- j •, •			
2	Dar	a S.S,I	Umare	eS.S."I	Engine	eering	Chem	nistry"	, S. Cl	nand &	z Con	npany	Ltd., N	New D	elhi ,
	201	0			-	0		•				- •	-		

REF	ERENCES:	
1.	Pahari A and C	hauhan B., "Engineering Chemistry"., Firewall Media., New Delhi.,
	2010.	
2.	Rao, C. N. R.; G	Govindaraj, A. "Nanotubes and Nanowires" United Kingdom: Royal
	Society of Chem	istry, 2005
3.	Advanced Polyn	neric Materials: From Macro- to Nano-Length Scales edited by Sabu
	Thomas, Nandal	kumar Kalarikkal, Maciej Jaroszewski, Josmine P. Jose; Apple
	Academic press,	Canada, 2016
4.	Jain and jain , 1	6 th editin, "Engineering Chemistry" Dhanpat Rqai Publishing Co.
5.	Sivasankar B, "	Engineering Chemistry", Tata Mc Graw-Hill Publishing Company
	Ltd, New Delhi,	2008.

18ZBS1	02 ENGINEERING MATHEMATICS - I	L	Т	Р	С							
		3	1	0	4							
OBJEC	TIVES:											
•	Matrix algebra and techniques and using them in engineering	app	licat	ions.								
•	The concept of infinite series and their convergence so that th with limitations of using infinite series approximations for sol mathematical modeling.	ey v lutio	vill t ns a	be fai rising	niliar g in							
•	Differential and integral calculus and their applications in variapplications.	ious	eng	ginee	ring							
UNIT I	MATRICES			9+3								
Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of eigenvalues and eigenvectors – Statement and applications of Cayley-Hamilton Theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.												
UNIT I	SEQUENCES AND SERIES				9+3							
Sequence – Tests or series – L	s: Definition and examples – Series: Types and Convergence – Serie convergence: Comparison test, Integral test and D'Alembert's ratio eibnitz's test – Series of positive and negative terms – Absolute and	es of tes cor	f pos t – iditio	sitive Altei onal	terms							
	I APPLICATIONS OF DIFFERENTIAL CALCUI	JIS			9+3							
Curvature	in Cartesian co-ordinates – Centre and radius of curvature – Circle	of c	urva	ture	-							
Evolutes	- Envelopes - Evolute as envelope of normals.											
UNIT I	FUNCTIONS OF SEVERAL VARIABLES				9+3							
Li functions and minin	mits and Continuity – Partial derivatives – Total derivative – Differ – Jacobian and properties – Taylor's series for functions of two vari- na of functions of two variables – Lagrange's method of undetermin	entia iable ned 1	ation es – 1 nult	i of i Maxi ipliei	mplicit ima :s.							
UNIT V	MULTIPLE INTEGRALS				9+3							
Double in enclosed Triple int	tegrals in cartesian and polar coordinates – Change of order of by plane curves – Change of variables in double integrals – Area o egrals – Volume of Solids.	inte f a c	egrat curve	ion - ed su	– Area rface -							
	TOTAL : 60 PER	ΙΟΙ	DS									
OUTCO	MES: On completion of this course, students will be able to)										
1.	Solve problems on matrices and to apply concepts of matrix applicable in the field of engineering.	x the	eory	whe	never							
1. 2.	Solve problems on matrices and to apply concepts of matrix applicable in the field of engineering. Solve problems using convergence tests on sequences and series ar engineering field appropriately.	x the	eory	whe	never em in							
1. 2. 3.	Solve problems on matrices and to apply concepts of matrix applicable in the field of engineering. Solve problems using convergence tests on sequences and series ar engineering field appropriately. Solve problems on differential and integral calculus and will be exp applications in engineering.	x the	eory app d to	whe ly th their	never em in							

COU	IRSE	ARTI	CULA	ATION	N MA'	FRIX :	:								
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	P01	P01	P01	PSO	PSO	PSO
										0	1	2	1	2	3
C01	3	1	1	2									3	1	
CO2	2	2	1	1									2	2	1
CO3	3	2	1				1						3	2	
(L- Low, M- Moderate, H-High)															
TEXT BOOKS:															
Bali N. P and Manish Goyal, "A Text book of Engineering Mathematics", Eighth															
1	1. Edition, Laxmi Publications Pvt Ltd., 2011.														
2	Grewal. B.S, "Higher Engineering Mathematics", 41 st Edition, Khanna														
	•	Publi	cation	s, Dell	ni, 201	1.									
REF	FERI	ENCE	ES:												
1.		Dass,	H.K.,	and Er	r. Rajn	ish Ve	rma, ʻ	<i>'Highe</i>	er Eng	ineerii	ng Ma	thema	tics",		
		S. Che	ind Pr	ivate L	.td., 20)11.									
2.		Glyn.	James,	"Adv	anced	Moder	rn Eng	ineeri	ng Ma	thema	tics",	3rd Ea	lition,	Pears	on
		Educa	tion, 2	2012.											
3.		Peter	V. Oʻl	Veil, "I	Advan	ced Er	ngineer	ring M	lathem	natics"	', 7th E	Edition	, Ceng	gage	
		learni	ng, 20	12.											
4.		Rama	na B.V	7, "Hig	gher Ei	nginee	ring M	1athen	natics'	", Tata	ı McGi	raw H	ill Pub	lishing	g
		Comp	any, N	lew De	elhi, 20	008.									
5.		Sivarc	ıma K	rishna	Das P	and .	Rukma	ingadi	ichari	E., "E	Ingine	ering l	Mather	natics	",
		Volun	ie I, Se	econd I	Edition	ı, PEA	RSON	l Publi	ishing,	2011.					

18ZES	103	B	BAS	SIC	ELI	EC	TF	RIC	CA	٩L	E	2N(GI	[N]	EF	R	ING	ſ	L	Т	P		С
																			2	1	0		3
OBJE	CTIV	'ES:																					
•	To ir	ntroduce	ce D	C and	d AC	C cii	ircui	its a	ana	aly	ysis	5											
•	To u	ndersta	and t	the co	once	epts	of t	tran	nsf	fori	me	rs a	and	l El	lect	trica	al m	achi	nes				
٠	To st	udy ab	oout	the E	Elect	trica	al in	nstal	ılla	atic	ons												
UNIT I DC CIRCUITS													9										
Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws, analysis of simple circuits with DC excitation, star delta transformation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.																							
UNIT I	[AC C	CIR	CUI	TS																		9
Represent power, rea circuits co Three-pha	Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor. Time domain Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections.																						
UNIT I	Ι	TRA	NS]	FOR	RMI	ER	S																9
Magnetic in transfor connectio	mater rmers, ns.	ials, BI regula	H clation	naract	teris effic	stics cien	s, id ncy.	leal . Au	l an uto	nd 5-tr	pra ran	acti sfo	ical orm	l tra	ans anc	fori 1 th	mer, ree-j	equ phas	ivale e trai	nt ci Isfor	rcui mei	.t,]	losses
UNIT I	V	ELE(CT	RIC	AL	, M	[A (CH	IIN	NE	ES												9
Generatio motor, Si speed con speed cha generators	n of ro gnifica trol o tracter s[Elen	otating ance of f induc istic an nentary	g mag of tor- ction nd s y An	gnetic rque-s mot speed alysis	c fiel slip cor. S con s on	elds, cha Sing ntrol ly]	, Co arac gle- l of RT	onst cteri -pha f dc	tru isti ase c n	icti tic. e ir mo	ion . Lo ndu otor	and oss acti 2. C	d v cc lon Con	vor omj ma stru	kir por oto uct	ng o nent r. C ion T R	f a t s an Cons and	hree d ef truct wo	-phas ficier ion, rking	e in ncy, worl of	duc star king syne	tio rtir ;, t chi	n ng and orque- ronous
UNIT V	r	INST	ΓΑΙ		TIC	DNS	S		NO	5 E		D				1 N	IC.	AL					9
DC-DC b source inv Compone and Cable calculatio	uck ar verters nts of es, Ear ns for	nd boos ; sinuso LT Sw thing. 7 energy S: A	st co soida vitch Typ y con	onvert al moo agear: es of nsum e end	ters, dula : Sw Batt ption	, dut ation vitch terie on, p this	ty ra n. h Fu es, []] pow	ratio use ¹ Imp ver f	$\frac{1}{1}$	nit rta ctor	t (S ant (or in	1. S FU Cha npr	Sing D, I ara rov wi	gle MC acte rem	-ph CB, erist ten	EL tics t an e to	and CB, for d ba T (thre MC Batt ttery	2^{cB}	ase Typ Ele <u>kup</u> 45	volt es o mer	age f V nta: RI	e Wires ry IODS

1.		Ar	Analyze the DC circuits using various theorems.													
2.		Ar	Analyze the AC circuits in time domain.													
3.		Ar	nalyze	the pe	erform	ance c	of the t	ransfo	rmer.							
4.		Ur	ndersta	and the	e cons	tructio	on and	worki	ng of I	DC and	d AC 1	notors	5.			
5.		Ur ins	ndersta stallati	and the	e Powe	er Con	verter	s and t	he cor	npone	nts of	low-v	oltage	electri	cal	
CO	UR	SE	AR	FICU	JLAT	ION	MA	ſRIX	•							
	PC	01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3		2	1	1			1						3	2	1
CO2	3		2	1	2			1						3	2	1
CO3	3															
CO4	3		2 1 2 1 3 2													
CO5	3		1	1				1						3		
(1-Lov	w, 2	- Mo	oderate	, 3-Higl	n)	L		L								
TEX	КТ	BC	OOK	S:												
1.		D. 20	Р. Ко 10.	othari a	and I	J. Nag	rath, "	Basic	Electri	ical Er	nginee	ring",	Tata N	/lcGrav	w Hill,	
2.		D.	C. Kı	ulshres	shtha,	"Basic	Elect	rical E	ngine	ering",	, McG	raw H	ill, 200)9.		
REF	FEI	RE	RENCES:													
1.		Е.	E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.													
2.		V.	D. To	ro, "E	Electrio	cal En	gineer	ing Fu	ındam	entals	", Pre	ntice I	Hall In	dia, 19	989.	
3.		L. 20	S. Bol 11.	brow,	"Fund	lament	tals of	Electr	ical E	nginee	ering",	, Oxfoi	rd Uni	versity	Press	,
4.		V.I Ca	K.Mel mpan	nta 19,2012	and 2	Rohi	tMehte	a"Bas	ic I	Electri	cal	Engin	eering	g"S.Ch	and	and
5.		Mi	ittle ar	nd Mit	tal "B	asic E	lectric	al Eng	gineeri	ng" T	ata M	cgraw	Hill E	ducati	ion,200)5

18ZES104	ENGINEERING GRAPHICS AND DESIGN	L	T	Р	С
		1	0	4	3

OBJECTIVES:

•	This course aims to introduce the concept of graphic communication, develop the drawing skills for communicating concepts, ideas and designs of engineering products and to expose them to existing national standards related to technical drawings
•	To draw the projection of simple solids like prisms, pyramids, cylinder etc.
•	To draw the development of surfaces to estimate the sheet metal requirement and to prepare sectional views of solids.
•	To develop skills in three-dimensional visualization of engineering components and to draw isometric views of simple solids.

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications – use of drafting instruments – BIS / ISO conventions and specifications – size, layout and folding of drawing sheets – lettering and dimensioning.

UNIT I

PLANE CURVES AND FREE-HAND SKETCHING

6+9

Basic geometrical constructions, curves used in engineering. Conics – construction of ellipse, parabola and hyperbola by eccentricity method – drawing of tangents and normal to the above curves. Visualization concepts and free hand sketching: visualization principles –representation of three dimensional objects – layout of views- freehand sketching of multiple views from pictorial views of objects.

UNIT IIPROJECTION OF POINTS, LINES AND PLANE6+9SURFACES

Orthographic projection – Principles-principal planes - First angle projection - Projection of points - Projection of straight lines inclined to both the principal planes - determination of true lengths and true inclinations by rotating line method - traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS

6+9

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids, when the axis is inclined to both the principal planes by rotating object method.

UNIT IVPROJECTION OF SECTIONED SOLIDS AND
DEVELOPMENT OF SURFACES6+9

Sectioning of prisms, pyramids, cylinders and cones in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – prisms,

pyramids cylinders and cones.

UNIT V ISOMETRIC PROJECTION AND OVERVIEW OF COMPUTER GRAPHICS

Principles of isometric projection – isometric scale –isometric projections of simple solids and truncated solids - prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions – Introduction to CAD - The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD- (CAD – evaluation during CA only)

TOTAL: 75 PERIODS

OUT	CO	MES:	Or	l comp	letion	of this	cours	e, stud	ents w	vill be	able to)			
1.		Famili freeha	Familiarize with the fundamentals, standards of Engineering graphics and Perform freehand sketching of multiple views of basic geometrical constructions.												
2.		Draw	Draw orthographic projections of points, lines and plane surfaces.												
3.		Draw	project	ions o	f solid	s, secti	oned s	solids a	and de	velop	nent o	f surfa	ces.		
4.		Visual	ize and	d draw	isome	etric vi	ews of	simpl	e solic	ls.					
5.		Appre	ciate th	ne use	of con	puters	s in dra	wing	and m	odellir	ng of s	imple	objects	8.	
COU	URS	SE AR	TICU	JLAT	ION	MAT	RIX	:							
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	1	1										3	1	
CO 2	3	2	1										3	2	
CO 3	3	2	1										3	2	
CO 4	3	2	2										1	1	1
CO 5	3	1	2										1	2	
(1-Lov	w, 2-	Moderate	e, 3-Hig	h)											
TEX	т во	OOKS:	OOKS:												
1.		Natrajan K. V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2016.													
2.		Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2016.								al (P)					
3.		Shah, M. B. and Rana B. C. "Engineering Drawing and Computer Graphics", Pearson Education, 2010								rson					

6+9

REFERE	ENCES:
1.	N S Parthasarathy and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
2.	Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas publications, Bangalore, 2014.
3.	Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2013.
4.	Luzzader, Warren J. and Duff John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production", Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005
5.	Bhatt N. D. and Panchal V. M., "Engineering Drawing", Charotar Publishing House, 53 rd Edition, 2014.

CHEMISTRY LABORATORY

L	Т	Р	С
0	0	3	1.5

OBJE	TIVES	:										V		1.0
•	To mak	e stud	ents co	nversa	nt wit	h hand	ls on w	ater n	aramet	er ana	lvsis			
•	To make	e the st	udent to	acqui	re prac	tical sk	ills in t	he corr	osion i	n meta	ls.			
•	То аса	aint t	he stud	ents w	ith the	deteri	ninatio	on of n	nolecu	lar we	ight of	a poly	mer by	V
	Ostwale	d visco	ometer.								-8		·	,
٠	To mak	the sthe	student	acqui	re prac	tical s	kills in	analy	tical ir	strum	ents.			
LIST (FEXP	ERIN	MENT	ΓS										
1. E	eterminati	ion of t	otal har	dness	of give	n watei	sample	e by EI	DTA m	ethod.				
2. D	eterminati	ion of a	alkalinit	y in gi	ven wa	ter sam	ple.	•						
3. D	eterminati	ion of 1	nolecul	ar weig	ght of p	olyviny	lalcoh	ol using	g Ostwa	ald vis	comete	r.		
4. C	onductom	etric ti	tration 1	using n	nixture	of acid	s and s	trong b	ase.					
5. E	eterminati	ion of s	strength	of in g	given h	ydroch	loric ac	id usin	g pH m	eter.				
6. E	stimation	of sodi	um pres	sent in	water u	sing fl	ame ph	otomet	er.					
7. E	stimation	of Zn p	oresent i	in efflu	ent usi	ng Ato	mic Ab	sorptio	n Spec	troscor	oy(AAS	5)		
8. C	orrosion e	xperin	nent – w	eight l	oss me	thod			ľ			,		
9. E	stimation	of iron	content	t of the	given	solutio	n using	potent	iomete	r meter				
10. E	stimation	of iron	content	t of the	given	sample	using S	Spectro	photo	meter (thiocya	nate m	ethod).	
List of 1. Flam 2. Weig 3. Cond 4. Ostw 5. Atom Common flask, po- each)	equipmen e photome hing bala uctivity n ald viscon ic Absorp on appara orcelain ti	nts for eter - 4 nce - 4 neter ; meter ; ption \$ atus: 1 iles, dr	a bate 5 nos 5 nos 9 otent - 30 no Spectro Pipette, copper,	ch of 3 iometo s photor , Buret reager	80 stud er; pH meter - te, Bu nt bottl	lents meter- · 1 no. rette st les, gla	- 9 nos cand, S uss rod	each. tandar , beakc	d volu er, was	metric h bott	flask, le, test	funnel tube (:	, Coni 30 nos	cal
COUR	SE OUT		MES								TOT	AL: 45	PERI	ODS
At the e	nd of the	cours	e stude	ents sk	non14 1	be abl	e to						- 210	
1. The che etc.	students mical ana	will b lysis c	e outfit	tted wi	ith han ty rela	ds-on ted pa	knowle ramete	edge in rs, cor	n the q rosion	ualitat studie	ive and es, heav	d quan vy met	titative al anal	ysis,
COUR	SE AR	IICU	LAT	ION]	MAT	RIX:								
PC	01 PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1	P01	P01	PSO	PSO2	PSO3
CO1 3	2	2			2	2				1	2	3	2	
(1-Low, 2	Moderate,	3-High	ı)		1	1	1	L	1		1	1		

REFERENCES:

1.	Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., "Vogel's Textbook of practical
	organic chemistry", LBS Singapore 1994.
2.	Jeffery G.H., Bassett J., Mendham J.and Denny vogel's R.C, "Text book of quantitative
	analysis chemical analysis", ELBS 5th Edn. Longman, Singapore publishers, Singapore, 1996.
3.	Kolthoff I.M., Sandell E.B. et al. "Quantitative chemical analysis", Mcmillan, Madras 1980.
4.	Daniel R. Palleros, "Experimental organic chemistry" John Wiley & Sons, Inc., New York
	2001.

BASIC ELECTRICAL ENGINEERING LABORATORY

													U	U	4		4
OBJECT	TIVES:																
•	To obtain th	he re	esponse	e of Ele	ectrical c	circui	iits.										
•	To obtain E	Elect	rical m	achine	s and tra	ansfo	ormer b	oasic c	chara	cteri	stics.						
•	To introduce basic power converters.																
LIST OF	EXPERI	ME	NTS	:													
1.	(a) Study of (b) Measure	f Ele reme	ectrical ent of v	basic s oltage,	safety pr current	recau t, Pov	utions. wer in 1	resistiv	ve lo	oads.							
2.	(a) Measurement of waveforms parameters using CRO(b) Identification and calculation of resistors, inductors and Capacitors values.																
3.	 a) Steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a Step input voltage using a storage oscilloscope. b) Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification. c) Observation of phase differences between current and voltage. 																
	d) Resonan	nce in	n R-L-	C circu	iits.	nt wo	wafarr	n Tron	ofor	mor	00.00	000111					
4.	(b) Load Te	Cest c	on Sing	gle phas	se Trans	sform	ner.	n fran	ISTOF	mer		oscino	Jscol	je.			
5.	Measureme	ent c	of three	e phase	power i	in a b	balance	ed thre	ee ph	ase c	circuit	s.					
6.	Demonstrat (a) DC mac (b)Inductio (c) synchro (d) Single-J	ation chine on m onou -phas	of cut- e (com achine s mach se indu	-out sec mutato (squirr nine (fic ction m	ctions of or-brush rel cage eld wing nachine.	of mac arrar e rotor ging - e.	chines ngeme or) – slip 1	nt) ring ar	rrang	geme	nt)						
7.	Torque Speed Characteristics of DC Shunt motor.																
8.	 (a)Synchronous speed of two and four-pole, three-phase induction motors. (b)Direction reversal by change of phase-sequence of connections. (c)Torque-Slip Characteristics of an induction motor. (d)Generator operation of an induction machine driven at super-synchronous speed. 																

 Demonstration of (a) dc-dc converters (b) dc-ac converters – PWM waveform (c) the use of dc-ac converter for speed control of an induction motor (d) Components of LT switchgear. 																	
											ТО	TAL	:45 P	ERIC	DDS		
OUI	CON	AES:	A	After the course, the student will be able to													
	1.		Ι	dentify	comme	on elec	trical c	ompor	nents a	nd their	r rating	gs					
	2.		N	Make electrical connections by wires of appropriate ratings.													
	3.		τ	Jndersta	and the	usage	of con	nmon e	lectric	al meas	suring	instrun	nents.				
	4.		τ	Understand the basic characteristics of transformers and electrical machines.													
	5.		Ţ	Understand the working of power electronic converters.													
COU	RSE	ART	ICU	LATI	ON M	IATR	IX:										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3		
CO1	3	2	1										3	2			
CO2	3	2	3										3	2			
CO3	3	2	1										2	1			
CO4	3	2	2										2	2	1		
CO5	O5 3 2 1 2 1 2 1									1							
(1-Low	, 2- Moo	derate, 3	3-High)	·												

SEMESTER II

18SLS201

ENGINEERING PHYSICS

L T P C 3 1 0 4

OBJECTIVES:

•	To develop knowledge on properties of solids									
•	To understand the properties of conducting and semiconducting materials									
•	To become proficient in magnetic and dielectric materials									
•	To apply principles of quantum physics in the engineering field									
•	To know about the fundamentals of LASER and fibre optics and its applications									

UNIT I PROPERTIES OF MATTER

9+3

Elasticity – Hooke's law – Stress – Types of Stresses – Strain- Types of Strain - Young's Modulus – Rigidity Modulus – Bulk Modulus –Poisson's ratio – Relationship between three elastic constants and Poisson's ratio – Torsional Pendulum – Factors affecting elasticity of materials - Bending moment of a Beam – Depression of cantilever (Theory and Experiment) – Determination of Young's modulus – Uniform and non-uniform bending (Theory and Experiment).

UNIT II

CONDUCTING AND SEMICONDUCTING MATERIALS

9+3

Conductors –Ohm's Law – Electrical conductivity – Relation between current density, drift velocity and mobility – Classical free electron theory of metals – Expression for electrical conductivity of a metal –Expression for thermal conductivity of a metal – Wiedemann – Franz law – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states.

Intrinsic semiconductor – Energy band diagram – Direct and indirect semiconductors – Carrier concentration in an intrinsic semiconductor (derivation) – Extrinsic semiconductors – n-type & p-type semiconductors (Qualitative) – Determination of Bandgap of semiconductors (Experiment)

UNIT III

MAGNETIC AND DIELECTRIC MATERIALS

9+3

Magnetism in materials – magnetic field and induction – magnetization – magnetic permeability and susceptibility – types of magnetic materials –microscopic classification of magnetic materials –Domain theory of ferromagnetism.

 $\label{eq:constraint} \begin{array}{l} \text{Dielectric materials: Polarization processes} - \text{dielectric loss} - \text{internal field} - \text{Clausius-Mosotti relation} - \text{dielectric breakdown} - \text{high-k dielectrics}. \end{array}$

UNIT IV

QUANTUM PHYSICS

9+3

Blackbody radiation – Wien's displacement law – Rayleigh-Jean's law - Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh-Jean's law – Matter waves – De-Broglie's Hypothesis – Properties of matter waves - Wave-particle duality – Wavefunction and its physical Significance – Schrodinger wave equation – Time-dependent and timeindependent – Application of Schrodinger wave equation: Particle in a 1 D box.

UNIT V LASER PHOTONICS AND FIBRE OPTICS

9+3

LASER – Interaction of light radiation with materials – Einstein's A and B coefficient derivation – Concept of LASER – Population inversion – Pumping action – Methods for pumping action – Characteristics of LASER – Principle, construction and working of Nd-YAG – Industrial and medical applications of lasers.

Structure of Optical Fibre – Guiding mechanism – Total internal reflection – Critical Angle – Conditions for total internal reflection – Principle and Propagation of light in Optical Fibres – Numerical aperture and acceptance angle – Types of optical fibres (Material, refractive index and mode) – their characteristics and applications.

TOTAL: 60 PERIODS

OU	ГС	ON	MES													
1.	1	To learn about three types of elastic moduli and able to calculate them for different materials														
2.	1	To learn about conducting and semiconducting materials and able to derive different parameters relevant to them														
3.	,	To learn about types of magnetic materials and their types and functional knowledge of dielectric materials														
4.	,	To understand the quantum nature of materials and apply fundamental principles of quantum physics to the engineering field														
5.	1	To understand the working principles of lasers and their types and also to know about fiber optics and mechanism of propagation of light through them.														
COURSE ARTICULATION MATRIX:																
	PO	1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3		2	1										3	1	
CO2	3		2	1										2	2	
CO3	3		2	1										2	1	
CO4	3		1	1	2									2	1	
CO5	3		1	1	2									3	1	
(1-Lov	w, 2-	Mo	oderate	, 3-Higl	h)	1	1	1	1	1	1		1	1	1	
TEXTBOOKS:																
1	•		P. M	ani, "E	Engine	ering	physic	s", Dh	anam	Public	ations	, 2017				
2.			G. Se	enthil]	Kumai	r, "Eng	gineeri	ng ph	ysics",	VRB	Publis	shers				

3.	A. Marikani, "Engineering Physics", PHI Learning Pvt., India 2009										
4.	Wahen M. A. "Solid state physics: Structure and properties of materials" Narosa publishing house, 2009										
REFERE	NCES:										
1.	<i>R. K. Gaur and S.C. Gupta, "Engineering physics", Dhanpat Rai publications, New Delhi 2003.</i>										
2.	<i>M. N. Avadhanulu and P. G. Kshirsagar, "A textbook of engineering physics", S. Chand and Company Ltd, New Delhi, 2005.</i>										
3.	K. Rajagopal, "Engineering Physics", PHI, New Delhi, 2011.										
4.	P. K. Palanisamy, "Engineering Physics", SCITECH Publication, 2011										
5.	M. Arumugam, "Engineering physics", Anuradha publishers										

18ZBS2	5202ENGINEERING MATHEMATICS - IILTPC													
	3 1													
OBJEC	OBJECTIVES:													
•	• Vector calculus and their uses in various field theoretic subjects.													
•	• Higher order and special type of linear differential equations and methods to find solutions.													
•	Laplace transforms and properties and their applications in er	gine	eerin	g.										
•	Construction of analytic functions and concepts of concepts of mapping, complex integration and series solutions	f co	nfor	mal										
UNIT I	I VECTOR CALCULUS													
Gradient,	Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields													
- Vector integration - Green's theorem in a plane, Gauss divergence theorem and Stokes'														
theorem (excluding proofs) – Simple applications involving cubes and rectangular														
	parallelopipeds.													
UNII II Ligher or	der linger differentiel equations with constant coefficients. Method	lof	uorio	tion	9+3									
narameter	s Cauchy's and Legendre's linear equations Simultaneous first.	i UI orde	valle r lin	uioii ear	01									
equations	with constant coefficients.	oruc	1 1111	car										
UNIT I	I LAPLACE TRANSFORMS				9+3									
Laplace transform – Sufficient condition for existence – Transform of elementary functions –														
Basic properties – Transforms of derivatives and integrals of functions - Derivatives and														
integrals of	of transforms - Transforms of unit step function and impulse funct	ions	- T	ransf	orm of									
periodic f	unctions. Inverse Laplace transform -Statement of Convolution th	eore	em –	- Init	ial and									
final value	e theorems – Solution of linear ODE of second order with constant	coef	ficie	nts u	ising									
Laplace tr	ansformation techniques.													
UNIT I	ANALYTIC FUNCTIONS				9+3									
Functions	of a complex variable - Analytic functions: Necessary conditions	– C	aucł	iy-Ri	lemann									
equations	and sufficient conditions (excluding proofs) – Harmonic and ortho	ogor	nal p	rope	rties of									
analytic fi	inction – Harmonic conjugate – Construction of analytic functions $\frac{1}{2}$	- Co	ontoi	mal										
	W = Z + K, KZ, 1/Z, Z, e and difficent transformation.				0 + 2									
	COMPLEX INTEGRATION			10	9+3									
integral f	integration – Statement and applications of Cauchy's integral the	oren	n an	a Ca Posi	duces									
Cauchy's	residue theorem – Evaluation of real definite integrals as contour ir	teat	s — valcia	rour	dues –									
circle and	semi-circle (excluding poles on the real axis).	1051	u15 c	lioui	a unit									
	TOTAL : 60 PER	IO	DS											
OUTCO	MES: On completion of this course, students will be able to)												
1.	Solve problems on vector calculus and to apply them in any other t	ïeld	theo	orv re	elated									
	subjects.			- , .										
2.	Solve differential equations and will be exposed to their application	ns ir	var	ious	fields									
	of engineering.													
3.	Solve problems on Laplace transforms and will be able to use L	apla	ce ti	ansf	orm in									
	finding solutions of differential and integral equations and	oth	er e	engin	eering									

		applications.													
4	•	Solve of	compl	ex inte	gratio	n prob	lems a	nd wil	l be ex	kposed	to var	rious a	pplica	tions c	of
		analyti	c func	tions a	ind coi	nforma	al map	ping ir	ı engir	neering	g .				
COU	COURSE ARTICULATION MATRIX:														
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	2	1									3	1	
CO2	3	2	2	1									2	1	1
CO3	3	2	2	1									2	1	1
CO4	3	2	2	1									2	1	
(1- Lo	(1- Low, 2- Moderate, 3-High)														
TEX	KT E	OOK	S:												
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2	2.	Grew Publi	al. I	B.S, ' 1s, Dell	'Highe hi, 201	r En 1.	gineer	ing N	Mather	matics	", 41	st]	Editior	n, Kh	anna
REF	FER	ENCE	ES:												
1.		Dass, S. Cha	H.K., and Pr	and Er ivate I	r. Rajn Ltd., 20	eish Ve 011.	erma, ʻ	'Highe	er Eng	ineerii	ng Ma	themai	tics",		
2.	•	Glyn . Educa	James ation, 2	, "Advi 2012.	anced	Moder	rn Eng	gineeri	ng Ma	thema	tics",	3rd Ec	lition,	Pears	on
3.	•	Peter learni	V. Oʻl ng, 20	Neil, ". 912.	Advan	ced Er	nginee	ring M	lathem	natics'	', 7th I	Edition	, Ceng	gage	
4.	•	Rama Comp	na B.V any, N	7, "Hig lew De	gher E elhi, 20	nginee)08.	ering N	1athen	natics	", Tata	ı McG	raw H	ill Pub	olishing	g
5.	•	Sivarc Volun	ama K 1e I, So	rishna econd I	Das F Edition	P. and I n, PEA	Rukma ARSON	ingada I Publi	ichari ishing,	E., "E 2011.	Engine	ering l	Mather	matics	",

18Z	ES2	03	PROGRAMMING IN C L T												C		
			3 (3		
OBJ	OBJECTIVES:																
	• Learn the organization of a digital computer and get exposed to the number																
		s	systems														
	•	• Learn to think logically and write pseudo code or draw flow charts for problems															
		and get exposed to the syntax of C.															
	•	1	Learn to	o use a	rrays,	strings	s, func	tions,	pointe	rs, stru	ictures	and u	nions	in C.	•		
UNI	ΤI		NTR	ODU	CTIC)N								8			
Gene	Generation and Classification of Computers- Basic Organization of a Computer –Number																
System – Binary – Decimal – Conversion – Problems. Need for logical analysis and thinking –																	
Algorithm –Pseudo code – Flow Chart.																	
UNI	UNIT II C PROGRAMMING BASICS 10																
Probl	Problem formulation – Problem Solving - Introduction to 'C' programming –fundamentals –																
structure of a 'C' program – compilation and linking processes – Constants, Variables – Data																	
Type	s - E	xpress	ions us	ing op	erators	5 in °C	´ – Ma	inaging	g Inpu	t and (Jutput	operat	10ns -	– Dec	cision		
	Making and Branching – Looping statements – solving simple scientific and statistical problems.																
UNI	UNIT IIIARRAYS AND STRINGS9																
Array	ys - 1	nitializ	ation -	- Decla	aration	– One	e dime	nsiona	and and	Two d	imens:	ional a	rrays.	Stri	ng-		
String	g ope		$\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$		$\frac{ays. 5}{10}$		progra	ms- so	orung-	searci	nng –	matrix	oper	ation	s.		
UNI			UNC		NS A	ND P	UIN	TERS				_			9		
Func	tion -	- defin	ition of	functi	$\log - I$	Declara	ation o	of func	tion –	Pass t	y valu	e - Pa	ss by	refer	ence –		
Recu	rsion	– Poli Problem	nters - I	Definit	10n – J	Initiali	zation	- Pon	nters a	rithme	$t_{1}c - F$	ointer	s and	array	/S-		
EXall			IIS. VTDT	CTU	DEC		TINIT								0		
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110 p	1000	sor an							тот		45 P	ERIC	DDS				
OU	ГСО	MES	•	On co	mplet	ion of	this co	ourse	studen	ts will	be ab	le to					
1		Know	'• the va	rious n	umbei	· svete	me and	their	conve	rsion		10 10					
2	•	Write	simple	nrogr	ams in	C Syste			conve	131011.							
3	•	Desig	nrogi	ams ha	ased or	n arras	/S										
4	•	Const	The program	ograms	using	functi	ions ar	nd poir	iters c	oncen	S						
5		Formu	late si	mple S	tructu	res and	1 Files	progr	am.	oneep							
COURSE ARTICULATION MATRIX:																	
	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	PSO	PSC	D PSO		
	_			_			_			0	1	2	1	2	3		
CO1	3	2	3	3	1								3	2	1		
CO2	3	2	3	3	1								3	2	1		
CO3	3	2	3	3	1								3	2	1		
CO4	3	2	3	3	1						1		3	1			

CO5	3	2	3	3	1						1		3	1	
(1-Lov	(1-Low, 2- Moderate, 3-High)														
TEX	KT B	OOK	S:												
1	•	Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.													
2	•	Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009.													
REF	REFERENCES:														
1.		Byron	S Go	ttfried,	"Prog	gramm	ing wi	ith C",	Schau	ım's C	Dutline	es, Seco	ond Ec	lition,	Tata
		McGr	aw-H	ill, 200	6.										
2.		Drom	ey R.C	G., "He	ow to S	Solve i	t by Co	ompute	er", Pe	earson	Educ	ation, .	Fourth	h Repr	int,
		2007.													
3.		Kerni	ghan,	B.Wan	d Ritc	hie,D.	М, "Т	he C P	Program	mming	g langi	uage",	Secon	d Edit	ion,
		Pears	on Ed	lucatio	n, 2000	5.									
4.		Yasha	want l	P. Kan	etkar.	"Let U	<i>Is C"</i> ,	BPB I	Publice	ations,	2011.				
5.		Herbe New D	rt Schi Delhi, 2	ildt, "C 2010.	The C	omplet	e Refer	ence",	Tata N	1cGrav	v Hill I	Publish	ing Co	mpany	,
18ZH	[S204		TECHNICAL ENGLISH	L	Т	Р	С								
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				2	0	0	2								
OBJEC	TIVE	S:			L										
•	To be	e ab	le to acquire vocabulary by way of reading skills.												
٠	To be struct	e ab ture	le to declare pointers of different types and use them in de	fining s	self- ref	eren	tial								
•	To be	e ab	le to create, read and write to and from simple text files.			-									
UNIT I		V	ocabulary Building			6									
1.1 The c 1.3 Acqua Synonym	oncept aintance s, antor	of e w nym	Word Formation 1.2 Root words from foreign languages ith prefixes and suffixes from foreign languages in English ns, and standard abbreviations	and the to form	eir use m deriv	in Er ative	iglish s.1.4								
UNIT I	I	B	asic Writing Skills				6								
2.1 Sente punctuati 2.6 Techr	nce Stru on 2.4 (niques f	uctu Crea for y	ares 2.2 Use of phrases and clauses in sentences 2.3 Impor- ating coherence 2.5 Organizing principles of paragraphs in writing precisely	tance of docum	f prope nents	r									
UNIT I	II	Id	entifying Common Errors in Writing				6								
3.1 Subje 3.4 Articl	ct-verb es 3.5 I	agı Prep	reement 3.2 Noun-pronoun agreement 3.3 Misplaced modi positions 3.6 Redundancies 3.7 Clichés	fiers											
UNIT I	V	Na	ature and Style of sensible Writing				6								
4.1 Descr 4.5 Writin	ibing 4 ng intro	.2 I oduc	Defining 4.3 Classifying 4.4 Providing examples or eviden- ction and conclusion	ce											
UNIT V	7	W	riting Practices				6								
			TOTAL: 30 PF	RIOI	DS										
OUTCO	OMES	5: A	At the end of the course, the students will be able to :												
1.	Acquit writing	re b g ar	pasic proficiency in English including reading and listening and speaking skills.	g compi	ehensi	on,									
2.	Partici expres	ipat ss th	e effectively in formal and informal conversations; introduce their opinions in English.	ice ther	nselves	and									
3.	Comp	reh	end conversations and deliver short talks in English.												
4.	Write	ess	ays and descriptions of any kind in English.												

5.		Prepare	report	s, grap	h prese	entation	n and T	Technic	al writ	ting.					
COU	JRS	E ART	[ICU]	LATI	ON N	IATF	RIX:								
	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1				1						3		3	1	2	
CO2				2						3		3	3	2	
CO3				1						3		3	3	2	
CO4				1						3		3	3	1	
CO5		1 3 3 1 Anderate 3-High)													
(1-Low	v, 2- N	Aoderate,	3-High)		•	•	•	•							
TEX	T B	OOKS	5:												
1.		William	i Zinss	er, " O	n Writ	ing We	ell", Ha	arper R	esourc	e Book	x, 2001				
2.		Liz Han	np-Lyc	ons and	Ben H	Ieasly,	"Stud	y Writi	ng", C	ambric	lge Un	iversit	y Press	, 2006.	
3.		Sanjay l	Kumar	and Pu	ıshpLa	.ta, "Co	ommur	nication	n Skills	s", Oxf	ord Ur	niversit	y Press	s. 2011	
REF	ER	ENCE	S:												
1.		Richard	ls, C. J.	ack, "I	nterch	ange S	tudent.	s", Boo	ok-2 N	ew Del	hi: CU	P, 201	5.		
2.		Bailey ,, 2011.	Stephe	n, "Ace	ademic	e Writin	ng: A H	Practic	al guia	le for si	tudents	s", Nev	v York.	Rutleo	dge,
3.		Seely, Jo	ohn, "	The O:	xford g	uide to	o writir	ng & Sj	peakin	g", Net	w York	, 1998.			
4.		Bhatia 1 Edition.	M.P, ".	4 Hand	dbook	of APP	PLIED	GRAM	'MAR'	', <u>M.</u> []	Publice	ations,	AGRA,	Sixth	

Objective:

• To provide understanding of basic concepts of Indian Constitution and various organs created by the constitution including their functions.

UNIT I INTRODUCTION

Constitution' Definition and Classification -Constitutional Organs - Indian Constitution: Sources and constitutional history, Salient features of Indian Constitution - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy Rule of Law - Separation of powers Constitution - Doctrine of Basic Structure.

UNIT II UNION GOVERNMENT & STATE GOVERNMENT AND THEIR ADMINISTRATION

4

4

4

3

Distribution of Powers between Center and States Structure of the Indian Union: Federalism, Centre-State -relationship, President: Role, power and position, PM andCouncil of ministers, Cabinet and Central Secretariat, LokSabha, RajyaSabha.

Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT III LOCAL ADMINISTRATION

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of ElectedRepresentative, CEO of Municipal Corporation, Pachayatiraj: Introduction, PRI: ZilaPachayat, Elected officials andtheir roles, CEO ZilaPachayat: Position and role, Blocklevel: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy Emergency Provisions

UNIT IV ELECTION COMMISSION

Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

TOTAL: 15 PERIODS

References:

1. V.N. Shukla, Constitution of India

2. M.P. Jain – Indian Constitutional Law.

- 3.H.M.Seervai : Constitution of India
- 4.D.D.Basu: Shorter Constitution of India
- 5.Kagzi : Indian Constitution
- 6.Pylee : The History of Indian Constitution

PHYSICS LABORATORY

L	Т	Р	С
0	0	3	1.5

OBJECTIVES

• To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids

LIST OF EXPERIMENTS : PHYSICS LABORATORY (ANY 5 EXPERIMENTS)

1.	Determination of rigidity modulus : Torsion Pendulum								
2.	Determination of Young's modulus by non-uniform bending	g method							
3.	(a) Determination of wave length and particle size using LA(b) Determination of acceptance angle in an optical fibre	SER							
4.	Determination of thermal conductivity of a bad conductor –	Lee's Disc method							
5.	Determination of velocity of sound and compressibility of flinterferometer	uid – Ultrasonic							
6.	Determination of wavelength of mercury spectrum – Spectrometer grating								
7.	Determination of band gap of a semiconductor								
		TOTAL: 45 PERIODS							
COURSI	E OUTCOME: After the course the students will be able t	0							
•	• Apply Principles of elasticity, optical and thermal properties for engineering applications.								
COURSE	E ARTICULATION MATRIX:								

	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3
CO1	3	2	2			2	2						3	2	3

18Z	ES20	7	PR	OGI	RAM	MIN	G IN	C LA	BOF	RATC	ORY	L	Τ	P	С
												0	0	4	2
OBJ	ЕСТ	IVE	S:												
	٠	B to	e fami	liar wi	th the	use of	Office	e softw	vare ar	nd pres	sentati	on and	visua	lizatio	on
	•	B	e fami	liar wi	th pro	gramn	ning in	C and	l basic	s of D	ecisio	n maki	ng, Lo	ooping	5
	٠	Le	earn to	use A	rrays, on and	string file or	s, func ganiza	ctions ation.	and im	pleme	nt the	concep	ots of		
LIS	ΓOF	EXE	PERI	MEN	TS:		6								
1 2 3 4 5 6 7 8 9 9 9 10 0U 1 1 2	Searce Prob. C Prob. C Prob. Sciere Solvi Solvi Prog. Prog. Prog. Prog. Prog. Prog.	ch, ger entatio lem fo ogram ntific p ile pro ing pro rams v rams v rams v ram us gram u MES oly goo	n and rmulat ming u probler gramn bblems vith us vith us vith Po sing Re sing st cod pro d imp	manip Visual tion, P using S n solv ning fo s using er defi- pinters ecursiv ructur on com gramn	bulate of ization roblen Simple ing usion or one String ined fu ve Fun es and upletion hing de	data us n – gra n Solv staten ng dec dimen g funct inctior ction. union n of th esign r	sing M uphs, c ing an- nents a cision sional tions ns – In us.	S offic harts, 1 d Flow and ex makin and tv cludes cludes <u>rse, stu</u> ds for <u>p</u>	ce/ Op 2D, 3I vcharts pressio g and vo dim Paran Paran	en Off ons loopin hension heter F	fice g. hal arr Passing e able elopm	ays. g IRIOI to ent.	DS		
3	Wri	te C n	rograr	ns. wh	ich in	volve o	decisio	n mak	ipplication	d arra	vs and	string	S.		
4	. Dev	velop r	program	ms usi	ng fun	ctions	and p	ointers	5.		<u>, - and</u>	8			
5	. Dev	velop p	orogra	ms usi	ng stru	ictures	and u	nions.							
COU	RSE	ARTI	CULA	OIT	N MA'	FRIX :	8							1	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	PSO	PSO	PSO
CO1	3	2	1	1						U	1	2	3	3	3
CO2	3	2	2	1							1		3	3	
CO3	3	2	2	1							2		2	1	
CO4	3	2	2	2							2		2	1	
CO5	3	2	2	2							2		3	1	
(L- Lo	w, M-	Modera	te, H-H	igh)											
REF	FERF	CNCE	CS:												
1.	He Co	rbert 1 mpan	Schildi v. New	t, "C - Delhi	The C	omple	ete Ref	erence	e", Tat	a McC	Fraw F	Iill Pu	blishi	ng	

18ZES208

WORKSHOP PRACTICES

L T P C 1 0 4 3

COURSE OBJECTIVES:

- To make various basic prototypes in the carpentry trade such as Lap joint, Lap Tee joint, Dove tail joint, Mortise & Tenon joint and Cross-Lap joint
- To make various welding joints such as Lap joint, Lap Tee joint, Edge joint, Butt joint and Corner joint.

LIST OF EXPERIMENTS:

- 1. Introduction to use of tools and equipment in Carpentry, Welding, Foundry and Sheet metal
- 2. Safety aspects in Welding, Carpentry and Foundry
- 3. Half lap Joint and Dovetail Joint in Carpentry
- 4. Welding of Lap joint, Butt joint and T-joint
- 5. Preparation of Sand mold for cube, conical bush, pipes and V pulley
- 6. Fabrication of parts like tray, frustum of cone and square box in sheet metal
- 7. Electrical wiring simple house wiring
- 8. Plumbing
- 9. CNC Machines demonstration and lecture on working principle.
- 10. Additive manufacturing demonstration and lecture on working principle.

TOTAL: 75 PERIODS

COU	IRSE	OUTO	COME	S:	On completion of this course, students will be able to										
1.		Use too	ols and	l equip	ment u	used in	Carpe	entry, V	Weldir	ng, Fot	indry a	and Sh	eet me	etal.	
2.		Make l joint	nalf lap	o joint	doveta	ail join	t in ca	rpentry	y and v	velded	lap jo	int, bu	tt join	t and T	_
3.		Prepare	e sand	mould	for cu	ıbe, co	nical t	oush, p	ipes ai	nd V p	ulley.				
4.		Fabrica	Fabricate parts like tray, frustum of cone and square box in sheet metal												
5.	5. Carry out minor works/repair related to electrical wiring and plumbing.														
CO	URS	E AR'	ΓICU	LAT	ION	MAT	RIX	•							
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	2												2	1	2
CO 2	2	1 2 1 2													
CO 3	2	1	2										2	2	2
CO 4	2	1	2										3	2	2

CO5	2	2	2		1				3	2	2
(1-Lo	w, 2- M	oderate	, 3-Higł	n)							

18ZHS2	209	COMMUNICATION ENGLISH LAB	L	Т	Р	С					
			0	0	2	1					
OBJEC	TIVES:										
•	To deve speaking	lop their communicative competency in English with spec g and listening.	ific refe	erence	to the	eir					
•	To enha	nce their ability to communicate effectively in interviews, lay life communication.	Group	Discus	sion	and					
•	To com	prehend a different types of accent and use them in their co	ommun	ication							
UNIT I	PF	RONUNCIATTION PRACTICE				6					
Verbal A Various l	bility, Arti ectures	culation of sounds- Intonation-Stress and Rhythm-Conve	rsation	practice	e-list	ening					
UNIT I	I CO	OMMUNICATION AT WORKPLACE				6					
Creative abstracts-	Image: Non-Arrow of the second sec										
UNIT I	II EN EX	NGLISH FOR NATIONAL AND INTERNATIONAL KAMINATIONS AND PLACEMENTS				6					
Internatio (TOEFL)	onal Englis - Civil Ser	h Language Testing System (IELTS)- Test of English as a vice(Language related part) –English for competitive exa	a Foreig minatio	gn Lang ns	juage	;					
UNIT I	V IN	TERVIEW SKILLS				6					
Different Body lan	types of I guages.	nterview format- answering questions- offering information	on- moc	k interv	views	<u></u> -					
UNIT V	/ SC	OFT SKILLS				6					
Motivatio leadershi	on- emotio p straits- te	nal intelligence-Multiple intelligences- managing changes eam work- career planning- creative and critical thinking	- time 1	nanage	men	t-					
	Τ	OTAL HOURS 30 Hrs									
OUTCO	DMES: A	At the end of the course, the students will be able t	0								
1.	Face interviews, group discussions and other language parameters in the job mark										
2.	Write any	y competitive examinations which cover language part in	lt.								
3.	Take partshyness.	t in any English conversations of any kind in English. Flav	vlessly	withou	t feai	and					
4.	Write art mistakes	icles for newspapers and magazines or any write-up in En	glish w	ithout g	ramı	mar					
5.	5. Come out with leadership qualities, team work and career planning and will also possess critical and creative thinking.										
COURS	SE ART	ICULATION MATRIX:									

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 1 0	PO 1 1	PO 1 2	PSO1	PSO2	PSO3
CO1	2					3			2	3			3	2	
CO2	3					2			2	3			3	2	
CO3	2					2			3	3			3	3	
CO4	3					2			3	3			3	3	
CO5	3					2			3	3			3	2	
(1-Lov	w, 2- I	Moderate.	oderate, 3-High)												
TEX	T B	OOKS:													
1.		Communication Skills for Engineers and Scientists, PHI Learning PVT.LTD, Delhi, 2014.													
2.		Commı (INDIA	inicatio) PVT	on Skil '.LTD,	ls and New I	Soft S Delhi, 2	kills A 2012.	n Inte	grated	Appro	oach, D	orling	Kinde	rsley	
3.		Soft Sk	ills, M	JP Put	olishers	,Chen	nai, 20	010.							
REF	ER	ENCE	S:												
1.		Craven, Univers	, Miles sity Pre	: Liste ess, 20	ning E 04.	xtra-A	resou	rce bo	ok of n	nulti-le	vel ski	lls acti	ivities.	Camb	ridge
2.		Seely, John. The Oxford guide to writing & Speaking. New Delhi: Oxford University Press,20													
3.		Comfort, Jeremy, et al. Speaking Effectively: Developing speaking skills for Business English. Cambridge University Press, Cambridge: Reprint 2011.													
4.		Dutt P. Books:2	ish. Cambridge University Press, Cambridge: Reprint 2011. P. Kiranmai and RajeevanGeetha. Basic Communication Skills, Foundation s:2013												

SEMESTER III

18ZBS301

TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

OBJ	ECTIVE	ES:	•
•	To intr apart f	roduce Fourier series analysis which is central to many applications in engineer rom its use in solving boundary value problems.	ing
•	To acq	uaint the student with Fourier transform techniques used in wide variety of situ	ations.
•	To intr equation discret	roduce the effective mathematical tools for the solutions of partial differential ons that model several physical processes and to develop Z transform technique e time systems.	es for
UNI	ΤI	PARTIAL DIFFERENTIAL EQUATIONS	9+3
Forma order j of sec types.	tion of pa partial dif ond and l	artial differential equations – Singular integrals Solutions of standard types ferential equations - Lagrange's linear equation Linear partial differential equation higher order with constant coefficients of both homogeneous and non-homog	of first Juations geneous
UNI	ГП	FOURIER SERIES	9+3
Dirich Half ra	let's cond ange cosir	itions – General Fourier series – Odd and even functions – Half range sine serie ne series – Complex form of Fourier series – Parseval's identity – Harmonic and	es – alysis.
UNI	ГШ	APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS	9+3
Classi equati equati	fication o on – One on of heat	f PDE – Method of separation of variables - Solutions of one dimensional dimensional equation of heat conduction – Steady state solution of two dime conduction (excluding insulated edges).	ıl wave ensional
UNI	ΓIV	FOURIER TRANSFORMS	9+3
Staten	nent of Fo	urier integral theorem – Fourier transform pair – Fourier sine and cosine transforms of simple functions – Convolution theorem – Parseval's identity	orms –
UNI	Γ	Z - TRANSFORMS AND DIFFERENCE EQUATIONS	9+3
Z- tran Convo transfo	nsforms - olution the orm.	Elementary properties – Inverse Z - transform (using partial fraction and resistorem - Formation of difference equations – Solution of difference equations u	dues) – sing Z -
COL		TOTAL :60 PE	RIODS
	KSE OU		
1.	Solving	the problems based on partial differential equations.	
2.	Applying	g the concepts of general and complex fourier series.	
3.	Understa	nding the applications of partial differential equation.	

4.	. Illustrating the principle and properties of fourier transform.														
5.	Und	erstand	ling the	e prope	erties o	f Z-tra	nsform	is and o	differe	ntial eq	uation	s.			
6.	Sum engin	marize neering	the pr g.	inciple	es of pa	urtial di	ifferen	tial equ	ations	and so	lve soi	ne equ	ations	of	
COU	JRSE	ART	ICUI	LATI	ON N	IATE	RIX:								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO 3
CO1	3	2	2	3									2	1	
CO2	3 2 2 2 3 1 3 2 2 1 3 2														
CO3	3 2 2 1 3 2														
CO4	3 1 2 2 3 3 2														
CO5	3 1 2 1 3														
CO6	3 1 2 3 2														
(1-Low	, 2- Mo	oderate,	3-High)												
TEX BOC	T DKS:														
1.	Veer Pvt.	arajan Ltd., N	T., "T Iew De	ransfo lhi, 3 rd	rms an Editio	d Part on, 201	ial Difj 6.	ferentie	al Equ	ations"	, Tata	McGra	w Hill	Educa	ition
2.	Grev 2017	val B., 7.	S., "H	igher E	Engine	ering N	Mathen	natics"	, 44 th	Editi	on, Kh	anna P	Publish	ers, De	elhi,
3.	Nara Engi	iyanan neerin	S., Ma g Stud	anicava ents" V	achago Yol. II c	om Pillo & III, S	ay.T.K S.Viswa	and Ra Inathar	amana 1 Publi	iah.G ' ishers I	'Advan Pvt Ltd	ced M ., 1998	athema	itics fo	r
REFE	EREN	CES:													
1.	Bali. Pvt I	N.P a Ltd, 9 th	nd Ma Editio	nish G n 2016	oyal, ". 5.	A Text	book o	f Engir	neering	g Mathe	ematics	s", Lax	mi Puł	olicatio	ons
2.	Ram Limi	ana. B ted, Ne	.V., "H ew Del	ligher I hi, 201	Engine 8.	ering l	Mather	natics'	', Tata	McGra	ıw Hill	Publis	shing C	Compar	ıy
3.	Glyn 2016	James 5.	s, "Adv	vanced	Moder	n Engi	ineerin	g Matl	hemati	cs", 4 th	Editio	n, Pear	rson Ed	ducatio	on,
4.	Erwi	in Krey	vszig, "	Advan	ced En	gineer	ing Ma	athema	tics", I	10 th Edi	ition, V	Viley Ir	idia, 2	011.	
5.	Ray McG	Wylie Graw H	C and . Iill Edu	Barreti cation	t .L.C, Pvt Lt	"Advai d, New	nced E [,] Delhi	nginee , 2012.	ring M	lathem	atics",	6 th Edi	tion, T	ata	
6.	Datte Ltd,	a K.B., Delhi,	"Matl 2013.	hematio	cal Me	thods a	of Scier	nce and	d Engir	neering	", Cen	gage L	.earnin	g India	a Pvt

18SES	5302	DIGITAL PRINCIPLES AND SYSTEMS DESIGN	L	Τ	P	С									
			3	0	0	3									
OBJEC	TIVES	8:		-	-	_									
•	ך כ	To design digital circuits using simplified Boolean functions and analyombinational circuits	yze a	nd d	esign										
٠] ປ	o analyze and design synchronous and asynchronous sequential circunderstand Programmable Logic Devices	uits a	nd											
•]	o write HDL code for combinational and sequential circuits													
UNIT	Ι	BOOLEAN ALGEBRA AND LOGIC GATES				9									
Review	v of N	Iumber Systems – Arithmetic Operations – Binary Codes –	Bool	ean	Alge	bra									
and Th	eorems	B – Boolean Functions – Simplification of Boolean Functions	usin	g K	arnau	ıgh									
Map an	nd Tabu	lation Methods – Logic Gates – NAND and NOR Implementations.													
UNIT	II	COMBINATIONAL LOGIC				9									
Combin Code C Combin	ational Convers ational	Circuits – Analysis and Design Procedures – Circuits for Arithmetic ion – Decoders and Encoders – Multiplexers – Real Time A Circuits- Introduction to HDL – HDL Models of Combinational circu	Oper Appli uits.	ration catio	ns, on of										
Code Conversion – Decoders and Encoders – Multiplexers – Real Time Application Combinational Circuits- Introduction to HDL – HDL Models of Combinational circuits. UNIT III SYNCHRONOUS SEQUENTIAL LOGIC Sequential Circuits – Latches and Flip Flops – Shift Registers – Counters- State Reduction and State Assignment - Analysis and Design Procedures – HDL for Sequential Logic Circuits.															
Sequent	JNIT III SYNCHRONOUS SEQUENTIAL LOGIC Sequential Circuits – Latches and Flip Flops – Shift Registers – Counters- State Reduction and State Assignment - Analysis and Design Procedures – HDL for Sequential Logic Circuits.														
State As	signme	ent - Analysis and Design Procedures – HDL for Sequential Logic Cir	rcuits	5.											
UNIT	NIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 9 valuesia and Design of Asymphronous Sequential Circuita Deduction of State and Elever Tables														
Analysis Race-fre	NIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 9 alysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – e-free State Assignment – Hazards. 9														
UNIT	V	MEMORY AND PROGRAMMABLE LOGIC				9									
RAM an	nd RON	I – Memory Decoding – Error Detection and Correction – PROM – I	Progr	amm	able										
Logic A Specific	rray —] Integra	Programmable Array Logic – Sequential Programmable Devices – Apated Circuits.	pplic	ation	-										
	0	TOTAL : 45 F	PER	IOD	S										
OUTC	OME	S: On completion of this course, students will be able to													
1.	Evalu	ate arithmetic operations on any number system.													
2.	Solve combi	the Boolean expression using K-map and tabulation technique and denational hardware circuit using Boolean simplification technique.	esign	ing a	l										
3.	Desig	n a given digital circuit using synchronous sequential logic.													
4.	Analy	ze a given digital circuit using Asynchronous sequential logic.													
5.	Desig	n a circuit using PLD.													
COUR	SE A	RTICULATION MATRIX:													

	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	3	3	1	1		1	1	1					3	1		
CO2	3	3	2	2	1	1	1	1			2		3	2	1	
CO3	3	3	2	2	1	1	1	1			1		3	2	1	
CO4	3	3	2	2		1	1	1			1		3	2	1	
CO5	3	3	2	2	1	1	1	1			2		3	2		
(1-Low	v, 2- Mo	oderate,	3-High)						•	•						
TEX	T BC	BOOKS: M. Morris Mano and Michael D. Ciletti, "Digital Design", Fifth Edition, Pearson														
1.	M. Ed	M. Morris Mano and Michael D. Ciletti, "Digital Design", Fifth Edition, Pearson Education, 2012.														
2.	<i>G</i> .	Education, 2012. G. K. Kharate, "Digital Electronics", Oxford University Press, 2010.														
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2.	Ch Ho	arles H ouse, M	I. Roth umbai	Jr, "I 2003.	Fundan	nentals	of Log	gic Des	sign",	Fifth E	dition,	Jaico	Publi	shing		
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5	Ed	ition, T	ata M	c Grav	v Hill,	2010	ogion"	Tata	Ma Cu	an 11:1	1 2002					
5.	MC	IRK K B	acn, C	comple	eie Dig	uai De	esign,	Taid	wic Gri	uw Hill	, 2003	•				

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	•	B pi	e fami rogran	iliar wi nming	ith the	Objec + using	t orier g class	nted pr ses and	ogram l objec	ming ts.	concep	pts , ba	isi	CS O	f	
	•	B C	e fami onstru	iliar wi ictors e	ith the etc.	C++ 0	concep	ots of o	verloa	ding,	Inherit	tance,	po	olym	orphi	ism,
	•	B fe	e expo atures	osed to s of Jav	the O	bject o gramm	oriente ning La	d prog anguag	gramm ge	ing co	ncepts	using	Ja	iva a	and	
UN	IT I	C	BJE	CT C	RIE	NTE	D PR	OGR		AINO	r J					8+3
Proce object overl Cons	edura cts, o loadir structo	l langua classes, ng. Intro ors and	ages, (inhe oducin Destru	Dbject eritance ig C++ uctors.	orient e, reu classe	ed app isabilit es – St	roach, zy, cr ructur	, Chara reating es and	acteris new Classe	tics of data t es – U	object ypes, j nions	t orien polyme and Cl	teo orj las	d lar phis ses	nguag m an –	ges — d
UN	IT II		BJE	CTS	AND	CLA	SSE	S IN	C ++							10+3
Frien mem Retu types	nd fur nbers arning s – Po te	objects	– Frie pe res s. Arra to cla	solution ays of ss men	sses – n ope objec mbers	Inline rator ts – P – Re	e funct – Nes ointers ferenc	sted cl sto ot s to ot s = - I	Paran lasses ojects Dynam	neteriz – Pa – this ic allo	zed conssing pointe	nstruct object er – Po n opera	tor s oii atc	to t to t nters	Station funct s to c - nev	c class ions – lerived w and
UN	IT II	TF	EAT	URE	S OF	'C++										9+3
Func	ction of	overloa	ding, (Copy c	onstru	ctors,	Defau	lt argu	ments	, Oper	ator o	verloa	diı	ng, I	nheri	tance,
Virtu	ual fu	nctions	and p	olymo	rphism	n, Tem	plates	Ũ								
UNI	IT IV	V J	AVA	PRC	OGRA	MM	ING	LAN	GUA	GE						9+3
Data	types	s, varial	oles ar	nd Arra	ays, Oj	perato	rs, Coi	ntrol S	tateme	ents. Ir	ntrodu	cing cl	as	ses -		
const	tructo ritano	ors – thi e basic	s keyv s – usi	vord –	overlo	oading vnami	methors	ods – A	Arrays	– Cor – abst	nmand	l line a	ırg	ume	ents.	
UN	IT V	F	\mathbf{EAT}	URE	$\frac{\mathbf{S} - \mathbf{u}}{\mathbf{S} - \mathbf{v}}$	JAV	A A		paten	absi		<i>usses</i> .				9+3
Exce	eption eworl	handli k – java	ng – N util, I	Iultith Event l	readed handli	l Progr ng – A	ammi WT -	ng – I/ Swing	O Bas ;.	ics – S	Stream	s – Ap	pl	ets.	Colle	ections
									TOT	'AL :	60 P	ERI	DI	DS		
OU	TCC	MES	•	On co	omplet	tion of	this c	ourse,	studer	nts wil	l be ab	ole to				
1		Illustra	te the	basic o	concep	ots of (OOPS	using	c++.							
2	2.	Unders	tand t	he vari	ious co	oncept	s of ot	ojects a	and cla	isses i	n C++.	•				
3 4). L	Inplen	te the	$\frac{10}{\text{basic }}$	concer	$\frac{C++}{\text{ots of i}}$	ava									
5	5.	Remen	nber th	ne feat	ures of	f java l	like ex	ceptio	n hanc	lling n	nethod	l and n	nu	ltith	readi	ng.
COU	JRSE	ARTI	CULA	ATION	N MA'	TRIX	:	-			1	1	1			
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1	PO1	F 1	PSO	PSC	D PSO
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CO5 3	3											3	1	
(L-Low, N	1- Modera	te, H-F	High)											
TEXT	BOOK	S:												
1	Robe	ert Laf	ore, "C	Dbject	orient	ed Pro	gramn	ning in	C++'	', Four	th edit	tion, S	AMS	
1.	Publi	ishing	, 2002.											
2	Herb	ert Sc	hildt, "	Java:	The C	omple	te Refe	erence	", Nin	th Edit	tion, N	/lcGrav	w-Hill	
۷.	Educ	ation,	2014.											
REFEF	RENCE	ES:												
1.	E Bal	aguru	samy,	"Obje	ct orie	nted P	Program	nming	with	<i>C</i> ++"	, Sixth	editio	n, 201	3.
2	Herbe	ert Sch	ildt, "	C++:	The C	omple	te Refe	erence	", Tat	a McG	Fraw H	Iill Pu	blishin	g
۷.	Comp	any, I	Vew De	elhi, 20	011.									
3.	Venug	gopal I	K. R., I	Rajkun	narBu	vya an	d Ravi	shank	ar T, '	'Maste	ering (C++",	Tata	
	McGr	awHil	ll Publi	ishing	Comp	any, N	lew De	elhi, 20)09.					
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	2015.													
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	L									3	6 0	0	3		
OBJECTI	VES:											11			
•	Be fam	iliar wi	th the	basics	s of lin	ear da	ta stru	ctures	using	C prog	gramn	ning			
	languag	ge and a	advan	ced co	ncepts	of Li	near A	DTs							
•	Learn n	ion line	ear dat	a struc	tures -	– Tree	s, grap	h and	its trav	versals	5				
•	Be expe	osed to	sortin	ig, sea	rching	, hashi	ing alg	orithn	ns						
UNIT I	LINE	AR D	ATA	STR	UCT	URE	S - L	IST					9		
Abstract Dat	a Types (A	ADTs) -	– List	ADT -	– array	v-based	d impl	ement	ation –	- linke	d list				
implementat	ion —sing	ly linke	ed lists	s- circu	larly	linked	lists-	doubly	/-linke	d lists	– app	lication	ons of		
lists –Polync	mial Mani	pulatic	$\frac{n - S_1}{2}$	parse N	Matrix	opera	tions.								
UNIT II	LINE	AR D	АТА	STR	UCT	URE	S - S	ТАС	KS,				9		
	QUEU	JES													
Stack ADT -	- Operation	ns - Ap	plicati	ions - l	Evalua	ting a	rithme	tic exp	pressio	ons- Co	onvers	ion o	f Infix		
to postfix ex	pression -	Queue	ADT	– Oper	rations	s - Ciro	cular Q	Jueue	– Prio	rity Qı	ieue -	deQu	eue –		
Applications	of queues	– Eval	luating	g postf	ix exp	ression	ns								
UNIT III			9												
Tree ADT –	Tree ADT – Tree traversals - Binary Tree ADT – Expression trees – Applications of trees – Binary search tree ADT – AVL Trees – B-Tree - B+ Tree - Heap – Applications of heaps – Huffman coding														
Binary search tree ADT – AVL Trees – B-Tree - B+ Tree - Heap – Applications of heaps – Huffman coding															
Binary search tree ADT – AVL Trees – B-Tree - B+ Tree - Heap – Applications of heaps – Huffman coding UNIT IV NON LINEAR DATA STRUCTURES - GRAPHS 9															
UNITIV	Huffman coding UNIT IV NON LINEAR DATA STRUCTURES - GRAPHS 9 Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first														
Definition –	UNIT IV NON LINEAR DATA STRUCTURES - GRAPHS 9 Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first 9														
traversal – C	Huffman coding UNIT IV NON LINEAR DATA STRUCTURES - GRAPHS 9 Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Connected Components – Minimum Cost Spanning trees – Shortest Paths – Single 9 Seurce All Destinction – All Daim Shortest Daths – Tanala single Seurce All Destinction – All Pairs Shortest Daths – Tanala single Seurce All Destinction – All Pairs Shortest Paths – Tanala single Seurce All Destinction – All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs Shortest Paths – Tanala single Seurce All Pairs (Seurce All Pairs All Pair														
Source All L	Destination	– All I	Pairs S	Shortes	t Path	<u>s - Toj</u>	pologi	cal Sol	rt - Ap	plicat	ions o	f grap	ohs.		
UNIT V	SEAR	CHI	NG, S	SORT	ING	ANL) HA	SHIN	G				9		
Searching- L	inear Sear	ch - Bi	nary S	bearch.	Sorti	ng - Bi	ubble s	sort - S	Selection	on sor	t - Inse	ertion	sort -		
Shell sort – I	Radix sort	– Merg	ge Sort	t - Qui	ck sort	t. Hash	ning- F	lash F	unctio	ns - S	eparat	e Ch	aining		
– Open Addi	ressing – R	lehashi	ng.			r	T 07								
		r -					TOT	AL :	45 P	ERI	JDS				
OUTCOM	IES:	On co	omplet	tion of	this c	ourse,	studer	nts wil	l be ab	ole to					
1. Ex	xplain the c	concept	ts of a	rray, li	nked l	ist and	their	types.							
2. De	evelop the	progra	ms usi	ing sta	cks an	d quei	ıe.								
3. Ai	nalyze the	use of	variou	s trees	and s	earch	trees.								
4. Ui	nderstand t	he use	of gra	phs an	nd algo	orithms	s in co	mpute	r appli	cation	s.				
5. Ex	xplain the v	various	types	sortin	g, seai	ching	and ha	ash fur	octions	5.					
COURSE A						DOG	DOO	DO 4	DO4	DO 4	DO O	DOC			
P01	P02 P03	P04	P05	P06	P07	P08	PO9	0	1	2	1	2) PSU 3		
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CO2 3	3 2	1									3	2	1		
CO3 3	3 3	3									3	2			
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CO5 3	2 Iodarata II I	Jigh)									2				
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1	Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data												
1.	Structures in C", Second Edition, University Press, 2008												
2	Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition,												
۷.	Pearson Education, 2002.												
REFER	Pearson Education, 2002. NCES: <i>Geema Thareja, "Data Structures Using C", Second Edition , Oxford University</i> <i>Tress, 2011</i> <i>Tifford A. Shaffer, "Data Structures & Algorithm Analysis in C++", Third Edition,</i> <i>Pover Publications, 2011</i>												
1.	ICES: eema Thareja, "Data Structures Using C", Second Edition, Oxford University ress, 2011 lifford A. Shaffer, "Data Structures & Algorithm Analysis in C++", Third Edition, over Publications 2011												
	NCES: Reema Thareja, "Data Structures Using C", Second Edition, Oxford University Press, 2011 Clifford A. Shaffer, "Data Structures & Algorithm Analysis in C++", Third Edition, Dover Publications, 2011												
2.	NCES: Reema Thareja, "Data Structures Using C", Second Edition, Oxford University Press, 2011 Clifford A. Shaffer, "Data Structures & Algorithm Analysis in C++", Third Edition, Dover Publications, 2011												
	NCES: Leema Thareja, "Data Structures Using C", Second Edition, Oxford University Press, 2011 "lifford A. Shaffer, "Data Structures & Algorithm Analysis in C++", Third Edition, Pover Publications, 2011												
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	Education, 1983.												
4.	Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, —Fundamentals of Data												
	Structures in Cl, Second Edition, University Press, 2008												
5.	Thomas H. Cormen, Charles E. Leiseron, Ronald L.Rivest, Clifford Stein,												
	"Introduction to Algorithms", Third Edition, PHI learning Pvt. Ltd., 2011.												

18ZMC305

ENVIRONMENTAL SCIENCE AND ENGINEERING (ECE/EEE/CSE/MECH)

OBJI	ECTIV	ES:		
•	To fi	nding and	d implementing scientific, technological, economic and political solutions to	
	envir	onmental	l problems.	
•	To st	udy the in	nterrelationship between living organism and environment.	
•	To st	udy the in	ntegrated themes and biodiversity, natural resources, pollution control and waste	
	mana	igement.		
UNI	ΓI	ENVI	RONMENT, ECOSYSTEMS AND BIODIVERSITY	
		(CO-a	a &b)	
concep	pt of an e	cosystem	n – structure and function of an ecosystem – producers, consumers and	
decom	posers- t	ypes of o	ecosystem (forest ecosystem, grassland ecosystem, desert ecosystem, aqu	uatic
ecosys	stems (po	onds, str	reams, lakes, rivers, oceans, estuaries) - energy flow in the ecosyste	m –
ecolog	gical succ	ession p	processes –types – Introduction to biodiversity definition: genetic, species	and
ecosys	stem dive	ersity – ł	biogeographical classification of India – value of biodiversity: consump	ptive
use, p	roductive	use, soc	cial, ethical, aesthetic and option values – India as a mega-diversity nati	on –
hot-sp	ots of bi	odiversit	ty - threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife, man	dlife
conflic	cts - enda	angered	and endemic species of India – conservation of biodiversity: In-situ and	ı ex-
Situ CO	onservatio	n of bio	diversity. Field study of common plants, insects, birds.	
	SLUUY OF S	simple e	TOSYSTEMS – polit, river, nin stopes, etc.	
	L II		IKONMENTAL POLLUTION (CO-a & C)	
Defini	tion - cat	uses, effe	ects and control measures of: (a) Air pollution (b) Water pollution (c) Soil	
polluti	ion (d) M	arine pol	flution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards- soli	a
waste	managen	lent: cau	uses, effects and control measures.	
Field :	Study of I	local pol	nuted site – Orban / Kurai / Industriai / Agriculturai.	
UNI		NAT	UKAL RESOURCES (CO-a &d)	
Forest	resource	s: Use ai	nd over-exploitation, deforestation – Water resources: Use and overutiliza	ation
of surf	tace and g	ground w	vater– Mineral resources: Use and exploitation, environmental effects of	
extrac	ting and	using mi	ineral resources – Food resources: World food problems, changes cause	d by
agricu	Iture and	overgra	azing, effects of modern agriculture, fertilizer-pesticide problems– En	lergy
resour	ces: rene	wable a	and non renewable energy sources, use of alternate energy sources. I	
resour	ces- land	degrada	ation, man induced landslides, soil erosion and desertification – role of	or an
	uuai in co		on of natural resources.	
rieiu :	study of I		TOTAL • 15 PFRI	ODS
COL	RSE O		MES	505
Envir	onmenta	l Polluti	ion or problems cannot be solved by mere laws. Public participation is	san
imnor	tant asna	et whic	the serves the environmental Protection. One will obtain knowledge on	, an the
follow	ving after	comnle	ting the course	unc
1	Ability t	o apply	the knowledge of environmental science in identifying to formulate and t	0
	solve the	e enviror	nmental problems.	Ŭ
2.	Public a	wareness	s of environmental function is at infant stage.	
			č	
3.	Ignorand	ce and in	ncomplete knowledge has led to misconceptions.	
4.	Obtainir	ng knowl	ledge about natural recourses and their functions.	

5.	Abil	ity to a	pply k	nowled	dge in	conser	ving va	arious	natural	resour	ces.				
COU	JRSE	ART	ICU	LATI	ON N	IATE	RIX:								
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO 3
CO1	1					2	1	1						2	1
CO2	1					2	2	2						2	1
CO3	1					2	3	2						2	
CO4	1					2	2	2						2	1
CO5	1					2	3	2						2	
(1-Low	ow, 2- Moderate, 3-High) XT BOOKS:														
TEX	EXT BOOKS: Gilbert M.Masters, 'Introduction to Environmental Engineering and Science'. 2nd edition.														
1.	Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.														
2.	Pearson Education, 2004. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi,														
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1.	Cun	ningha	m, W.F	Coop	er, T.H.	Gorh	ani, Er	ivironn	nental	Encycl	opedia	i', Jaic	o Publ	.,Hous	е,
	Mun	<i>ibai</i> , 20	$\frac{001}{1000}$			1.64		<u> </u>		· · · · · /)(1	T. T		20	05
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4.	Bhar	rucha I	Erach,	The Bi	iodiver	sity of	India,	Mapin	Publi	shing H	vt. Lta	l., Ahm	edaba	d India	l,
5.	Dhai Delh	rmendi vi,2007	ra S. S	'engar,	'Envir	onmen	tal law	y', Prei	ntice h	all of I	ndia P	VT LT.	D, New	,	

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	•	Т	o insti	ll Mor	al and	Socia	l Valu	es amo	ong the	e stude	ents.					
	٠	T is	o leari sues.	n abou	t safet	y, resp	onsibi	lities a	and rig	hts an	d fami	liarize	abou	t glob	al	
UNI	IT I	H	IUM	AN V	ALU	ES									9	
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Engi	neeri	ng as E	xperin	nentati	on – E	Engine	ers as 1	respon	sible I	Experi	menter	rs - Co	odes o	of Eth	ics –	
	A Balanced Outlook on Law.UNIT IVSAFETY, RESPONSIBILITIES AND RIGHTS9															
		IV SAFETY, RESPONSIBILITIES AND RIGHTS 9 and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - 9														
Resp Occu (IPR	Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights IPR) – Discrimination – Gender sensitization.															
UNI	T V	6	LOI	BAL I	[SSU]	ES									9	
Mult	inatio	onal Co	rporat	ions –	Enviro	onmen	tal Eth	nics – (Compi	iter Et	hics –	Weap	ons D	evelo	pment	
-En	ginee	rs as M	anage	rs - Co	onsult	ing En	gineer	s - En	gineer	s as E	xpert V	Witnes	ses a	nd Ac	visors	
-Mc	oral L	eaderst	np –C	ode of	Cond	uct - C	Corpor	ate So		espons		5 DE		DC		
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3	•	Explai	n the e	engine	ering v	soci	alle en	nics. Primen	tation	and et	hics					
4		Analyz	re safe	tv Ris	k and	their h	enefit	s and I	Profess	sional	Rights					
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CO2						2	1	3						2	1	
CO3						2		3						2		

CO4						2	2	3						2			
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1		Govi	ndaraj	an M,	Natara	ijan S	, Senth	il Ku	nar V.	S , "E	nginee	ring E	thics",	Prent	ice		
1	•	Hall	of Ind	ia, Nev	w Delh	i, 200	4.										
2)	Mike	W. N	lartin a	and Ro	land S	Schinz	inger,	"Ethic	s in E	nginee	ring",	Tata N	/lcGra	W		
		Hill,	New I	Delhi, 2	2003.			-			-	-					
REF	FERI	ENCE	NCES: Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey,														
j	<i>l</i> .	Charl	Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004														
		Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey 2004. Charles F. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethic															
2	•	2004. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethic Concepts and Cause", Concepts 2000															
		-Con	2004. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009														
3		John I	R Boat	tright,	"Ethic	es and	the Co	onduci	t of Bu	siness	", Pea	rson E	ducati	ion, Ne	гw		
		Delhi,	2003	0					0								
4		Edmu	nd G S	Seebau	er and	l Robe	rt L B	arry, '	"Fund	ametal	ls of E	thics fo	or Scie	ntists	and		
		Engin	eers",	Oxfor	d Uni	versity	Press	, Oxfo	rd, 20	01							
5	•	Laura	P. Ha	artman	and J	oe De	sjardi	ns, "B	usines.	s Ethic	es: De	cision I	Makin	g for			
		Perso	nal In	tegrity	and S	ocial I	Respon	isibili	ty" Mc	Graw	, Hill e	educati	ion, In	dia Pv	et.		
		Ltd.,N	ew De	elĥi 20	13.		-										

18S	ES3)7 I	DIGIT	CAL P	PRIN	CIPL	ES A	ND S	YSTI	EMS	DESI	GN	L	Т	P	С
						LAB	ORA	TOR	Y				0	0	3	1.5
OBJI	ECTI	VES:														
	•	U	ndersta	and the	variou	ıs logi	c gates	and v	arious	combi	nation	al circu	uits.			
	•	U	ndersta	and the	variou	is com	ponen	ts used	in the	desig	n of di	gital co	ompu	iters	and	
		se	equenti	al circu	iits											
	•	L	earn to	use H	DL.											
LIST	ΓOF	F EXP	ERIN	AEN	S:											
1.	Ver	ificatio	n of Bo	oolean	Theore	ems us	ing ba	sic gate	es.							
2.	Des	ign and	l imple	mentat	ion of	combi	nation	al circu	iits usi	ing bas	sic gate	es for a	rbitra	ary		
	func	ctions,	code co	onverte	rs.											
3.	Des	ign and	l imple	ment a	4-bit	oinary	adder	/ subtr	actor.							
4.	Des	ign and	l imple	ment P	arity g	generat	or / ch	ecker.								
5.	Des	ign and	l imple	ment N	/lagnit	ude Co	ompara	tor.								
6.	Des	ign and	l imple	ment a	n appl	ication	using	multip	lexers	5.						
7.	Des	ign and	l imple	ment s	hift –r	egister	s.									
8.	Des	ign and	l imple	ment s	ynchro	onous o	counter	rs.								
9.	Des	ign and	l imple	ment a	synchi	onous	count	ers.								
10	Coding combinational circuits using HDL.Coding sequential circuits using HDL.															
11	 Coding sequential circuits using HDL. Design and implementation of a simple digital system (Mini Project). 															
12	12. Design and implementation of a simple digital system (Mini Project).															
	OUTCOMES: On completion of this course, students will be able to															
OUT	DUTCOMES: On completion of this course, students will be able to															
1.	A	pply th	eorem	s and K	L-maps	to sin	nplify l	Boolea	n func	tions.						
2.	D	esign a	combi	ination	al circu	uits lik	e arith	metic o	circuits	s, deco	der an	d				
	E	ncoder.														
3.	A	nalyze	a give	n digita	l circu	it like	combi	nation	al and	sequer	ntial.					
4.	D	esign s	ynchro	nous s	equent	ial circ	cuits lil	ke regi	sters a	nd cou	nters a	nd asy	nchr	ono	us	
	ci	rcuits.														
5.	D	evelop	a simp	le digi	tal syst	tem for	r a give	en spec	cificati	ons an	d desig	en vari	ous	circu	iits f	or
	sy	stems	design	using l	HDL		8-	r				5				
COU	JRS	E AR'	ΓICU	LAT	ION I	MAT	RIX:									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSC	01 F	SO2	PSO3
CO1	3	1	2	1	2				1				3	2	2	1
CO2	3	2	3													
	-		Ľ													
CO3	3	3	2	2	2				1				3	2	2	
CO4	3	3	3	3	2				1				2	2	2	2
			1	I						I						

CO5	3	3	3	3	3				1				3	2	1							
(1-Lo	w, 2- N	loderat	e, 3-Hi	gh)																		
REF	TERENCES:																					
1.	Ste	ephen H	Brown,	Zvonk	ko Vrai	nesic, '	'Funda	imenta	ls of D	igital .	Logic I	Design	With	VHDL	,, ,							
	Th	ird Edi	ition, N	AcGra	wHill I	India, 1	2012.		Third Edition, McGrawHill India, 2012.													

18SE\$	5308	OBJ	JEC	CT OI	RIE	NTE	D PRO	OGRA	AMMING USING	L	Т	Р	C
				C++	- AN	D JA	AVA L	ABO	RATORY	0	0	4	2
OBJEC	TIVES	:									1		
	•	To bui	ild so	oftwar	re dev	velopn	nent ski	ills usir	ng java programming for	real-	worl	d	
		applica	ation	ns usin	ng gei	neric p	program	nming a	and event handling.				
	•	To und	dersta	and an	nd app	ply the	e concep	pts of c	classes, packages, interfac	es, a	rray	list,	
		excepti	10n h		ng an		process	sing.		ا ما م م			.1.1
	•	simple	Gra) a java phical	a app I Usei	r Inter	faces	threads	s and generics classes and	i des:	ign a	na di	1110
LIST	OF EX	PERI			5:	I Inter	14005.						
C++	- PROG	RAMS	S										
1. l	Function	n Overlo	oadii	ng.									
2. (Call by	value ar	nd C	all by	Refe	erence.							
3. 5	Static D	ata and	Mer	mber F	Funct	tion.							
4. 1	Friend f	unction	n and	Friend	d cla	SS							
5. (Objects	as Argu	umer	nts.									
6. 5	Static ar	nd Dyna	amic	Objec	cts.								
7. (Constru	ctor and	d De	structo	or.								
8. (Operator	r Overlo	oadii	ng									
9. 1	Inheritai	nce.											
10. \	Virtual f	function	ns.										
11. 7	Templat	e Funct	tions	and T	Гетр	late C	Class.						
JAV	A PRC	OGRAN	MS										
1. (Overloa	ding and	nd Ov	verridi	ing								
2. 1	Exception	on Hand	dling	ŗ.									
3. (Classes	and Inh	nerita	ance									
4.]	Dynami	c metho	od di	ispatch	h								
5. I	Multithr	readed p	progi	rammi	ing								
6. (Collecti	ons and	l Ger	nerics									
7. 4	Applet I	Develop	pmen	nt									
8. (Controls	s and La	ayou	its	~								
9. 1	Applet I	Develop	pmen	nt usin	ig Sw	ing							
10. 1	Streams												
11	IDBC										.		
									TOTAL : 60 PERI	ODS	5		
OUTC	COME	S:	On	comp	oletion	n of th	nis cours	se, stud	dents will be able to				
1.	Develo	op a C+	+ pr	ogram	ns usi	ng OC	OPS con	ncepts.					
2.	Build a	a C++ p	progr	ams u	ising	call by	y value	and ca	ll by reference.				
3.	Constr	uct a C-	'++ p	orograr	ms us	sing vi	irtual fu	inctions	s and templates.				
4.	Develo	op a Jav	a pro	ogram	ns for	simpl	le applic	cations	that make use of classes	and			
5	Build a	ance, O_{a}	Progr	rame u	$\frac{1}{10}$	overn array l	ist ever	ention 1	handling and Multithread	ing	file		
J.	Proces	sing, ge	<u>ene</u> ri	c prog	gram	ming,	I/O stre	eams ap	pplets and JDBC.	<u>,</u>			
COUR	RSE AI	RTICU	ULA	ATIO)N N	AT	RIX:						

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO	PO	PO 12	PS 01	PSO2	PSO3
CO1	3	3	2	2				1				12	3	3	2
CO2	3	3	2	1				1					3	3	2
CO3	3	3	2	1				1					3	3	2
CO4	3	3	1										3	2	1
CO5	3	3	1										3	2	1
(1-Low	, 2- Mo	derate,	3-High)												

18SI	PC30	9	D	ATA	STR	UCTU	URES	LAB	ORA	TOR	RY	L	Τ	P	С
												0	0	4	2
OBJ	ECT	IVES	:												
	٠	Т	o imple	ement	linear a	and nor	n-linea	r data s	structu	res.					
	٠	Т	o unde	rstand	the dif	ferent	operati	ons of	search	trees	and gra	aph trav	versal		
		al	gorithr	ns.											
	٠	Te	o get fa	amiliar	ized to	sorting	g, sear	ching a	algorith	nms an	d hash	ing tec	hniqu	e.	
LIST	ΓOF	EXP	ERIN	1ENT	TS:										
1.	Arra	y imp	lement	ation o	f List,	Stack a	and Qu	eue Al	DTs						
2.	Link	ed Lis	t imple	ementa	tion of	List, S	Stack a	nd Que	eue AI	DTs					
3.	 Polynomial manipulations Sparse matrix operations Evaluation and first supervisions 														
4.	Spar	se mat	trix op	eration	S										
5.	Eval	uating	postfi	x expre	essions										
6.	Con	verting	g infix	to post	fix exp	pressio	ns								
7.	Bina	ry Tre	e trave	ersals –	Recur	sive ar	nd non-	-recurs	ive fur	nctions	5				
8.	Impl	ement	ation c	of Bina	ry Sea	rch tree	es								
9.	Huff	man c	oding												
10). Graf	oh repr	resenta	t10ns –	Adjac	ency n	hatrix a	ind Ad	jacenc	y Lists	5				
	I. Min	Imum	cost sp	anning	g trees -	– Prim	's algo	rithm							
	2. Shot	test pa	iths			T ,									
	5. Sele	ction s	ort, Bu	ibble s	ort and	Insert	ion soi	t							
14	+. Quia	ing or	and Mo	ergeso	rı										
1.	<i>J</i> . 11asi	nng a _l	pheau	10115				n	TOT A	Ι • 6	<u>A PF</u>		S		
OUT	FCON	AES:	C	n com	pletion	of this	s cours	e, stud	ents w	ill be a	able to		0		
1.	. App	oly gen	eric pr	ogram	- ming to	echniq	ue to ii	nplem	ent any	y data	structu	re.			
2.	. Ider	ntify ap	opropri	iate sea	arch tre	es for	an app	lication	n.	·					
3.	. Mal	ce use	of grap	ohs in p	probler	n solvi	ng.								
4.	. Dev	elop tl	he vari	ous soi	rting al	gorithi	ns and	comp	are the	m.					
5.	Cre	ate a p	rogran	n for ha	ash app	licatio	ns.								
COU	RSE A	ARTIO	CULA	TION	MATI	RIX:		r							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO	PO	PO	PS	PS	PS
CO1	3	3		2						10	3	12	3	3	2
CO2	3	3		2							2		3	3	1
CO3	3	3	2	2				2			2		3	3	1
CO4	3	3	3	2				3			1		3	2	1
CO5	3	3	3	2				3			1		3	2	1
(1- Lo	w, 2- M	oderate	, 3-High	l)	1	1	1	1	1	1	1	1		1	

SEMESTER IV

-	18SE	BS401		PRO)BAB	ILIT	Y AN	D QI	JEUF	CING	THE	ORY	L	Τ	P	C
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~											3	1	0	4
OBJE 1	ECTI	VES:														
	1	Fo prov probabi	vide the	e requi nodels	red ma which	thema can be	tical su e used i	ipport i in seve	in real ral are	life pro as of so	oblems	and de and en	evelop gineer	ring.		
UNI	ГΙ	I	RAND	OM V	ARIA	BLES										9+3
Discre	ete an	d conti	nuous	randon	n varia	bles –	Mome	nts – N	Iomen	t gener	ating f	function	ns – B	inon	nial	,
Poisso	on, Ge	eometri	ic, Uni	form, I	Expone	ential, (	Gamma	a and N	Normal	distrit	outions	•				
UNIT	II	]	гwо -	DIM	ENSIO	NAL	RAND	OM V	ARIA	BLES						9+3
Joint	distrit	outions	– Mar	ginal a	nd con	ditiona	al distri	ibution	is – Co	varian	ce – Co	orrelati	on and	d Lir	near	
regres	sion -	– Trans	format	tion of	randor	n varia	bles.									
UNIT	III	I	RAND	OM P	ROCE	SSES										9+3
Classi	ficati	on – St	ationa	ry proc	ess – N	Aarkov	proce	ss - Po	oisson l	process	– Dise	crete p	arame	ter N	Iark	ίον
chain	– Cha	apman	Kolmo	ogorov	equation	-1	limitin	g distr	ibution	IS.						
UNIT	IV	(	QUEU	EING	MOD	ELS										9+3
Marke	ovian	queues	s – Birt	h and	Death j	process	ses – S	ingle a	nd mu	ltiple s	erver c	lueueir	ng moo	dels -	_	
renegi	s iori	mula -	Queue	s with	finite v	vaiting	rooms	s – Que	eues w	ith imp	atient	custom	iers: E	aiki	ng a	ina
UNIT	C V	A	ADVA	NCED	QUE	UEIN	G MO	DELS								9+3
Finite	sourc	e mod	els - M	I/G/1 q	ueue –	Pollac	zek Kl	hinchir	n form	ıla - M	/D/1 a	nd M/I	Ек/1 а	s spe	cial	l
cases	– Ser	ies que	ues – C	Open Ja	ackson	netwo	rks.									
-									ТО	TAL (	L:45	+ <b>T</b> :	15): 6	0 PE	RI	ODS
COU	JRSE	E OUI	ГCON	<b>MES:</b>	On co	mpletio	on of th	nis cou	rse, stu	dents	will be	able to	C			
1.	Und	lerstand	d discre	ete and	contin	uous v	ariable	es and	their d	istribut	ions.					
2.	Out	line tw	o dime	nsiona	l rando	om vari	ables o	listribu	utions a	and the	ir trans	sforma	tion.			
3.	Clas	ssify th	e vario	ous rand	dom pr	ocesse	s.									
4.	Und	lerstand	the q	ueuing	model	s.										
5.	Illus	strate th	ne adva	anced c	lueuing	g mode	ls like	finite	source	model	s and s	eries q	ueues	•		
6.	Dev	elop pi	obabil	istic m	odels v	which o	can be	used in	n sever	al area	s of sc	ience a	nd en	gine	erin	g.
COU	JRSE	E ART	<b>FICU</b>	LATI	ON N	<b>IATE</b>	RIX:									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO	PS	02	PSO3
CO1	3	3	3	3							1		3	2		1
		1	1		I		I	I	I			1		I		

CO2	3	3	3	3							1	:	3	2	1
CO3	3	3	3	3							2	:	3	2	
CO4	3	3	3	3							2	:	3	3	
CO5	3	3	3	3							3	:	3	3	
CO6	3	3	3	3							3	:	3	3	1
((1-Lov	w, 2- M	oderate	, 3-Hig	n)								·			·
TEX	XT BOOKS:         1. Ibe.O.C., "Fundamentals of Applied Probability and Random Processes", 2 nd Edition,														
1.	<ol> <li>Ibe.O.C., "Fundamentals of Applied Probability and Random Processes", 2nd Edition, Academic press (Elsevier), 2014.</li> <li>Gross D. and Harris C.M. "Fundamentals of Queueing Theory" 4th Edition. John Wiley and</li> </ol>														
2.	<ul> <li>Academic press (Elsevier), 2014.</li> <li>2. Gross. D. and Harris. C.M, "Fundamentals of Queueing Theory", 4th Edition, John Wiley and Sons, 2008.</li> </ul>														
REFE	EREN	CES:													
1.	Robe evalı	ertazzi uation	T, "Co ", 3rd	ompute Edition	r Netw , Sprin	orks a nger, 20	nd Sys 206.	tems: (	Queuei	ing Theo	ory ana	l perfor	man	ce	
2.	Taha	n H.A.,	"Ope	rations	Resea	rch",	$10^{th} Ed$	dition,	Pearso	on Educ	ation, l	India, 2	017.		
3.	Trive Appl	edi.K.S lication	5., "Pr ns", 2 ⁿ	obabili ^d Editic	ty and m, Joh	Statist n Wile	ics wit y and	th Relic Sons, 2	ıbility, 016.	Queuei	ng and	l Compi	uter S	Scienc	:e
4.	Hwe Rand	i Hsu, dom Pi	" <mark>Scha</mark> rocess	um's O es", 3 rd	utline Editio	of The n, Tate	ory an 1 Mc (	d Prob Graw H	lems d ill Edi	of Proba ition, Ne	ıbility, ew Dell	Randon hi, 2014	n Vai 1 _.	riable	s and
5.	Yate. Indic	s. R.D. a Pvt. I	. and ( Ltd., B	Goodma angalo	ın. D.J re, 201	!., "Pro !4.	babili	ity and	Stoche	astic Pro	ocesses	s", 3 rd E	ditio	on, Wil	ley

18SPC402

**OBJECTIVES:** 

•

# **COMPUTER ORGANIZATION AND** ARCHITECTURE

COMPUTER ORGANIZATION AND ARCHITECTURE	L	Τ	P	С
	3	0	0	3
:				
To understand Memory addressing modes used by the instru	ctions	and	to ex	pose the
major differentials of RISC and CISC architectural character	istics	with	perfo	ormance
evaluation of CPU and understand CPU data path and control	ol.			
To understand Concept of pipelining and the various bezord	that	mico	inor	inalina

	evaluatio	n of CI	PU and	l under	rstand	CPU d	ata pat	h and o	control				
٠	To under	stand C	Concep	ot of pi	pelinin	g and	the var	ious ha	azards	that ar	ise in a	a pipeli	ne
	and the ty	pical s	olutio	ns to th	ne haza	ards, ge	et fami	liarize	d to Co	oncept	of mer	nory	
	Technolo	gies an	nd Para	allelisn	n and N	Aemor	y Hier	archies		1.1			
•	To under	stand C	Concep	ots of N	Aultico	ore and	Share	d Mem	ory M	ultipro	cessor	s.	
UNIT I	BASIC	COM	IPUT	ER E	DESIC	GN							9
Register Tran	sfer Langu	iage – I	Regist	er Trar	nsfer –	Bus ar	nd Mer	nory T	ransfe	rs – Aı	rithmet	ic	
Microoperatio	ns – Log	ic Mic	ropera	tions -	- Shift	t Micr	oopera	tions-1	Arithm	etic L	ogic S	Shift U	Jnit-
Instruction Co	odes – Co	mputer	Regis	ters –	Comp	uter Ir	nstruct	ons-Ti	ming	and C	ontrol-	Instruc	tion
Life Cycle -	Memory 1	Referen	nce Ins	structio	ons-IO	and l	nterru	ot-Con	nplete	Comp	uter D	escript	ion-
Design of Ba	sic Compu	ter-De	sign of	f Accu	mulato	or Logi	c.		1	1		1	
U	1		0			υ							
UNIT II			9										
Introduction	- General	Regi	ister (	Organi	zation	– S	tack (	Organiz	zation-	Instru	ction	Forma	ts-
Addressing M	odes – Dat	a Trans	sfer an	d Man	ipulati	on-Pro	gram (	Control	l-RISC	-Paral	lel Pro	cessing	<u>,</u>
Pipelining-Ari	thmetic I	Pipeline	e-Instr	uction	Pipe	line-R	ISC ]	Pipelin	e-Vect	or P	rocessi	ng-Arra	ıy
Processors.	~~~~~					~							
UNIT III	COMP	UTEF	R AR	ITHN	<b>AETI</b>	C							9
Introduction	A .1.1141	101											
muouucuon –	Addition a	and Sut	otractio	$\mathrm{Dn} - \mathrm{M}$	lultiplio	cation	Algori	thms –	Divisi	on Alg	gorithn	ns-	
Floating-Point	Addition a Arithmeti	and Sut c Opera	otractionations	on – M – Deci	ultiplio mal A	cation rithme	Algori tic Uni	thms – t-Deci	Divisi mal Ar	on Alg	gorithn ic Ope	ns- erations	<b>.</b>
Floating-Point	Arithmeti	c Opera	ations	on – M – Deci	ultiplie mal A	cation rithme	Algori tic Uni	thms – t-Deci	Divisi mal Ar	on Alg	gorithn ic Ope	ns- erations	
Floating-Point	Addition a Arithmeti INPUT	c Opera	ations	on – M – Deci ORO	ultiplio mal A GANI	cation rithme ZATI	Algori tic Uni	thms – t-Deci	Divisi mal Ar	on Alg	gorithn ic Ope	ns- erations	9.
Floating-Point UNIT IV Peripheral Dev	Addition a Arithmetic INPUT rices – Inp	•OUT	Tractions TPUT	on – M – Deci ORC erface	iultiplio mal An GANI – Asyr	cation rithme ZATI	Algori tic Uni ON ous Da	thms – t-Decin ta Trai	Divisi mal Ar	on Alg ithmet Mode	gorithn ic Ope	ns- erations	9
Floating-Point UNIT IV Peripheral Dev Priority Interru	Addition a Arithmetic INPUT rices – Inp pt-DMA-1	Operation Sub c Operation -OUT ut-Outp OP-Se	TPUT TOUT Internal Control of the second	on – M – Deci ORC erface	fultiplio mal Ar <b>GANI</b> – Asyr nication	cation rithme ZATI nchrono n.	Algori tic Uni <b>ON</b> ous Da	thms – t-Decir ta Trai	Divisi mal Ar	on Alg ithmet Mode	gorithn ic Ope	ns- prations ransfer-	9
Floating-Point UNIT IV Peripheral Dev Priority Intern UNIT V	Addition a Arithmeti ices – Inp pt-DMA-1 MEMC	-OUT -OUT ut-Outp OP-Se	TPUT TPUT Tout Internal Co	on – M – Deci ORC erface ommur	EANI GANI – Asyr nication	cation rithme ZATI nchrono n. DN	Algori tic Uni ON ous Da	thms – t-Decin ta Trai	nsfer –	on Alg ithmet Mode	gorithn ic Ope s of Tr	ns- prations ransfer-	9 9 9
Floating-Point Floating-Point UNIT IV Peripheral Dev Priority Interru UNIT V Memory Hiera	Addition a Arithmetii INPUT rices – Inp pt-DMA-1 MEMC rchy– Mai	-OUT ut-Outp OP-Se ORY ( n Mem	TPUT TPUT Tout Internal Co Trial Co DRGA	on – M – Deci orface ommur ANIZ Auxili	Ealtiplia mal An An Asyr nication ATIC ary Me	cation i rithme ZATI nchrono n. DN emory-	Algori tic Uni ON ous Da	thms – t-Decir ta Tran ciative	Memo	on Alg ithmet Mode	gorithn ic Ope s of Tr ache N	ns- erations cansfer- demory	<b>9</b> <b>9</b> <b>9</b>
Floating-Point Floating-Point Peripheral Dev Priority Interru UNIT V Memory Hiera – Virtual Mem	Addition a Arithmeti ices – Inp pt-DMA-1 MEMC rchy– Mai ory – Men	-OUT ut-Outp OP-Se <b>DRY C</b> n Mem nory M	<b>PUT</b> <b>TOUT</b> TOUT International TOUT International TOUT International TOUT International TOUT International TOUT INTERNATIONAL INFORMATION	on – M – Deci orface ommur ANIZ Auxili ment H	Ealtiplic mal An An An An An An An An An An An An An A	cation i rithme ZATI nchron- n. DN emory- ure	Algori tic Uni ON ous Da	thms – t-Decin ta Tran ciative	Divisi mal Ar nsfer – Memo	on Alg ithmet Mode	gorithn ic Ope s of Tr ache N	ns- erations ransfer- Memory	9 9 9
Floating-Point Floating-Point UNIT IV Peripheral Dev Priority Interru UNIT V Memory Hiera – Virtual Mem	Addition a Arithmetic ices – Inp ipt-DMA-1 MEMC rchy– Mai ory – Men	-OUT ut-Outp OP-Se <b>DRY (</b> n Mem nory M	YPUT Tout Internal Co DRGA	on – M – Deci erface ommur ANIZ Auxili ment H	Eultiplio mal An <b>GANI</b> – Asyr nication <b>ATIC</b> ary Me Iardwa	cation rithme <b>ZATI</b> achronon n. <b>DN</b> emory- ure	Algori tic Uni ON ous Da	thms – t-Decir ta Trai ciative <b>TOT</b> .	Divisi mal Ar nsfer – Memo	on Alg ithmet Mode ory – C 45 PE	gorithn ic Ope s of Tr ache M	ns- prations ransfer- Memory <b>DS</b>	9 9 7
Floating-Point Floating-Point UNIT IV Peripheral Dev Priority Interru UNIT V Memory Hiera – Virtual Mem	Addition a Arithmetii ices – Inp pt-DMA-1 MEMC rchy– Mai ory – Men	-OUT ut-Outp OP-Se ORY C n Mem nory M	<b>PUT</b> <b>PUT</b> out Interial Co <b>DRG</b> ory – fanages letion	on – M – Deci orface ommur ANIZ Auxili ment H	EANI Mal An Asyr nication ATIC ary Me Hardwa	cation rithme ZATI nchronon n. DN emory- ure e, stude	Algori tic Uni ON ous Da - Assoc	thms – t-Decin ta Tran ciative <b>TOT</b> Il be al	Memo AL:	on Alg ithmet Mode ory – C <b>45 PE</b>	gorithn ic Ope s of Tr ache N	ns- prations ansfer- Aemory <b>DS</b>	9 9 7
Floating-Point Floating-Point Peripheral Dev Priority Interru UNIT V Memory Hiera – Virtual Mem OUTCOMI 1. Under	Addition a Arithmetii ices – Inp pt-DMA-J MEMC rchy– Mai ory – Men CS: Or stand Reg	-OUT ut-Outp OP-Se ORY C n Mem nory M	<b>PUT</b> out Internal Co <b>DRG</b> ory – fanages letion ansfer	on – M – Deci orface ommur ANIZ Auxili ment H of this Langu	<b>GANI</b> - Asyrnication <b>ATIC</b> ary Me Hardwa	cation rithme ZATI nchrond n. DN emory- ure e, stude	Algori tic Uni OUS Da - Association ents wi	thms – t-Decin ta Tran ciative <b>TOT</b> Il be al	Memo AL:	on Alg ithmet Mode ory – C 45 PE	gorithn ic Ope s of Tr ache N	ns- prations ransfer- Aemory <b>DS</b>	9 9 7
Floating-Point Floating-Point UNIT IV Peripheral Dev Priority Interru UNIT V Memory Hiera – Virtual Mem OUTCOMI 1. Under 2. Analy	Addition a Arithmetic ites – Inp pt-DMA-1 MEMC rchy– Mai ory – Men CS: On stand Regize various	-OUT ut-Outp OP-Se <b>DRY C</b> n Mem nory M n comp ister Tr CPU c	YPUT out International DRGA Nory – Lanaged letion ansfer	on – M – Deci orface ommur ANIZ Auxili ment H of this Langu	Ealtiplic mal And GANI - Asymication ATIC ary Me Hardwa course hage. and Pi	cation rithmer <b>ZATI</b> nchronon n. <b>DN</b> emory- ure e, stude peline	Algori tic Uni ON ous Da - Associents wi	thms – t-Decir ta Trai ciative <b>TOT</b> Il be al	Divisi mal Ar nsfer – Memo AL : 4 ole to	on Alg ithmet Mode ory – C <b>45 PE</b>	gorithn ic Ope s of Tr ache M	ns- prations ransfer- Memory <b>DS</b>	9 9 7
Floating-Point Floating-Point Peripheral Dev Priority Intern UNIT V Memory Hiera – Virtual Mem OUTCOMI 1. Under 2. Analy 3. Evalu	Addition a Arithmetii ices – Inp pt-DMA-J MEMC rchy– Mai ory – Men CS: Or stand Reg ze various ate Compu	-OUT ut-Outp OP-Se ORY C n Mem nory M n comp ister Tr CPU c ter Ari	<b>PUT</b> <b>PUT</b> out International out International <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b>	on – M – Deci orface ommur ANIZ Auxili ment H of this Langu cations c Oper	Gantiplic mal And GANI - Asyr nication ATIC ary Me Hardwa course hardwa and Pi cations	cation rithme ZATI nchronon n. DN emory- ure e, stude peline using	Algori tic Uni OUS Da - Association ents wi d Circu arithm	thms – t-Decin ta Tran ciative <b>TOT</b> Il be al nits. etic alg	Memo AL: gorithn	on Alg ithmet Mode ory – C 45 PE	gorithn ic Ope s of Tr ache N	ns- prations ransfer- Aemory <b>DS</b>	9 9 7
Floating-Point Floating-Point Peripheral Dev Priority Interru UNIT V Memory Hiera – Virtual Mem OUTCOMI 1. Under 2. Analy 3. Evalu 4. Interp	Addition a Arithmetii INPUT rices – Inp pt-DMA-1 MEMC rchy– Mai ory – Men CS: On stand Regi ze various ate Compute ret IO and	-OUT ut-Outp OP-Se <b>ORY C</b> n Mem nory M n comp ister Tr <u>CPU co</u> ter Ari its orga	<b>PUT</b> out Intorial Co <b>DRG</b> nory – (anage) letion ansfer organiz thmeti anizati	on – M – Deci orface ommur ANIZ Auxili ment H of this Langu tations c Oper on.	Eultiplia mal An GANI – Asyr nication ATIC ary Me lardwa course lage. and Pi rations	cation rithmer <b>ZATI</b> nchronn n. <b>DN</b> emory- tre e, stude pelined using	Algori tic Uni ON ous Da - Asso ents wi d Circu arithm	thms – t-Decir ta Tran ciative <b>TOT</b> Il be al iits. etic alg	Divisi mal Ar nsfer – Memo AL : 4 ole to	on Alg ithmet Mode ory – C <b>45 PE</b>	gorithn ic Ope s of Tr ache M	ns- prations cansfer- Memory <b>DS</b>	9 9 7
Floating-Point Floating-Point Peripheral Dev Priority Interna UNIT V Memory Hiera – Virtual Mem OUTCOMI 1. Under 2. Analy 3. Evalu 4. Interp 5. Outlin	Addition a Arithmetii ices – Inp pt-DMA-J MEMC rchy– Mai ory – Men Stand Reg ze various ate Compu ret IO and e various to	-OUT ut-Outp OP-Se ORY C n Mem nory M n comp ister Tr CPU c iter Ari its orga	<b>PUT</b> <b>PUT</b> out International out International <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b> <b>DRG</b>	on – M – Deci orface ommur ANIZ Auxili ment H of this Langu cations c Oper on. ory an	ATIC and Pi cations d its out	cation rithme ZATI nchronon n. DN emory- ure e, stude peline using	Algori tic Uni OUS Da OUS Da - Association ents wi d Circu arithm	thms – t-Decin ta Tran ciative <b>TOT</b> Il be al nits. etic alg	Divisi mal Ar nsfer – Memo AL : 4 ole to	on Alg ithmet Mode ory – C 45 PE	gorithm ic Ope s of Tr ache N	ns- prations ransfer- Aemory <b>DS</b>	9 9 7
Floating-Point Floating-Point Peripheral Dev Priority Interru UNIT V Memory Hiera – Virtual Mem OUTCOMI 1. Under 2. Analy 3. Evalu 4. Interp 5. Outlir COURSE A	Addition a Arithmetii INPUT rices – Inp pt-DMA-J MEMC rchy– Mai ory – Men CS: On stand Regi ze various ate Compu ret IO and e various to RTICU	-OUT ut-Outp OP-Se ORY C n Mem nory M a comp ister Tr CPU c iter Arii its orga cypes o LATI	<b>PUT</b> out Interial Co <b>DRG</b> ory – lanage letion ansfer organiz thmeti anizati f Mem <b>ON N</b>	on – M – Deci orface ommur ANIZ Auxili ment H of this Langu cations c Oper on. ory an IATE	Anital An	cation rithmer	Algori tic Uni ON ous Da - Asso - Asso ents wi d Circu arithm ation.	thms – t-Decir ta Tran ciative TOT Il be al nits. etic alg	Divisi mal Ar nsfer – Memo AL : 4 ole to	on Alg ithmet Mode ory – C 45 PE	gorithm ic Ope s of Tr ache M	ns- prations cansfer- Memory DS	9 9 /

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CO2	3	2	1	1									3	1		
CO3	3	3	2	2									3	2		
CO4	3	3	2	1		1						1	3	2		
CO5	3	3	2	1									3	2	1	
(1-Low	v, 2- Mo	oderate,	3-High)	)												
TEX	<b>Γ BOOKS:</b> M. Morris Mano "Computer System Architecture" Third Edition. Pearson Education															
1.	M. 201	M. Morris Mano "Computer System Architecture", Third Edition, Pearson Education, 2017.														
2.	2017.         V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation", VI th adition       Ma Crew Hill Inc. 2012															
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1.	Wil Edı	liam S ication	talling 1, 2006	s "Con 5.	nputer	Organ	izatioi	1 and A	lrchite	cture"	, Seve	nth Ea	lition,	Pearso	on	
2.	Go	vindar	ajalu,	"Comp	uter A	rchitec	cture a	nd Org	anizat	ion, De	esign I	Princip	oles an	d		
L	App	olicatic	ons", fi	rst edit	tion, T	ata Mc	Graw	Hill, N	ew De	lhi, 20	05.					
3.	Joh Hil	n P. H l, 1998	layes, ' 8.	"Comp	uter A	rchitec	ture at	nd Org	anizat	ion", T	Third E	Edition	, Tata	Mc Gr	aw	
4.	Da	vid A. I	Patters	son and	l John	L. Her	inessey	, "Cor	nputer	organ	izatior	i and a	lesign'	, Morg	an	
	Kai	ıffman	/Else	vier, Fi	ifth edi	ition, 2	014.		-							
5.	Go	vindar	ajalu,	"Con	ıputer	Arch	itectur	e and	l Org	anizat	ion, I	Design	Prin	ciples	and	
	App	olicatic	ons",fir	rst editt	ion, Ta	ta <u>M</u> c	Graw I	Hill, Ne	ew Del	hi, 200	)5.					

18SPC403	OPERATING SYSTEMS	L	T	Р	C
	1	3	0	0	3
OBJECTI	VES:				·
•	To understand the basic concepts and functions of operating and Threads.	syste	ems,	Proc	esses
•	To analyze Scheduling algorithms and concept of Deadlocks I/O management and File system	and	to u	nders	stand
•	To analyze various memory management schemes.				
UNIT I	INTRODUCTION				9
Definition – I systems – Us Monolithic sy an operating s	History of Operating systems – Review of computer hardware er and operating system interface – System calls – Operating stems – Microkernels – Exokernals – Linkers and loaders – Bu system – BIOS – Bootstrap loader.	– Ty g sys ildir	pes o stem ig an	of op stru d bo	erating cture – oting
UNIT II	PROCESSES AND THREADS				9
memory syst client server Thread librar – Scheduling scheduling.	ems – message passing systems – examples of IPC systems systems. Thread concepts – Multicore programming – Mult es – Implicit threading – issues – examples. CPU Scheduling – algorithms – Thread scheduling – Multi-processor schedulir	– co ithre Sch	mmu adin edul Rea	unica g mo ing o l-tim	ition in odels – criteria e CPU
UNIT III	PROCESS SYNCHRONIZATION				9
synchronizati synchronizati problems – S model – Dea handling dead Recovery fro	on tools – Critical Section problem – Peterson's solution – Fi on – Mutex locks – Semaphores – Monitors. Synchronization ynchronization within the kernel – POSIX synchronization. I idlock in Multithreaded applications- Deadlock characteriza llocks – Deadlock prevention – Deadlock avoidance – Deadloc n deadlock.	exa Deac tion k det	vare mple llock – N æctio	supp es – Is – Ietho on –	Classic System ods for
		. 1	1		. 9
Main memory Segmentation copy-on-write – Allocating and their imp	<ul> <li>Contiguous memory allocation – paging – structure of page</li> <li>Segmentation with paging - Examples. Virtual memory</li> <li>Page Replacement – Allocation of frames – Thrashing – Me</li> <li>Kernel Memory – Examples. Virtual machines – building bloc</li> <li>Immentations – Virtualization and operating system components</li> </ul>	e tab – De mor cks s - e	le – eman y coi – tyj xamj	swaj d pa mpre pes c ples.	pping – lging – ession of VMs
UNIT V	FILE MANAGEMENT, PROTECTION AND				9
	SECURITY, CASE STUDIES				
File system in	iterface – low level file implementations – supporting high lev	el fi	le ab	strac	tions –
Directories –	implementing directories – Memory mapped files. Protec	ion	and $\Delta$	sec	urity –
matrix – Role	based and mandatory access control. Case studies – Linux sys	tem -	- Wi	ndov	.s ws 10.
	TOTAL: 45 PER		DS		
OUTCOM	<b>ES:</b> On completion of this course, students will be able t	0	- ~		
1. Un	derstand various operating systems. hardware and its functions				
2. Ou	tline operating system process, thread concepts and CPU sched	uling	g alg	orith	ms.

3		Remen	nber p	rocess	synch	roniza	tion, E	Deadlo	ck, pre	eventio	on and	avoid	ance a	lgorith	ms.	
4		Compa	re var	ious m	emory	/ mana	gemer	nt sche	mes.							
5		Unders	stand t	he fun	ctional	lity of	file sy	stems.								
COU	RSE	ARTI	CULA	ATION	N MA'	<b>FRIX</b> :										
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	<b>PO1</b>	P01	P01	PSO	PSO	PSO	
										0	1	2	1	2	3	
CO1	3	3	1		1								3	1		
CO2	3	2	3	2	2								3	2		
CO3	3	3     2     2     3     2       3     3     2     2     3     2														
CO4	3	3	3     3     2     2       3     3     3     3													
CO5	3	3	3     3     3     3     2       Anderate     3-High)     3     3     2													
(1- Lo	w, 2-	- Moderate, 3-High)														
ТЕХ	KT E	BOOK	S:													
1		Abra	ham S	ilberch	natz, P	eter B	aer Ga	lvin, C	Greg G	lagne '	'Opera	ating s	ystem	conce	ots",	
1	•	$9^{\text{th}} \text{ ed}$	lition,	John V	Wiley I	Publis	hers, 2	012.								
2		Andr	ew S	5 Tar	enbau	m ar	nd H	erbert	Bos,	"M	odern	Oper	ating	Syste	ems",	
2	•	Fourt	h edit	ion, Pe	earson,	2016						-	-	•		
REF	FER	ENCE	ES:													
	1.	Gary	Nutt,	"Operc	ating S	ystem.	s", Ad	dison	Wesley	v, USA	, 2009	).				
2	•	Willia	m Sta	llings '	"Oper	ating S	System	s: Inte	rnals (	and de	sign F	Princip	les" 8	th Edi	tion,	
		Prenti	ice Ha	ll, 201	4.	0					0	•				
3	•	DML	Dhama	lhere,	"Oper	ating S	System	s: A C	Concep	t-base	d Appi	roach	", 2nd	Editio	n,	
		Tata M	AcGra	w-Hill	l Educ	ation,	2009.				11					
4		Achvu	t S.Go	odbole.	Atul I	Kahate	e, —Oi	peratir	ig Syst	tems.	McGr	aw Hi	ll Educ	cation.		
		2016.		,			. 1		5.	,				,		
.5		Harve	v M. I	Deitel	-One	erating	, Syste	ms. T	hird E	dition	Pear	son Ea	lucatio	n. 200	4.	
	-		,		<i>-p</i> <b>·</b>		,,							, _ 00		

18SPC40	4	DESIGN AND ANALYSIS OF ALGORITHMS	L	T	P	C
			3	0	0	3
OBJECT	'IV	ES:				
•		To understand and apply the algorithm analysis techniques ar of alternative algorithmic solutions for the same problem	nd th	e ef	ficie	ncy
٠		To understand different algorithm design techniques				
٠		To understand the limitations of Algorithmic power.				
UNIT I		INTRODUCTION				9
Algorithm Algorithm types. Fund best case, Mathematic number – A	<ul> <li>– I</li> <li>cor</li> <li>lam</li> <li>ave</li> <li>cal a</li> <li>Amo</li> </ul>	Fundamentals of algorithmic problem solving – Understand rectness – Analyzing an algorithm – Coding an algorithm. entals of the analysis of algorithm efficiency – Analysis fram grage case efficiencies – Asymptotic notations and basic e analysis of non-recursive and recursive algorithms – Computin prtized analysis.	ding Imj ewo effic ig nt	the porta rk – ienc h Fi	pro nt p wor y cla bona	blem - roblem st case, asses – cci
UNIT II		BRUTE FORCE, EXHAUSTIVE SEARCH,				9
		DECREASE AND CONQUER				
Brute force	e - S	Selection sort and Bubble sort, Sequential search and brute fo	rce	strin	g ma	tching,
Closest pair	r ar	nd convex hull problems by brute force, Exhaustive search –	Tra	velir	ng sa	lesman
problem, ki	nap	sack problem, Depth First search and Breadth first search. Dec	reas	e an	d coi	nquer –
Insertion so	ort,	Topological sort, generating permutations. Decrease by a con-	stan	t fac	tor –	binary
	1a01	DIVIDE AND CONDUED TDANSEODM AND				0
		CONQUER, TRANSFORM AND				9
Divide and	Co	nquer - Merge sort, Quicksort, Binary tree traversals, Multiplic	catio	n of	larg	e
integers and	d St	rassen's matrix multiplication. Transform and Conquer – Bala	nceo	1 sea	rch t	rees –
AVL, 2-3, 1	Hea	ps and heapsort, Binary Exponentiation, Horner's rule and bin	ary	expo	onent	iation.
UNIT IV		DYNAMIC PROGRAMMING, GREEDY				9
		TECHNIQUE				
Dynamic p binary sear Kruskal's a Maximum	rog ch lgo flov	ramming - Basic examples, Knapsack problem and memory trees, Warshall's and Floyd algorithms. Greedy technique rithm, Dijkstra's algorithm, Huffman trees and codes. Iterative v problem.	fur – Pı imı	iction rim's prove	ns, C s alg emer	Dptimal orithm, 1t –
UNIT V		COPING WITH LIMITATIONS OF				9
		ALGORITHMIC POWER				
Backtrackin	ng -	- n Queens problem, Hamiltonian Circuit problem and Su	ibse	t sui	m pi	oblem.
Branch and	l Bo	ound – Assignment problem, Knapsack problem and traveling	g sal	esma	an pi	oblem.
Decision tre	ees	for sorting. P, NP and NP-Complete problems, Approximation	ı alg	orith	nms f	or NP-
nara proble	-1115	TOTAL : 45 PER	IO	DS		
OUTCO	MF	CS: On completion of this course, students will be able to	)	~		
1. U	Jnd	erstand the fundamental of algorithm and Analyze the algorith	m e	fficie	ency.	
2. E	Expl	lain the various brute force approach, exhaustive search and de	ecrea	ise a	nd co	onquer
a	ppr	oach.				-

3.	•	Explai	n the v	various	techn	iques i	n divi	de and	conqu	ier, tra	insform	n and	conque	er.		
4.		Outline	e the d	ynami	c prog	rammi	ng app	proach	and g	reedy	approa	ach.				
5.	•	Illustra	te the	variou	s appr	oaches	s in ba	cktracl	king a	nd bra	nch an	d bou	nd tech	nnique	•	
COU	RSE	ARTI	CULA	TION	N MA'	<b>FRIX</b> :										
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	P01	P01	P01	PSO	PSO	PSO	
										0	1	2	1	2	3	
CO1	3	3										3	3	1	1	
CO2	3	2		3								2	3	2	1	
CO3	3	2	2     3     3     2     2     3     3     1     2       2     3     2     2     3     3     1     2													
CO4	3	2	2     3     2     2     3     2     3     3     3     2       2     3     2     3     3     3     2     1     3     2													
CO5	3	2	2 2 3 1 3 2 (oderate 3-High)													
(1- Lo	w, 2- 1	Moderate, 3-High)														
TEX	KT B	- Moderate, 3-High) BOOKS:														
1		Anan	y Lev	itin, "I	ntrodu	ction	to the	Desigr	n and A	Analys	is of A	Algorit	hms",	Third		
1	•	Editio	on, Pe	arson l	Educat	ion, 2	012.									
2		Thon	nas H.	Corme	n, Cha	arles E	.Leise	rson, F	Ronald	l L. Ri	vest ar	nd Clif	ford S	tein		
2	•	"Intro	oducti	on to A	Algorit	hms",	Third	Editio	n, PH	I Leari	ning P	rivate	Limite	d, 201	2.	
REF	FERI	ENCE	ES:													
j	<i>l</i> .	Ellis I	Horow	vitz, Sa	rtaj Sa	hni ar	id San	guthev	ar Ra	iaseka	ran, "	Funda	menta	ls of		
		Comp	uter A	lgorith	nms",	Galgo	tia Pul	blicati	ons, Ň	ew De	lhi, 20	010.		U		
2.		Alfred	! V. A	ho, Joł	ın E. H	lopcro	oft and	Jeffre	ey D.	Ullma	n, —l	Data S	tructur	es and	ł	
		Algori	ithms  ,	Pears	on Ed	ucatio	n, Rep	rint 20	006.							
3.		Harsh	Bhas	<b>in, —</b> A	llgorit	hms D	esign	and Ar	nalysis	l, Oxf	ord un	iversit	y pres.	s, 2010	5.	
4.		S. Sric	dhar, -	-Desi	gn and	l Analy	vsis of	Algor	<i>ithms</i>	, Oxfo	rd uni	versity	press,	2014.		
5.		http://	nptel.	ac.in/												
18SPC405	DATABASE MANAGEMENT SYSTEMS	L	Т	P	С											
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OBJECTI	VES:															
•	To learn the fundamentals of data models and to represent using ER diagrams.	(	latab	base	system											
•	To study SQL and relational database design and understand t	the i	nter	nal s	torage											
	structures using different file and indexing techniques which y	vill	help	in	U											
	physical DB design.															
•	To understand the fundamental concepts of transaction proces	sing	g- co	ncur	rency											
	control techniques and recovery procedures.															
UNIT I	INTRODUCTION TO DATABASES				9											
Traditional a	pproaches – Network model, Hierarchical model, File syster	ns.	Dat	abase	es and											
database user	s, advantages of DBMS approach, Database system concepts an	d ar	chite	ectur	e –											
data models,	schemas and instances, three schema architecture and data inde	pen	denc	e, da	tabase											
system enviro	onment, Client server architectures, ER models, Enhanced ER m	ode	1 –													
Specialization	n and generalization, UNION types.															
UNIT II	RELATIONAL MODEL				9											
Relational M	odel - Constraints - Keys - Dependencies - ER to Relational	Ma	ppin	ıg –	Object											
Relational M	apping - Relational Algebra – Tuple relational calculus - Norma	lizat	ion	- Firs	st,											
Second, Thin	econd, Third & Fourth Normal Forms - BCNF – Join Dependencies – Inference rules, quivalence and minimal cover, Properties of relational decompositions.															
equivalence a	Second, Third & Fourth Normal Forms - BCNF – Join Dependencies – Inference rules, equivalence and minimal cover, Properties of relational decompositions.															
UNIT III	<b>SQL &amp; QUERY OPTIMIZATION</b>				9											
Basic SQL -	Data definition and data types, specifying constraints, basi	c re	etrie	val q	ueries.											
Complex que	ries - Nested subqueries, Correlated subqueries, Inner joins and	Out	er jo	oins,												
Views. PL SC	QL – Cursors, functions, procedures, triggers. Algorithms for que	ery	pro	cessi	ng and											
optimization,	Database tuning.															
UNIT IV	<b>TRANSACTION PROCESSING, CONCURREN</b>	CY	,		9											
	CONTROL AND RECOVERY															
Introduction	o Transaction processing, Properties of transaction, Characteriz	ing	sche	dule	s based											
on recoverab	ility and serializability. Concurrency control techniques - T	wo	pha	se l	ocking											
protocol, time	e stamp ordering protocols, optimistic concurrency control techn	ique	es, n	nultip	ole											
granularity lo	cking, Deadlocks. Database recovery techniques - Deferred upd	late	and	Imn	nediate											
update, Shade	ow paging, log based recovery.															
UNIT V	ADDITIONAL TOPICS				9											
File structure	s, Indexing – Multilevel indexes, B trees and B+ trees, External	Has	hing	g, RA	ID,											
Distributed d	atabases, Introduction to data warehousing and data mining, Spa	tial	and	temp	oral											
databases, Bi	g data applications.															
	TOTAL : 45 PER	IO	DS													
OUTCOM	<b>ES:</b> On completion of this course, students will be able to	)														
1. Cla	assify the modern and futuristic database applications based on s	ize	and	comp	olexity.											
2. Co	nstruct Relational model to perform database design effectively.			•												
3. Cr	eate various queries using normalization criteria and optimize qu	ierie	s.													
4. Un	derstand transaction processing, concurrency control techniques	and	l dat	abas	e											
rec	overy techniques.															
5. Ou	tline the advanced databases like indexing technique, trees.															
COURSE A	RTICULATION MATRIX:															

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FERI	ENCE	ES:														
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	Eighth	h Editi	on, Pe	arson	Educa	tion, 2	2006.									
	G.K.G	<i>Fupta</i> ,	"Datał	oase M	anage	ment S	System	sI, Tat	ta Mc(	Graw P	Hill, 20	011.				
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•	Atul K	Cahate	, "Intr	oducti	on to l	Databa	ase Ma	inagen	nent S	ystems	", Рес	irson l	Educat	tion,		
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.	Raghu	ı Ram	akrishi	nan, "I	Datab	ase Ma	anager	nent S	vstems	s", Fot	urth E	dition,	Tata I	Мс		
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1. 2. 3. 4. 5. 6. 7. 8. 9. 10 11	<ol> <li>Data Definition Commands, Data Manipulation Commands, Database constraints,</li> <li>Transaction Control statements</li> <li>Database Querying – Simple queries, Nested queries, Sub queries and Joins</li> <li>Views, Sequences, Synonyms</li> <li>Database Programming with PL/SQL: Implicit and Explicit Cursors</li> <li>Procedures and Functions</li> <li>Triggers</li> <li>Exception Handling</li> <li>Database Connectivity with Front End Tools</li> <li>Mini project using real life database applications</li> </ol> <b>TOTAL : 60 PERIODS OUTCOMES:</b> On completion of this course, students will be able to 1 Make use of typical data definitions, manipulation commands, Database constraints and														
0.11	1001					0.1.1		]	ОТА	L:6	0 PE	RIOD	S		
		AES:		n com	pletion	of this	s cours	e, stud	ents w	$\frac{111}{100}$	able to $\overline{\mathbf{D}}$				1
1.		te use	of typi n cont	cal dat	a defin	itions,	manip	ulatior	i comn	nands,	Datab	ase cor	istrair	its and	a
2.	Des	ign ap	plicatio	ons for	Datab	ase que	erying	and Vi	ews.						
3.	Dev	elop si	imple a	applica	tions f	or Data	abase F	Program	nming	with l	PL/SQI	L.			
4.	Crea	ating a	pplicat	tions th	at mak	ke use (	of proc	edures	, trigge	ers and	ł excep	tion ha	ndlin	g.	
5.	Dev	elopin	g an ap	oplicati	on tha	t requi	res a F	ront-er	nd Too	l and l	Normal	izatior	is and	deve	lop real
COU	RSE A	<b>RTI</b>	se app		1. MATE	NIX.									
	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	РО	PO	PO	PS	PS	PS
001		-								10	11	12	01	02	2 03
CO1	3	3		2	1	2							3	3	_
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CO4	3	3	1	3	3	2					2		3	2	1
CO5	3	3	1	3	3	2			l		2		3	2	1
(L- L0	<b>w, M-</b> I	Modera	te, H-H	igh)		1	1	1			1		I	1	

## SEMESTER V

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												3	1	0	4
OBJECT	IVES:														
1.	To ex and to applic	tend stu o introd ation of	dent's uce me ideas	Logics ost of to solv	al and the ba ve prac	Mathe sic ter tical pr	matica minolo oblem	l matur ogies u s.	rity and ised in	d abilit comp	y to dea outer sc	al wit ience	h abs cou	stract	tion and
UNIT I		LOGI	C AND	PRO	OFS									ļ	9+3
Propositio Rules of in	nal Log	gic – Pro e - Intro	positio duction	onal ec n to pr	juivale oofs –	nces - Proof	Predica methoo	ates an ls and	d Quar strateg	ntifiers y.	– Nest	ed Qu	antif	iers -	
UNIT II		COMB	SINAT	ORIC	S									9	9+3
Mathemat	ical ind	uction -	Stron	g indu	ction a	nd wel	l order	ing – 7	The bas	sics of	countin	g – T	he	I	
pigeonhol	e princi	ple – Pe	ermutat	tions a	nd con	nbinati	ons – I	Recurre	ence re	lations	- Solv	ing li	near		
recurrence	e relatio	$\frac{1}{CDAD}$	neratin	g func	tions -	- Inclu	sion an	d exclu	usion p	orincipl	le and it	s app	licati	ions.	
UNIT III	I         GRAPHS           nd graph models – Graph terminology and special types of graphs – Matrix representation           nd graph isomorphism – Connectivity – Euler and Hamilton paths.														9+3
Graphs an graphs and	and graph models – Graph terminology and special types of graphs – Matrix representation of and graph isomorphism – Connectivity – Euler and Hamilton paths.9+3VALGEBRAIC STRUCTURES9+3														of
UNIT IV	id graph isomorphism – Connectivity – Euler and Hamilton paths.         7       ALGEBRAIC STRUCTURES         9+3         a sustame       Semi-groups and monoids         Croups       Subgroups         Homomorphisms       Normal														
Algebraic	system	s – Sem	i group	os and	monoi	ds - Gi	roups –	Subgr	oups –	- Homo	omorph	isms -	- No	rmal	
subgroup	and cos	ets – La	grange	e's theo	orem –	Defin	itions a	ind exa	mples	of Rin	gs and	Fields	S.		
UNIT V		LATT	ICES A	AND I	BOOL	EAN A	ALGE	BRA						9	9+3
Partial ord Sub lattice	lering – es – Dir	Posets - ect prod	– Lattie uct and	ces as d hom	posets omorpl	– Prop hism –	oerties Some	of latti specia	ces - L l lattice	attices es – Bo	as alge oolean a	braic Igebr	syste a.	ems -	_
								TC	TAL	(L:45	<b>5 + T :</b> 1	15): 6	0 PE	RIO	DS
COURS	E OU	TCOM	IES:	On the	comp	letion of	of cour	se, stu	dents w	vill be	able to				
1. U	ndersta	nd the co	oncept	s need	ed to te	est the	logic c	f a pro	gram.						
2. In	fer vari	ous com	ibinato	ry and	l its app	plicatio	ons.								
^{3.} O	utline t	ne conce	epts of	graphs	s and it	s repre	esentati	on.							
4. De	efining	the prop	perties	of alge	ebraic s	structu	re such	as gro	oups, ri	ngs an	d fields	•			
5. D	iscuss t	he conce	epts an	d prop	erties	of latti	ces and	l Boole	an alg	ebra.					
6. Ui so	ndersta lve pra	nd basic ctical pr	termir oblems	nologie 5.	es used	in cor	nputer	scienc	e cours	ses and	l applica	ation	of id	eas to	C
COURS	EAR	TICUI	ATI	ON N	/IATF	RIX:									
PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PS 2	0 1	PSO 3

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CO2	3	1		1									3	2	1
CO3	3	2		1									3	2	
CO4	3	1		1									3	3	
CO5	3	1		1									3	3	
CO6	3	2	2	2							3		3	3	1
(1-Lov	-Low, 2- Moderate, 3-High) <b>EXT BOOKS:</b>														
TEX	TEXT BOOKS:         1.       Kenneth H.Rosen, "Discrete Mathematics and its Applications", 7 th Edition, Tata Mc Graw														
1.	TEXT BOOKS:         1.       Kenneth H.Rosen, "Discrete Mathematics and its Applications", 7 th Edition, Tata Mc Graw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2011.         2.       Trembley, L.D. and Manchen P. "Discrete Mathematical Structures with Applications to the second s														
2.	Tren Con	mblay . nputer	J.P. an Scienc	d Mano e", Mc	ohar R Graw	, "Disc Hill E	rete M ducatio	athema on, Nev	atical S w Delh	tructu i, India	res wit an Edit	h Appl tion, 20	ication )17.	is to	
REF	EREN	CES:													
1.	Ralı Edir	ph.P.G tion, Pe	rimald earson	'i., "Dis Educa	screte a tion A	and Co sia, De	mbina Ihi, 20	torial 1 07.	Mather	natics:	An Ap	plied I	Introdu	uction"	, 4 th
2.	Tho	mas Ko	oshy.,	"Discre	ete Ma	themat	ics with	h Appl	ication	s", Els	evier I	Publica	tions,	2006.	
3.	Seyr Out	nour L lines, T	ipschu Fata M	tz, Mai c Graw	rk Lips 7 Hill I	on and Pub. Co	l Varsh 5. Ltd.,	a H Po New I	atil, "L Delhi, I	Discrete Revised	e Math 1 3rd E	ematic Edition,	s", Sch 2017.	iaum's	

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OBJE	CTIV	/ES:													
	•		Under and va	stand l arious	basics modes	of Cor of trai	nputer 1smissi	Netwo	orks an ohysica	d get f al laye	familiaı rs.	with l	SO/O	SI Mo	del
	٠		Under	stand i	in deta	il the p	protoco	ols in E	Data Li	nk lay	er and l	Networ	∙k laye	er.	
	•		Be far	niliar v	with va	rious	protoco	ols in t	ranspo	rt laye	r and a	pplicat	ion la	yer	
UNIT	ΓI		INTI	RODU	UCTI	ON&	: PHY	<b>SIC</b>	AL L	AYE	R				9
Buildir their se Networ Charac Techni	ng a Nervice rking terist ques	Vetwo mode Devi ics - I - Cha	rk - Ne els - OS ices - Data Tra nnel Ac	twork SI Refe Mode ansmis	Edge a crence f ems - ssion - fechnic	nd Co Model Route Physic Jues - '	re – D - Netv ers - S cal Lin TDM -	elay, L vork T Switche ks and FDM	oss an opolog es – ( Transi	d thron gies - I Gatewa missio	ughput nternet ays. Pł n Medi	– Prote Archit nysical a - Sig	ocol la ecture Layer nal Er	yers a	nd Signal g
UNIT	II		DAT	ALI	NK L	AYE	R, LA	Ns a	nd M	ULT	IMEI	DIA			9
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UNIT	' III		NET	WOF	RK Al	ND R	OUT	ING							9
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UNIT	IV		TRA	NSP(	<b>DRT</b>	LAY	ER								9
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UNIT	C V		APP	LICA	TIO	N LA	YER								9
Principl MIME)	les of ) - DN	Applio S – SI	cation L NMP – I	ayer Pı Peer to	otocols peer ap	s - Web plicatio	o and H ons – S	TTP - I ocket p	FTP - E rogram	lectron ming.	ic Mail	(SMTI	P - POF	93 - IM	AP -
				r				TO	<b>)TAI</b>	<b>45</b>	PER	IODS			
OUT		/IES:		On th	ne com	pletion	$\frac{1 \text{ of } \text{co}}{2}$	urse, s	tudents	s will t	be able	to			
1.	Lis net	t netw work.	vork de	vices a	ind trac	the t	flow of	finfor	nation	from	one noo	de to ai	nother	node i	n the
2.	Ex]	plain	the link	layer	and m	ultime	dia app	olicatio	ns.						
3.	Eva	aluate	the pro	otocols	in net	work l	ayer fr	om Qo	S pers	pectiv	e.				
4.	Ch	oose f	function	nalities	at eac	h laye	r for di	fferent	applic	cations	5.				
5.	De	fine th	ne vario	ous app	olicatio	n laye	r proto	cols.							
COU	RSE	AR	<b>FICU</b>	LATI	ON N	<b>AAT</b>	RIX:								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2		1							1	2	3	1	1

CO2	3	2	2	2	1							2	3	2	1
CO3	3	3	2	2	1						1	1	3	2	2
CO4	3	3	2	1							1	3	3	3	1
CO5	3	3	2	3	2						2	3	3	3	1
(1-Low	, 2- Mo	oderate,	3-High)	)											
TEX	T B(	DOKS	5:												
1.	<ul> <li>Andrew S Tanenbaum and David J Wetherall, "Computer Networks", Prentice Hall of India/ Pearson Education, New Delhi, Fifth Edition, 2012.</li> <li>James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Sixth Edition, Pearson Education, 2012.</li> </ul>														
2.	James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Sixth Edition, Pearson Education, 2012.														
	James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Sixth Edition, Pearson Education, 2012.														
REF	ERE	NCE	S:												
1.	Will	iam St	allings	, "Dat	a and	Сотри	iter Co	mmun	ication	is", Te	nth Ea	lition,	Pearso	n	
	Edu	cation,	2013.												
2.	Lari	у L. Р	etersor	ı, Bruc	e S. D	avie, "	Compi	iter Ne	etwork.	s: A Sy	vstems	Appro	ach", I	Fifth	
	Edit	ion, M	organ	Kaufm	ann Pi	ıblishe	ers Inc.	, 2011							
3.	Behi	rouz A	. Forot	uzan ai	nd Fire	ouz Mo	sharra	ıf, "Co	mpute	r Netw	orks a	Top L	Down A	pproa	ch",
	Tata	ı McGı	raw-Hi	ill, 201	1.										
4.	Dou	glas E	. Come	er, —Ii	nternet	workin	ig with	TCP/	IP(Vo)	lume I,	) Princ	ciples,	Protoc	ols and	d
	Arch	iitectu	re, Sixi	th Edit	ion, Pe	arson	Educa	tion, 2	013.						
5.	Nad	er F. N	Air, Co	ompute	r and (	Сотті	unicati	on Net	works,	Secon	nd Edit	ion, Pi	rentice	Hall, 2	2014.

18SPC503	OBJECT ORIENTED SOFTWARE	L	Т	P	С									
	ENGINEERING													
		3	0	0	3									
OBJECTIV	TES:			•										
•	Develop models using UML Notation and analyze requirement	nts v	vith	use c	ases									
	and create domain models													
٠	Relate analysis, design artifacts, document and present projec	t de	iver	ables										
•	Apply concepts to semester long software engineering project	S												
UNIT I	<b>INTRODUCTION &amp; SOFTWARE PROCESS</b>				9									
Evolving role	of software – software characteristics – software applications	5 – 5	softv	vare	myths.									
Software Proc	ess models - Generic process model, Prescriptive process n	node	els -	- Wa	terfall,									
Incremental,	Evolutionary, Concurrent, Specialized process models -	Co	npo	nent	based									
development,	Formal methods model, Aspect oriented software development	nt, U	Jnifi	ed P	rocess,									
Personal and T	Yeam Process models. Agile Development – Process, Extreme I	Prog	ram	ming	,									
Scrum.														
UNIT II	<b>REQUIREMENTS ENGINEERING &amp; ANALYS</b>	IS			9									
Identifying sta	akeholders – Eliciting requirements – Developing usecas	es -	- B	uildi	ng the									
requirements	model - Negotiating and validating requirements. Require	men	ts N	Aode	ling –									
Analysis, Scen	ario based modeling, UML models that supplement use case	– A	ctivi	ty di	agram,									
Swimlane diag	Analysis, Scenario based modeling, UML models that supplement use case – Activity diagram, Swimlane diagram. Data Modeling - Data Objects - Attributes and Relationships - Data Flow Diagrams - The Data Dictionary – Creating a behavioral model – identifying events with use													
Swimlane diagram. Data Modeling - Data Objects - Attributes and Relationships - Data Flow Diagrams - The Data Dictionary – Creating a behavioral model – identifying events with use														
Swimlane diagram. Data Modeling - Data Objects - Attributes and Relationships - Data Flow Diagrams - The Data Dictionary – Creating a behavioral model – identifying events with use case, state representations.														
Swimlane diagram. Data Modeling - Data Objects - Attributes and Relationships - Data Flow Diagrams - The Data Dictionary – Creating a behavioral model – identifying events with use case, state representations.Data Flow 9UNIT IIIDESIGN9														
Design concep	pts - Modularity - Functional Independence - Cohesion -	Cou	ıplin	ıg -	Object									
oriented desig	n concepts - Design classes - Design model. Architectural	des	ign	– Sc	oftware									
architecture, a	rchitectural genres, architectural styles, architectural mapping	g us	ing	data	flow.									
Component lev	vel design, User interface design, Pattern based design – Desi	gn j	patte	rns, j	pattern									
based software	e design, architectural patterns, component level and user interf	ace	desi	gnpa	tterns.									
UNIT IV	TESTING TECHNIQUES				9									
Strategic appro	oach to Software Testing – Issues, Unit testing, Integration test	ing,	Syst	tem t	esting,									
Art of debuggi	ng. Testing conventional applications - White Box Testing – H	Basis	s Pat	h Te	sting –									
Control structu	re testing – Black box Testing – Testing for specialized envir	onn	nent	s - P	atterns									
for software te	sting, Testing object oriented applications – OOA and OOD test	sting	g mo	dels,										
strategies, testi	ing methods at class level, Interclass test case design.				_									
UNIT V	SOFTWARE QUALITY ASSURANCE &				9									
	SOFTWARE CONFIGURATION MANAGEME	NT												
SQA tasks, G	oals and metrics - Formal approaches to SQA - Statistic	al s	oftw	are	quality									
assurance, So	ftware reliability - Six sigma, ISO 9000 standards – SQ	)A	Plar	n. So	oftware									
configuration 1	nanagement – Elements, Baselines, Configuration items, SCM	rep	osito	ory, S	СМ									
Process – Vers	ion control, Change control – Configuration Audit.													
	TOTAL : 45 PER	IOI	DS											
OUTCOME	<b>CS:</b> On completion of this course, students will be able to	)												
1. Und	erstand the various process models for software design.													
1														

2		Determ	termine the requirements for developing software. derstand the fundamental principles underlying Object-Oriented software design. velop error identification and testing strategies for code development. fine approaches of SQA and SCM process. <b>RTICULATION MATRIX:</b> <b>20 P03 P04 P05 P06 P07 P08 P09 P01 P01 P01 PS0 PS0 PS0</b> <b>3</b> 1 1 2 3 2 1 1 3 3 2 1 1 <b>3</b> 2 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 2 1 1 3 3 3 2 1 1 3 3 3 2 1 2 3 3 3 1 1 3 3 3 2 2 3 3 3 3													
3		Unders	stand t	he fun	damen	tal pri	nciple	s unde	rlying	Objec	t-Orie	nted s	oftwar	e desig	gn.	
4		Develo	p erro	r ident	ificati	on and	l testin	ig strat	egies t	for co	le dev	elopm	ent.			
5		Define	appro	aches	of SQ.	A and	SCM	proces	s.							
COU	IRSI	E ARTI	CULA	ATION	N MA'	<b>FRIX</b> :	:									
	PO	1 PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	
CO1	3	3	1	1			3	2		1	3		3	2	1	
CO2	3	3	2	1		2	3	2		1	3		3	2	1	
CO3	3	3	2	2	1	2	3				3		3	2	1	
CO4	3	3	3	3	1	1	3	3		2	3		3	3	1	
CO5	3	3	3	3	2	2	3	3		2	3		3	3	2	
(1- Lo	w, 2-	Moderat	e, 3-Hig	gh)												
ТЕХ	KT H	BOOK	JOKS:           Roger S Pressman, "Software Engineering - A Practitioner's Approach", 7 th Edition,													
1	•	Roge McG	<b>OOKS:</b> Roger S Pressman, "Software Engineering - A Practitioner's Approach", 7 th Edition, McGraw Hill, 2017         Michael R Blaha, James R Rumbaugh, "Object oriented modeling and design with													
2		Mich UML	Roger S Pressman, "Software Engineering - A Practitioner's Approach", 7 th Edition, McGraw Hill, 2017 Michael R Blaha, James R Rumbaugh, "Object oriented modeling and design with UML", Second edition, Pearson Education India, 2007													
REF	FER	ENCE	ES:													
j	<i>l</i> .	Grady	, Booc	h, Jam	es Rui	mbaug	h, Iva	r Jaco	bson,	"The l	Unified	l mode	ling la	inguag	e	
		user g	uide"	Secor	ıd edit	ion, A	ddisor	n Wesle	ey, 201	17	v		U	0 0		
	2.	Ali Ba	hram	i, "Obj	iect or	iented	systen	ns deve	lopme	ent", l	st Edit	ion, Te	ata Me	Graw	-Hill	
		Educa	tion, 2	2017			2		1							
	3.	Craig	Larm	an. "A	pplvin	g UM	L and	Patter	ns: An	Intro	duction	n to Ol	bject-C	Driente	ed	
		Analy	sis and	d Desis	gn and	I Iterat	tive De	evelop	ment".	$3^{rd} E$	dition.	PHI, 2	2018			
4	4.	Ian Sc	mmer	ville	-Soft	vare F	ngine	ering.	9th E	dition.	Pears	on Ed	ucatio	n Asia		
		2011.		,			0		2						,	
	5.	Stephe	en R.S	chach.	"Soft	ware F	Engine	ering'	. Tata	McGi	raw-H	ill Puk	lishin	g Com	panv	
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OBJEC	CTIV	/ES:													
	•		Be fa	miliar	with i	Regula	ar lang	uages	and F	inite A	Automa	ata, Co	ntext	Free	
			Lang	uages	and P	ush Do	own A	utoma	ta						
	•		Be ex	xposed	d with	Turing	g Macl	nines,	Recur	sively	and Re	ecursiv	ely E	lnumer	able
			Lang	uages											
	•		To L	earn w	vith U1	ndecid	able p	roblen	ns.						
UNIT	Ι		REC	GUL	AR L	ANG	UAG	ES A	ND ]	<b>FINI</b> '	TE				11
			AU.	ГОМ	ATA										
Mathem	natic	al too	ols and	d tech	niques	s -	Logic	and P	roofs,	Sets, l	Functio	ons and	l Equ	ivalend	ce
Relation	ns, L	angau	iges, F	Recurs	ive de	finitio	ns, Pro	of tec	hnique	es. Reg	gular L	angua	ges -	Regula	ır
express	ions,	, DFA	, NFA	, NFA	A Epsil	lon, Co	onverti	ng NF	FA-Ep	silon t	o NFA	, Conv	verting	g NFA	to
DFA, N	linir	nizing	g DFA	, Klee	ne's T	heorer	n, Pun	nping	Lemm	a, Dec	cision p	problei	ns.		
UNIT	II		CO	NTE	XT F	REE	LAN	GUA	GES	ANI	D PUS	SH	T		11
			DO	WN A	AUT(	OMA	ТА								
Context	Fre	e grar	nmars	(CFG	), Der	ivatior	trees.	Amb	iguity,	Norm	nal forr	ns – C	NF, C	GNF - I	Push
down au	utom	nata (F	PDA) -	- Com	putati	on tree	es, Equ	ivaler	ice of	detern	ninistic	and n	on-de	termin	istic
PDA's,	Con	versi	on of I	PDA to	o CFG	and C	FG to	PDA,	Prope	rties c	of Cont	ext fre	e lang	guages	
(CFL), 1	Pum	ping l	lemma	for co	ontext	free la	inguag	es, De	cision	probl	ems.				
UNIT	III		TU	RING	Ъ МА				8						
Turing	macl	hines	as lang	guage	accept	lti-trac	k turi	ing							
machine	es, N	/ulti-t	ape tu	ring n	nachin	es, Ch	urch T	uring	thesis,	Non-	determ	instic	turing	g mach	ines,
Univers	al tu	iring r	nachir	nes.											
UNIT	IV		UN	DECI	<b>IDAB</b>	BLE F	PROF	BLEN	IS A	ND					7
			CO	MPU	TAB	LE F	UNC	TIO	NS						
Recursi	ve a	nd Re	cursiv	ely En	numera	able la	nguage	es, Ch	omsky	Hiera	urchy, l	Decida	ble a	nd	
Undecid	dable	e prob	olems,	Reduc	ctions a	and the	e Halti	ng pro	blem,	Diago	onaliza	tion m	ethod	, Decis	sion
problem	ns in	volvii	ng Tur	ing ma	achine	s, Rice	e theor	em, P	ost Co	rrespo	ondence	e probl	em, N	Modifie	ed
Post con	rresp	onder	nce pro	oblem	•										
UNIT	V		CO	MPU	TAT	IONA	AL C	OMP	LEX	ITY					8
Primitiv	e Re	ecursi	ve fun	ctions	and $\mu$	-recur	sive fu	inctior	ns, Go	del nu	mberin	ıg, Tra	ctabil	ity and	l
Intracta	bilit	y, P a	nd NP	Class	es, Pol	lynom	ial tim	e redu	ctions	and N	P-Con	npleter	ness, S	Satisfia	ablity
problem	n, Co	ook Le	evin th	eorem	1.										
									<b>ROT</b>		4		<b>D</b> a		
								,	ГОТ	AL:	45 PF	<b>ERIO</b>	DS		
OUTC	CON	<b>AES</b> :	•	On	the co	mpleti	on of	this co	urse, s	tuden	ts will	be abl	e to,		
1.	Cre	eate a	utoma	ta, reg	ular ex	kpressi	on for	any p	attern.						
2.	Illu	istrate	conte	xt free	e gram	mar fo	or any	constr	uct.						
3.	De	sign t	uring 1	machii	nes for	any la	anguag	ge.							
4.	Eva	aluate	the u	ndecid	lable a	nd dec	idable	probl	ems ai	nd con	nputati	onal fi	inctio	ns.	
5.	De	velop	the co	mputa	ation s	olutio	ns usin	ıg turiı	ng mao	chines	•				
COUF	RSE	AR'	ΓΙϹ	JLAT	TION	MA	ΓRIX								
P	01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	PSO	PSO	PSO
										0	1	2	1	2	3

CO1	3	3	2	1								2	3	2		
CO2	3	3	3	2								1	3	3		
CO3	3	3	3	2								2	3	3		
CO4	3	3	3	3		2		1			1	2	3	3	1	
CO5	3	3	2	3		1		1			1	1	3	2	1	
(1-Low	v, 2- M	oderate	, 3-Hig	h)												
TEX	T B	OOK	S:													
1	l. Jo	hn C N	Martin	, "Intro	oductio	on to L	angua	iges an	d the	Theor	y of C	omput	ation"	, Tata		
	Μ	McGraw Hill Publishing Company, New Delhi, 2009.         .       H.R. Lewis and C.H. Papadimitriou, "Elements of the Theory of Computation", Second														
2	2. H.	H.R. Lewis and C.H. Papadimitriou, "Elements of the Theory of Computation", Second Edition, Pearson Education, 2003.														
	Ec	H.R. Lewis and C.H. Papadimitriou, "Elements of the Theory of Computation", Second Edition, Pearson Education, 2003.														
REF	ERE	ENCE	ES:													
	Joi	hn E H	lopcro	ft and	Jeffer	v D Ul	lman,	"Intro	ductio	on to A	lutoma	ita The	eory, L	angua	ges	
1	and	d Com	putati	on", P	Pearson	ı Educ	ation .	Asia, 1	Vew D	elhi, 2	2009		-	-	-	
2	2. <i>Mi</i>	chael	Sipser	, "Intr	oducti	on of t	he The	eory a	nd Cor	mputa	tion",	Third	Editio	n, Cen	gage	
	lea	rning,	<i>201</i> 4.													
ź	<i>B. Pe</i>	ter Lin	ız, "Ai	ı Intro	ductio	n to F	ormal	Langu	age ai	nd Aut	tomata	e", Fif	th Edit	tion, Jo	ones	
	& I	Bartle	tt Lear	ning,	New L	elhi, 2	2011.									
4	4. Ad	'am Br	ooks V	Vebber	r, "Foi	rmal la	anguag	ges: a	practi	cal int	roduc	tion",	Jim Le	eisy, 20	008	
4	5. Ka	mala I	Krithiv	vasan d	and Ra	ıma. R	, "Intr	oducti	ion to .	Forma	al Lang	guage	s, Auto	mata		
	Th	eory a	nd Co	mputa	tion",	Pears	on Edi	ication	ı 2009	)	,	- 0				

<b>18SP</b>	C505	5	CON	<b>IPUT</b>	ER I	NET	WOR	KS I	LABO	<b>DRA</b> '	TOR	Y	L ]	[ ]	P	С
													0 (	)	3	1.5
OBJ	ECT	IVES	5:													
	•		To l	earn s	ocket j	progra	mmin	g, use	netwo	ork cor	nmano	ds.				
	•		То д	gain kr	nowled	lge ab	out the	e work	ting of	routi	ng algo	orithm	s.			
	•		Τοι	ise sin	nulatic	on tool	s to an	alyze	the pe	erform	ance o	of proto	ocols	in d	liffe	erent
			laye	rs in c	omput	ter net	works	and ir	nplem	entati	on of e	error c	orrec	tion	co	de.
LIST	l' OF	EXP	<b>ERI</b>	MEN	TS:											
1.	Lear	n to u	se con	nmand	ls like	tcpdu	mp, ne	etstat, i	ifconfi	ig, nsl	ookup	and tr	acero	oute.	Ca	pture
2	ping	and the	racero	ute PL	OUS US	ing a i	networ	'k prot	tocol a	inalyz	er and	exami	ne.			
Ζ.	The	10110V i S	ving ei Simple	Chat	Progra	re to t m usi	ng TC	P Soc	lea m	C/Jav	а					
		ii .	Slidin	σ Win	dow P	rotocc	ng re	3 TCP	Sock	ets						
		iii.	DNS	using	UDP S	Socket	ts	5 1 01	DOCK	015						
3.	Stud	ly of V	Viresh	ark To	ol											
4.	Trac	ing of	f TCP	and U	DP Co	onnect	ion us	ing W	iresha	rk						
5.	Impl	lemen	tation	of Sub	onettin	g										
6.	Stud	ly of N	Vetwor	k Sim	ulator	(NS-3	) Tool	~ •								
7.	Sim	ulation	n of T	CP Pei	rforma	ince us	sing N	S-3								
8. 0	S1m	ulation	1 of U	DP Pe	rforma	ance u	sing N	18-3 to colo	naina	NG 2						
9. 10	Sim	ulation	l of er	mpans	son or rrectio	n code	ng Fiu a (lika		using	, <b>IND-</b> D						
10	10. Simulation of error correction code (like CRC).															
PLA	TFO	RM	NEE	DED												
•	Iava	/ Eau	ivalen	t Com	niler											
•	Netv	vork s	imula	tor like	e NS3/	Glom	nosim/	OPNI	ET/ Ec	quival	ent					
										1						
									TOT	ΓAL :	: 45 F	PERI	ODS	5		
OUT	CON	<b>AES</b> :		On th	e com	pletio	n of th	is cou	rse, st	udents	will t	be able	to,			
1.	C	Outline	the no	etwork	basec	l com	mands	•								
2.	D	evelo	p the p	protoco	ols usi	ng TC	P and	UDP	Socke	ts.						
3.	C	ompa	re the	perfor	mance	e of di	fferent	routi	ng alge	orithm	s usin	g simu	ilatio	n to	ols.	
4.		compa	re the	perfor	mance	e of di	fferent	trans	port la	yer pr	otocol	s.				
).		npiem				error c		ion co	de.							
COL	RSE				ION				DOA	DO1	DO1	DO1	DCO			<b>D</b> CO2
	POI	PO2	P03	PO4	P05	PO6	P07	PO8	P09	0 0	1 1	2	PSO 1	2 PS	50	P\$03
CO1	3	2	2	1		2			2	2	1		3	2		2
CO2	3	2	2	1		3			2	1	2		3	2		3
CO3	3     2     3     1     2     1     3     3     2     1       3     2     1     1     2     1     3     3     2     1															
CO4	04     3     2     3     1     1     2     2     1     3     3     2     1       05     3     2     3     1     1     2     2     1     3     3     2     1															
CO5	3	2	3	1	1	2			2	1	3		3	2		1
(1-Low	, 2- Mo	oderate,	, 3-Higl	n)												

18HSC506

### SOFT SKILLS AND PERSONALITY DEVELOPMENT LABORATORY

L	Т	Р	С
0	0	3	1.5

### **OBJECTIVES**

UNIT I	LISTENING AND SPEAKING SKILLS
•	To help them to face the interviews and to improve soft skills.
•	To make them prepare for national and international examinations and placements.
•	To help the students to improve the listening, speaking, reading and writing skills.

Conversational skills (formal and informal)-making effective presentations using computers, listening/watching debates, documentaries. Listening to lectures, discussions from TV/ Radio/ Podcast.

### UNIT II READING AND WRITING SKILLS

Reading different genres of tests ranging from newspapers to creative writing. Writing different types of Applications and complaints- Writing reviews – film appreciation- thesis writing – posture making-advertisement-magazine preparation

### UNIT III ENGLISH FOR NATIONAL AND INTERNATIONAL EXAMINATIONS ANDPLACEMENTS

International English Language Testing System (IELTS) - Test of English as a Foreign Language (TOEFL) - Civil Service (Language related)- Verbal Ability.

### UNIT IV SOFTSKILLS

Motivation- emotional intelligence-Multiple intelligences- - career planning -creative and critical thinking.

## **UNIT V** EMPLOYABILITY AND CORPORATE SKILLS

Interview skills – Types of interview, preparation for interview, mock interview. Group Discussion leadership and co-ordination. Time management and effective planning- Stress management – causes and effect-stress relief techniques

TOTAL	-	45 PERIODS
OUTCOMES	On completion of this course, students will be able to	
1	Make presentations and participate in group discussions.	
2	Take international examinations such as IELTS and TOEFL.	
3	Successfully answer questions in interviews.	
4	Create postures, advertisements and magazine making which writing skills.	are the parts of
5	Write film – appreciation, book review and Thesis writing wh of analytical thinking and creative writing	nich are the part

COURSE ARTICULATION MATRIX:															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1										3	3	3	1	2	1
CO2										3	3	3	3	3	1
CO3										3	3	3		2	1
CO4										3	3	3		2	1
CO5										3	3	3		2	1
(1-Lov	w, 2- M	oderate	, 3-High	ı)											

18SPR507	Project I	L	Τ	Р	С
		0	0	3	1.5
OBJECTIVE	S:				
•	To identify the problem based on societal needs and suggest	crea	tive	solutio	ons to

	societal problems
•	To interview people on societal problems that require computerization
•	To explore possible alternative solutions and estimate risk and develop a
	prototype

1. The students have to complete a project by implementing the knowledge they have acquired in the following course of study

- Data Structures
- Operating Systems
- Computer Networks
- Algorithms

A detailed report has to be submitted comprising of Title, Problem Definition, Feasibility Study, Significance of the project, Methodology, Tools &Platform used, Sample Source Code, Screen Shots and References. The Students should have their Projects approved by the Department Project Review committee before commencing the projects.

									TOT	'AL :	45 P	ERI	DDS		
OUT	<b>FCC</b>	<b>DMES</b>	:	On co	omplet	ion of	this co	ourse,	studen	ts will	l be ab	le to			
1.		Analyz	e prof	ession	al issu	es, inc	luding	g ethica	al, lega	al and	securi	ty issu	es, rel	ated to	)
		compu	ting pi	rojects	•										
2.		Apply	prior	knowl	edge to	o desig	gning a	and im	pleme	nting s	solutio	ns to o	open-e	nded	
		computational problems while considering multiple realistic constraints.													
3.	3.       Make use of CASE tools for solving case studies.														
4		Analyze Database, Network, Algorithms and Application Design methods.													
5.		Design and use performance metrics to evaluate a designed system.													
COU	JRS	SE AR'	TICU	JLAT	TION	MA	ΓRIX	:							
	PO	1 PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	P01	P01	PO1	PSO	PSO	PSO
										0	1	2	1	2	3
CO1	3	3		1					1	3				2	3
CO2		3	2	3					1	3		1		2	3
CO3		3	3	3	3	2				3	3	2	1	1	2
CO4		3	3	3					3	3	3		2	3	3
CO5	3	3	3						2	3	3	1		1	2
(1- Lo	w, 2-	Moderate	e, 3-Hig	gh)											

## **SEMESTER VI**

18	SPC6	01			C	OMP	ILER	R DES	SIGN	•		Ι	T	P	C
												3	6 0	0	3
OBJ	ECTI	VES:										•	•		
	٠		To le	arn th	e vario	ous par	rsing te	echniq	ues an	d diffe	erent l	evels c	of tran	slation	and
			how	to obta	ain spe	ecific o	object of	code f	rom sc	ource 1	angua	ge			
	٠		To le	arn ho	w to c	optimiz	ze the	code a	nd sch	edule	for op	timal _l	perfor	mance	
	•		To L paral	earn h lelism	ow to	schedu	ule coc	le and	to be t	familia	ar with	the co	oncep	t of	
UNI	ΤI		INT	ROD	UCT	ION	& L1	EXIC	CAL A	ANAI	LYZI	ER			10
Structure of a compiler – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – Lex – Finite Automata – Regular Expressions to Automata – Design of Lexical Analyzer Generator – State minimization in Lexical Analyzers.UNIT IISYNTAX ANALYSIS9															
UNI	TII		SYN	JTAX	K AN	ALY	SIS								9
Role Parse Parsi SLR	of Pa trees ng – B Parsin	rser – and de ottom g Tabl	<ul> <li>Representative Grammars – Syntax Error Handling – Context-free grammars – derivations – Top Down Parsing - Recursive Descent Parsing - Predictive om up Parsing - Shift Reduce Parsing - LR Parser-LR (0) Items - Construction of ables – Canonical LR(1) Items - Constructing LALR Parser - YACC.</li> </ul>											ars – on of	
UNI	T III		INT	ERM	IEDI	ATE	COD	E G	ENEI	RATI	[ON				9
Trees Chec	s, Thre king, ( T IV	e Add Contro	ress C l flow <b>RU</b> N	ode, T , Back N-TII	ypes a patchi ME E	nd Deng.	clarati	ons, T MEN	ransla	tion of <b>ND C</b>	f Expr	ession:	s, Typ	e	9
			GEN	NERA	ATIO	N									
Stora Mana	ge Org Igemen	ganiza nt. Issu	tion, S tes in t	tack A	llocat sign of	ion of f Code	Space Gener	, Acce rator –	ss to N Addro	Non-lo esses i	cal Da	ata on t arget o	the Sta code –	ack, Ho - Basic	eap
DIOCK	$\frac{1}{T}$	Flow §	graphs	-Coc	e gen		$\frac{1}{1}$ algor	ithm –	- Regis	ster all	ocatio	n and	assign	ment.	0
Princ Data Loop	ipal So Flow $A$ s in flo	ources Analys ow gra	of Op sis – R phs, R	timiza eachir egion	tion – ig defi based	Optin nitions analys	nizatio s, Live sis.	n of B varial	asic B ole ana	locks Ilysis,	- Peep Availa <b>45 PH</b>	-hole o able e	optimi xpress <b>DS</b>	zation sions,	-
OU	ГCOI	MES:	}	On	compl	etion of	of this	course	e, stude	ents w	ill be a	able to	,		
	1. De	esign c	ompil	er pha	ses fro	m lan	guage	specif	ication	l					
	2. Ar	nalyze	the sy	ntax a	nd par	sing a	nd use	of too	ols.						
	$\frac{3}{4}$ De	velop ·	the in	termed	liate la	anguag	ges.	1 1							
4	+. De 5 Δ+	sign c	ode ge	enerato	ors for	tion te	ecified	1 mach	nne.						
CO	IRSE	C AR'			'ION	MA	<b>FRIX</b>	•							
									DOO	DO1	DO1	DC1	DOC	DOO	DOO
	PUT	P02	FUS	F04	PU3	PU0	PU/	FUð	FU9	0	1	2	1	2	3
CO1	3	3		1									3	1	

CO2	3	3		1									3	1	
CO3	3	3	2	2									3	2	
CO4	3	3	2	2	1	1	1				1	1	3	2	1
CO5	3	3									1	1	3	1	1
(1-Lov	w, 2- N	Ioderate	e, 3-Hig	h)								•	•		
TEX	KT B	OOK	S:												
]	I. A Te	lfred V echniq	⁷ Aho, ues an	Moni d Tool	ca Lan ls", Es	n, Ravi sex Pe	i Sethi arson,	and Jo Harlo	effrey w, 201	D Ullı 4.	nan, "	Comp	ilers -	Princi	ples,
4	2. K	eith D	Coope	er and	Linda	Torczo	on, "E	nginee	ring a	Comp	oiler",	Secon	d Edit	ion,	
	Μ	lorgan	Kaufn	nann P	Publish	ers Els	sevier	Scienc	e, 201	1.					
REF	FERI	ENCE	ES:												
1.	$V = \frac{V}{P}$	. Ragh ublish	avan, ers, 20	"Prino 916.	ciples o	of Con	ıpiler .	Desigi	n", Ta	ta Mc(	Graw I	Hill Ec	lucati	on	
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3.	S K	teven S aufma	S. Muc nn Pul	hnick, blisher	—Adv rs - Els	vanced vevier S	Comp Scienc	oiler D e, Indi	esign a, Indi	and In ian Re	ıpleme print 2	entatio 2003	n∥, Mo	organ	
4.	R D	andy A Depend	Allen, I ence b	Ken Ke ased A	ennedy Approa	, Optir ch, Mo	nizing organ	Comp Kaufn	oilers f 1ann P	or Mo ublish	dern A ers, 20	Archite 202.	ctures	s: A	
5.	C E	'harles ducati	N. Fis on,200	scher, )8.	Richar	[.] d. J. L	eBlan	с, "Ст	afting	a Con	npiler	with C	?", Pe	arson	

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		NETWORKS     3													
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OBJECT	TVE	S:													
•	To u	ndersta	nd the	signal	s and t	transm	ission	and ba	asics o	f mobil	e telec	ommu	nicatio	on	
	syste	em.													
•	To b basis	e famil s of trar	iar wit isport a	h the n and ap	networl plicati	k layer on laye	r proto er prot	cols ar ocols.	nd Ad-	Hoc ne	tworks	s and k	now t	he	
•	To g	ain kno	wledg	e abou	t diffe	rent m	obile p	olatfor	ms and	l applic	cation of	levelo	pment	•	
UNIT I		VIRE CONT	LESS 'ROL	S TRA	ANSN	/IISSI	ION &	& MF	EDIU	MAC	CES	S		9	
Frequenci	es fo	r Tran	smissi	on –	Signa	ls –	Anten	nas –	Sign	al Prop	pagatic	n-Mu	ltiplex	ing-	
Modulatio	on-Spi	read S	pectru	m-Cell	lular	Systen	ns-Mo	tivatio	n for	Speci	ialized	MA	C-SDN	AA-	
FDMA-T	DMA	-CDMA	A-Com	pariso	n of S/	F/T/C	DMA.			1					
UNIT II		TELE SYSTI	COM EMS	MUN	NICA	TION	N SYS	STEN	1S &	SATI	ELLI	ГЕ		9	
GSM-DEC	T-TE	TRA-U	MTS a	and IM	IT-200	0-Sate	ellite S	System	s-Hist	ory-Ap	plicati	ons-Ba	asics-		
Routing-Lo	ocaliza	ation-H	andove	er-Cyc	lical R	lepetiti	on of ]	Data-I	Digital	Audio	Broad	casting	g-Digit	al	
Video Broa	adcast	ing-Co	nverge	nce of	broad	casting	g and N	Aobile	Appli	cations	•				
UNIT III		VIRE	LESS	5 LAN	N									9	
Infrared vs Bluetooth	radio	transm	ission	– Infra	structi	ure and	d ad ho	oc netv	vork –	IEEE8	02.1(1	-HIPE	R LAI	N-	
IINIT IV		ЛОВІ	LEN	<b>FT</b> W	ORK		VFR	& M	ORII	F				9	
	]	<b>FRAN</b>	SPOI	RT L	AYE	R			ODIL					1	
Mobile IP-	Dynai	nic Ho	st Cont	figurat	ion Pr	otocol	Mobil	e ad-h	oc net	works -	-Tradi	tional	TCP-		
Classical T	CP in	nprover	nents-7	ГСР о	ver 2.5	5/3G w	ireless	netwo	orks-Pe	erforma	ance er	hanci	ng		
proxies – I	ntrodu	ction to	3 4 G a	nd 5G	wirele	ss netv	vorks.					I		-	
UNIT V		SUPP(	JRT .	FOR	MOH	BILI'I	.'Y							9	
File Systen	ns– W	orld W	ide We	eb – W	vireless	s Appl	ication	Proto	col(ve	rsion 1	.x)-i-m	ode-s	yncMI		
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$\frac{2}{3}$ Co	mpar	the W	ireless	LAN	Techn	ologie	s 1100		mun	carions					
4. Ur	derst	and Mo	bile No	etwork	and T	ranspo	ort Lav	vers							
5. De	fine V	Vireles	s Appl	ication	Proto	$\frac{1}{\text{col.}}$									
COURSI	E AR	TICU	LAT	ION	MAT	'RIX:									
PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 1 0	PO 11	PO 1 2	PSO1	PSO2	PSO 3	

CO1	1	1	2		2							2		3	
CO2	3	3			2							2	2	3	
CO3	0	0										-	_	0	
CO4	3	2										2	2	3	
004	2	1	2									3	1	3	
CO5	0	4	0									0		0	
	2	2- Moderate, 3-High)													
(1-Lov	, 2- Moderate, 3-High)														
TEX	T BOOKS:														
1.	Jochen Schiller "Mobile Communications", Second Edition, Pearson Education, 2008.														
2.	2.       Asoke K. Talukder and Roopa R Yavagal, "Mobile Computing, Technology,														
	2. Asoke K. Talukder and Roopa R Yavagal, "Mobile Computing, Technology, Application and Service Creation", Second Edition, Tata McGraw Hill, 2010.														
REF	FERENCES:														
1.	Jon W.Mark and Weihua Zhuang, "Wireless Communication and Networking", Prentice														
	Ha	ll, 200	2.												
2.	CDM Cordeiro and D. P. Agarwal, "Adhoc and Sensor Networks: Theory and														
	Ap	plicatio	ons",	World	Scient	fic, 20	006.								-
3.	Pei	Zhan	g, Fer	ig Zha	o, Da	vid Tip	pper, J	linmei	Tatuy	a, Kei	ichi Sl	tima,	Yi Qia V	n, ları	ry L.
	Pet	erson,	Lion	el M.	Ni, M daa Ci	anjune iihaa	ath D,	Qing	Ll, J	oy Ku ian Ea	ri, An	urag 1	Kumar	, Pras	shant
	к/1 "И	snnum Iiroloss	uriny, Notw	Leoni orkina	uus Gi Comr	loto"	v ijay 1 Flsovi	1. Gur or 201	g, Aari 10	ап га	теі, Б	ruce s	. Davi	e,	
4	Bel	hrouz /	$\frac{1}{4}$ For	ouzan	"Date	<u>ісіс</u> , і Соті	nunico	tions	And Ne	etwork	ing" F	ourth	Editio	n. Tata	ı.
7.	Mc	Graw	Hill		- 410				11000 1 11			5		.,	
5.	Wi	lliam S	stalling	gs, "Da	ata and	l Com	outer (	Commi	ınicati	ons", 1	Eith E	dition,	Pears	on	
	Edi	ucation	<u>n</u>	-											

18SPC	603	EMBEDDED COMPUTING SYSTEMS	L	Τ	Р	С
			3	0	0	3
OBJEC	CTIVE	S:				
•	T	b learn the architecture and programming of ARM processor				
•	T	become familiar with the embedded computing platform d	esign	and	analy	vsis.
	T	get thorough knowledge in interfacing concepts and to des	ign a	n em	bedde	-d
•	sy	stem and to develop programs	1511 4		locuu	74
UNIT I	[	INTRODUCTION TO EMBEDDED				9
		COMPUTING AND ARM PROCESSORS				
Complex	x system	s and micro processors– Embedded system design process	s –D	esign	n exar	nple:
Model ti	rain con	roller- Instruction sets preliminaries - ARM Processor -	CPU	: pro	ogram	ming
input and	d output	supervisor mode, exceptions and traps - Co-processors- Me	emor	y sys	stem	
mechanis	sms - C	PU performance- CPU power consumption.				
UNIT I	Ι	EMBEDDED COMPUTING PLATFORM				9
		DESIGN				
The CPU	J Bus-M	lemory devices and systems-Designing with computing pl	latfor	ms –	- cons	umer
electroni	cs archi	tecture - platform-level performance analysis - Compon	nents	for	embe	dded
program	s- Mode	els of programs- Assembly, linking and loading - comp	pilati	on t	echni	ques-
Program	level p	erformance analysis - Software performance optimizatio	n –	Prog	gram	level
energy a	nd powe	r analysis and optimization – Analysis and optimization of p	rogra	am s	ize-	
Program	validati	on and testing				
UNIT I	III	SENSOR INTERFACING WITH ARDUINO				9
Basics of	f hardwa	re design and functions of basic passive components-sensor	s and	lactu	lators	-
Arduino	code - li	brary file for sensor interfacing-construction of basic application	ation	s		
UNIT I	IV	<b>REAL TIME OPERATING SYSTEM (RTOS)</b>	)			9
		BASED DESIGN				
Basics of	f OS, Ke	rnel, types of OSs, tasks, processes, Threads, Multitasking a	nd N	Iultip	proces	sing,
Context	switchin	ng, Scheduling Policies, Task Communication, Task Synd	chror	nizati	ion -	Inter
process (	Commur	ication mechanisms, Evaluating OS performance, Choice of	RTO	S, P	ower	
Optimiza	ation. De	sign Example: Telephone Answering Machine.				
UNIT	V	EMBEDDED C PROGRAMMING				9
Introduct	tion-Cre	ating _hardware delays' using Timer 0 and Timer (1-Readi	ng sv	witch	nes-Ac	lding
Structure	e to the o	ode-Generating a minimum and maximum delay-Example:	Crea	ating	a por	table
hardware	e delay-	Timeout mechanisms-Creating loop timeouts-Testing loop t	imeo	uts-	hardw	'are
timeouts	-Testing	a hardware timeout		<u> </u>		
		TOTAL : 45 PERI	IOD	S		
OUTC	OMES	On completion of this course, students will be able	to			
1.	Discuss	the basic of embedded processors.				
2.	Describ	e the architecture and programming of ARM processor.				
3.	Underst	and the Concepts of peripherals and interfacing of sensors.				
4.	Capable	of using the system design techniques to develop firmware				
5.	Illustrat	e the code for constructing a system				
COUR	SE AR	TICULATION MATRIX:				

	PO	1 PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO	PO	PO	PS 01	PS	PS
C01	3	1	2								3	12	3	1	2
CO2	3	1	2								3		3	2	2
CO3	3	1	2								3		3		
CO4	3	1	3								3		2	1	2
CO5	3	1	3								3		2	1	2
(1-L	ow, 2-	Moderat	e, 3-Hig	h)											
TE	XT	BOOK	S:												
	1.	Marilyn	Wolf,	"Com	puters	as Co	mpone	ents - l	Princip	oles of	Embe	dded (	Compu	iting	
		System Elsevie	Desigr (), 2012	ı", Thi 2. (Uni	rd Edi it I & I	tion — I)	-Morg	an Ka	ufman	n Publ	lisher (	An im	print 1	from	
	2.	https://v	www.co	oursera	a.org/l	earn/ir	ıterfac	e-with	-ardui	no#sy	llabus	(Unit ]	III)		
	3.	Michae	l J. Por	nt, "En	ıbedde	ed C",	2 nd Ed	ition,	Pearso	n Edu	cation	, 2008	.(Unit	IV & 1	V)
RE	FEF	RENCI	ES:												
1.	Shib	u K.V, '	'Introd	uction	to Em	bedde	d Syst	ems",	McGr	aw Hi	ll.2014	1			
2.	Jonathan W.Valvano, "Embedded Microcomputer Systems Real Time Interfacing", Third "Edition, Cengage Learning, 2012														
3.	<i>Raj Kamal, "Embedded Systems-Architecture, programming and design", 3rd edition, TMH, 2015</i>									1H,					
4.	t. Lyla, "Embedded Systems", Pearson, 2013														
5.	Dav	id E. Sir	non, "1	4n Em	bedde	d Softv	vare P	rimer	", Pea	rson E	ducati	ion, 20	000.		

18SPC604	COMPILER LABORATORY	L	Τ	P	С
		0	0	4	2
OBJECTIV	'ES:		11		
٠	Be exposed to compiler writing tools.				
•	Learn to implement the different Phases of compiler, transla	tor w	vith i	nput	and
_	object language.			1	
•	Be familiar with control flow, data flow analysis, simple opt	imiz	ation	l	
	techniques				
LIST OF E	XPERIMENTS:				
<ul> <li>comma</li> <li>2. Impler</li> <li>3. Impler</li> <li>and pr</li> <li>4. Parser</li> <li>5. Symbo</li> <li>6. Impler</li> <li>7. Impler</li> <li>8. Impler</li> <li>9. Genera</li> <li>One da statem</li> <li>10. Impler</li> <li>product assemi</li> <li>11. Impler and Al</li> </ul> PLATFOR <ul> <li>C/ C+-</li> </ul>	ents, operators etc.) nentation of lexical analyzer using LEX. nentation of a calculator that takes an expression (with digits, nts its value, using YACC. using LEX and YACC to validate loops 1 table creation. nentation of Predictive parser. nentation of Shift Reduce Parsing Algorithm. nentation of LR parsing. the three address code for a simple language with: ta type integer, arithmetic operators, relational operators, varia- ent, one conditional construct, one iterative construct and assig- nent back end of the compiler which takes three address code a es assembly language instructions that can be assembled and r oler. The target assembly instructions can be simple move, add nent simple code optimization techniques (Constant folding, S gebraic transformation). <b>M NEEDED</b> + / Equivalent Compiler	able ognme as inj run us , sub treng	decla nt st put a sing , and th re	aratio atem nd an 80 I jum	on ent. )86 p. ion
NITCOM	TOTAL . UVILIT				
	relop the lexical analyzer for token specification	.0			
2. Bui	Id the parser from the syntax specification using tools.				
3. Des	ign an intermediate code generator.				
4. Des	ign simple code optimizations techniques.				

5. Create a program for generating target assembly instructions and translator with specific input and object language.

### **COURSE ARTICULATION MATRIX:**

	PO1	PO 2	PO3	PO4	PO5	PO6	PO 7	PO8	PO9	PO 1 0	PO 1 1	PO 1 2	PS 0 1	PSO 2	PSO 3
CO1	3	2	3		3	2	1					1	3	2	
CO2	3	2	3		2	1						1	3	2	
CO3	3	3			1	1						1	3	3	1
CO4	3	3			3	1						1	3	3	
CO5	3	3			2	1	1					1	3	3	
(1-Low	, 2- Mo	derate,	3-High	)											

	PC60	C605 MOBILE APPLICATION DEVELOPM LABORATORY											T	Р		С
												0	0	4		2
<b>OB</b> J	ЕСТ	IVES	5:										1		1	
	٠	K	now th	ne com	ponen	ts and	struct	ure of	mobile	e appli	cation	develo	pme	nt		
		fr	amewo	orks fo	r And	roid ar	nd win	dows (	OS bas	ed mo	biles.					
	٠	U	nderst	and ho	w to v	vork w	ith vai	rious n	nobile	applic	ation d	levelop	omer	ıt		
		fr	amewo	$\frac{1}{1}$	nd the	capabi	lities,	limitat	ions of	f mobi	le devi	ces.	1		6	
	•		earn th	le basi	c and 1	mport	ant des	sign co	oncepts	s and 1	ssues c	of deve	lopn	nent	10	
T TC'	T OF	FVP	FRI	MFN'	rc.											
	$\frac{1 \text{ OF}}{1 \Gamma}$				D:	t 11000	CIII	ompor	onta 1	Fonta	d Col	01120				
	1. L 2 Г	)evelor	) an ap	plicati	on tha	t uses	Lavou	t Man	agers a	and eve	ent list	eners				
	2. E 3. E	Develor	a nat	ive cal	culato	r appli	cation					chiers.				
	4. V	Vrite a	n appli	cation	that d	raws b	asic g	raphic	al prim	itives	on the	screer	1.			
	5. D	Develop	o an ap	plicati	on tha	t make	es use o	of data	ibase.							
	6. D	Develop	o an ap	plicati	on tha	t make	es use o	of RSS	S Feed							
	7. Iı	nplem	ent an	applic	ation t	hat im	pleme	nts Mı	ılti thr	eading						
	8. D	Develop	o a nat	ive app	plication	on that	uses (	GPS lo	cation	inforr	nation.					
	9. Ii	nplem	ent an	applic	ation t	hat wr	ites da	ita to t	he SD	card.						
	10.	Impler	nent a	n appli		that c	reates	an ale	rt upor	n receiv	ving a	messa	ge.			
	11.	VV IIIC	<u>a</u>		1100110	n that	oranta	alarn	1 clock	-						
LIST	ſ OF I	EOUIF	PMEN	T FO	R A B	n that	creates	s alarn 80 STI	n clock J <b>DEN</b> '	TS						
LIS Stand Deve	f <b>OF I</b> dalone elopme	EQUIE deskto ent Too	PMEN ops wit	T FOI th Win h appro	<b>R A B</b> dows opriate	n that ATCE or And emula	creates I OF 3 Iroid o ators a	s alarn <b>30 STU</b> r iOS nd deb	n clock J <b>DEN</b> or Equ ouggers	TS ivalen s -30 N	t Mobi Ios	le App	olicat	ion		
LISI Stand Deve	<b>FOF I</b> dalone elopme	EQUIF deskto ent Too	PMEN ops wit	T FOI th Win h appro	<b>R A B</b> dows opriate	on that <b>ATCH</b> or And emula on of t	creates I OF 3 Iroid o ators as	s alarn <b>30 STU</b> r iOS o nd deb	n clock J <b>DEN</b> or Equ ouggers FOT A	TS ivalen s -30 N AL : ( s will)	t Mobi los <b>50 PE</b> be able	le App <b>RIO</b>	olicat	ion		
LIST Stand Deve	<b>FOFI</b> dalone elopme	EQUIE deskto ent Too MES: Design	PMEN ops wit ols with variou	T FOI th Win h appro	R A B dows opriate mpleti	n that ATCH or And emula on of t	this co	s alarn <b>60 STU</b> r iOS nd deb urse, s ng em	n clock J <b>DEN</b> or Equ uggers <b>FOT</b> tudent	TS ivalen s -30 N AL : ( s will )	t Mobi los <b>60 PE</b> be able	le App RIO	olicat DS	ion		
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LIS ⁷ Stand Deve 0U ⁷ 1 2 3 4 5 CO CO CO CO CO CO CO CO CO CO	<b>F OF H</b> dalone         elopme <b>FCOI</b> .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       I         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .	EQUIE deskto ent Too MES: Design mplem Jnderst Develop Jnderst E AR PO2 3 3	PMEN ops wit ols with variou ent that tand the p an ap tand ca FICU PO3 3 3	T FO th Win h appro- On co us mob e desig e vario oplicat apabili LAT PO4 2	mpleti ile app gn of m ous Mo ion to ties an <b>ION</b> <b>PO5</b> 1 1	n that ATCE or And emula on of t oblication oblie Ahand-H d limit <b>MAT</b> <b>PO6</b> 2 1	this coordinations and this coordinations using the second	s alarn s alarn s alarn r iOS nd deb urse, s ng em ation u ation I evices. of mo	n clock JDEN' or Equ ouggers FOT A tudent ulators ising d Develop obile do	TS ivalen s -30 N AL : ( s will s evelop pment evices. PO1 0 3 3	t Mobi Ios <b>50 PE</b> be able ment t Tools <b>PO1</b> 1 3 3	e to	PSC 1 3 3	ion <b>P P</b> <b>2</b> 2 2 2	SO	<b>PSO</b> 3 1 2
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18SI	PC6	06	EMBEDDED COMPUTING SYSTEMS LABORATORY											Р	C	ר ר
		·										0	0	4	2	2
OBJ	EC	<b>FIVE</b> S	5:													
	•	Ir	ntrodu	ce stud	ents to	embe	dded s	ystem	s desig	gn tool	s and h	ardwa	re pr	ogra	mmei	rs
	٠	Ν	lake st	udents	famil	iar wit	h Emb	edded	C Pro	gramn	ning.					
	•	G b ar	ive the asic bu nd requ	e stude iilding uireme	nts ski blocks nts, A	ills in t s inclu /D con	ooth sin ding ti version	mulati mers, n, seria	on and counte al com	l practi ers, PW munic	ical im /M gen ations	pleme eratio	ntation, I/O	on of D tec	the hniqu	ıes
LIS	ΓΟ	F EXP	<b>ERI</b>	MEN'	ГS:											
1. De	velop	o a C pr	ogram	for Se	even So	egmen	t LED	Displa	ay.							
2. De	velop	o a C pr	ogram	for D	DC.											
3. De 4. De	velor	n a C pr	ogram	for $PV$	NM.											
5. De	velop	a C pr	ogram	for R'	ГC.											
6. De	velop	o a C pr	ogram	for Ke	eyboar	d Mat	rix.									
7. De	velop	o a C pr	ogram	for LO	CD.											
8. De	velop	o a C pr	ogram	for Fl	ashing	of LE	DS.									
9. De	velop	o a C pr	ogram	for ste	epper 1	notor.										
10. D	evel	op a C r	program	n Ior t n for F	Emperation of the second secon	ature s	ensor.									
12. D	evelo	op a C r	rogra	n for i	nterrur	vi. Dt										
13. Ir	nterru	pt perf	orman	ce chai	acteris	stics of	ARM	and F	PGA.							
14. S	peed	perform	nance	charac	teristic	s of A	RM ar	nd FPC	GA.							
15. Ir	npler	nenting	zigbe	e proto	ocol wi	ith AR	M.									
								r	ΓΟΤΑ	AL:	60 PE	RIO	DS			
OUT	ГСО	MES		On co	mpleti	on of t	this co	urse, s	tudent	s will	be able	to				
1		Experii	nent v	vith a s	et of to	ools fo	r embe	edded	systen	is prog	grammi	ng and	d deb	ouggi	ng	
2	•	Do em	bedded	l C Pro	gramr	ning										
3.		Experie	ence w	ith imp	plemer	nting so	everal	embec	lded sy	ystems	with p	articu	lar fo	ocus (	on the	e
4		interact	ion be	tween	multip	ole dev	ices.									
4		Unders	$\frac{1}{2}$	108	hadda	d avet	ame h.	form	ulating	the cr	untom a	logian	nrah	lom		
5	•	includi	p exis no the	design	Const	u sysu rainte	enns by	TOLIU	urating	g me sy	ystem C	lesign	prop	nem		
COU	JRS	E AR'			ION	MAT	'RIX:									
	PO1	P02	PO3	P04	PO5	PO6	P07	POs	PO9	P01	PO1	PO1	PSC	)   Pq	SO   P	250
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CO3	3		2	3		2					3		3	1		>
CO4	3	1	3	3		3					3		2	1	2	
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# SEMESTER VII

18SHS701	MANAGEMENT AND ENTREPRENEURSHIP	L	Τ	P	С
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OBJECTIV	'ES:				
•	Explain fundamentals management functions of a manager. Also	exp	lain	plan	ning
	and decision making processes				
•	Explain the organizational structure, staffing and leadership process of motivation and different control systems in management.	and	und	ersta	nding
•	Explain understanding of Entrepreneurships and Entrepreneurship d	level	opm	ent p	rocess
	Available for an entrepreneur.	chen	ls an	u III	ancing
UNIT I	INTRODUCTION				9
Management:	Introduction - Meaning - nature and characteristics of Mana	gem	ent	Sco	one and
Functional are	as of management - Management as art or science, art or professi	on -	Ma	nage	ment &
Administration	n - Roles of Management, Levels of Management, Development	ent	of N	Aana	gement
Thought - ear	ly management approaches - Modem management approaches	s. Pl	anni	ng:	Nature,
importance and	d purpose of planning process objectives - Types of plans (meanin	g on	ly) -	Dec	ision
making, Impor	tance of planning - steps in planning & planning premises - Hierar	rchy	of p	lans.	
UNIT II	<b>ORGANIZING, DIRECTING &amp; CONTROLLING</b>				9
Organizing an	d staffing: Nature and purpose of organization, Principles of orga	niza	ation	– T	ypes of
organization-I	Department Committees-Centralization Vs Decentralization	of	aut	horit	y and
responsibility	- Span of control - MBO and MBE (Meaning only) Nature and imp	porta	ince	of st	affing-
- :Process of	Selection & Recruitment (in brief). Directing: Meaning and	natı	are o	of di	irecting
Leadership sty	les, Motivation, Theories, Communication - Meaning and import	ance	e - co	oordi	nation,
meaning and	importance - Techniques of coordination. Controlling: Mea	ning	g ar	nd s	teps in
controlling - E	ssentials of a sound control system - Methods of establishing cont	rol (	in br	ief).	
UNIT III	ENTREPRENEURSHIP				9
Meaning of H	Entrepreneur; Evolution of the Concept; Functions of an Entr	epre	eneu	r, Ty	ypes of
Entrepreneur,	Entrepreneur - an emerging. Class Concept of Entrepreneurs	ship	- E	Evolu	tion of
Entrepreneurs	nip, Development of Entrepreneurship; Stages in entrepreneurial p	roce	ss; F	Role	of
entrepreneurs	in Economic Development; Entrepreneurship in India; Entrepreneu	ırshi	ip – :	its B	arriers.
UNIT IV	SMALL SCALE INDUSTRIES & INSTITUTIONA	L			9
	SUPPORT				
Small scale in	dustries: Definition; Characteristics; Need and rationale; Object	ives	; Sc	ope;	role of
SSI in Econor	nic Development. Advantages of SSI, Steps to start and SSI -	Go	vern	ment	policy
towards SSI; I	Different Policies of SSI; Government Support for SSI during 5 y	vear	plan	s. In	pact of
Liberalization,	Privatization, Globalization on SSI Effect of WTO/GA TT Sup	port	ing .	Ager	ncies of
Government f	or SSI, Meaning, Nature of support; Objectives; Functions; Type	s of	Help	; Aı	ncillary
Industry and T	iny Industry (Definition Only). Institutional support: Different Sc	chem	nes; '	TEC	KSOK;
KIADB; KSSI	DC; KSIMC; DIC Single Window Agency; SISI; NSIC; SIDBI; K	SFG	2		
UNIT V	<b>PROJECT PREPARATION &amp; INDUSTRIAL</b>				9
	OWNERSHIP				
Preparation of	project: Meaning of Project; Project Identification; Project Select	ion;	Pro	ject l	Report;
Need and Sign	ificance of Report; Contents; formulation; Guidelines by Planning	g Co	mmi	ssior	n for
Project report	; Network Analysis; Errors of Project Report; Project Apprais	sal.	Iden	tifica	ation of

Business Opportunities: Market Feasibility Study; Technical Feasibility Study; Financial Feasibility Study & Social Feasibility Study. Industrial ownership: Definition and meaning of Partnership, Characteristics of Partnership, Kinds of Partners, Partnership Agreement or Partnership Deed, Registration of Partnership Firm, Rights, Duties and Liabilities of Partners, Advantages and Disadvantages of Partnership, Sole proprietorship, Features, Scope Advantages and Disadvantages of Sole Proprietorship.

	TOTAL : 45 PERIODS														
OU	ГСС	<b>MES:</b>		On co	omplet	ion of	this co	urse, s	tudent	s will l	be able	e to			
1.	•	Define	manag	gement	functi	ions of	and ex	xplains	plann	ing and	d decis	sion ma	aking p	rocess	es.
2.		Unders	tand th	e orgar	nizatio	nal stru	cture, s	staffing	g, direc	ting an	d cont	rolling	concep	ots.	
3.	•	Unders	tand of	f Entrep	oreneui	ships a	nd Ent	trepren	eurship	devel	opmen	t proce	SS		
4	•	Illustrat	te Sma	ll Scale	e Indus	tries, va	arious	types o	of suppo	orting	agencie	es and i	financi	ng	
		availab	le for a	in entre	preneu	ır									
5.	5. Summarize the preparation of project report, need significance of report. Also to explain														
COL		about 11	idustri	al owne	ership	DIX									
COU	RSE	ARTIC	CULA	TION	MAT	RIX:		1			1	1			
	PO1	I PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO1	PO1	PO1	PSO 1	PSO 2	PSO 3
CO1						2	1	3		U	-	2	-	1	1
CO2						2		3						2	1
CO3						2		3						2	
CO4						2	2	3						2	
CO5						3		3						3	1
(L-Lo	w, M	- Moderat	te, H-Hi	igh)											
TEX	KT B	BOOK	S:												
1	•	P. C. 2012.	Tripat	hi, P.N.	Redd	y, "Prin	ciples	of Maı	nageme	ent", 5 ^t	^h editic	on, Tata	a McGr	aw Hil	1,
2	2.	Vasar Publi	nt Desa shing I	ai , "Dy House,	mamic 2011.	s of En	treprer	neurial	Develo	pment	& Ma	nagem	ent", H	imalay	a
REF	FER	ENCE	S:												
1.		Poorn Enterr	ima. N prises'	<i>I. Cha</i> '. 2 nd E	rantim dition.	ath, "E Pears	Entrept on Edi	reneur. ucation	ship D 1. 2014	evelop !	ment a	and Sm	all Bus	siness	
2.	•	S. S. K Delhi,	Chanka 2006.	i, "Ent	repren	eurshij	p Deve	elopme	nt", Re	evised	editior	n, S. C.	hand &	с <i>Со.</i> Л	lew
3.	•	Stephe Educa	en P. F. tion, 1	Robbins 3 th Edit	s, Mary tion, 2	v Coult 017.	ter, "N	1anage	ement"	, Thirt	eenth	edition	, Pears	son	
4.	•	Rober Devel	sLusie	r, "I t" Th	Manag	gement	Fur Weste	ıdamer rn 2∩í	ntals	- (	Concep	ts, A	pplica	tion,	Skill
5.		B.Bad	hai, "	Entrep	reneur	ship D	evelop	ment"	, Secor	ıd Edi	tion, B	.K Puł	licatio	ns,201	3.
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18SPC70	2 CLOUD COMPUTING	L	Т	P	С
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OBJECT	IVES:	-		-	
	To understand the concept of cloud computing and evolution of	clou	d fro	m th	e
•	existing technologies.				•
•	To have knowledge on the various issues in cloud computing and	l the	lead	l pla	yers in
	cloud.				
•	To appreciate the emergence of cloud as the next generation com	puti	ng p	arad	igm.
UNIT I	INTRODUCTION				9
Cloud com	outing - vision, definition, reference model, characteristics and	bene	fits,	cha	llenges.
Historical d	evelopments - Distributed systems, Virtualization, Web 2.0, Service	orie	nted	com	puting,
Utility orie	nted computing, Building cloud computing environments. Princip	ples	of ]	Paral	lel and
Distributed	Computing - Elements of Parallel computing - hardware are	chite	cture	e, le	vels of
parallelism,	Elements of distributed computing - Components, Architectura	l sty	les,	mod	lels for
interprocess	communication, technologies - RPC, Distributed object framework	k, S	ervi	ce c	riented
computing					
UNIT II	VIRTUALIZATION				9
Characteris	ics of virtualized environments, taxonomy of virtualization technique	es, v	irtua	lizat	ion and
cloud com	outing, Implementation Levels of Virtualization, Virtualization S	Struc	ture	s/To	ols and
Mechanism	s, Virtualization of CPU Memory I/O Devices, Virtual clu	ster	s ar	nd r	esource
managemer	t, Virtualization for data center automation, Technology	exa	ampl	es	– Xen:
Paravirtuali	zation, VMware: Full virtualization, Microsoft Hyper-V.				
<b>UNIT III</b>	<b>CLOUD COMPUTING ARCHITECTURE</b>				9
Cloud refe	ence model - Architecture, Infrastructure and hardware as a se	rvic	e, Pl	atfoi	m as a
service, Sof	tware as a service, Types of clouds – public clouds, private clouds, h	ybri	d clo	ouds,	
community	clouds - examples, Economics of the cloud, open challenges	_	inter	oper	ability,
scalability,	ault tolerance, standards – Openstack architecture			-	-
UNIT IV	CLOUD PROGRAMMING AND SOFTWARE				9
	ENVIRONMENTS				-
Parallel and	l distributed programming paradigms – Mapreduce, Twister, Ite	erati	ve N	ЛарБ	Reduce,
Hadoop, Pi	ogramming support of Google App Engine – Google file system,	Big	Tabl	le, G	loogle's
NOSQL sy	tem, Programming on Amazon AWS and Microsoft Azure - Progr	amn	ning	on A	Amazon
EC2, Ama	on simple storage service (S3), Amazon Elastic Block store (E	BS)	and	Sim	pleDB,
Microsoft	Azure programming support, Emerging cloud software environn	nents	s —	Euca	alyptus,
OpenNebul	a, OpenStack, Aneka.				•
UNIT V	CLOUD APPLICATIONS AND SECURITY				9
Scientific a	plications – Healthcare, Biology, Geoscience, Business and consum	er aj	oplic	atior	<u>1s –</u>
CRM and E	RP, Productivity, Social networking, Media applications, Multiplay	er or	nline	gam	ing.
Cloud Secu	ity and Trust Management – Defense strategies, Distributed intrusio	n, D	ata a	ind s	oftware
protection t	echniques, reputation guided protection of data centers.				
	TOTAL : 45 PERI	OD	S		
OUTCO	<b>IES:</b> On completion of this course, students will be able to				
1. I	xplain the main concepts, key technologies, Strength and limitations	of	loud	1	
c	omputing.				
2. U	Inderstand the different virtualization techniques.				

3.		Outline the architecture of cloud service models and deployment models.													
4.		Make u	se of a	current	cloud	techno	ologies	and so	oftware	e envir	onmen	ts.			
5.		Discuss	s the v	arious	cloud a	applica	tions a	and clo	ud sec	urity a	nd trus	st mana	agemei	nt.	
COU	RSE	ARTIC	CULA	TION	MAT	RIX:									
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1	PO1	PO1	PSO	PSO	PSO
CO1	3	2	3	1						U	1	2	2	2	3
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CO2	2	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$													
CO3	2	2	2	1	2						2		3	2	1
004	2	2	2	2	3						3		3	2	3 1
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1	•	Comp	outing"	', Tata I	McGra	w Hill	Educat	tion Pri	vate L	imited,	New I	Delhi, 2	2013.		
2		Kai H	lwang,	Geoffr	ey C. I	Fox, Ja	ck G. I	Dongar	ra, "Di	stribute	ed and	Cloud	Compu	iting, F	rom
	·•	Parall	el Pro	cessing	to the	Interne	et of Th	nings",	Morga	n Kauf	mann	Publish	ners, 20	12.	
REF	<b>ER</b>	ENCE	S:												
1	!.	Dan M	larines	<i>вси, "С</i>	Cloud c	omput	ing: th	eory a	nd pra	ctice",	Secon	nd editi	ion, Mo	organ	
		Kaufm	ann, 2	<i>017</i>											
2	2.	Barrie	Sosin	sky, "C	Cloud c	comput	ing bil	ble", N	Viley P	ublish	ing Inc	, 2011			
3	3.	Ritting	house	, John	W., an	d Jame	es F. R	ansom	e, "Cle	oud Co	omputi	ng: Im	plemer	ntation	,
		Manag	gement	t and S	ecurity	,", CR	C Pres	s, 2012	7						
4	<i>t</i> .	Toby V	^r elte, A	Anthon	y Velte	, Robe	rt Else	npeter	, "Cloi	ud Con	nputing	$g - \overline{AP}$	ractica	al	
		Appro	ach", 1	Tata M	lcgraw	Hill, 2	2009.								
5	5.	Tim $\overline{M}$	ather,	Subra	Kuma	raswar	ny, S <del>h</del> a	ahed L	atif "C	Cloud S	Securit	v & Pr	ivacy"		
		O'Reil	lyMed	'ia, Sep	tember	r 2009.									

### CRYPTOGRAPHY AND NETWORK SECURITY

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OBJECTIV	'ES:										
٠	• To understand Cryptography Theories, Algorithms and Systems.										
٠	To understand necessary Approaches and Techniques										
•	• To build protection mechanisms in order to secure computer networks.										
UNIT I	UNIT I CLASSICAL CRYPTOGRAPHY & NUMBER THEORY										
Services, Me Classical Er transposition Groups, Ring Arithmetic – Chinese rema	chanisms and attacks-the OSI security architecture-Network acryption techniques (Symmetric cipher model, substituti techniques, steganography).FINITE FIELDS AND NUMB gs, Fields-Modular arithmetic- Euclid's algorithm-Finite fiel Prime numbers-Fermat's and Euler's theorem- Testing for inder theorem- Discrete logarithms	secur ion t ER ids- I prim	ity tech THI Poly nalit	mod niqu EOR nor y -1	lel- ιes, (Y: nial Γhe						
UNIT II	BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY				10						
Data Encryp Advanced En cryptograph management cryptography	otion Standard-Block cipher principles-block cipher modes acryption Standard (AES)-Triple DES-Blowfish-RC5 algorith <b>y:</b> Principles of public key cryptosystems-The RSA - Diffie Hellman Key exchange- Elliptic curve arithmetic	of 1m. <b>I</b> algo c-Elli	ope Publ orith iptic	eration lic k im-K cui	on- <b>cey</b> Cey rve						
UNIT III	HASH FUNCTIONS AND DIGITAL SIGNATUR	ES			8						
Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – EI Gamal – Schnorr.											
UNIT IV	<b>SECURITY PRACTICE &amp; SYSTEM SECURITY</b>	7			8						
Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security											
UNIT V	E-MAIL, IP & WEB SECURITY				9						
<b>E-mail Security:</b> Security Services for E-mail-attacks possible through E-mail - establishing keys-privacy-authentication of the source-Message Integrity-Non-repudiation- Pretty Good Privacy-S/MIME. <b>IPSecurity:</b> Overview of IPSec - IP and IPv6- Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). <b>Web Security:</b> SSL/TLS Basic Protocol- computing the keys- client authentication-PKI as deployed by SSLAttacks fixed in v3-											

- 1. Compare various Cryptographic Techniques and Defining the various finite fields and number theory.
- 2. Analyze various block ciphers and public key cryptographic techniques.
- 3. Understand Hash Functions and Digital Signature Algorithms
  - 4. Illustrate the security mechanisms like Kerberos, firewalls, IDS.
  - 5. Understand various security services for e-mail and web.

### **COURSE ARTICULATION MATRIX:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO 11	PO1 2	PSO 1	PSO 2	PSO3
CO1	3	2	3	1							3		3	2	1
CO2	3	3	3	2		1					3		3	3	1
CO3	3	2	3	2	1	2					3		3	3	1
CO4	3	2	1	2	1	1					3		3	2	2
CO5	3	3	1	3	1	1					3		3	3	2

(1-Low, 2- Moderate, 3-High)

### **TEXT BOOKS:**

- 1. William Stallings, "Cryptography and Network Security", 7th Edition, Pearson Education, 2017
  - 2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002.

#### **REFERENCES:**

1.	Atul Kahate, "Cryptography and Network Security", 3 rd Edition, McGraw Hill
	Education India, 2013.
2.	Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc-Graw Hill,
	2007.
З.	Wade Trappe, Lawrence C.Washington, "Introduction to Cryptography with Coding
	<i>Theory</i> ", 2 nd Edition, Pearson Education, 2006.
4.	Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley
	Dreamtech India Pvt Ltd, 2003.
5.	C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network
	Security, Wiley India Pvt.Ltd

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### **CLOUD COMPUTING LABORATORY**

#### **OBJECTIVES:**

•	To develop web applications in cloud
•	To learn the design and development process involved in creating a cloud based application

• To learn to implement and use parallel programming using Hadoop

### LIST OF EXPERIMENTS:

- 1. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7/8/10 and Ubuntu 18.04.1/16.04.5/14.04.5
- 2. Find procedure to run the virtual machines of different configurations. Check how many virtual machines can be utilized at particular time
- 3. Install a C compiler in the virtual machine and execute Simple Programs.
- 4. Show the virtual machine migration based on the certain condition from one node to the other.
- 5. Install Google App Engine. Create hello world app and other simple web applications using python/java.
- 6. Use GAE launcher to launch the web applications.
- 7. Find a procedure to transfer the files from one virtual machine to another virtual machine.
- 8. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
- 9. Install Hadoop single node cluster and run simple applications like wordcount.
- 10. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
- 11. Sizing Virtual Machines for Azure IaaS (Resource Manager)

## **SOFTWARE REQUIRED:**

OpenNebula/ OpenStack/ Windows Azure/ Eucalyptus/ Aneka/ Google App Engine /CloudSim

							TAL	: 60 I	PERI	ODS		
OUTC	COMES:	On completio	on of th	is cour	se, stu	dents v	will be	able to	)			
1.	Learn the configuration various virtualization tools such as Virtual Box, VMware workstation.											
2.	Design a web application in a PaaS environment.											
3.	Learn to simulate cloud environment to implement new schedulers.											
4.	Make use of a generic cloud environment that can be used as a private cloud.											
5.	5. Evaluate large data sets in a parallel environment.											
COUR	COURSE ARTICULATION MATRIX:											
I	PO1 PO2 PO	PO4 PO5	PO6	P07	PO8	PO9	PO10	P011	PO12	PSO	PSO2	PSO3
										1		
--------	---------	-----------	---------	---	---	---	---	---	---	---	---	---
CO1	2	3	2	3	3				3	3	2	1
CO2	3	3	2	2	2				3	3	2	2
CO3	3	3	2						3	3	2	2
CO4	3	3	3						3	3	3	1
CO5	3	3	3						3	3	3	2
(1-Low	, 2- Mo	derate, 3	3-High)			•	•	•			-	·

18SPC705	NETWORK SECURITY LABORATORY	L	Т	P	С
		0	0	3	1.5
OBJECTIV	ES:				
•	To learn different cipher techniques.				
•	To implement the algorithms DES, RSA, MD5, SHA-1.				
•	To use network security tools and vulnerability assessment tools.				
LIST OF	EXPERIMENTS:				
1. Implemen	t the following SUBSTITUTION TECHNIQUES:				
a. Ca	nesar Cipher				
b. At	fine Cipher				
c. Pl	ay Fair Cipher				
	gnere Cipner				
f H	ll Cinher				
2 Implement t	he following Transposition Techniques				
a. Rail-Fe	ence Cipher				
b. Colum	nar Transposition Cipher				
3. Number The	eory				
a. Chines	e Remainder Theorem				
b. Extend	ed Euclidean Algorithm.				
c. Miller-	Rabin's Algorithm.				
4. Implement t	he following Private Key and Public Key Cryptography Algorithms				
a. DES b RSA					
c Diffie-	Hellmann Key Exchange				
5. Implement t	he following Hash Functions				
a. SHA 5	12				
b. MD5					
6. Implement t	he following Digital Signature Algorithms				
a. DSS					
b. Elgama	1				
C. KSA	how to provide secure data storage, secure data transmission and for	oroot	ina		
digital sign	atures (GnuPG)	cicat	mg		
8. Setup a hone	ev pot and monitor the honeypot on network (KF Sensor)				
9. Installation	of rootkits and study about the variety of options				
10. Perform w	ireless audit on an access point or a router and decrypt WPS and WPA	2.			
(Net Stum)	bler)				
LIST OF F	<b>CQUIPMENT FOR BATCH OF 30 STUDENTS</b>				
C / C++ /	Java or equivalent compiler				
GnuPG, F	KF Sensor or Equivalent, Net Stumbler or Equivalent				
HARDWARE					

Standalone desktops -30Nos. (or) Server supporting 30 terminals or more.

	TOTAL : 45 PERIODS															
									TC	DTAL	: 45 ]	PERI	ODS			
OUT	CO	MES:		On con	npletio	n of th	is cou	se, stu	dents	will be	able to	)				
1.	C	reate a	progra	m for s	ubstitu	tion ar	nd tran	spositi	on tecl	hnique	5.					
2.	B	uild a p	orograr	n for th	e algoi	rithms	in Nun	nber T	heory							
3.	D	evelop	algori	thms for	r Publi	ic Key	Crypto	ograph	y and I	Private	Key C	Cryptog	graphy			
4.	D	esign a	progra	am for t	he var	ious H	ash Fu	nction	s and I	Digital	Signat	ure Al	gorith	ns.		
5.	Ν	Iake us	e of di	fferent o	open so	ource t	ools fo	or netw	ork se	curity a	and an	alysis				
COU	RS]	REARTICULATION MATRIX:														
	PO	PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PO12         PS01         PS02         PS03           3         3         3         3         3         3         3         3         3         2														
CO1	3	3	3	3					1		2		3	3	2	
CO2	3	3     3     3     1     2     3     3     2       3     3     3     1     2     2     2     2														
CO3	3	3	3	3					1		2		2	2	2	
CO4	3	3	3	3					1		2		3	2	1	
CO5	3	3	3	3	3				1		2		3	3	1	
((1-Low	7, 2- I	Moderate	e, 3-Hig	h)												
REF	FERENCES:															
	1. WebTutorial: <u>http://www.cis.syr.edu/~wedu/seed/cryptography.html as on 14/04/2016</u>															
2.	1	www.pi	ractica	lcryptog	graphy	v.com										

18SPR7	06		Project II		L	Τ	Р	С
					0	0	6	3
OBJECT	IVES:				1	11		
	• To ide	tify the pro	blem based on sc	cietal needs and interviev	w pe	ople	on so	cietal
	proble	ns that requi	ire computerizati		p•	opie	011 50	eretur
	To sug	gest creative	e solutions to soc	etal problems and exploi	re po	ssib	le	
	alterna	ive solution	IS	1 1	1			
	• To est	nate risk an	d develop a proto	type				
Studer	nts may ident	fy any real	word problem an	d develop the following	deliv	erab	les	
1 So	ftware requi	ements spec	ification docume	nt				
2 Us	e Case mode	ing						
3 Ide	entify the con	ceptual clas	ses and develop a	domain model with UM	IL C	lasso	diagra	m.
4 Us	ing the ident	fied scenari	os, find the intera	ction between objects an	d re	prese	ent the	m
5 usi	ing UML Se	uence diagr	ams, State charts	and activity diagrams	-	_		
6 Cc	ding (any pr	gramming	language)					
7 De	evelop test ca	es – white l	box and black bo	X				
8 Pro	oject report p	eparation a	nd presentation.					
<ol> <li>Pa</li> <li>Ba</li> <li>Ex</li> <li>Ex</li> <li>State</li> <li>Cr</li> <li>E-1</li> <li>So</li> <li>Cr</li> <li>E-1</li> <li>Re</li> <li>Fo</li> <li>Ca</li> <li>Re</li> <li>Fo</li> <li>Ca</li> </ol>	ssport autom ook bank. am registration ock maintena aline course of ticketing. ftware perso edit card pro book manage cruitment sy reign trading onference ma	ntion system on. exervation system. exervation system nel manage essing. ment system tem. system. agement system	n. ystem. oment system. n.					
13 DI 14 Li	brary manage	ment system.	2					
14 Lli 15 Sti	ident inform	tion system						
10 50		tion system						
				TOTAL · 90 PER	10	DS		
ΟΠΑ	MFS	On comple	tion of this cours	e students will be able to				
	Anoluzina -	ofoscional:	aquag including	thical local and country	ina	100	alatad	to
1.	computing r	vicssional I	ssues, menualing (	uncai, iegai anu security	1550	105, 1	erated	iU
2		ojects.	to designing of	d implementing colution	a to	onat	anda	d
۷.	Apprying pr	of KHOWIEdg	while considering a	a multiple realistic const	15 lO	oper	i-ende	u
2	Make use of	CASE toolo	for solving cose	studios	aiiil	5.		
<u>э.</u> Л	A noluzina T	CASE 1001S	twork Algorithm	suults.		thad	0	
4.	Analyzing L	alabase, Net	work, Algorithm	s and Application Design	i me	unod	<b>S</b> .	
Э.	Design and	se periorma	ince metrics to ev	aiuate a designed system	1.			

CO	COURSE ARTICULATION MATRIX:														
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	P01	P01	P01	PSO	PSO	PSO
										υ	1	2		2	3
CO1	3	3		1			1	2	3		1		3	1	3
CO2		3	2	3		3	1		3					2	3
CO3			3	3	3			3						3	3
CO4							3	3					3	3	3
CO5	3	3	2	3	3	3	1		3		3		3	3	3
(1- Lo	w, 2- N	Ioderate	e, 3-Hig	gh)											

## SEMESTER VIII

18SPR801 Project III	L	Τ	P	С
	0	0	12	6
OBJECTIVES:				
• To identify the problem based on societal needs and intervieu problems that require computerization	ew pe	ople	on soc	cietal
To suggest creative solutions to societal problems and explo	ore po	ssib	e	
alternative solutions				
• To estimate risk and develop a prototype				
The aim of this course is to encourage the students to identify projects the variables that promote creativity and innovation. Each student is expected to	nat he	elp in ose a	n explo	oring ife or
socially relevant problem. At the end of the project, students should be far	iliar	with	the sta	ate of
art in their respective fields. They would be able to apply the concepts learn	t to r	eleva	nt rese	earch
problems or practical applications. This course is to motivate them to lea	rn co	ncep	ots, mo	odels,
frameworks, and tools that engineering graduates need in a world w	where	cre	ativity	and
innovation is fast becoming a pre-condition for competitive advantage.				
1. Internals				
a. First Review i Block Diagram of the proposed solution for a societal / graat	vo pr	hlar	n	
ii New Contribution in terms of modifications to ex	ve pro istino	ala	11 Jorithn	1 or
suggestion of new ones	isting	aig	Jointin	101
iii. Detailed Design of each module				
iv. Evaluation Metrics				
v. Test Cases				
b. Second Review				
i. Implementation - Justifying pros and Cons				
ii. Coding - highlighting what has been reused and what is bein	g wri	tten		
c. Third Review				
i. Test Runs				
ii. Performance Evaluation based on Metrics				
in. Project Documentation				
2. Externals Dresentation Viva Vaca Depart submission				
resentation, viva-voce, Report submission.				
TOTAL : 180 PI	CRIC	DDS		
<b>OUTCOMES:</b> On completion of this course, students will be able	to			
1. Analyze professional issues, including ethical, legal and security	issues	s, rel	ated to	,
computing projects.				
2. Synthesize and applying prior knowledge to designing and imple- open-ended computational problems while considering multiple r	nenti ealist	ng so ic co	olution nstrair	is to nts.
3. Practice CASE tools for solving case studies.				
4. Analyze Database, Network and Application Design methods.			<u>c</u>	
5. Design and use performance metrics to evaluate a designed system SWOT Analysis.	n anc	l Per	torm	
COURSE ARTICULATION MATRIX:				

	PO	PO	PO	PO	PO5	PO	PO	PO8	PO9	PO1	PO1	P01	PSO	PSO	PSO
	1	2	3	4		6	7			0	1	2	1	2	3
CO1	2	2	1	1		2	2					2	2		3
CO2	3	2	2	2		1	2					2	3	3	3
CO3	2	2				2	2					2	3	3	3
CO4	2	3				1	2					2	2	2	3
CO5	2	2				1	2					2	3	3	3
(1- Lo	(1- Low, 2- Moderate, 3-High)														

## PROFESSIONAL ELECTIVES

18SPE001	FUNDAMENTALS OF IMAGE PROCESSING	L	Т	Р	С
		3	0	0	3
OBJECTIV	ES:				
•	Introduce basic concepts and methodologies for digital image spatial methods for image processing, image smoothing and ec techniques.	proc lge (	essi detec	ng an ction	ıd
•	Analyze images in the frequency domain using various transfo various compression techniques and evaluate compression star	orms ndar	and ds	Cate	gorize
•	Understand 3D image representation and processing technique	es.			
UNIT I	DIGITAL IMAGE FUNDAMENTALS				9
Fundamental S Image sensing Mathematical	teps in Digital Image Processing-Components-Elements of visu and Acquisition-Image Sampling and Quantization-Relationshi tools used in Digital Image Processing.	ial p ps b	erce etwe	ption een p	- ixels-
UNIT II			9		
Histogram pro spatial filters-C the Fourier tran Sharpening-Se	nd sl amp thing	harpe ling a g, Im	ning and age		
UNIT III	IMAGE RESTORATION AND RECONSTRUCT	OI	N		9
Image restoration filtering-Period Degradations-I projections	ion process-Noise Models-Restoration in the presence of noise dic noise reduction by frequency domain filtering-Linear ,Positi Estimating the Degradation function-Inverse filtering-Image Re	only on – cons	-Spa Inva	tial tiant	from
UNIT IV	COLOUR AND MORPHOLOGICAL IMAGE				9
	PROCESSING				
Color Fundam segmentation b Dilation-The morphology	entals-Color Models-Color transformations-Smoothing and sha based on color-Color image compression-Morphological Proces Hit-or-Miss Transformation-Basic Morphological Alg	rpen sing orith	ing- : Ero 1ms-	Imag osion -Gray	e and ⁄-Scale
UNIT V	IMAGE COMPRESSION AND RECOGNITION				9
Fundamentals- Classes-Recog	Basic Compression Methods-Digital Image Watermarking-Patt nition based on decision-theoretic methods-Structural methods.	erns	and	Patte	ern
	TOTAL : 45 PER	IOI	DS		

OU	ГCC	)MES:	:	On co	omplet	tion of	this co	ourse,	studen	ts will	l be ab	le to				
1		Unders	tand t	he ima	ge rep	resenta	ation.									
2		Experi	ment v	with in	nage tr	ansfor	matior	n meth	ods.							
3		Apply	the im	age pr	ocessi	ng algo	orithm	s.								
4		Create	the fa	ce dete	ction	and rec	cogniti	on alg	orithm	ns.						
5		Remen	nber th	ne basi	c com	pressio	on met	hods.								
COU	JRS	E AR	ΓΙCΙ	JLAT	ION	MAT	<b>FRIX</b>	:								
	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO 1 0	PO 11	PO 1 2	PS O 1	PS O 2	PS O 3	
CO1	3												3			
CO2	3	2											3	2		
CO3	3	2											3	2		
CO4	3	3	2     3     3     3     2       3     3     3     3													
CO5	3	2		3									3	1		
(1-Lov TEX	w, 2- KT I	Moderate BOOK	, 3-Hig <b>S:</b>	h)												
1		Defeat			D:1	1 E	W 1.	· · · · · · ·	:4-1 T.,	n		·	<u></u>	1:4:		
1.	•	Pearso	on Edu	cation	, 2013	aru E	woods	s, Dig	,ital III	lage P	rocess	sing i	mira e	anion		
2.	•	Milan Visior	Soanl n", Fif	ka, Vao th Edit	clav H tion, C	lavac, engage	Roger e Lear	Boyle	, "Dig 014.	ital In	nage P	rocess	ing an	d Com	puter	
REF	FER	ENCE	S:			00										
	1.	Anil K 2011	. Jain	, "Fun	damer	itals oj	f Digit	al Ima	ge Pro	ocessii	ıg", S	econd.	Edition	n, Pea	rson,	
	2.	Rafae	l C. G MATI	onzale. AR' P	z, Rich	nard E. n Edua	Wood	ls, Stev Inc	ven Ed	dins, _	_Digit	al Imaz	ge Pro	cessin	g	
	З.	Kenne	eth R.	Castlei	man, _	Digita	l Imag	ge Prod	cessing	gʻ, Pea	arson,	2006.				
	4.	Willia	m K. I	Pratt, '	"Digite	al Imag	ge Pro	cessin	g", Jo	hn Wi	ley, No	ew Yor	·k, 200	2		
	5.	Anil K	. Jain	, "Fun	damer	itals of	f Digit	al Ima	ge Pro	ocessii	ıg", P	earson	n, 2002	2.		
						5	C		-		<u> </u>					

18SPE002	2	SOFTWARE PROJECT MANAGEMENT	L	Τ	P	С
			3	0	0	3
OBJECT	IVES	5:				
•	Unde proje	erstand and articulate the importance of Project Managemenet, project planning in an organized step-by-step manner.	nt in	any	busii	iess
•	Carr	y out an evaluation and selection of projects against strategi omic criteria and the importance of manageable project sch	ic, te edul	chni e.	cal a	nd
•	Visu signi be er	alize and assess the state of a project, ways to administer ng to completion and the characteristics of the various tear nployed.	a c n str	ontra uctu	act fi res tl	rom its nat can
UNIT I		INTRODUCTION TO SOFTWARE PROJEC MANAGEMENT	Т			9
Introduction Project Ma Projects Pro Specificatio	n-Impo nagen oblem on, Ma	ortance of Software Project Mangement – Activities Conent, Plan, Methods and Methodologies- Ways of Catwith Software Projects – Setting Objectives Stakeholders- nagement Control	overe tego Requ	ed b rizin 1iren	y So g So nents	oftware oftware
UNIT II		PROJECT EVALUATION AND PROJECT PLANNING				9
Project Port Managing the Programme	folio l he All - Aid	Management-Evaluation of Individual Projects-Programme ocation of Resources - Strategic Programme Management - s to Programme Management - Benefits Management– Ove	Mar Cre ervie	nage ating w of	ment g a Proj	ect
UNIT III	Stepw	ACTIVITY PLANNING AND RISK MANAGEMENT				9
Objectives Scheduling the Time Di – Shortenin Risk Manag Managemen Resource A Resources –	of Ac Activ imensi g Proj gemen nt – Ev Illocat	tivity Planning – Project Schedule – Project and Activitie ities – Network Planning Models – Formulating a Netwo ion -Forward Pass – Backward Pass –Identifying Critical F ject Duration – Identifying Critical Activities - Activity or t – Categories -Risk - Framework – Identification – Asses valuating Risk to the Schedule – PERT Technique – Monte ion – Nature of Resources – Identifying Resource Require ting Critical Paths – Counting the Cost - Publishing the Res	es - ork M Path Arr Ssme Carl Carl Sourc	Sequ Iode - Ac cow ent – lo Si ts – ce Sc	ienci el – A tivity Netw Plar mula Sche	ng and Adding 7 Float 7 rorks – 1 ning – 1 tion – 2 duling 1 le.
UNIT IV		MONITORING AND CONTROL				9
Framework Analysis – Managing C Contract – S – Acceptance	– Co Prior Contra Stages ce	Illecting the Data –Visualizing Progress – Cost Monitori itizing Monitoring – Getting Project Back to Target – cts – Introduction – The ISO/IEC 12207 Approach –Suppl in Contract Placement – Typical Terms of a Contract – Co	ng Ch y pr ntrae	- Ea ange oces ct M	rned Cor s –Ty Ianag	Value ntrol – ypes of gement
UNIT V		MANAGING PEOPLE AND ORGANIZING TEAMS				9
Introduction for the Job Characterist	n - Un p - Ins	derstanding Behavior – Organizational Behavior - Selectin struction in the Best Methods – Motivation – The Oldh Iodel – Working in Groups – Becoming a Team –	g the am Deci	e Rig – Ha sion	ght Pe ackm Mal	erson an Job king —

Lead	Leadership – Organizational Structures – Stress – Health and Safety. TOTAL: 45 PERIODS														
	TOTAL : 45 PERIODS         OUTCOMES:       On completion of this course, students will be able to         1.       Explain the roles of the project manager.         2.       Identify the threats and opportunities in project management.														
OU	TCO	MES	:	On	compl	etion of	of this	course	e, stud	ents w	ill be	able to	)		
1	. E	xplain	the role	es of t	he pro	ject m	anage	r.							
2	2. Io	lentify	the thr	eats a	nd opp	ortuni	ties in	projec	et man	ageme	ent.				
3	3. E	stimate	the kr	iowleo	dge ab	out siz	e, effo	ort and	cost.						
4		tilize t	he tech	nıque	s avai	able to	b keep	the pr	oject's	s aims	and o	bjectiv	ves, un	der co	ntrol.
	$\frac{1}{1}$	ndersta	and the	organ	11zatio	nal be	havior								
CO	URS	E AR	TICU		TON	MA	<b>FRIX</b>	4:							
	P01         P02         P03         P04         P05         P06         P07         P08         P09         P01         P01         P01         PS0         PS0         PS0         PS0         S0         PS0         S0         S0														
C01	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$														
CO2	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$														
CO3	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$														
CO4	1     3     2     3     1     1       2     2     2     3     2     1     2														
CO5	3	2	2		2						3			1	3
(1-Lo	ow, 2- N	Aoderate	e, 3-Higl	1)											
TE	XT B	OOK	S:												
1	. B	ob Hug ill Edu	ghes, N cation.	1ike C 2012	ottere	ll, "So	ftware	e Proje	ct Mai	nagem	ent", l	Fifth E	dition,	, McG	raw
2	2. R H	amesh ill, 200	, Gopal )6.	aswai	my, "N	Ianagi	ng Gl	obal P	rojects	s", Thi	rd Edi	tion, T	'ata M	cGraw	r
RE	FER	ENCE	ES:												
1.	Royc	re, "Soj	ftware .	Proje	ct Mar	nageme	ent", l	Pearso	n Edu	cation	, Seco	nd Edi	tion, 1	999.	
2.	Robe Man	ert T. F agemer	utrell, . 1t", Th	Dona ird Ea	ld F. S lition ,	hefer a Pears	and Li son Ed	nda I. lucatio	Shefer n, 200	; "Qu 13.	ality S	'oftwar	re Proj	iect	
3.	Jaloi 2002	e, "Soj	ftware .	Proje	ct Mar	nageme	ent in .	Practio	ce",	earsor	ı Educ	cation,	Secon	d Edit	ion,
4.	Robe	ert K. W	Vysocki	"Effe	ective ,	Softwa	re Pro	oject M	lanage	ement'	" – Wi	ley Pu	blicati	on,201	11
5.	Joel	Henry,	" Softv	vare F	Project	Mana	igemei	nt", Pe	earson	Educe	ation,2	2004.			

<b>18SPE00</b>	3	FOUNDATIONS OF IT	L	Τ	P	С
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OBJECT	IVES	5:				
•	Deve mod	elop algorithms for user problem statements; introduce objected and fundamentals of object-oriented programmentals of object-oriented programm	ct oi cami	riente ning	ed in Ja	ava.
•	Desi	gn ER-models to represent simple database application, wri	te S	QLa	Jueri	es.
•	Desi code	gn webpages using HTML, CSS and Javascript and Illustrate and web application.	te ho	ow to	test	java
UNIT I	1	FOCUS AREA 1: OBJECT ORIENTED PROGRAMMING USING JAVA				9
Problem So	lving	Techniques: Introduction to problem solving - Computation	al p	roble	em ai	nd it's
classificatio	on - Lo	ogic and its types - Introduction to algorithms - Implemen	tatic	on of	algo	orithms
using flowe	chart ·	- Searching and sorting algorithms - Introduction and cla	assif	ïcati	on t	o Data
Structures -	Basic	Data Structures - Advanced Data Structures.				
Tools: Under implementa	erstan	ding basic programming constructs using Scratch Tool - Flourough RAPTOR tool	wcł	arts		
UNIT II						8
Programmi	ng Bas	sics: Identifiers – variables - data types – operators - control	stru	ictur	es - t	vpe
conversion	- casti	ng - arrays - strings - Introduction to UML: Use case diagra	ms -	– Cla	ass	51
diagrams.						
Object Orie	nted (	Concepts fundamentals: class & object – instance variables a	& m	etho	ds –	access
specifiers -	refere	ence variables – parameter passing techniques – constructors	s – t	his r	efere	nce –
static – com	nmand	line arguments-Tools-Eclipse IDE for Java programming.				
UNIT III						10
Relationshi	ps -Inl	heritance – types of inheritance – aggregation – association	– St	atic		
Polymorphi	sm - r	nethod overloading – constructor overloading – Dynamic p	olyn	norpl	hism	•
method ove	rridin	g – abstract – interface – introduction to packages - Industry	/ Co	ding	Stan	dards
and Best Pr	actice	s – code tuning & optimization – clean code & refactoring.				
UNITIV		FOCUS AREA 2: RELATIONAL DATABASE MANAGEMENT SYSTEM	Ľ			9
RDBMS: da	ata pro	ocessing – the database technology – data models- ER mode	eling	con	cept	—
notations –	conve	rting ER diagram into relational schema - Logical database	desi	gn -		
normalizati	on (1N	NF, 2NF and 3NF).				
SQL: DDL	staten	nents – DML statements – DCL statements - Joins - Sub que	eries	-V	iews	-
Database de	esign l	ssues – SQL fine tuning.				
UNIT V		FOCUS AREA 3: WEB TECHNOLOGIES AN	<b>ND</b>			9
		SOFTWARE ENGINEERING				
Introduction	n to u	ser interface and web technologies: web fundamentals - t	ypes	s we	b co	ntent –
HTML – te	xt for	matting tags in HTML – HTML form elements - <div> and</div>	d <s< td=""><td>pan&gt;</td><td>&gt; tag</td><td>s - text</td></s<>	pan>	> tag	s - text
formatting u	using	CSS-embedded CSS, inline CSS and external CSS – JavaSo	cript	and	its f	eatures
Software E	Ingine	ering: Definition - role of software and software crisis	- 3	SDI	<i>C</i> n	nodels-
waterfall m	odel, i	ncremental model and spiral model - software testing - stat	tic 8	z dyr	namio	:
testing – ty	pes te	sting-unit testing, integration testing, system testing, perfo	orma	ince	testi	ng and
regression t	esting					

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OU'	ГСО	MES	:	On	compl	etion of	of this	course	e, stud	ents w	ill be	able to	)		
1	. Id	lentify	the sol	lution	for pro	oblem	solvin	g usin	g algo	rithms					
2	. D	esign a	and tes	ting si	mple j	progra	ms to :	impler	nent o	bject o	oriente	d conc	epts u	sing Ja	ava.
3	. In	terpret	artifa	cts usi	ng cor	nmon	quality	y stand	lards.						
4	. R	ecogni	ze the	conce	pts of	RDBN	<u> 1S .</u>								
5	. U	ndersta	and the	e basic	s of w	eb tec	hnolog	gy and	softw	are en	gineer	ing.			
CO	URS	EAR	TICU	JLAI	ION	MA	<b>FRIX</b>								
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2	. A	lfred V	⁷ .Aho,	Ullma	an, Ho	pcroft,	, "Data	a Struc	tures a	and Al	gorith	ms", S	Second	editio	n,
	A	ddison	-wesel	ly. 200	)7.										
RE	FERI	ENCE	<u>LS:</u>		-										
1.	Elma Wesl	ey.200	ivathe, 7	"Fune	damen	tals of	Datal	base S	ystems	s", Thi	rd edit	tion, A	ddison	ļ	
2.	Thon Refe	ias Pot ence S	well, " 'eries)	HTMI Paper	L & CS back	SS: Th	e Com	plete I	Referei	nce", I	Fifth E	Edition	(Com	plete	
3.	John	L. Her	inessy,	Davie	d Gola	lberg,	David	A. Pa	ttersor	1, "Co	mpute	r Arch	itectur	e: A	<
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7.	2009	schul2	<i>- unu</i> (	Juivill,	, ope	ruing	, syste		icepis	, 50111	i milej	y & 50	nis, 517	un eul	071,
5.	Andr 2007	ew Tar	ienbau	ım, "M	lodern	ı Oper	ating 1	System	es", Fo	ourth E	Edition	ı, Pear	son Ec	ducatio	on,

18SPE	2004	DATA MINING	L	Т	Р	С								
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OBJE	CTIVE	S:	v	v	v	0								
•	Intersupt	rpret the contribution of data warehousing and data mining to port systems and Evaluate the performance of different data-	to th min	e dec ing a	cision algor	n- ithms.								
•	Diff freq clus	erentiate between situations for applying different data-min uent pattern mining, association, correlation, classification, ter and outlier analysis.	ing t pred	echn ictio	ique n, an	s: id								
•	Und busi	erstand the algorithms for association rule mining, the impa ness decisions and strategy and the challenges of text minin	ct of g an	f big d we	data b mi	for ning.								
UNIT	I	INTRODUCTION				9								
Moving Busines attribute similarit reductio	towards s intellige types – I ty and d on, Data tr	the Information Age – Kinds of Data – Kinds of Patterns – ence – Web search engines – Major issues in Data mining Basic statistical descriptions of data – Data visualization – N issimilarity – Data Preprocessing – Data cleaning, Dat ransformation and data discretization.	Tecł – Ľ ⁄Ieas a in	nolo Data o uring tegra	ogies objec g dat ation	– ets and a , Data								
UNIT	II	DATA WAREHOUSING & MINING				9								
Basic co usage – Mining mining Closed a	Data wa Data wa frequent methods and Max	Data warehouse modeling: Data Cube and OLAP – Data warehouse implementation – Data generalization by attribute patterns, associations and correlations – Basic concept – Apriori algorithm, Generating Association rules, Patter patterns - Pattern evaluation methods.	areh orio s, F n gr	ouse entec requ rowth	desi l ind ent i n app	gn and uction. temset proach,								
UNIT	sage – Data warehouse implementation – Data generalization by attribute oriented induction.Ining frequent patterns, associations and correlations – Basic concepts, Frequent itemsetining methods – Apriori algorithm, Generating Association rules, Pattern growth approach,Closed and Max patterns - Pattern evaluation methods.Initial CLASSIFICATION9													
General Rule b classific backpro learners	approach ased cla cation acc pagation – k nearc	to Classification – Decision tree induction – Bayes classifissification – Model evaluation and selection – Tech uracy – Bayesian belief networks – Multilayer feed forwa – Support vector machines – Classification using frequents the neighbor classifiers.	cationiqu rd n ent l	on m es t eura Patte	ethoo to ir l net rns -	ds – nprove work – – Lazy								
UNIT	IV	CLUSTER ANALYSIS				9								
Require methods DBSCA clusterin Clusteri reductio	ments for s – Agg N, OPT ng. Proba ng high on method	cluster analysis – Partitioning methods – k Means, k Mecolomerative, Divisive – BIRCH – Chameleon – Density CS, DENCLUE – Grid based methods – STING, CLIQ abilistic model based clustering – Expectation Maximi dimensional data: problems, challenges and methodologies – Clustering Graph and Network data – Outliers and Outliers	loids y ba UE zations es – ier A	s – F sed – Ev on a Dim	lieran meth valua llgori ensio vsis.	rchical nods – tion of thm – onality								
UNIT	V	DATA MINING TRENDS AND APPLICATIO	DNS	5		9								
Mining Graphs and tele Privacy,	Sequence and Netw communi , security	Data: Time series, Symbolic sequences and biological sequences – Statistical data mining – Applications – Financial Data cation industries, Intrusion detection and prevention, Recont and social impacts of data mining.	ata a nme	es – nalys nder	Mini sis, R Syst	ng tetail ems –								
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	Demons	trate the various architectures and its application with data t	nini	na										
2.	Create n	rograms for classification, clustering and association rule m	inin	ng. g.										
3.	Evaluate	e various mining techniques on complex data objects		0.										

4	. De	evelop	applic	cations	s using	Big D	Data M	'ining	Tools.						
5	5. In	npleme	ent apa	che ha	adoop,	text a	nd we	b mini	ng.						
CO	URSI	E AR	TICU	JLAT	TION	MA	<b>FRIX</b>	:							
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TE	TEXT BOOKS:														
1	TEXT BOOKS:         1.       Jiawei Han, Micheline Kamber, Jian Pei"Data Mining: Concepts and Techniques", Third Edition, Morgan Kaufmann Publisher, 2012.														
2	2. Pa Pe	ng-Ni arson	ng Tar Educa	n, Mic tion, 2	hael S ¹ 2007.	teinba	ch and	Vipin	Kum	ar," In	troduc	tion to	Data	Minin	g",
RE	FERF	ENCE	ES:												
1.	Ian H	.Witte	n and	Eibe F	Frank,	"Data	Minin	ng: Pro	actica	l Mach	nine Le	earning	g Tool	s and	
	Techr	<i>iiques</i>	", Seco	ond Ec	lition,	Elsevi	er,200	)5		5			T (D)		
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3.	<i>K</i> . <i>P</i>	Soman	, Shya	mDiw	akar a	nd V.	Aja, "	Insight	t into l	Data N	Iining	Theor	y and		
	Pract	ice", l	Eastern	n Ecor	nomy E	Edition	, Pren	tice H	all of	India,	2006.		-		
4.	Danie	el T.La	irose,	"Data	Minin	g Met	hods a	nd Mo	odels",	, Wiley	y-Inter	scienc	e, 200	6.	
5.	<i>G. K.</i>	Gupta	ı, "Int	roduct	ion to	Data I	Mining	g with	Case 2	Studie	s", Ea	stern I	Econor	ny Edi	tion,
	Prent	ice Ha	all of In	ndia, 2	2006.		-								

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Obje Array Expr	ects and Types: Creating Classes-Classes and Structs – Objects – Inheritance – Generics – ys and Tuples-Operators and Casts-Delegates, Lambdas and Events-Strings and Regular ressions-Collections-Memory Management-Reflection-Errors and ExceptionsIT IIICORE ADO.NET9														
UNI	kpressions-Collections-Memory Management-Reflection-Errors and ExceptionsNIT IIICORE ADO.NET9														
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1	. In	spect t	he bas	ic stru	cture of	of a Ca	# appli	cation	•						
2	. Aı	nalyze	the m	ajor el	ement	s of th	e .NE	Γ fram	e worl	κ.					
3	. St	immar	ize ho	w C# 1	fits int	o the .	NET p	latfor	m						
4	. Id	entity	.NET	tramev	work t	o build	d distri	buted	applic	ations	•				
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TEX	KT BO	OOK	S:												
1	<ol> <li>Christian Nagel et al. "Professional C#5.0 with .NET 4.5.1", Fifth edition, Wiley India, 2012.</li> <li>Herbert Schildt, "The Complete Reference: C# 4.0", Tata Mc Graw Hill, Fourth</li> </ol>														
2	2012.2.Herbert Schildt, "The Complete Reference: C# 4.0", Tata Mc Graw Hill, Fourth														
2	<ol> <li>Herbert Schildt, "The Complete Reference: C# 4.0", Tata Mc Graw Hill, Fourth Edition, 2010.</li> </ol>														
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RE	ERE	INCE	LS:												
1.	Andre	ew Tro	elsen,	"Prog	gramm	ing C	<i># 2010</i>	and the	he .NE	T 4 Pl	latforn	n", Fif	th edit	ion, A	
	Press	, 2010													
2.	Ian G	riffith.	s. Mat	thew A	ldams.	Jesse	Libert	v. "Pr	ogran	iming	C# 4.0	)". Six	th Edi	tion.	
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5.	S. Th 2003.	amara	ai Selv	i, R. M	luruge	san, "	A Text	book d	on C#'	", Pear	rson E	ducati	on, Ne	wDell	ıi,

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CO2						2	3	3						2	3
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TEX	XT E	OOK	S:												
1	1.       Bhuvan Unhelkar, "Green IT Strategies and Applications using Environmental Intelligence", Fourth Edition, CRC Press, June 2011.         2.       Woody Leonhard, Katherrine Murray, "Green Home computing for dummies", Second														
2	<ul> <li>Intelligence", Fourth Edition, CRC Press, June 2011.</li> <li>Woody Leonhard, Katherrine Murray, "Green Home computing for dummies", Second Edition, August 2009.</li> </ul>														
RE	FER	ENCE	ES:												
1.	Johr	Lamb,	"The	Green	ing of	`IT", 1	Third E	Edition	, Pear	son Ec	lucatio	on, 200	)9.		
2.	Jaso Indu	n Harr stry", T	is, "Gr Third E	een C dition	omput , Lulu	ing an .com, .	d Gre 2008.	en IT-	Best P	Practic	es on I	Regula	tions d	and	
3.	Wu	Chun F	eng (ed	litor),	-Gre	en con	mputin	ıg: Lai	rge Sco	ale ene	ergy e <u>f</u>	ficienc	cy∥, CR	C Pre	SS
4.	Carl	Spesho	ocky, "	Empo	wering	g Gree	n Initi	atives	with I	Т", Јо	hn Wil	'ey ana	l Sons,	2010.	
5.	Alin Fou	Gales, th Edit	Micha ion, Sh	el Sch off IB	aefer, M reb	Mike I ook, 2	Ebbers 011.	s, "Gro	een Do	ita Ce	nter: S	Steps fo	or the .	Iourne	<i>y"</i> ,

18SPE00	)7 A	GILE SOFTWARE DEVELOPMENT	L	Τ	P	С								
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OBJECT	TIVES:	· · ·												
•	Examine the methods: Le	e principles and practices associated with each of the a ean, Scrum, Extreme Programming, Feature-driven de	agil evel	e de opn	velo nent	pment								
•	Provide kno practices su to their soft	owledge on how to manage a project using Scrum fram ch as test-driven development, standup meetings, and ware engineering practices.	nev l pa	vork ir pr	, agil ograi	e mming								
•	Ability to ic Agile metho	dentify and address most common problems encounter ods.	red	in a	dopti	ng								
UNIT I	FUN	DAMENTALS OF AGILE				9								
The Genes Overview Developme - Test Driv Design - U	is of Agile - I of Scrum - E ent - Agile pro en Developm ser Stories - A	ntroduction and background - Agile Manifesto and Pri extreme Programming - Feature Driven development oject management - Design and development practice ent - Continuous Integration – Refactoring - Pair Prog Agile Testing - Agile Tools.	inci nt - es ir gran	ples Lea n Ag nmir	- in So ile p 1g - S	oftware rojects Simple								
UNIT II	AGI	LE SCRUM FRAMEWORK				9								
Sprint back stories - A planning a Scrum Tea	klog - Iteratio cceptance tes nd retrospect m - Scrum cas	n planning - User story definition - Characteristics a ts and Verifying stories - Project velocity - Burn de ive - Daily scrum - Scrum roles – Product Owner se study - Tools for Agile project management.	and owr - S	con n ch Scru	tent art - m M	of user Sprint laster -								
UNIT II		LE TESTING				9								
The Agile framework and manag Automatio	lifecycle and and tools for ging testing cy n - Tools to su	d its impact on testing - Test-Driven Developmer TDD - Testing user stories - acceptance tests and scer vcle - Exploratory testing - Risk based testing - Regr apport the Agile tester.	nt ( nari ress	TDI os - ion	D) - Plan tests	xUnit ning - Test								
UNIT IV	AGI DEV	LE SOFTWARE DESIGN AND ELOPMENT				10								
Agile design Open Close Dependence Refactoring	blanning and retrospective - Daily scrum - Scrum roles – Product Owner - Scrum Master -         Scrum Team - Scrum case study - Tools for Agile project management.         UNIT III       AGILE TESTING         9         The Agile lifecycle and its impact on testing - Test-Driven Development (TDD) - xUnit         Gramework and tools for TDD - Testing user stories - acceptance tests and scenarios - Planning         and managing testing cycle - Exploratory testing - Risk based testing - Regression tests - Test         Automation - Tools to support the Agile tester.         UNIT IV       AGILE SOFTWARE DESIGN AND         DEVELOPMENT         Agile design practices - Role of design Principles including Single Responsibility Principle -         Open Closed Principle - Liskov Substitution Principle - Interface Segregation Principles -         Dependency Inversion Principle in Agile Design - Need and significance of Refactoring -         Refactoring Techniques - Continuous Integration - Automated build tools - Version control.         UNIT V       INDUSTRY TRENDS													
UNIT V	IND	USTRY TRENDS				8								
Market sce applicability Mitigation developme	Image: Section rease study = roots for Agne project management.         JNIT III       AGILE TESTING       9         The Agile lifecycle and its impact on testing - Test-Driven Development (TDD) - xUnit ramework and tools for TDD - Testing user stories - acceptance tests and scenarios - Planning and managing testing cycle - Exploratory testing - Risk based testing - Regression tests - Test Automation - Tools to support the Agile tester.       10         JNIT IV       AGILE SOFTWARE DESIGN AND DEVELOPMENT       10         Agile design practices - Role of design Principles including Single Responsibility Principle - Deen Closed Principle - Liskov Substitution Principle - Interface Segregation Principles - Dependency Inversion Principle in Agile Design - Need and significance of Refactoring - Refactoring Techniques - Continuous Integration - Automated build tools - Version control.       3         JNIT V       INDUSTRY TRENDS       8         Market scenario and adoption of Agile - Agile ALM - Roles in an Agile project - Agile applicability - Agile in Distributed teams - Business benefits - Challenges in Agile - Risks and Mitigation - Agile projects on Cloud - Balancing Agility with Discipline - Agile rapid levelopment technologies.													
		TOTAL : 45 PERIO	OD	S										
OUTCO	MES:	On completion of this course, students will be able t	to											
1. U de	<ul> <li>Provide knowledge on how to manage a project using Scrum framework practices such as test-driven development, standup meetings, and pair proto their software engineering practices.</li> <li>Ability to identify and address most common problems encountered in an Agile methods.</li> <li>NIT I FUNDAMENTALS OF AGILE         <ul> <li>e Genesis of Agile - Introduction and background - Agile Manifesto and Principles verview of Scrum - Extreme Programming - Feature Driven development - Lea evelopment - Agile project management - Design and development practices in Agile Toriven Development - Continuous Integration - Refactoring - Pair Programming sign - User Stories - Agile Testing - Agile Tools.</li> <li>NIT II AGILE SCRUM FRAMEWORK</li> <li>troduction to Scrum - Project phases - Agile Estimation - Planning game - Product 1 vrint backlog - Iteration planning - User story definition - Characteristics and com ories - Acceptance tests and Verifying stories - Project velocity - Burn down channing and retrospective - Daily scrum - Scrum roles - Product Owner - Scrum rum Team - Scrum case study - Tools for Agile project management.</li> <li>NIT III AGILE TESTING</li> <li>e Agile lifecycle and its impact on testing - Test-Driven Development (TDI amework and tools for TDD - Testing user stories - acceptance tests and scenarios - di managing testing cycle - Exploratory testing - Risk based testing - Regression utomation - Tools to support the Agile tester.</li> <li>NIT IV AGILE SOFTWARE DESIGN AND DEVELOPMENT</li> <li>gile design practices - Role of design Principles including Single Responsibility pen Closed Principle - Liskov Substitution Principle - Interface Segregation Princip pendency Inversion Principle in Agile Design - Need and significance of Re factoring Techniques - Continuous Integration - Automated build tools - Version contigation - Agile projects on Cloud - Balancing Agility with Discipline - Agile rapic velo</li></ul></li></ul>													
2. St	ate the busine	ess value of adopting Agile approaches.												
3. C	ompare the Te	est Driven Development approaches.												

4	. D	eploy a	automa	ated by	uild to	ols, ve	rsion o	control	and c	ontinu	ious in	tegrat	ion.		
5	. Te	est acti	vities	within	an Ag	gile pro	oject.								
CO	URSI	E AR'	TICU	JLAJ	TION	MA	ΓRIX								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	1	2		2					2				3	
CO2	3	3			2					2			2	3	
CO3	3	2								2			2	3	
CO4	2	1	2							3			1	3	
CO5	2	1	2							3			1	3	
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TEX	KT B	OOK	S:												
1	. The work of the	ne cour ebsites	rsewar prov	e incluvides	ding l articl	Power les/ f	Point s reely	slides i dowr	s avai loada	lable f ble e	or the Book	course on	e. Follo Agile	owing Soft	tware
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	Ken (	Schawl	ber M	ike Re	edle '	"A gile	Softy	are D	evelor	ment	with S	crum"	Dear	ron	
1.	2008.	(Unit	I,II)	IKC D	cure,	Agne	Soltw		evelop	ment	with 5	ciuiii	, i cai	3011	
2.	Robe Prent	rt C. M ice Ha	lartin, 11, 200	"Agil )2. (Ui	e Softv nit III)	vare D	)eveloj	pment,	Princ	riples,	Patter	ns and	l Praci	tices",	
3.	Lisa Team	Crispin s", Ad	1, Jane Idison	et Greg Wesle	gory, ' y, 200	'Agile 8. (Un	Testin it IV)	g: A P	Practic	al Gui	de for	Tester	rs and	Agile	
4.	Alista 2006.	uir Coc. (Unit I	kburn, ')	"Agil	e Softw	vare De	evelop	ment: '	The Co	oopera	tive Ga	ame", .	Addiso	n West	ley,
5.	Mike	Cohn,	"User	Storie	s Appl	ied: Fa	or Agil	e Softw	vare",	Addis	on We	sley, 2	004. (U	Unit II)	)

18SPE00	8	SOFTWARE DEFINED NETWORKS	L	Τ	P	С
			3	0	0	3
OBJECT	<b>FIVES</b>	5:				
•	Com archi	pare and contrast conventional networking approaches and itecture of SDN.	basi	C CO	ncept	ts,
•	Anal cons	lyze the implementation of SDN through Open Flow Switch of applying SDN in WAN and data centers.	hes a	ind p	ros a	nd
•	Prog and 1	ram a sample SDN for a given task, Configure an example NFV.	serv	ice u	sing	SDN
UNIT I		INTRODUCTION				9
History of	Softwa	re Defined Networking (SDN) – Modern Data Center – Tr	aditi	onal	Swit	ch
Architectu	re – V	Vhy SDN – Evolution of Switches and Control planes	, Co	ost, l	Data	center
innovation	– Con	npute and storage virtualization, Inadequacies in network	s toc	lay,	Data	center
needs – Ev	olutio	n of networking technology – Forerunners of SDN – Char	actei	istic	s of l	SDN –
SDN: oper	ation, c	devices, controller, applications.				
UNIT II		OPEN FLOW AND SDN CONTROLLERS				9
Open Flow	Speci	fications – Drawbacks of Open SDN, SDN via APIs, SDN	via I	Type	rvisc	or
based Ove	erlays -	- SDN via Opening up the Device - Emerging Proto	col,	Cor	troll	er and
Application	n mode	els – Definitions, Protocol models, Controller models, appli	catio	on m	odels	, SDN
Security.						
UNIT II	[	DATA CENTERS				9
SDN in Da	ata cent	ers - Data center demands, Tunneling technologies, Path te	chno	ologi	es,	
Ethernet fa	abrics,	SDN Use cases in the data center, Comparison of Open	SDN	N, O	verla	ys and
APIs. SDN	l in oth	er Environments – Wide area networks, Service provider a	nd C	arrie	er net	works,
Campus ne	etworks	s, Hospitality networks, Mobile networks, Optical network	ks -	Mult	titena	int and
Virtualized	l Multi	tenant Data Center - SDN Solutions for the Data Center N	Vetw	ork -	- VL	ANs –
EVPN – V	xLAN	– NVGRE.				
UNIT IV	7	SDN PROGRAMMING				9
Programm	ing SD	Ns - Northbound Application Programming Interface - Cur	rent	Lang	guage	es and
Tools - Co	mposit	ion of SDNs – Network Functions Virtualization (NFV) an	d So	ftwa	re De	efined
Networks -	- Conc	epts - Implementation and Applications.				
UNIT V		SDN FRAMEWORK				9
Juniper SI	ON Fra	umework – IETF SDN Framework – Open Daylight Cor	ntrol	ler –	Flo	odlight
Controller	– Use	cases for Bandwidth scheduling, manipulation and calenda	ring	– U	se ca	ses for
Data center	r overla	ays, big data and network function virtualization - Use case	s for	· inpi	ıt tra	ffic
monitoring	g, classi	ification and triggered actions.		1		
	-	TOTAL : 45 PER	ΙΟΙ	<b>S</b>		
OUTCO	MES:	On completion of this course, students will be able	e to			
1. A	nalyze	the evolution of software defined networks.				
2. Li	ist the	various components of SDN and their uses.				

3	. ]	Explain	the us	e of Sl	ON in	the cu	rrent n	etworl	king so	cenario	).				
4	. ]	Develop	vario	us app	licatio	ns of S	SDN.								
5	. ]	Impleme	ent the	softw	are de	fined r	networ	k fram	nework	Κ.					
CO	URS	SE AR	TICU	JLAT	TON	MA	<b>FRIX</b>	:							
	PO	1 PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
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CO4	A       3       2       2       3       1         A4       3       2       2       3       3       2       3       1         D5       3       3       2       3       3       2       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1 <th1< th="">       1       1       1</th1<>														
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TEX	KT I	BOOK	S:												
1	•	Paul Go Approac	ransso h". Fi	n and rst Edi	Chuck tion. N	Black	r, "Sof 1 Kauf	tware fmann.	Define 2014.	ed Net	works	: A Co	mpreh	ensive	e
2		Thomas 2013.	D. Na	deau,	Ken G	ray, "S	SDN:	Softwa	are De	fined 1	Netwo	rks", C	D'Reill	y Med	ia,
RE	FER	RENCE	ES:												
1.	Siar Puk	mak Az Jishina	odolm 2013	iolky,	"Soft	ware	Defin	ned N	letwor	king	with	Open	Flow	,", P	acket
2.	Vive	ek Tiwai	<u>2013.</u> ri, "SL	DN and	l Open	Flow	for Be	eginne	rs". Ai	mazon	Digita	al Serv	vices, I	nc., 20	)13.
3.	Fei	Hu, Edi	tor, "1	Vetwo	rk Inne	ovation	i throi	igh Op	oen Flo	ow and	I SDN	: Princ	ciples a	and	
	Des	ign", C	RC Pr	ess, 2(	014.			5 F					1		
4.	Wil. Clo	liam Sta ud." 1st	llings editio	"Four nPea	idatior Irson F	is of $\overline{M}$	lodern ion. In	n Netw nc. 201	orking 6.	: SDN	V, NFV	', QoĒ	, <i>IoT</i> ,	and	_
5.	Kre	utz et al	:: Soft	ware-l	Define	d Netw	vorkin	g: A C	ompre	hensiv	e Surv	vey, Pr	oceed	ings of	f the
	IEE	E. Vol.	103. N	Vo. 1	Januar	rv 201.	5.		1					0 5	

<b>18S</b>	PE	009			SOC	CIAL	NET	WO	RKS	ANA	LYS	IS	L	Τ	P	С
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OB.	<b>IE</b>	CTI	VES	5:												
•		1	Appl	y kno	wledg	e for c	urrent	web d	leveloj	pment	in the	era of	Social	Web		
•		] t	Deve tools	elop a a and a	model n algo	for in rithm	tegrati for mi	ing dat ning it	ta for l 1 socia	knowle al netw	edge re vorks	eprese	ntation	and l	earn a	bout
•		]	Exan visua	nine th alizatio	ne hun on tech	nan be nnique	havior in So	and tr	rust dis twork	sputes	of soc	ial net	works	and A	Apply	
UN	<b>T</b> ]	[		INT	ROE	DUCT	ION									9
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ŰNI	Έ	<u>  </u>		SOC	IAL N	NETW	ORK	DAT	A AN	D RE	PRES		TION			9
Struc of ne Netd	ructural – composition-affiliation variables-modes-boundary specification and sampling- type         inetworks- measurement and collection - Review of graph theory- Data set- Tools - Pajek,         etdraw, UCInet         NIT III       STRUCTURAL PROPERTIES OF SOCIAL       9         NETWORKS															
UNI	Structural PROPERTIES OF SOCIAL         NIT III       STRUCTURAL PROPERTIES OF SOCIAL         NETWORKS       Detions of centrality - cohesiveness of subgroups - roles and positions - structural equipation															9
Notic equit	NETWORKS         tions of centrality - cohesiveness of subgroups - roles and positions - structural equivalence -         nitable partitions.															
UNI	<b>T</b> ]	[V		WE	B CC	)NTE	ENT I	MINI	NG							9
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UNI	<b>T</b>	V		WE	B LI	NKA	GE N	<b>/INI</b>	NG							9
Нуре	erlin	ıks- c	co-ci	tation	and bi	bliogr	aphic	coupli	ng- pa	ge ran	k and	HITS	algorit	hm –	web	
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3		Dete	ermir	ne hun	nan be	havioi	in so	cial we	b and	relate	d com	muniti	es.			
4		Expe	erim	ent wi	th soc	ial net	works	visual	izatio	n tools						
5		Supp	port	the alg	gorithr	ns for	web li	nkage	minin	g.						
CO	UR	SE A	AR	<b>FICU</b>	LAT	ION	MA	ΓRIX								
	PC	01 F	<b>°</b> 02	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1	P01 1	PO1	PSO 1	PSO 2	PSO 3
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TEX	<b>( 1</b> )	RO	UK	5:												

1.	Stanley Wasserman, Katherine Faust, "Social network analysis: methods and													
	applications", Cambridge University Press, 2009.													
2.	John Scott, "Social Network Analysis: A Handbook", SAGE Publications, 2000.													
REFE	CRENCES:													
1.	Guandong xu, yanchun zhang, "Web mining and social networking: techniques",													
	Springer science and business media, 2011.													
2.	Charles Kadushin, "Understanding Social Network: Theories, Concepts, and													
	Findings", Oxford Press, 2011.													
3.	Peter Mika, "Social Networks and the Semantic Web", First Edition, Springer 2007.													
4.	John G. Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web",													
	Springer, 2009.													
5.	Max Chevalier, Christine Julien and Chantal Soulé -Dupuy, "Collaborative and Social													
	Information Retrieval and Access: Techniques for Improved user Modelling", IGI													
	Global Snippet, 2009.													

18SPE010	PATTERN RECOGNITION	L	Τ	P	С								
	3												
OBJECTIVE	S:												
•	Enable the students to understand the fundamentals of Patr	tern	reco	gniti	on,								
	pattern classification algorithm for a pattern recognition pr	robl	em, j	prope	r								
	implementation of the algorithm.												
•	Enrich the student's knowledge with non linear and linear	clas	sific	ation	along								
	with its applications.												
•	Understand the techniques of feature generation and temp	late	matc	hing	and								
	know about Support Vector Machines and Clustering App	roac	ches										
UNIT I	JNIII INTRODUCTION 9												
Introduction: Ex	ample: Polynomial Curve Fitting-Probability Theory –M	lode	l Se	lectic	on-The								
Curse of Dimens	onality-Decision Theory-Information Theory-Probability D	istri	buti	ons: l	Binary								
Variables-Multin	omial Variables-The Gaussian Distribution-The Ex	pon	entia	l F	'amily-								
Nonparametric N	lethods												
UNIT II	LINEAR MODELS FOR REGRESSION AND	)			9								
	CLASSIFICATION												
Linear Basis Fun	ction Models-The Bias-Variance Decomposition-Bayesian	Lin	ear I	Regre	ession-								
Bayesian Mode	Comparison-The Evidence Approximation-Limitation	s o	f F	ixed	Basis								
Functions-Linear	Models for Classification Discriminant Functions-Proba	abili	istic	Gen	erative								
Models-Probabili	stic Discriminative Models-Laplace Approximation	-Bay	yesia	n Lo	ogistic								
Regression													
UNIT III	NEURAL NETWORKS				9								
Feed-forward N	etwork Functions-Network Training-Error Backpropaga	ntion	-T	he H	lessian								
Matrix-Regulariz	ation in Neural Networks-Mixture Density Network	s-Ba	ayesi	an	Neural								
Networks-Kernel	Methods: Dual Representations-Constructing Kernels-Rad	dial	Basi	s Fu	nction								
Networks- Gauss	ian Processes.												
UNIT IV	<b>GRAPHICAL, MIXTURE MODELS AND EM</b>	[			9								
Bayesian Networ	ks-Conditional Independence-Markov Random Fields-Infer	ence	e in (	Grapł	nical								
Models-Mixture	Models and EM: K-means Clustering-Mixture of Gaussians	-An	Alte	ernati	ve								
View of EM-The	EM Algorithm in General-Combining Models: Bayesian M	lode	l Av	eragi	ng-								
Boosting-Tree-B	ased Models-Condition Mixture Models.												
UNIT V	SAMPLING METHODS				9								
Basic Sampling	Methods-Markov Chain Monte Carlo-Gibbs Sampling-S	lice	Sai	nplir	ig-The								
Hybrid Monte Ca	rlo Algorithm-Estimating the Partition Function-Continuou	s La	tent	Varia	ables:								
Principal Comp	onent Analysis-Probabilistic PCA-Kernel PCA-Nonline	ar 1	Later	nt Va	ariable								
Models.													
	TOTAL : 45 PERI		<b>)S</b>										
OUTCOMES	On completion of this course, students will be able	to											
1. Determi	ne the classifiers for pattern recognition.												
2. Examine	e feature selection and dimensionality reduction techniques.												
3. Make us	e of the MC and HMM models.												
4. Classify	the data objects and develop template matching module to a	reco	gniz	e the	;								
patterns													
5. Build ur	supervised learning algorithms and clustering algorithms to	dat	a obj	ects.									

COURSE ARTICULATION MATRIX:															
	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2	2	1	1									2	3	
CO2	2	2	1	1									2	3	
CO3	2	2											2	3	
CO4	2	1		1									2	3	
CO5	2 2 1 1 2 3														
(1-Low, 2- Moderate, 3-High)															
TEXT BOOKS:															
1	. Cł 20	nristop 11	her M	.Bisho	p, "Pa	ttern F	Recogr	nition a	and Ma	achine	Learr	ning", l	Spring	er-Ve	rlag,
2	. Se	rgios '	Theod	oridis,	Konst	tantinc	os Kou	troum	bas, "I	Pattern	Reco	gnitior	n", 4th	Editio	on,
REI	TERE		IC FIES	5, 200	9.										
1	Steph	en M	larslav	nd "	Machi	ne L	parnin	σ	An A	Noorit	hmic	Persr	nective	" Se	cond
1.	Editic	on,Cha	ipman	and H	all/CF	RC Ma	chine .	s Learni	ing and	d Patte	ern Re	cognit	ion Se	, se ries, 2	014.
2.	Malay	v K. P	akhira,	, "Dig	ital In	age P	rocess	ing an	nd Patt	tern Re	ecogni	tion",	First I	Edition	1,
	PHI I	Learni	ng Pvt.	. <i>Ltd</i> .,	2011.										
3.	Russe	ell, S. a	ind No	rvig, 1	V. "Ar	tificial	Intell	igence	e: A Me	odern	Appro	ach" l	Prentic	ce Hal	l
	Series	s in Ar	tificial	Intell	igence	<u>, 2003</u>	<u>.</u>	_	~ 1						
4.	Duda, R.O., Hart, P.E., and Stork, D.G. "Pattern Classification" Wiley-Interscience, 2nd Edition 2001														
5.	T.M. Mitchell, Machine learning, Mc Graw-Hill, New York, 1997.														

## BUILDING ENTERPRISE APPLICATIONS

L	Τ	Р	С
3	0	0	3

OBJECTIVES:         •       Exposed to essentials of building enterprise applications and analysis of enterprise application and business process modeling.         •       Learn to design and develop high quality enterprise applications.         •       Be familiar with the approaches of testing enterprise application         UNIT I       INTRODUCTION TO ENTERPRISE APPLICATION										
<ul> <li>Exposed to essentials of building enterprise applications and analysis of enterprise application and business process modeling.</li> <li>Learn to design and develop high quality enterprise applications.</li> <li>Be familiar with the approaches of testing enterprise application</li> <li>UNIT I INTRODUCTION TO ENTERPRISE APPLICATION</li> </ul>										
Learn to design and develop high quality enterprise applications.     Be familiar with the approaches of testing enterprise application     UNIT I INTRODUCTION TO ENTERPRISE     APPLICATION     Introduction to enterprise applications and their types software engineering, methodologies										
Be familiar with the approaches of testing enterprise application     INTRODUCTION TO ENTERPRISE     APPLICATION     Introduction to enterprise applications and their types software engineering, methodologies										
UNIT I         INTRODUCTION TO ENTERPRISE           APPLICATION         Introduction to enterprise applications and their types software engineering methodologies										
APPLICATION										
Introduction to enterprise applications and their types software engineering methodologies										
life cycle of raising an enterprise application - introduction to skills required to build an enterprise application - key determinants of successful enterprise applications and measuring the success of enterprise applications.										
UNIT II INCEPTING ENTERPRISE APPLICATION										
AND BUSINESS PROCESS MODELING										
Inception of enterprise applications - enterprise analysis - business modeling - requirements elicitation - use case modeling - prototyping - non-functional requirements - requirements validation - planning and estimation.										
UNIT IIIENTERPRISE ARCHITECTURE AND1										
<b>DESIGNING ENTERPRISE APPLICATION</b>										
Concept of architecture - views and viewpoints - enterprise architecture - logical architecture										
technical architecture - design - different technical layers - best practices - data architecture an										
design - relational - XML and other structured data representations - Infrastructure architectur										
and design elements – Networking - Internetworking and Communication Protocols - I										
Hardware and Software – Middleware - Policies for Infrastructure Management - Deployment										
Strategy - Documentation of application architecture and design.       UNIT IV       CONSTRUCTING ENTERDRISE										
APPLICATION										
Construction readiness of enterprise applications - defining a construction plan - defining a										
package structure - setting up a configuration management plan - setting up a development										
environment - introduction to the concept of Software Construction Maps - construction of										
technical solutions layers - methodologies of code review - static code analysis - build and										
testing - dynamic code analysis – code profiling and code coverage.										
UNIT V TESTING AND KULLING UUT ENTERPRISE										
APPLICATION										
I ypes and methods of testing an enterprise application - testing levels and approaches - testing										
alphalization testing and interface testing user acceptance testing rolling out an enterprise										
application.										
TOTAL : 45 PERIODS										
<b>OUTCOMES:</b> On completion of this course, students will be able to										
1. Recall relevant knowledge from the concept of Enterprise Analysis and Business Modeling.										

2	2. U	Understand requirements validation, planning and estimation.													
3	3. D	iscuss	the app	plication	on arc	hitectu	are and	1 impo	ortance	e of ap	plicat	ion fra	mewo	rk.	
4	4. C	ompos	e Code	e revie	w, Co	de ana	alysis,	build	proces	ss.					
5	5. U	ndersta	nd dif	ferent	testin	g invo	lved v	with en	terpri	se app	licatio	n and	the pr	ocess	of
	ro	olling o	ut an e	enterpr	ise ap	plicati	ion.								
6. Motivate the concept of Software Construction Maps.															
COURSE ARTICULATION MATRIX:															
	PO	PO 2	PO 3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	3	3	3										2	3	
CO2	3	2	2	1									2	2	
CO3	3	3	3			1							2	3	
CO4	3	2	2										2	3	
CO5	3	2	2	1									2	2	
CO6	>06     3     3     3     2     3														
(1-Lo	ow, 2- N	/loderate	, 3-Higl	h)											
TE	XT B	OOK	S:												
1	I. A	nubhav	v Pradl	han, Sa	athees	ha B.	Nanjaj	ppa, S	enthil	K. Na	llasan	ny, Ve	eraku	mar	
	E	sakimu	thu,"F	Raising	g Enter	rprise	Applie	cations	s", Joh	ın Wil	ey, 20	10			
2	2. B	rett Mc	Laugh	nlin, "I	Buildi	ng Jav	a Ente	erprise	Appli	catior	ns", O'	Reilly	Media	a, 2002	2
<b>RE</b>	FER	ENCE	S:												
1.	Sore	n Lau	esen, 1 200'	,"Soft	ware	Requ	ireme	nts: S	Styles	& Z	Techni	ques "	, Add	lison-	Nesley
	Pria	n Boron	$\frac{1}{2002}$	2. "Soft	varo (	netam	a Doar	inoma	nta Fr	nainaa	vina	In Dua	otioo"	McG	
2.	Hill/	Osborn	e Med	5011v lia, 200	vure 5 09	ystem	s Keqi	ureme	nis Li	iginee	ring. I	nira	chce,		'uw-
3.	Dear	n Leffin	gwell, 2 nd F	Don V	Vidrig Pear	; "Ma son ?	naging 003	g Softv	vare F	Requir	ement.	s: $A \overline{U}$	se Cas	se	
4.	Vasu	deva V	arma,	"Softv	vare A	Irchite	ecture:	A Ca	se Bas	ed Ap	proac	h", Pe	earson,	, 2009	
5	"Des	signing	Enter	prise A	<i>Applic</i>	ations	with t	he J21	EE Pla	utform	" (PD	F avai	ilable (	at-	
5.	http:	//java.s	un.cor	n/blue	prints.	/guide	lines/a	lesign	ing_er	iterpr	ise_ap	plicat	ions_2	e/.	

<b>18S</b>	18SPE012         NATURAL LANGUAGE PROCESSING         L         T														С
	OBJECTIVES:														3
OBJ	<b>IEC</b>	TVE	<b>S:</b>												
	٠		To le	earn th	e conc	ept of	speecl	n proc	essing	in NL	.Р.				
	•		To u in N	ndersta LP and	and the l theor	e morp ies of	holog parsing	ical fu g in N	ndame LP.	entals	of varie	ous w	ords, v	word fo	orms
	•		To u sema	ndersta intics a	and the and ap	e role o plication	of sem ons of	antics natura	, pragi il lang	natics uage p	and re process	preser ing.	ntatior	is of	
UNI	ΤI		SOU	UND		-						-			9
Biology of Speech Processing - Place and Manner of Articulation - Word Boundary Detection - Argmax based computations - HMM and Speech Recognition.													on -		
UNI	TI		WO	RDS	AND	) WO	RD I	FOR	MS						9
Morphology fundamentals - Morphological Diversity of Indian Languages - Morphology															
Paradigms - Finite State Machine Based Morphology - Automatic Morphology Learning - Shallow Parsing - Named Entities - Maximum Entropy Models - Random Fields															
UNI	<b>T II</b>	<u>u sing -</u> [						nuopy	MOU	218 - K	anuom	Tielu	5.		9
Theo	ries of	f Parsi	ng, Pa	rsing A	Algorit	hms -	Robus	t and	Scalab	le Par	sing on	Nois	y Tex	t as in	Web
documents - Hybrid of Rule Based and Probabilistic Parsing - Scope Ambiguity and Attachment															
Ambiguity resolution.															
UNITIV MEANING 9															
Lexical Knowledge Networks, Wordnet Theory - Indian Language Wordnets and Multilingual											ıal				
Meta	phors	-Core	eferen	ces.	- 0001	u Sen	5C D15	unioig	uation	- 1101		viuitii	ingua	iity –	
UNI	TV		WE	<b>B 2.0</b>	APP	LICA	ATIO	NS							9
Senti	ment	Analys	sis - Te	ext En	tailme	nt - Ro	bust a	nd Sca	alable	Machi	ine Tra	nslatio	on - Q	uestio	n
Ansv	vering	in Mu	ltiling	ual Se	tting -	Cross	Lingu	al Info	ormati	on Ret	rieval	(CLIR	<u>t).</u>		
				On		ation	fthia				45 PE	klo to	DS		
		WES:	ond (	On	ting of		$\frac{1}{2}$	notur	$\frac{1}{1}$			ing			
2	· C	iscover	r the v	arious	eleme	pproac	speech	natura	a lang	uage l	JUCESS	ing.			
3	. D	esign a	ind de	velopi	ng the	machi	ne lea	rning t	echnic	Jues ir	the ar	ea of ]	NLP.		
4	. 0	utline 1	the lex	ical kr	nowled	lge net	tworks	and v	vordne	et.					
5	. Ex	xplain	the we	b appl	icatio	ns and	CLIR	•							
COU	URSI	EAR	FICU	LAI	ION	MA	<b>FRIX</b>								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3										2	•		
CO2	3	3	3								3		3	2	
CO3	3	3	3	3							3		3	3	
CO4	<b>O4</b> 3 3 3 3 3 3 3														
CO5	3	3	3	3							3		3	2	

(1-Lo	w, 2	2- Moderate, 3-High)									
TE	ХT	BOOKS:									
1		Daniel Jurasfsky.	James H.Martin, "Speech and Language Processing: An Introduction								
		to Natural Langu	ge Processing, Computational Linguistics and Speech Recognition",								
	3rd Edition, Prentice Hall, 2013.										
2	2. Manning, Christopher, Heinrich, Schutze, "Foundations of Statistical Natural Language										
		Processing", MIT	<u>Press, 1999.</u>								
RE	REFERENCES:										
1.	Al	len James, "Natur	al Language Understanding", 2 nd edition, Benjamin Cumming, 1995.								
2.	Cl	harniack, Eugene,	"Statistical Language Learning", MIT Press, 1993.								
3.	Та	nveer Siddiqui, U.	S. Tiwary, "Natural Language Processing and Information								
	Re	etrieval", Oxford U	University Press, 2008.								
4.	St	even Bird, Ewan K	Ilein and Edward Loper, "Natural Language Processing with								
	Py	thon", First Editio	on, O_Reilly Media, 2009.								
5.	$\overline{Al}$	exander Clark, Ch	nris Fox, Shalom Lappin, "The Handbook of Computational								
	Li	nguistics and Natu	IralLanguage Processing", Wiley-Blackwell, 2012.								

18SPE	013	INFORMATION RETRIEVAL	L	Τ	Р	С
		TECHNIQUES				
			3	0	0	3
(	<b>OBJEC</b>	TIVES:				
	•	Understand the theoretical basis behind the standard mode	els o	f IR	and t	he
		difficulty of representing and retrieving documents, image	es, sj	peecl	h	
	•	Understand the standard methods for Web indexing and se and Distributed IR along with its applications.	earcl	ning	, Para	ıllel
	•	Understand how techniques of web retrieval is established engine architecture in IR	l usi	ng se	earch	
UNIT	Ι	INTRODUCTION				9
Informa	tion Retri	eval – Early Developments – The IR Problem – The User's	s Tas	sk –	Infor	mation
versus I	Data Retri	ieval - The IR System – The Software Architecture of th	le IF	R Sy	stem	– The
Retrieva	l and Ra	nking Processes - The Web – The e-Publishing Era – Ho	w tl	ne w	veb c	hanged
Search -	- Practical	l Issues on the Web – How People Search – Search Interfac	es T	oday	y —	-
Visualiz	ation in S	earch Interfaces.		-		
UNIT	II	MODELING AND RETRIEVAL EVALUATI	ON			9
IR mode	els – Cla	ssic Information Retrieval – Alternative Set Theoretic M	[ode	ls –	Alte	rnative
Algebra	ic Model	s - Alternative Probabilistic Models - Other Models - I	Нур	ertex	t Mo	odels –
Web bas	sed Mode	ls – Retrieval Evaluation – Cranfield Paradigm – Retrieval	Met	rics	– Ret	erence
Collection	ons – Us	er-based Evaluation – Relevance Feedback and Query E	xpai	nsior	1 – E	Explicit
Relevan	ce Feedba	ack – Clicks – Implicit Feedback Through Local Analysis	– Gl	obal	Ana	lysis –
Docume	nts: Lang	uages & Properties – Queries - Languages & Properties.				-
UNIT	III	TEXT CLASSIFICATION AND CLUSTERIN	IG			9
A Chara	cterizatio	n of Text Classification – Unsupervised Algorithms – Supe	ervis	ed A	lgori	thms –
Feature	Selection	or Dimensionality Reduction - Evaluation metrics - Orga	nizi	ng ti	he cl	asses –
Indexing	g and Sear	rching – Inverted Indexes – Signature Files – Suffix Trees &	z Su	ffix .	Array	/s —
Sequent	ial Search	ing – Multi-dimensional Indexing.				
UNIT	IV	WEB RETRIEVAL AND CRAWLING				9
The W	eb – Se	earch Engine Architectures – Cluster based Architec	ture	—	Dist	ributed
Architec	ctures- Se	earch Engine Ranking – Link based Ranking – Simple R	lank	ing 1	Func	tions –
Learning	g to Rank	Evaluations Search Engine Ranking Search Engine Us	er Iı	ntera	ction	. —
Browsin	g – Appl	ications of a Web Crawler - Taxonomy - Architecture an	d Ir	nple	ment	ation –
Schedul	ing Algor	ithms –Evaluation.				
UNIT	V	<b>RECOMMENDER SYSTEM</b>				9
Recomn	nender S	ystems Functions – Data and Knowledge Sources	– R	lecon	nmei	ndation
Techniq	ues – Ba	sics of Content-based Recommender Systems – High L	evel	Are	chite	cture –
Advanta	ges and I	Drawbacks of Content-based Filtering – Collaborative Filter	ing	$-\mathbf{M}$	atrix	
factoriza	ation mod	els – Neighborhood models.	-			
		TOTAL : 45 PER		<b>S</b>		
OUTC	<b>OMES</b> :	On completion of this course, students will be able	to			
1.	Utilize th	ne open source search engine framework and exploring its c	capa	biliti	es.	
2.	Analyze	the documents in different ways and discuss its effect on si	mila	rity.		
3.	Experim	ent with calculations and on search.				

4	. De	esign a	and app	olying	the in	novati	ve feat	ture in	a sear	ch eng	gine.				
5	. M	ake us	e of er	nterpri	se sear	ch and	l paral	lel & (	distrib	uted II	R.				
CO	URSI	E AR'	TICU	JLAT	TION	MA	ΓRIX	•							
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	3										1		
CO2	3	2	3										1	2	
CO3	3	3			1								1	2	1
CO4	3	3											1	2	
CO5	3 3 1 2														
(1-Low, 2- Moderate, 3-High)															
TEXT BOOKS:															
1	. Ri Co	cardo oncept	Baeza s and [	-Yates Fechno	s, Bertl blogy l	hier Ri Sehind	beiro- Searc	Neto, h", Se	"Mode cond l	ern Inf Editior	format n, ACN	ion Re A Pres	trieval s Bool	: The (s, 201	1.
2	. Ri Ec	cci, F, lition,	Roka 2011.	ch, L.	Shapiı	a, B.K	Lantor,	"Reco	ommei	nder S	ystems	s Hand	lbook"	, First	
RE	FERF	ENCE	ES:												
1.	C. Ma Camb	anning pridge	r, P. Ra Univer	aghava rsity F	an, H. Press, 2	Schütz 2008.	ze, "In	troduc	tion to	o Infor	mation	n Retri	eval",		
2.	Stefar Imple	1 Bueti mentir	tcher, ( 1g and	Charle Evali	es L. A lating	. Clari Search	ke and h Engi	' Gord nes, Tl	on V. he MII	Corma [ Pres.	ıck, — s, 2010	Inforn ).	nation	Retrie	val:
3.	Bruce Pract	e <del>Croft</del> ice". I	, Donc First E	ald Me dition	etzle, T , Addis	revor son We	Strohn eslev, 2	nan, " 2009.	Search	h Engi	nes: In	ıforma	tion R	etrieva	al in
4.	Mark Levene, An Introduction to Search Engines and Web Navigation, 2nd Edition Wiley, 2010.														
5.	Ophir Frieder "Information Retrieval: Algorithms and Heuristics: The Information Retrieval Series ".2nd Edition. Springer, 2004.														

18S	PE0	14		G	GPU A	ARCI PRO	HITE GRA	CTU MMI	RE A NG	ND		L	T	P	С
												3	0	0	3
	0	BJEC	TIVE	ES:									-		
	٠		To u	nderst	and the	e basic	es of p	arallel	ism wi	ith GP	U, GPU	J para	digm	S	
	٠		To u	nderst	and the	e prog	rammi	ng iss	ues an	d algo	rithms	in GP	Us		
	•		To ir	ntrodu	ce diff	erent (	GPU p	rogran	nming	mode	ls				
UNI	ΤI		GP	U AR	CHI	ГЕСТ	<b>FURI</b>	£							9
Evolution of GPU architectures - Understanding Parallelism with GPU –Ty													-Typ	oical	GPU
Architecture - CUDA Hardware Overview - Threads, Blocks, Grids, Warps, Scheduli													ing -		
Memory Handling with CUDA: Shared Memory, Global Memory, Constant Memory a													and		
Texture Memory.													<u> </u>		0
UNI									atimiz	ing CI		nnlia	tions	Drohl	9
Deco	Using CUDA - Multi GPU - Multi GPU Solutions - Optimizing CUDA Applications: I Decomposition, Memory Considerations, Transfers, Thread Usage, Resource Contentio													tions.	em
UNI	TI	Ι	PRO	) GR	AMN	IING	ISSU	JES		-					9
Common Problems - CUDA Error Handling - Parallel Programming Issues – Synchronizati												on -			
Algorithmic Issues - Finding and Avoiding Errors.													0		
UNIT IV OPENCL BASICS												9			
OpenCL Standards-Kernels-Host Device Interaction-Execution Environment-Memory											y Moc	lel-			
Basic LINI	$\frac{c}{T} \mathbf{V}$	nCL E			тнл	15 0	NCI	<b>DT</b> T							0
Daral	$\mathbf{I} \mathbf{V}$	ottorne		Jution	Drofi				triv N	Matrix	Multir	licati	on		,
Prog	amm	ing He	teroge	neous	Cluste	r.	i, spai		u 1x - 1	VIALIIA	winnt	mean	- 110		
- 0		0	0					r	ΓΟΤ	AL:	45 PE	RIO	DS		
OU	ГСС	MES		On	compl	etion of	of this	course	e, stud	ents w	ill be a	ble to			
1	. E	xplain	GPU A	Archite	ecture.										
2	. (	Construc	ct the i	nstanc	es of G	CUDA									
3	. I	mpleme	ent alg	orithm	is in G	PUs to	o get n	naximu	um occ	cupanc	y and	throug	hput.		
4	. A	Appraise	e the p	rogran	n in an	y hete	rogen	eous p	rogran	nming	model	•			
	IRS	$\mathbf{F} \mathbf{A} \mathbf{R}'$	TICI	and C	iPU pr	ogram	iming FRIX	model	s.						
									DOD	DO1	DO1	DO1	DEO	DEO	DEO
	PUI	PUZ	P03	P04	P05	P06	P07	P06	PU9	0	1	2	1	2	3
CO1	3	2												1	
CO2	3	2	3	1							2		3	2	1
CO3	3	1	3	1							2		3	2	
CO4	3	2	1	3							2		3	3	
CO5	3	2	3	1							3		3	1	
(1-Loy	w. 2- 1	Moderate	. 3-Hig	h)	1	1	1	1	l	1				1	L
TE	XT BOOKS:														
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1.	Shane Cook, "C	UDA Programming: A Developer's Guide to Parallel Computing with													
	GPUs (Applicat	ions of GPU Computing)", First Edition, Morgan Kaufmann, 2012.													
2.	David R.Kaeli, I	Perhead Mistry, Dana Schaa, Dong Ping Zhang, "Heterogenous													
	Computing with	OpenCL", 3 rd Edition, Morgan Kauffman, 2015.													
RE	FERENCES:														
1.	Nicholas Wilt, "CU	DA Handbook: A Comprehensive Guide to GPU Programming",													
	Addison - Wesley, 2	013.													
2.	David B. Kirk, Wen	-mei W. Hwu, "Programming Massively Parallel Processors - A													
	Hands-on Approach	h", Second Edition, Morgan Kaufmann, 2012.													
3.	Jason Sanders, Edw	vard Kandrot, "CUDA by Example: An Introduction to General													
	Purpose GPU Prog	ramming", Addison - Wesley, 2010.													
4.	http://www.nvidia.c	om/object/cuda_home_new.html													
5.	http://www.openCL	.org													

18SI	<b>PE01</b>	5	BUSINESS INTELLIGENCE AND ITS L T APPLICATIONS												С
									. 10			3	0	0	3
OBJ	JECT	TVE	<b>S:</b>										-	-	
	•		Be exinteg	xposed tration	l with	the bas	sic rud	liments	s of bu	isiness	intelli	gence	syste	m and	data
	•		Unde	erstand	I the m	nodelin	ig aspe	ects be	hind b	usines	s intel	ligence	e		
	٠		To le techr	arn the	e basic	es of ei	nterpri	se rep	orting,	differ	ent da	ta anal	ysis t	ools a	nd
UNI	ΤI		INT	ROD	DUCT	TION	TOI	BUSI	NESS	5					4
			INT	ELL	IGEN	NCE									
Intro	ductio	n to $O$	LTP at	nd OL	AP - F	3I Defi	inition	s & Co	oncept	s - Bu	siness	Appli	cation	s of B	I - BI
Fram Tech	lework	c - Roie v - BI	e or Da Roles d	ata wa & Res	arenou ponsił	sing ir. vilities.	1 BI - I	BI Infr	astruc	ture C	ompor	ients –	BIP	rocess	- BI
UNI	TI	<u>) DII</u>	BAS	SICS	OF I	DATA	INT	EGR	ATI	ON					12
Conc	epts o	of data	integra	ation n	leed ar	nd adva	antage	s of us	ing da	ta inte	gratio	n - inti	oduct	tion to	)
common data integration approaches - introduction to ETL using SSIS - Introduction quality - data profiling concepts and applications.													ction	to dat	а
quality - data profiling concepts and applications.UNIT IIIINTRODUCTION TO MULTI-DIMENSIONAL															6
DATA MODELING													0		
Multi star a SSAS	i-dime and sn S.	nsiona owflał	ıl mod ce sche	eling - ema -	conce introd	epts of luction	dimer to bu	nsions siness	- facts metrie	- cube cs and	es - att KPIs	ribute - crea	– hieı ting c	archie cubes	s - using
UNI	ΊΤΙ	r	BAS	SICS	OF F	ENTE	RPR	ISE I	REP(	ORTI	NG				12
Introc introc	ductio ductio	n to en n to SS	iterpris	se repo rchited	orting - cture -	- conce enterp	epts of orise re	dashb dashb	oards g usin	- balaı g SSR	nced so S.	coreca	rds -		
UNI	ΤV		CAS	SE ST	ΓUDI	ES									11
The a	assign	ments	for the	cours	e can i	include	e the f	ollowi	ng.				I		
1.	. Sen	ninars	from t	he top	ics rela	ated to	Busin	ness In	tellige	nce sp	ace				
2.	. Kel	evant l	ab exe	rcises	to get	expos	ure to	BI COL	icepts	& too	15 DF		חמ		
	ΓΓΟ	MFS	•	On	compl	etion of	of this	course	IUIA stude	AL:	HJ PE	ble to	<b>D2</b>		
		istinou	ish the	Trans		Proce	essing	and A	$\frac{1}{nalvtic}$	al ann	licatio				
2	. R	elate th	ie tech	nology	y and $\mathbf{I}$	process	ses ass	sociate	$\frac{d}{d}$ with	Busin	ess In	tellige	nce fr	amew	ork.
3. Summarize the Data Warehouse implementation methodology and project life											fe cyc	le.			
4. Make recommendations to achieve the business goal.															
5.	. De	emons	trate th	ie appl	licatio	n of co	oncepts	s in Mi	icroso	ft BI s	uite.				
COL	UKSI	<b>5 AK</b> '	TICU	JLA'I	ION	MA	IKIX								
	PO1	PO2	PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO1         PO1 <td>PSO 1</td> <td>PSO 2</td> <td>PSO 3</td>									PSO 1	PSO 2	PSO 3	
CO1	2	2	2		2								3		

CO2															
	3	2	3		2								3	3	
CO3															
	2		2		2								3	3	1
CO4															
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TEX	KT B	OOK	S:												
1	. R.	N. Pra	sad, So	eema A	Achary	/a, "Fu	Indam	entals	of Bus	siness	Analy	tics ",	Secon	d Editi	on,
	Wiley 2016.														ŕ
2	<ol> <li>David Loshin, "Business Intelligence: The Savvy Manager's Guide", Morgan</li> </ol>														
	2. David Losnin, "Business intelligence: The Savvy Manager's Guide", Morgan Kaufmann, 2012.														
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	Proje	ct Life	cvcle f	or Dec	cision-	Suppo	rt App	licatio	ons". A	1ddiso	n West	lev. 20	03		
3	Cindi	Ноч	<u>son</u>	"Succ	essful	Busi	ness	Intelli	oence	· Sec	rets 1	to mo	iking	Killer	· BI
5.	Annli	cation	s". Sec	cond et	dition.	McGr	aw-Hi	ill Edu	cation	2013		0 110		miner	DI
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7.	editio	n, Mc(	Graw-I	Hill Ed	lucatio	on, 201	16 16	gence		1107 050	<i>ηι</i> 5 <u>Q</u> .		2000	5,4	
5.	Lynn	Langit	, "Foi	ındatio	ons of	SQL S	erver .	2005 E	Busine	ss Inte	lligend	ce ", A	press,	2007	

<b>18S</b>	PE0	16				GAN	IE TI	HEO	RY			L	Τ	P	С
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	٠		To kı frame	now al ework	bout g	ame er	ngine o	develo	pment	, mode	eling, t	echnic	ues a	nd	
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UNI	ΤIJ	[	GRA	APH	ICS F	PIPE	LINE								9
Mode	el and	d World	l Coord	linates	s-Pers	sective	e Proje	ection-	Came	ra Moo	lels-C	ulling	and C	lippin	g-
Surfa	Surface and Vertex Attributes-Rasterizing-An Efficient Clipping and Lighting Pipeline-Issues of Software, Hardware and APIs														
Softv	Software, Hardware and APIs         UNIT III       HIERARCHICAL SCENE REPRESENTATIONS       9														
UNI	UNIT III         HIERARCHICAL SCENE REPRESENTATIONS           Tree-Based         Representation-Updating         a         Scene         Graph-Rendering         a         Scene         Graph         Graph-Rendering         a         Scene         Graph         Graph														
Tree-	Tree-Based Representation-Updating a Scene Graph-Rendering a Scene Grap Detection-Design Issues-Intersection of Dynamic Objects and Lines-Intersection of I														
Detection-Design Issues-Intersection of Dynamic Objects and Lines-Intersection of Dynamic Objects and Planes-Static Object-Object Intersection-Dynamic Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Object-Objec															11C
Droge	Objects and Planes-Static Object-Object Intersection-Dynamic Object-Object Intersection														
Processing of Rotating and Moving Objects															
UNIT IV GEOMETRIC LEVEL OF DETAIL															9
Sprite	Sprites and Billboards-Discrete level of Detail- Continuous Level of Detail-Animation of Characters: Key Frame Animation-Inverse Kinematics-Skinning														
Char	acter	s: Key I	rame	Anima	ation-l	nverse	e Kine	matics	-Skini	nng					0
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CO1	3	3	2	3						-	_		3	2	
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TE	ХT	BOOKS:											
	1.	David H. Eberly, "3D Game Engine Design: A Practical Approach to Real Time											
		Computer Graphics", Second Edition, Morgan Kaufmann, 2010.											
2.	2. Jonathan S. Harbour,"Beginning Game Programming", Course Technology, Third												
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RE	FE	RENCES:											
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	20	)10.											
2.	Jii	m Thompson, Barnaby Berbank-Green, Nic Cusworth, "Game Design: Principles,											
	Pı	ractice, and Techniques - The Ultimate Guide for the Aspiring Game Designer", First											
	Εc	dition, Wiley, 2008.											
3.	А.	Dixit and S. Skeath, "Games of Strategy", WW Norton & Co Inc, 3rd Edition 2009.											
4.	Ja	ison Gregory, "Game Engine Architecture", CRC Press / A K Peters, 2009.											
5.	Er	rnest Adams and Andrew Rollings, "Fundamentals of Game Design", 2nd Edition											
	Pı	rentice Hall /New Riders, 2009.											

<b>18S</b>	PE0	17			OPE	N SO	URC	E SY	STE	MS		L	Τ	P	С
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OBJ	IEC	TIVE	S:												
	•		To le	earn ab	out O	pen so	ource o	peratii	ng syst	tems a	nd dat	abases			
	•		To a sour	cquire ce tool	the kn s and t	owled technic	lge of ques	open s	ource	progra	mmin	g lang	uages	, open	
	•		To g	et intro	oduces	s to Py	thon p	rogran	nming	const	ructs				
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UNI	TI	I	OP LA	EN SONGU	OUR AGE	CE P S	ROG	RAN	1MIN	NG					9
Intro Progr Case	Introduction to Open Source Programming and Scripting Languages- Execution Environment - Programming in Web Environment - File Handling and Data Storage - Working with Forms - Case Study: PHP - Python.														
UNI	ΤΓ	V	OP	EN S	OUR	CE V	VEB	SERV	VER						9
Web	Serv	er - Fe	ature –	Archi	tecture	es - Ca	se Stu	dy: Ap	bache V	Web S	erver ·	- Confi	igurin	g and	
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OU	ГСС	<b>MES</b>	:	On	compl	etion of	of this	course	e, stud	ents w	ill be a	able to			
1	. I	nterpre	t the o	pen so	urce sv	ystems	and d	latabas	es.						
2	. (	Create p	orogran	ns usir	ng ope	n sour	ce pro	gramn	ning la	nguag	es.				
3	. I	ntervie	w PHP	<b>p</b> rogr	ammiı	ng and	SQL	databa	se.						
4	. I	Build p	ogram	s using	g pyth	on.									
5	. J	ustify t	he file	handl	ing me	chanis	sms.								
COU	URS	E AR	TICU	JLAT	TION	MA	ΓRIX	:							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	PSO 1	PSO	PSO 2
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TEX	EXT BOOKS:														
	1. Kailash Vadera and Bhavyesh Gandhi, "Open Source Technology", Second Edition,														
	University Science Press, New Delhi, 2009														
	2. Peter Wainwright, "Professional Apache", Third Edition, Wrox Press, 2004.														
RE	REFERENCES:														
1.	Steve	Suchr	ing, "I	PHP6	and M	ySQL	Bible'	", Johr	ı Wiley	v, 200	9.				
2.	Rasm	us Ler	dorf, I	Levin T	latroe,	"Pro	gramn	ing P	HP", (	O'Reil	ly, 200	02.			
3.	Wesle	ey J. C.	hun, ''	Core I	Python	Prog	rammi	ng", S	Second	Editio	on, Pre	entice I	Hall, 2	2011.	
4.	<i>Remy</i> 2003	Card,	Eric I	Dumas	and I	Frank	Mevel,	"The	Linux	Kerne	el Bool	k", Wi	ley Pu	blicat	ions,
5.	Steph Addis	en J. N onWes	Aello <mark>r</mark> , sley, 20	Marc 002	Balce	es, " $\overline{Ex}$	ecutal	ble $U\overline{N}$	1S: A f	founda	tion fo	or $M\overline{D}$	<i>A"</i> ,		

18SPE018	BIG DATA AND ANALYTICS	L	Τ	P	С								
		2	2	0	3								
OBJECTIVES	5:												
•	To understand the competitive advantages of big data ana frameworks	lytic	s and	l big	data								
•	To learn data analysis methods												
•	To gain knowledge on Hadoop related tools such as Mong Cassandra. Pig and Hive for big data analytics and Jasper	goDI Rep	B, Hl orts.	Base,									
UNIT I	INTRODUCTION TO BIG DATA	r			8								
Digital Data: Ty Structured data - S of unstructured data Introduction to Bi	pes of Digital Data - Structured - Sources of structured Semi-Structured - Sources of semi-structured data - Unstructured data - Instructured data - Issues with terminology - Dealing with unstructured data - Challenges with big data -	d da uctur ata. Big	ta - red - data	- Ease - Sou	e with rces k.								
UNIT II	HADOOP	0			10								
Technology Landscape:Big Data Analytics - Analytics 1.0, Analytics 2.0, Analytics 3.0 - Traditional BI vs. Big Data Environment - Big Data technology Landscape - NoSQL Databases - NoSQL Vs. RDBMS- New SQL - Hadoop - Hadoop 1.0 vs. Hadoop 2.0 - Data Science is multi-disciplinary - Data Scientist - Your new best friend.Introduction to Hadoop: Introducing Hadoop - Why not RDBMS - Distributed Computing Challenges - A Brief History of Hadoop - Hadoop Overview - Hadoop Components - High Level Architecture of Hadoop - Hadoop Distributed File System -HDFS Architecture - Daemons Related to HDFS - Working with HDFS Command - Special Features of Hadoop - Processing Data With Hadoop - Introduction - How Map Reduce Works - Map Reduce Example - Word Count Example using Java - Managing Resources and Applications with YARN - Introduction - Limitation of Hadoop 1.0 - Hadoop 2: HDFS - Hadoop 2: YARN - Interacting with Hadoop EcoSystem - Hive - Pig - HBASE - Sqoop - Business Intelligence on Hadoop.UNIT IIIMONGO DB. CASSANDRA. HIVE11													
UNIT III	MONGO DB, CASSANDRA, HIVE				11								
Hadoop.MONGO DB, CASSANDRA, HIVE11Mongo DB:Recap of NoSQL databases - MongoDB - CRUD - MongoDB- Arrays, Java Scripts, Cursors, Map Reduce Programming, Aggregations. Cassandra:Cassandra- CQLSH - CRUD, Counter, List, Set, Map, Tracing. Introduction to Hive:Introduction to Hive - The Problem -Solution - Hive Use Case - Data Growth - Schema Flexibility and Evolution - Extensibility - What is Hive - History of Hive and Recent Releases of Hive - Hive Features - Hive Integration and Work Flow - Hive Data Units - Hive Architecture - Hive Primitive Data Types and Collection Types - Hive File Formats - Hive Query Language - Statements - DDL - DML - Hive Partitions, Bucketing, Views, Sub query, joins, Hive User Defined Function - Aggregations in Hive, Aggregations in Hive, Serialization													
UNIT IV	PIG				10								
Introduction to H Features - Pig Ph Data Types, Co Comments, Keyw Statements - LO GROUP BY - C Mode - Running	Query Language - Statements - DDL - DML - Hive Partitions, Bucketing, Views, Sub query, joins, Hive User Defined Function - Aggregations in Hive, Aggregations in Hive, Serialization and Deserialization, - Hive Analytic Functions.UNIT IVPIG10Introduction to Pig:Introducing Pig - History and Anatomy of Pig - Pig on Hadoop - Pig Features - Pig Philosophy - Word count example using Pig - Use Case for Pig - Pig Primitive Data Types , Collection Types and NULL - Pig Latin Overview - Pig Latin Grammar - Comments, Keywords, Identifiers - Case sensitivity in Pig - Common Operators in Pig - Pig Statements - LOAD - STORE - DUMP - Interactive Shell - GRUNT - FILTER - SORT - GROUP BY - ORDER BY - JOIN - LIMIT - Pig Latin Script - Local Mode - Map Reduce Mode - Running Pig Script - Working with Field - Tuple - Rage - User Defined Function												

Para	mete	ers i	n Pig	•												
UN	T]	V		JAS	PER	REP	ORT	۲								6
Intro	duc	tion	to Ja	sper R	eport:	Introd	uction	to Jas	per Re	eport u	sing J	asper	Soft St	tudio -	Repo	rting
using	g Mo	onge	oDB ·	- Repo	orting u	using (	Cassan	ıdra.	-	-	_	-			_	_
									r	ΓΟΤ	AL:	45 PI	ERIO	DS		
OU'	ГС	ON	1ES:	:	On	compl	etion	of this	course	e, stud	ents w	ill be	able to	)		
1		Inte	erpret	the co	oncept	s of bi	g data.									
2		Dei	monst	trate a	bout h	adoop	DFS.									
3		Coi	nstruc	et the I	DDL a	nd DN	IL stat	tement	t and in	ntrodu	ction	o hive				
4		Rec	$\frac{1}{1}$	ne knov	wledge	e  on  N	Iongol	OB and	d Cass	andra.						
3	5. Explain the concepts on pig and jasper studio.															
CO	COURSE ARTICULATION MATRIX:															
	PC	01	PO2	PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO1         PO1         PO1         PS0         PS0         PS0         2         3												
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TE	КТ	BC	OK	S:												
1		The	e cour	rsewar	e (Pov	verPoi	nt and	notes	) is ava	ailable	for th	e cour	se.			
2		Dav	vid Lo	oshin,	"Big I	Data A	nalyti	cs: Fro	om Stra	ategic	Plann	ing to	Enterp	orise Ir	itegrat	ion
		wit	h Too	ols, Te	chniqu	ies, No	DSQL,	and C	iraph",	, 2013						a . a
3	•	Fra	nk J (	Ohlhor:	st, "Bi	g Data	Analy	tics: T	urning	B1g D	ata int	o Big	Money	7", W11	ey and	SAS
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2	Pat	ul Z	ikopo	ulos, C	Chris E	aton, l	Paul Zi	ikopou	los, "U	Inders	tandin	g Big I	Data: 1	Analyti	cs for	
۷.	Ent	terp	rise C	Class H	ladoop	and S	treami	ng Da	ta", M	cGraw	, Hill, .	2011.				
3.	Ed [.] Me	war dia	d Cap	priolo,	Dean	Wam	pler, a	nd Jas	on Ru	thergl	en, "P	rogra	mming	g Hive'	", O'Re	eilly
2. 3.	Ent Ed Me	terp war dia	rise C d Cap	Class H priolo,	ladoop Dean	and S Wamp	treami pler, a	ng Dai nd Jas	ta", M on Ru	cGraw thergle	, Hill, 1 en, "P	2011. Program	mming	g Hive'	", O'Re	ei

18SPE	E019	MACHINE LEARNING	L	T	P	С								
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OBJE	CTIVES	S:												
	•	To introduce students to the basic concepts and technique Learning, Supervised and Unsupervised learning technique	s of a	Mac	hine									
	•	To study the various probability based learning techniques models of machine learning	s, ev	oluti	onar	У								
	•	To understand graphical models of machine learning algorithms	rithr	ns										
UNIT	Ι	INTRODUCTION				9								
Learnin Candida Hypoth	g Problem ate Elimin esis Space	ns – Perspectives and Issues – Concept Learning – Version ations – Inductive bias – Decision Tree learning – Represe Search, Issues in decision tree learning.	Spac ntatio	ces a on, A	nd Algor	ithm,								
UNIT	II	<b>NEURAL NETWORKS &amp; EVALUATION</b>				9								
Neural Network Representation – Problems – Perceptrons – Multilayer Networks and BackPropagation Algorithms – Face Recognition example – Error functions, Error minimizationprocedures – Recurrent networks – Dynamically modifying network structure – EvaluatingHypotheses – Estimating hypothesis accuracy – Basics of sampling theory – Central limittheorem.UNIT IIIBAYESIAN AND COMPUTATIONAL9														
UNIT	JNIT III       BAYESIAN AND COMPUTATIONAL       9         LEARNING       9         Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length													
Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Computational learning theory – Finite and Infinite hypothesis spaces. Mistake bound model of learning.														
UNIT	IV	INSTANCE BASED LEARNING & GENETIC	С			9								
K- Near Based r	rest Neigh easoning. nming, mo	bour Learning – Locally weighted Regression – Radial Bas Genetic algorithms – Illustrative example, Hypothesis spac odels of evolution and learning, parallelizing genetic algorit	sis F e sea hms	uncti arch,	ons - gene	- Case etic								
UNIT	V	ADVANCED LEARNING				9								
UNIT VADVANCED LEARNING9Learning Sets of Rules – Sequential Covering Algorithm, Learning Rule Sets, First Order Rules, FOIL, Induction on Inverted Deduction, Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation based Learning – Combining Inductive and Analytical learning – KBANN, TANGENTPROP, FOCL algorithms – Reinforcement Learning – Q-Learning, Temporal Difference Learning.														
0		TOTAL : 45 PER	101	<b>JS</b>										
OUTC	COMES	On completion of this course, students will be able	to	<u> </u>										
1.	Distingu	ish between supervised, unsupervised and semi-supervised	lear	ning.										
<u>2</u> . 3.	Recomm	the apt machine learning strategy for any given problem. hending supervised, unsupervised or semi-supervised learning a problem.	ng a	lgori	thms	for								
<u> </u>	Create s	II providin.	arnii	ισ										
5.	Modify e	existing machine learning algorithms to improve classification	ion e	ffici	encv									
COU	RSE AR'	TICULATION MATRIX:			. ,									

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CO1	3	2	3									2	2	3	
CO2	2	3	2									2	2	3	
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CO4	2	2	3									2	2	3	
CO5	2	2	3									2	2	3	
(1-Lo	ow, 2- Moderate, 3-High)														
TEX	TEXT BOOKS:														
1.       Tom M Mitchell, "Machine Learning", First Edition, McGraw Hill Education, 2013.															
2	<ol> <li>Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", First edition, MIT</li> </ol>														
	2. Kevin F. Murphy, Machine Learning: A Probabilistic Perspective", First edition, M11 Press, 2012.														
REI	EFERENCES:														
1.	Ethen	ı Alpa	ydin, ʻ	<i>'Introc</i>	luction	ı to M	achine	Learn	ning 3	e (Ada	ptive (	Сотрі	itation	and	
	Mach	ine Le	arning	g Serie	s)", T	hird E	dition,	MIT I	Press,	<i>2014</i> .					
2.	Richa	rd Sut	ton an	d And	rew Ba	arto, R	einfor	cemen	t Lear	ning:	An int	roduci	tion. M	1IT	
	Press	, <i>199</i> 8.													
З.	Chris	topher	· Bisho	р, "Ра	attern	Recog	nition	and M	lachin	e Lear	ning"	Sprin	ger, 20	007.	
4.	Steph	en Ma	rsland	', "Ma	chine .	Learni	ing – A	In Alg	orithm	ic Per	specti	ve", S	econd	Editio	n,
	Chap	man a	nd Hai	ll/CRC	C Mack	ine Le	earnin	g and	Patter	n Rece	ognitic	on Seri	es, 20	14.	
5.	Davia Press	l Barb , 2012	er, "Ba	ayesia	n Reas	coning	and M	lachin	e Leai	ning"	, Cam	bridge	e Univ	ersity	

18SI	PE02	0		GEO	L	Τ	P	С							
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OBJ	<b>EC</b>	TVE	<b>S:</b>												
	•		To ir syste	ntroduo m.	ce the	fundar	nental	s and o	compo	onents	of geo	graphi	c info	rmatio	on
	•		Be k	nown	to deta	ils of	data cl	assific	ation	and m	ap pro	jection	is, var	ious g	eo
	•		To h	ave a t	horou	gh und	lerstan	ding o	of editi	ng fea	tures i	n GIS	and a	pplica	tions
UNI	ΤI		INT	ROE		TON	TO C	GIS	5.						9
Geog	raphi	c Infor	matior	n: Scie	nce, S	ystem	s and s	ociety	-Princ	iples:	Nature	e of Ge	eograp	hic D	ata-
Repro	esenti	ng Geo	ograph	y- Geo	orefere	encing							<u> </u>		•
UNI	TI		TEC	CHN	QUE	S									9
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UNI	T II	[	AN	ALYS	SIS										9
Cartography and Map Production-Geovisualization-Spatial Data Analysis-Spatial Analysis and Inference-Spatial Modeling With GI Systems															
Infere	Inference-Spatial Modeling With GI Systems														
UNI	UNIT IV     POLICY AND MANAGEMENT     9														
Managing GI Systems: Managing Risk-Case for GI System: ROI-The process of Developing a sustainable GI System-Sustaining a GI System-Information and Decision Making: Information															
as Inf	frastru	cture-	Differ	ent For	rms of	GI-O	pen Da	ata and	l Oper	ind De	rnmen	t	ig. III	Ioma	.1011
UNI	TV		AC	ΓΙΟΝ		FGIS			- open						9
Navi	gating	the R	isks: C	lashes	betwe	een Sc	ientist	s and t	he Juc	liciary	-Busin	less M	odels	For G	I-
Relat	ed En	terpris	es-Leg	gal and	l Regu	latory	Const	raints-	Privac	cy and	GISy	stems-	Partn	ership	s,
Up-S Proce	caling	g Activ	ities a	na Kis zes	K Miti	gation	-Epilo	g: GR	55 in t	he Ser	vice of	f Huma	anity:	Ine	
11000	255 01		indirent	503				r	ΓΟΤ		45 PF	ERIO	DS		
OUT	ГСО	MES		On	compl	etion of	of this	course	e, stud	ents w	ill be a	able to	_ 10		
1	. D	efine tl	he gra	phical	inforn	nation	systen	n.							
2	. U	ndersta	and ma	ap proj	ection	s and	census	data.							
3	. Sı	ımmar	ize ab	out ge	ocodin	g.									
4	. Ill	ustrate	the b	asic co	oncept	s of we	eb map	oping a	and QO	GIS.					
		$\mathbf{F} \mathbf{A} \mathbf{P}'$	ne appl		ns of C		ΓDIV	•							
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CO3	1	2			2					1			3		
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<ol> <li>Longley A. Paul, Michael F. Goodchild, David J. Maguire, David W. Rhind</li> <li>"Geographical Information Systems and Science", Fourth Edition, Hoboken, NJ: John Wiley &amp; Sons, 2005.</li> </ol>														
2. Maantay, Julie, John Ziegler, "GIS for the Urban Environment", Redlands, CA:Esri Press, 2006.														
REFERENCES:														
1. Peters, Alan H., Heather MacDonald, "Unlocking the Census with GIS", Redlands,														
CA:E	SriPre	ss, 200	)4.					_						
US C	ensus I	Bureat	ı, "A (	Сотра	iss for	Under	rstand	ing an	d Usin	g Ame	erican	Comm	unity	
Surve	ey Data	a:Wha	t Gene	eral Us	ers Ne	ed to	Know	(Issue	d Octo	ober 20	<i>)08)",</i>	Wash	ingtor	<i>1</i> ,
DC:	US Cer	nsusBı	ıreau,	2010.										
Peter	son, G	retche	n, "Co	lors fo	r Map	os", 20	<i>11</i> .							
Schlo	ssberg	, Mare	c. "GI	S, the l	US Cer	nsus a	nd Nei	ghbou	rhood	Scale	Analy	sis."P	lannin	<i>g</i> ,
Practice & Research. 2003														
5. Kent, Robert B. and Richard E. Klosterman. "GIS and Mapping: Pitfalls for Planners."														
Journal of the American Planning Association, 2000.														
	2 W, 2- M XT B U W M Pr Peter CA:E US C Surve DC: 0 Peter Schlo Pract Kent, Jourr	2 w, 2- Moderate <b>XT BOOK</b> Longley "Geogra Wiley & Maantay Press, 20 <b>FERENCH</b> Peters, Alar CA:EsriPre US Census Survey Data DC: US Cen Peterson, G Schlossberg Practice & Kent, Rober Journal of t	2w, 2- Moderate, 3-HiglXT BOOKS:Longley A. Pau"GeographicalWiley & Sons,Maantay, JuliePress, 2006.FERENCES:Peters, Alan H., HCA:EsriPress, 200US Census BureauSurvey Data: WhatDC: US CensusBuPeterson, GretcheSchlossberg, MarcPractice & ReseauKent, Robert B. auJournal of the Am	2       w, 2- Moderate, 3-High)         XT BOOKS:       Iongley A. Paul, Mid         "Geographical Inform       Wiley & Sons, 2005.         Maantay, Julie, John       Press, 2006.         FERENCES:       Peters, Alan H., Heather         CA:EsriPress, 2004.       US Census Bureau, "A G         Survey Data: What Genee       DC: US CensusBureau,         Peterson, Gretchen, "Co       Schlossberg, Marc. "GIS         Practice & Research. 20       Kent, Robert B. and Rick         Journal of the American       Canada American	2       w, 2- Moderate, 3-High)         XT BOOKS:       Iongley A. Paul, Michael H         "Geographical Information Wiley & Sons, 2005.       Maantay, Julie, John Ziegle         Press, 2006.       Press, 2006.         FERENCES:       Peters, Alan H., Heather Mach         CA:EsriPress, 2004.       US Census Bureau, "A Compare         Survey Data: What General Us       DC: US CensusBureau, 2010.         Peterson, Gretchen, "Colors for       Schlossberg, Marc. "GIS, the U         Practice & Research. 2003       Kent, Robert B. and Richard E         Journal of the American Plant       Canada (Canada	2	22w, 2- Moderate, 3-High)XT BOOKS:Longley A. Paul, Michael F. Goodchild "Geographical Information Systems and Wiley & Sons, 2005.Maantay, Julie, John Ziegler, "GIS for th Press, 2006.FERENCES:Peters, Alan H., Heather MacDonald, "Un CA:EsriPress, 2004.VIS Census Bureau, "A Compass for Under Survey Data: What General Users Need to DC: US CensusBureau, 2010.Peterson, Gretchen, "Colors for Maps", 2005Schlossberg, Marc. "GIS, the US Census and Practice & Research. 2003Kent, Robert B. and Richard E. Klosterman Journal of the American Planning Association	2       2         w, 2- Moderate, 3-High)         XT BOOKS:         Longley A. Paul, Michael F. Goodchild, Davi         "Geographical Information Systems and Scien         Wiley & Sons, 2005.         Maantay, Julie, John Ziegler, "GIS for the Urb         Press, 2006.         FERENCES:         Peters, Alan H., Heather MacDonald, "Unlockin         CA:EsriPress, 2004.         US Census Bureau, "A Compass for Understanda         Survey Data: What General Users Need to Know         DC: US CensusBureau, 2010.         Peterson, Gretchen, "Colors for Maps", 2011.         Schlossberg, Marc. "GIS, the US Census and Nei         Practice & Research. 2003         Kent, Robert B. and Richard E. Klosterman. "GIS         Journal of the American Planning Association, 2	2       2         w, 2- Moderate, 3-High)         XT BOOKS:         Longley A. Paul, Michael F. Goodchild, David J. M         "Geographical Information Systems and Science", F         Wiley & Sons, 2005.         Maantay, Julie, John Ziegler, "GIS for the Urban En         Press, 2006.         FERENCES:         Peters, Alan H., Heather MacDonald, "Unlocking the O         CA:EsriPress, 2004.         US Census Bureau, "A Compass for Understanding and         Survey Data: What General Users Need to Know (Issued DC: US CensusBureau, 2010.         Peterson, Gretchen, "Colors for Maps", 2011.         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"GIS and Mapping: Pitfalls for Pla Journal of the American Planning Association, 2000.	2       2       3       1         w, 2- Moderate, 3-High)       XT BOOKS:       3       1         KT BOOKS:       Iongley A. Paul, Michael F. Goodchild, David J. Maguire, David W. Rhind "Geographical Information Systems and Science", Fourth Edition, Hoboken, NJ: Jo Wiley & Sons, 2005.       Naantay, Julie, John Ziegler, "GIS for the Urban Environment", Redlands, CA:Esr Press, 2006.         FERENCES:       Image: Compass for Understanding and Using American Community Survey Data: What General Users Need to Know (Issued October 2008)", Washington DC: US CensusBureau, 2010.         Peterson, Gretchen, "Colors for Maps", 2011.         Schlossberg, Marc. "GIS, the US Census and Neighbourhood Scale Analysis."Plannin Practice & Research. 2003         Kent, Robert B. and Richard E. Klosterman. "GIS and Mapping: Pitfalls for Planners. Journal of the American Planning Association, 2000.

<b>18S</b>	18SPE021SERVICE ORIENTED ARCHITECTURELTPC3003															
	OBJECTIVES: 3													0	3	
OBJ	[EC]	<b>FIVE</b>	S:													
	٠		Lear SOA	n XMI	L fund	ament	als and	d web	service	es tech	nolog	y elem	ents f	or real	izing	
	٠		Unde	erstand	l the k	ey prir	nciples	s behin	d SOA	ł						
	٠		Be e	xposed	l to bu	ild app	olicatio	ons ba	sed on	XML	and w	eb ser	vice s	tandar	ds	
UNI	ΤI		XM	L TE	CHN	OLC	)GY								9	
XML and I	. – XN DTD -	AL and Mode	l Web ling D	- Nam atabas	e Spao es in Σ	ces – X KML –	KML I - XQu	Docum ery.	ent St	ructure	e - Stru	ıcturin	g witł	n Sche	mas	
UNI	TII		SOA	A BA	SICS										9	
Servi	ce Or	iented	Archi	tecture	(SOA	(-Cc)	mpari	ng SO	A with	h Clier	nt-Serv	ver and	l Distr	ibuted		
archi	tectur	es - Cł	naracte	ristics	of SO	A - B	enefits	s of SC	DA - P	rincipl	es of S	Service	e orier	itation	_	
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UNI	TI		WE	B SE	RVI	CES									9	
SOA	and V	Veb Se	ervices	-We	b Serv	ices P	rotoco	l Stack	c - Set	vice d	escript	tions –	- WSE	DL-	2) (1	
Mess	aging	with S	SOAP	- Serv	1ce dis	scover	y - UI	DDI – T and	Servic	e Leve	el Inter	action	n patterns – XM			
	T IV						SINE					iiity.			0	
UNIT IV WS TECHNOLOGIES AND STANDARDS											A 3370	9				
Web Services Technologies - JAX-RPC, JAX-WS - Web Service Standards – WS-RM										VI, WS	-					
BPEI	– Se	s, ws- rvice (	)riente	ed Ana	lvsis a	nd De	sion		loreog	гарпу	- C011	ipositi		inuaru	5 –	
UNI	TV		XM		JD W	S SE	CUR	ITY							9	
XMI	Secu	rity O	vervie	w - Ca	nonic	alizati	$\frac{00-1}{00-X}$	ML S	ecurity	/ Fram	ework	-XN	IL End	ervotic	n –	
XML	Sign	ature –	- XKN	IS Stru	icture	- Web	Servi	ces Se	curity	- XAC	CML -	WS-S	ecurity	y.		
								r	ΓΟΤΑ	AL:	45 PE	ERIO	DS	<u>.</u>		
OUT	ГСО	MES	•	On	compl	etion of	of this	course	e, stud	ents w	ill be a	able to				
1	. D	esign a	and de	velopi	ng real	l work	applic	cations	using	the co	oncepts	s of SC	DA an	d Web		
	se	rvices		•	C				U		1					
2	. C	hoose	approa	ches f	or pro	viding	secur	ity for	XML	docun	nents a	s well	as me	essages	5	
	ey	chang	ed am	ong W	eb Sei	vices.										
3	. C	onstru	ct an a	pplicat	tion us	ing .N	ET an	d J2E	E enter	rprise	techno	logy.				
4	. <u>E</u>	xperim	ent wi	th JAX	X-WS	and w	eb ser	vice st	andarc	ls.						
5	. <u>C</u>	ategori	ze XN	1L sec	urity f	ramew	ork .	-								
COU	JRSI	EAR	ΠΟ	ICULATION MATRIX:												
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	
CO1	2	1		2												
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CO5	1			2	3								3		3
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TE	XT B	OOK	S:												
1	Т	homas	Erl, "S	Service	e Orie	nted A	rchited	cture:	Conce	pts, To	echnol	ogy, ai	nd Des	sign",	
	P	earson	Educa	tion, f	irst ed	ition, 2	2005.								
2	2. S	andeep	Chatt	erjee a	nd Jar	nes W	ebber,	"Dev	elopin	g Ente	rprise	Web S	Service	es: An	
	Architect's Guide", Prentice Hall, 2004.														
RE	REFERENCES:														
1.	Jam	es McG	lovern,	Same	er Tya	gi, Mi	chael .	E Stev	ens, Si	unil M	athew	, "Javo	a Web	Servic	es
	Arch	itectur	e", Els	evier,	<i>2011</i> .										
2.	Eric	Newco	mer, C	Greg L	omow,	"Una	lerstan	ding S	SOA w	ith We	eb Serv	vices",	Addis	on We	sley,
	2005	•													
3.	<i>3. Ron Schmelzer et al. "XML and Web Services", Third Edition, Pearson Education, 2008.</i>														
4.	4. Frank P.Coyle, "XML, Web Services and the Data Revolution", Pearson Education, 2002.														
5.	5. Muninder Singh & Michael Huhns, "Service Oriented Computing", Wiley, 2005.														

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OBJ	EC	TIVES	5:												
	•		Lear	n to cre	eate w	eb pag	es and	l web a	applica	ations	using l	HTMI	<u>ـ</u>		
	•		Unde Javas	erstand scripts	the m	ethod	of add	ling cli	ient sic	de beh	avior t	o HTI	ML pa	ges us	ing
	•		Be fa	miliar	with s	servlet	progra	ammin	ig and	develo	opmen	t using	g PHP		
UNI	ΤI		INT	ROD	UCT	ION	TOI	ITM	L						9
HTM	L-L	ist – Ta	bles –	Image	s – Fo	rms –	Frame	es - Ca	scadin	g Style	e sheet	ts - XI	ML- D	ocume	ent
type	defin	$\frac{1}{2}$	XML S	Schema	as -Do	cumen	it Obje	ect mo	del.						-
UNI			JAV	A SC	<u>CRIP</u>	<u>Γ</u>			01.1	·		<u> </u>	• •		9
Java Java	Scrip Scrip	ot -Cont	rol stat	tement	s – Fu	nction	s – Ar	rays –	Objec	ets – E	vents -	Dyna	mic F	TML	with
UNI	$\frac{\mathbf{T}}{\mathbf{T}}$	<u>I</u>	SER	VLE	TS										9
Web servers - IIS (XAMPP, LAMPP) and Tomcat Servers - Java Web Technologies											ogies	- Serv	lets		
- JavaServer Pages - Java Server Faces - Web Technologies in Netbeans - Building a										Web					
Application in Netbeans - JSF Components - Session Tracking - Cookies.												0			
UNI		V · · · ·	PHI			1.D	1 15	· · ·					1.D	•	9
PHP	– Ba	sics - St	ring Pi	Dvnar	ng and	1 Regu	llar Ex	pressi	ons - F recede	form F	'rocess hart	sing ai	nd Bus	siness	
UNI	$\frac{1}{\mathbf{T} \mathbf{V}}$	, ,	DA				VEC		ΓY		liait.				9
Datal	base	Connec	tivity v	with M	lySQL	– Ser	vlets –	JSP -	PHP -	Case	Studie	s- Stu	dent i	nforma	ation
syste	m - I	Health N	/anage	ement	Systen	n.									
								]	ΓΟΤΑ	<b>AL:</b>	<b>5 PE</b>	RIO	DS		
OU	<b>FCC</b>	<b>MES</b>		On	comple	etion c	of this	course	, stude	ents wi	ll be a	ble to			
1		Select ar	nd cons	structi	ng clie	nt side	e script	ting te	chniqu	ies.					
2	.   ł	Build rea	al worl	d appl	ication	is usin	g clier	nt side	and se	erver s	ide scr	ripting	langu	lages.	
<u> </u>	1 . A	Annly R	e an e- eoular	-Gover	sions	applic	sing co	using v okies	web te	cnnoi	ogy.				
5	. 1 . I	Develop	e datal	base co	onnect	ivity a	nd app	oly cas	e studi	les.					
COU	JRS	E AR'	ΓΙΟ	LAT	ION	MĂŢ	RIX	:							
	PO1	PO2	РО	PO4	РО	PO6	PO7	PO8	PO9	P01	PO1	PO1	PSO	PSO	PSO
CO1			3		5					0	1	2	1	2	3
									3						
002	3	2	3		2								3	3	
CO3	2		2		2								3	3	1
CO4	2		2		2								3	3	1
CO5	2	2	2		2								3	3	1
(1-Lov	w, 2-2	Moderate	, 3-Higl	n)											
TEX	KT I	BOOK	S:												

	1.	. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, "Internet	& World Wide Web How to								
		Program", 5th edition, Deitel series, 2012.									
2	2.	Jason Gilmore,"Beginning PHP and MySQL From Novid	e to Professional", 4th								
		Edition, Apress Publications, 2010.									
RE	FERENCES:										
1.	Robert W. Sebesta, "Programming with World Wide Web", 4th edition, Pearson, 2008.										
2.	Da	David William Barron, "The World of Scripting Languages"	', Wiley Publications, 2000.								
З.	Du	Darie, Cristian, Balanescu, Emilian, "Beginning PHP and M	<i>IySQL E-Commerce",</i>								
	Ap	Apress,2008.									
4.	Ut	Uttam K Roy, "Web Technologies", Oxford University Press	<i>z</i> , 2010.								
5.	Da	David Flanagan, "JavaScript: The Definitive Guide, 5th Ed	ition", O'Reilly, 2006.								

18SPE023

# COMPUTER GRAPHICS AND MULTIMEDIA

L	Т	Р	С
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OBJECTIVES:	
• To Understand the basic 2D and 3D Graphics viewing pipeline th Modeling, manipulation and rendering along with advanced Grap visual realism	nat includes, phics for
• To Learn the various shading models and Visible Surface Detect and get introduced to OpenGL programming	ion methods
• To Understand basic elements of multimedia and to learn the the data compression and different Multimedia Applications	ory behind
UNIT I INTRODUCTION	9
Overview of Graphics Systems: Video Display Devices-Raster-Scan Syste Workstations and viewing Systems-Input Devices-Graphics Networks-Introduction Coordinate Reference Frames-Line-Drawing Algorithms –OpenGL Point Function Line Functions-Parallel Curve Algorithms-OpenGL Polygon Fill- Area Function Vertex Arrays-OpenGL Character Functions-Attributes of Graphics Primitives: OpenGL Polygon Fill- Area Functions-	oms-Graphics to OpenGL- ons- OpenGL ons-OpenGL oenGL Color
INIT II     TWO-DIMENSIONAL GEOMETRIC	9
TRANSFORMATIONS	,
Basic Two-Dimensional Geometric Transformations-Matrix Representations and H Coordinates-Inverse Transformations-Two-Dimensional Composite Transform Dimensional Viewing :Clipping Window-Normalization and Viewport Tran OpenGL Two-Dimensional Viewing Functions-Clipping Algorithms- Two-Dime Clipping: Cohen-Sutherland Line Clipping-Polygon Fill-Area Clipping-Curve Clipp	omogeneous ations- Two nsformations- ensional Line bing
UNIT III THREE DIMENSIONAL VIEWING AND	9
<b>OBJECT REPRESENTATIONS</b>	
Overview of Three Dimensional Viewing- Three Dimensional Viewing Pipeline-Tra- from world to viewing Coordinates-Projection Transformations-Oblique Parallel Perspective Projections-The Viewport Transformation and Three Dimensional Coordinates-OpenGL Three Dimensional Viewing Functions- Three Dimensional Algorithms- OpenGL Optional Clipping Planes	ansformation Projections- onal Screen al Clipping
UNIT IV ILLUMINATION MODELS AND SURFACE-	9
RENDERING METHODS           Light Sources-Surface Lighting Effects-Basic Illumination Models-Transpare           Displaying Light Intensities-Halftone Patterns and Dithering Techniques-Polygon R           Methods-Ray-Tracing Methods-Texture Mapping- OpenGL Illumination and Surface           Functions- OpenGL Texture Functions-Color Models and Applications: Color Model           Model-Color Selection and Applications	ent Surfaces- lendering ce-Rendering el-RGB Color
UNIT V COMPUTER ANIMATION	9
Raster Methods for computer Animation-Design of Animation Sequence Animation Sequences-General Computer- Animation Functions – Computer Animat Languages-Key –Frame Systems-Motion Specifications-Articulated Figure Animat Motions-OpenGL Animation Procedures	es-Traditional ation ion-Periodic

	<b>TOTAL : 45 PERIODS</b>														
OU	TCO	MES	•	On	compl	etion of	of this	course	e, stud	ents w	ill be	able to	)		
	1. S	olve 2I	D appli	ication	s of co	omput	er grap	ohics.							
	2. A	ppraise	e adva	nced 3	D Gra	phics	that le	ads to	visual	realis	m and	percei	ive kno	owledg	ge on
	fr	actal th	neory,	color 1	nodel	s, Anii	nation	l <b>.</b>							
	3. C	reate p	rogran	ns in C	)penG	L for o	drawin	ıg basi	c 3D s	cenes	and ac	ld real	ism.		
	4.   R	ecall th	ne basi	c elem	ents c	of mult	imedi	a and t	o leari	n the t	heory	behind	l data		
		ompres	sion b	$\frac{\text{oth los}}{1}$	sless a	and $\log \frac{1}{1}$	ssy.								
	COURSE ARTICULATION MATRIX.														
CO	COURSE ARTICULATION MATRIX:														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2		1									3	2	
CO2	3	2		1									3	2	
CO3	3														
CO4	3														
CO5	3	2	2	1									3	1	
(1-Lo	ow, 2- N	/Ioderate	e, 3-Hig	h)											<u> </u>
TF	VT R	OOK													
1		onald	D Har	nn M	Douli	no Rol	zor W	arron	Carith	ore "(	omnu	itor Gr	onhice	with	
1.		nenGI	" Thi	rd Edi	tion F	learson	n Preni	tice H	all 20	10	Joinpu		apines	w Itili	
2.	F	rancis	S Hill.	Jr., St	ephen	M Ke	llev."	Compu	iter Gr	aphics	s Usin	g Oper	ıGL".	Third	
	E	dition,	Prenti	ce Hal	1, 200	7.		1		1	·	0 1	,		
RE	FERI	ENCE	ES:												
1.	Peter	[•] Shirle	ey, "Fi	ındam	entals	of Co	mpute	r Grap	ohics",	Thira	l Editio	on, A I	K Peter	rs, 200	19.
2.	Shali	Shalini Govil Pai, "Principles of Computer Graphics Theory and Practice Using OpenGL													
	and l	and Maya", Springer, 2004.													
3.	Ralf Steinmetz and Klara Nahrstedt, "Multimedia Computing, Communications and														
	Applications", First Edition, Pearson 2005.														
4.	Jeffre	ey Mc( • •	Connel	l, —C	omput	er Gra	phics.	: Theo	ry into	Praci	ticell, J	ones a	nd Ba	rtlett	
5	Publi	ishers,	2006. N. K. m.	JVin	The T	1	14.1	(i	. Curt		d D c	in D	<u>, , , , , , , , , , , , , , , , , , , </u>	0.2	
э.	Anal	eign, P	. п ап	a nira	п тпа	кrar, -	– <i>Muli</i>	imeai	ı syste	ems an	a Des	ıgn∎, P	пі, 20	<i>U</i> 3.	

<b>18SI</b>	<b>PE02</b>	4		AI	RTIF	ICIA	L IN	TEL	LIGE	CNCE	C	L	Т	P	C	
					0	0	3									
OBJ	ECTI	VES:														
	٠		To u searc	ndersta h strat	and the egies	e vario in AI.	ous cha	aracter	istics (	of Inte	lligent	agents	and	differe	nt	
	•		To le Macl	earn to hine L	repres earnin	sent kr g.	nowled	lge in s	solving	g AI p	roblen	ns and	differ	ent wa	ys of	
	٠		To k	now al	bout th	ne vari	ous ap	plicati	ons of	AI.						
UNI	ΤI		INT	ROD	DUCI	ION									9	
Intro	ductio	n–Def	inition	- Futu	ire of	Artific	ial Int	elliger	ice – C	Charac	teristic	es of In	tellig	ent Ag	ents-	
Тури	cal Inte	elligen	it Agei	$\frac{1}{2}$ nts – P	robler	n Solv	ing A	pproac	h to T	ypical	AI pro	oblems	•		-	
UNI	TII		PRO	PROBLEM SOLVING METHODS												
Iterat AO* satisf	ive De Algor	eepeni ithm - proble	ng Sea Advea ems.	Search - Bidirectional Search - Heuristic Search - Depui-Linit dversarial Search - Minimax Algorithm, Alphabeta Pruning – Co												
UNI	T III		KN	OWL			9									
Repro Chain Actin Facto	esentat ning - g und ors and	tion - Resol er Unc Rule	First Order Predicate Logic – Inference – Unification - Forward and ution - Reasoning with Default Information - Truth Maintenance ertainty - Statistical Reasoning - Probability and Bayes Theorem - Ce Based Systems - Dempster-Shafer Theory											d Back e Syste Certain	tward ems - ty	
UNI	T IV		PLA	NNI	NG A	AND	LEA	RNIN	IG					9		
Plann	ning w	ith St	ate Sp	ace S	earch	- Part	ial Or	der Pl	anning	g - Pla	anning	Graph	ns – 1	- Hierarchica		
plann	ing –	Multi	agent	planni	ng. Fo	orms o	f Leai	ning -	- Supe	ervised	l Lear	ning, L	earni	ng deo	cision	
trees,	choos	sing be	est hyp	othesi	$s - Ex_j$	planati	ion Ba	sed Le	earning	g - Sta	tistical	Learn	ing -	Learni	ng	
	$\frac{\text{comp}}{\mathbf{T} \mathbf{V}}$	iele da	$\mathbf{A} \mathbf{P} \mathbf{I}$			NIC	ing								0	
	<b>I v</b>	ions _	Lang		Iodels	-Info	rmatic	n Ret	ieval-	Infor	mation	Extra	rtion	_ Natu	<b>y</b> ral	
Lang	uage F	roces	sing -	Machi	ne Tra	– into nslatio	$n - S_{j}$	peech ]	Recog	nition	– Rob	otics -	Path 1	Plannir	1ai 1g —	
Hand	writte	n digit	t classi	ficatio	on usin	ig deep	o learn	ing.	FOT		48 DI		DC			
0.7.10							0.1.1		ΓΟΤΔ	AL:	<u>45 PF</u>		DS			
OU		MES		On	compl	etion of	of this	course	e, stud	ents w	111 be a	able to				
	1. M	ake us	e of ap	opropr	iate se	arch a	lgorith	ims to	r any A	AI pro	blem.					
4	$\frac{2.}{3}  \frac{111}{511}$	ustrate	e a pro	t agent	ising i t strate	1rst or	aer and	a prea	cate le	ogic.						
-	5. Su 1 Ur	nderst:	and the fundamental issues and challenges of machine learning.													
4	5. De	esignir	ng app	licatio	ns for	NLP t	hat use	es Arti	ficial	Intelli	gence.	<u>, ai iiiig</u>	•			
CO	URSI	EAR	TICU	JLAT	ION	MA	<b>FRIX</b>	:			5					
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO	PO	PO	PS	PS	PS	
СО	3	2								10	11	12	01	02	03	
1 CO	3	2	1										2	3	$\left  \right $	
2			1	1 2 1												

CO3	3	2	1										2	1	
CO4	3	2	1										2	1	
CO5	3	3	1										2		
(1-Lo	w, 2- Mo	derate, 3	-High)												
TE	<b>TEXT BOOKS:</b> 1 S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach" Third Edition														
	<ol> <li>S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Third Edition, Prentice Hall, , 2017.</li> <li>Elaine Rich and Kevin Knight —"Artificial Intelligence". Third Edition. Tata McGraw.</li> </ol>														
	<ol> <li>Elaine Rich and Kevin Knight, —"Artificial Intelligence", Third Edition, Tata McGraw Hill Publishing Company, New Delhi, 2014.</li> </ol>														
RE	FERE	<b>NCE</b>	S:												
1.	Nils J. Press,	Nilsso 2009.	on, "Th	e Que	est for .	Artific	ial Int	elliger	nce", T	Third E	dition,	Camb	oridge	Unive	rsity
2.	David Compi	L. Poc itation	ole and al Age	Alan nts", 1	K. Ma Secona	ickwor l Editi	rth, "A on, Ca	lrtifici imbrid	al Inte ge Un	lligen iversit	ce: Fo y Pres	undati s, 201	ons of 0.		
3.	Nils J.	Nilsso	оп, —Т	he Qu	est for	• Artifi	cial In	itellige	encell, (	Cambr	ridge U	Iniver	sity Pr	ess, 2	009.
4.	Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", Prentice Hall of India, 2006.														
5.	5. Deepak Khemani, "A First Course in Artificial Intelligence", Tata Mc Graw Hill Education 2013														

18SPE025

# PARALLEL AND DISTRIBUTED SYSTEMS

L	T	Р	С
2	Δ	Δ	3

	3	U	U	3							
<b>OBJECTIVES:</b>											
•	To understand the need and fundamentals of parallel computin	ıg par	adigm	15							
	and nuances of parallel algorithm design										
•	To understand the programming principles in parallel computi	ng									
	architectures and concept of distributed computing architecture	es									
•	To learn few problems that are solved using parallel algorithm	s									
UNIT I	INTRODUCTION TO PARALLEL			9							
	COMPUTING										
Scope of Paralle	l Computing – Parallel Programming Platforms – Implic	it Pa	arallel	ism,							
Limitations of Me	emory System Performance, Dichotomy of Parallel computing F	latfo	rms,								
Physical Organization of Parallel Platforms, Communication Costs in Parallel Mac											
Routing mechanisms, Impact of Process-Processor Mapping and Mapping Techniques.											
UNIT II     PARALLEL ALGORITHM DESIGN											
Principles - Dec	omposition Techniques, Characteristics of Tasks and Interac	ctions	, Map	ping							
Techniques for	Load Balancing, Methods for Containing Interaction Over	thead	s, Pai	rallel							
Algorithm Model	s – Basic Communication Operations – One-to-All Broadcast	and	All-to	-One							
Reduction, All-to	-All Broadcast and Reduction, All-Reduce and Prefix Sum Op	eratio	ns, Sc	atter							
and Gather, All-	to-All Personalized Communication, Circular Shill, Improving	g the	Spee	a 01							
some Communication Operations – Analytical modeling of parallel programsUNIT IIIPARALLEL PROGRAMMING PARADIGMS9											
UNIT III         PARALLEL PROGRAMMING PARADIGMS         9           Principles of Message Passing Programming, Building Blocks, MPI – Message Passing         9											
Interface Tonal	essage Passing Programming, Building Blocks, MPI – M	essag	e Pas	ssing							
Collective Com	munication and Computation Operations Groups and (	$\sim 0.$	nunics	ators							
Programming Sh	ared Address snace platforms – POSIX thread API - OpenMP	· a St	andar	d for							
Directive based F	Parallel Programming – Applications - Matrix-Matrix Multiplic	ation	$-So^{\dagger}$	lving							
Systems of Equat	ions – Sorting Networks – Graph algorithms – Parallel Depth F	irst Se	earch.								
<b>ÚNIT IV</b>	DISTRIBUTED COMPUTING PARADIGM			9							
Paradigms for Dis	stributed applications – Basic algorithms in Message passing Sy	stem	s – Le	ader							
Election in Rings	– Mutual Exclusion in Shared Memory										
UNIT V	FAULT TOLERANT DESIGN			9							
Synchronous Syst	tems with Crash Failures – Byzantine Failures – Impossibility ir	1 Asy	nchro	nous							
Systems - Formal	Model for Simulation – Broadcast and Multicast – Specificatio	n of a	ì								
Broadcast Servic	e - Implementing a Broadcast Service - Multicast in Group	s – I	Distrib	outed							
Shared Memory -	Shared Memory – Linearizable – Sequentially Consistent Shared Memory – Algorithms.										
TOTAL : 45 PERIODS											
<b>OUTCOMES</b>	On completion of this course, students will be able to										
1. Model th	ne parallel and distributed computing architectures for any given	ı prob	olem.								
2. Construc	t the problem solving (analysis, design, and development) skills	s to di	istribu	ited							
applicati	ons.										
3. Propose	the applications by incorporating parallel and distributed compu	ıting									
architect	ures.										
4. Modify t	<ul><li>4. Modify the applications by incorporating fault tolerance.</li></ul>										

5. Translate the sequential algorithm to a parallel one.															
CO	URS	E AR'	TICU	JLAT	TION	MA	ΓRIX								
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2	1		1									1	3	
CO2	2	2		1										3	
CO3	2	2												3	
CO4	CO4 2 1 2 3 3														
CO5	CO5         2         1         1         1         3														
(1-Lo	w, 2- N	Ioderate	, 3-Higl	n)											
TEXT BOOKS:															
	1. A Pa	nanth ( arallel (	Grama Comp	, Ansł uting"	ul Gu , Seco	pta, Go nd Edi	eorge I tion, P	Karypi earsor	is and 1 Educ	Vipin ation,	Kuma 2009.	r, "Int	roduct	ion to	
	2. H Si	aggit mulati	Attiya ons an	and d Adv	Jenr anced	ifer Topic	Welch s", Seo	, "Di cond E	stribut Edition	ted C , Wile	Compu y, 201	ting - 2.	- Fur	Idame	ntals,
RE	FERI	ENCE	ES:								-				
1.	Micha McGr	el Quit aw Hil	nn, "P l, 2002	aralle 2.	l Com	puting	- Theo	ory an	d Prac	ctice",	Secon	d Edit	ion, Ta	nta	
2.	Wan H	Fokkink	r, "Dis	tribut	ed Alg	orithm	s: An	Intuiti	ve App	proach	", MĽ	T Pres.	s, 201.	3.	
3.	M.L. 1 Educa	Liu, "D tion, 2	)istribı 011.	ited C	omput	ing - F	Princip	les an	d Appl	licatio	ns ", F	irst Ea	lition,	Pearso	on
4.	<i>A.</i> Norman Matloff, "Parallel Computing for Data Science With Examples in R, C++ and CUDA". Chapman and Hall/CRC, 2015.														
5.	5.       David B. Kirk and Wen-mei W. Hwu, Programming Massively Parallel Processors - A Hands-on Approach , MK. 2nd edition, 2014.														

18SPE026
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#### ESSENTIALS OF PYTHON PROGRAMMING

L	Τ	Р	С
•		Δ	2

			4	4	U	3
OBJEC	CTIVES:		I			
•	To know the basics of algorithmic prob	elem solving and learn	to re	ad a	and w	vrite
	simple Python programs.					
•	To develop Python programs with cond	litionals and loops, fu	nctio	ns a	nd ca	ıll
	them.	1 1. 4			· · ·	1 (*1
•	Io use Python data structures lists, the	uples, dictionaries, inj	out/oi	utpu	t W1t	n files
UNIT I	ALGORITHMIC PROBLEM S	OLVING				9
Algorithr	ms, building blocks of algorithms (statements,	state, control flow, fu	nctio	ns).	nota	tion
(pseudo	code, flow chart, programming language)	algorithmic proble	m so	olvir	nota 1g. s	simple
strategies	s for developing algorithms (iteration, recursion	n). Illustrative probler	ns: fi	nd r	ninin	num
in a list, i	insert a card in a list of sorted cards, and guess	an integer number in	a ran	ge, [	Towe	ers of
Hanoi.						
UNIT I	I DATA, EXPRESSIONS, STAT	EMENTS				9
Python in	nterpreter and interactive mode; values and ty	ypes: int, float, boole	an, s	tring	g, an	d list;
variables	e, expressions, statements, tuple assignment	t, precedence of op	erato	rs,	com	ments;
modules	and functions, function definition and us	se, flow of executio	n, p	aran	neter	s and
argument	ts; Illustrative programs: exchange the values of	of two variables, circu	late t	he v	alue	s of n
variables.	, distance between two points.	NO				-
	II CONTROL FLOW, FUNCTION		(: 6		<u> </u>	<u> </u>
Condition	nals: Boolean values and operators, conditional (if alif alap); Iteration, state, while, for h	tional (11), alternative	) (1I-0 Email	else :+f1	), cr	ained
roturn vo	lat (II-eIII-else); Iteration: state, while, for, t	unction composition	recu	IIIIII	1010	trings:
string sli	ices immutability string functions and me	ethods string modul	e I	ists	n, 5 as :	arrays
Illustrativ	ve programs: square root, gcd, exponentiation.	. sum an array of nur	ibers.	. lin	ear s	earch.
binary se	earch.	, =	,	,		,
UNIT I	<b>V LISTS, TUPLES, DICTIONAR</b>	IES				9
Lists: list	operations, list slices, list methods, list loop, n	nutability, aliasing, clo	oning	g list	s, lis	t
parameter	ers; Tuples: tuple assignment, tuple as return va	alue; Dictionaries: ope	ratio	ns a	nd	
methods;	; advanced list processing - list comprehension	; Illustrative programs	s: sele	ectio	on so	rt,
insertion	sort, mergesort, histogram.					
UNIT V	V FILES, MODULES, PACKAGI	ES				9
Files and	exception: text files, reading and writing files	, format operator; con	ıman	d lir	ne	
argument	ts, errors and exceptions, handling exceptions,	modules, packages; I	lustra	ative	e	
programs	s: word count, copy file.					
		TOTAL : 45 PER		)5		
OUTCO	<b>OMES:</b> On completion of this course, s	students will be able to	)			
1.	Develop algorithmic solutions to simple com	putational problems.				
2.	Execute the hand simple Python programs.	11				
3.	Build simple Python programs for solving pr	oblems.				
4. <i>r</i>	Divide the Python program into functions.	u l'ata taul 1 l'	4:-			
5.	kecommend the compound data using Pytho	n lists, tuples, and dic	tiona	ries.		

COURSE ARTICULATION MATRIX:															
	PO1	PO2	PO3	PO4	PO5	PO6	P07	<b>PO8</b>	PO9	P01	P01	P01	PSO	PSO	PSO
										0	1	2	1	2	3
CO1	3	1	1		3							3	3		
CO2	3	1	1		3							3	3		
CO3	3	1	1		3							3	3		
CO4	3	2	1		3							3	3		
CO5	3	2	1		3							3	3		
(L- Lo	w, M-	Modera	ate, H-H	ligh)											
TEX	T B	OOK	S:												
1		Allen E	3. Dow	'ney, "	Think	Pytho	n: Hov	v to T	hink L	ike a (	Compu	iter Sc	ientist	", 2 nd	
	(	dition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016													
	(	(http://greenteapress.com/wp/think- python/).													
2	. (	Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised													
		and upo	dated f	or Pyt	hon 3.	2", Ne	twork	Theor	y Ltd.	, 2011	•				
REF	EFERENCES:														
1.		Rober	t Sedg	ewick,	Kevin	Wayn	e, Rob	ert Da	ondero	, "Inti	roduct	ion to	Progra	ammin	g in
		Pytho	n: An	Inter-a	liscipli	nary A	lpproa	ch", F	Pearso	n Indi	a Educ	cation	Servic	es Pvt.	
		Ltd., 2	2016.		1										
2.		Dr.A.	Kanna	n, Dr.	L.Saire	amesh,	"Pro	blem S	olving	g and I	Python	progr	ammir	ıg",	
		United	d Glob	al Pul	blisher	s Pvt.	Ltd., 2	017.	C	,		1 0		0	
3.		Kenne	eth A. I	Lambe	rt, "Fi	undam	entals	of Pyt	hon: I	First P	rograi	ns", C	CENGA	IGE	
		Learn	ing, 20	012.											
4.		Charl	es Die	rbach,	"Intro	oductio	on to (	Сотри	ter Sci	ience ı	ising H	Python	: A		
		Comp	utatio	nal Pr	oblem-	Solvin	g Foc	us", W	viley In	ıdia E	dition,	2013.			
5.		Timot	hy A. I	Budd.	"Explo	oring F	- vthon	", <i>Mc</i> -	Graw	Hill E	Educat	ion (In	dia) P	rivate	Ltd.,
		2015.	2	,	1	0		, -				(	/		,

18SPE027

# GRAPH THEORY AND ITS APPLICATIONS

L	Т	Р	С
2	1	Λ	3

												4	L	U	3
OBJ	ЕСТ	IVES	S:											·	
	٠		To un vario	ndersta	and fur cepts	ndame in graj	ntals o phs.	of grap	h theo	ory and	l proof	techn	iques 1	related	to
	•		To ex repre	xplore sentat	mode ion.	rn app	licatio	ns of g	graph t	heory	and ba	isic co	ncepts	on ma	atrix
	•		To g	et hand	ds on s	hortes	t path	and fu	Indam	ental c	ircuit.				
UNI	ΤI		INT	ROD	UCT	ION	TO	GRA	PH T	HEO	RY				9
Intro	ductio	n - Gra	aph Te	rmino	logies	- Type	es of C	Graphs	- Sub	Graph	- Mult	i Grap	h - Re	gular	
Grapi Relat	h - Iso ed Th	morph eorem	nism - 1 s	Isomo	rphic (	Graphs	s - Sub	-grapł	ı - Eul	er graj	ph - Ha	amilto	nian G	raph -	
UNI	TII		TRI	EES8		NEC	CTIV	ITY							9
Trees	s -Prop	perties-	- Dista	nce an	d Cen	tres - [	Гуреѕ	- Root	ed Tre	e Tr	ee Eni	imerat	ion La	beled	Tree
- Unl	abelec	l Tree	- Span	ning T	- Fund	lamen	tal								
Circu	int and	Cut-se	et- Co	nnectiv			0								
UNI				Crew l		9									
Com	binato	rial Du	ial - R	elated	metric	netric and									
UNI	T IV		MA	TRIC		9									
Matrix Representation - Adjacency matrix- Incidence matrix- Circuit matrix - Cut-set														matrix	ζ-
Path	Matrix	k- Prop	perties	- Rela	ted Th	neorem	is - Co	orrelati	ons. G	raph (	Colorir	ıg - Cł	nromat	ic	
	$\frac{10m1a}{T}$	l - Chr	omatic	A DLI		$\frac{g - Mat}{ODT}$	tching	- Cov	ering -	- Relat	ed The	eorems	5 <b>.</b>		0
Gran	$\mathbf{I} \mathbf{V}$	rithm		<b>AFI</b>	ALG	nd Co		ants = S	-INC	$\frac{\mathbf{OIIC}}{\mathbf{n}\sigma \mathbf{T}r\mathbf{e}}$	) e_ Fun	damer	ntal Ci	rouite	9 Cut
Verti	ces- D	) irected	d Circi	uits- S	hortes	t Path	- Appl	licatio	ns ove	rview.	c- run	uamer		icuits-	Cut
							11	r	ΓΟΤΑ	<b>AL</b> :	45 PE	CRIO	DS		
OU	ΓΟΟ	MES	•	On	compl	etion of	of this	course	e, stud	ents w	ill be a	ble to			
1	. Su	ımmar	ize the	basic	conce	pts of	graphs	s, and	differe	ent typ	es of g	raphs			
2	. Re	ephrase	e the p	ropert	ies, the	eorems	s and b	be able	to pro	ove the	orems	•			
3	. Aj	pply th	e suita	ble gr	aph m	odel a	nd alg	orithm	for so	olving	applic	ations.			
4	$\frac{\ln}{D}$	pleme	$\frac{1}{1}$ the $\frac{1}{2}$	differe	ent ma	trices.									
			r the si		patns		indam <b>FDIV</b>	ental c	rcuits						
COU	JNSI		iice		ION			•	1	1	1				
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	2	3											
CO2	2	3	1										3		
CO3	2	3	1										3	2	
CO4	2	3	1	1 1 2											
CO5	2	3	1										1	2	

(1-Lo	w, 2- Moderate	, 3-High)									
TEX	KT BOOK	S:									
	1. Narsingh	n Deo, "C	Graph Theory with Application to Engineering and Computer Science",								
	Third Ed	lition,Pre	entice-Hall of India Pvt.Ltd, 2003.								
2	2. L.R.Foulds , "Graph Theory Applications", Fourth Edition, Springer ,2016.										
RE	FERENCE	CS:									
1.	West, D. B.,	"Introdi	uction to Graph Theory", Second Edition, Pearson Education, 2011.								
2.	Bondy, J. A.	and Mu	rty, U.S.R., "Graph Theory with Applications", North Holland								
	Publication,	, Third E	<i>Edition, 2008.</i>								
3.	Kenneth H.I	Rosen, "L	Discrete Mathematics and Its Applications", Mc Graw Hill, 2007.								
4.	Diestel, R, '	'Graph T	heory", Springer,3rd Edition,2006.								
5.	John Clark, Derek Allan Holton, —A First Look at Graph Theory ^{II} , World Scientific										
	Publishing (	Company	y, 1991.								

<b>18S</b>	SPE028FUNDAMENTALS OF SIGNAL PROCESSINGLT20												T	P	С		
0.0.0			~									3	0	0	3		
OR ¹	IEC	TIVE	5:														
	•		To un class	ndersta ificatio	and the	e basic le disci	es of di rete tir	iscrete ne sigi	time s nals in	signals both t	, syste time a	ems an nd frec	d thei	r y dom	ain.		
	•		To de based	esign l d on ai	owpas nalog f	ss digi filter tl	tal IIR	filters	accor alog-te	ding to o-digit	o prede al filte	efined er trans	speci	ficatic ation.	ons		
	•		To de	esign l	Linear	phase	digita	l FIR 1 age of	filters DSP i	using : n vari	fourier	r meth	od, w	indow elds			
UNI	ΤI		DIS		TE T	IME	SIG	NAL	S AN	D SY		MS		<b>ciu</b> s.	9		
Intro	ducti	on to D	SP - F	Basic e	elemer	nts of I	$\overline{\text{OSP}-S}$	Sampli	ng of	Contin	uous t	ime si	onals-	_	-		
Repr	esent	tation, C	)perati	on and	d Class	sificati	on of a	Discre	te Tim	e Sigr	al-Cl	assific	ation	of Dis	crete		
TINI	<b>T</b>	r I									F SIC	INAT	S		9		
UIU		L		DSV	STEN STEN	MS		JUN					10		,		
Anal	vsis	ofLTH	Discret	e Tim	e Syste	ems us	sing D	FT_Pr	opertie	es of I	)FT_Iı	iverse	DFT-	- Anal	vsis		
of L7	FI Di	screte T	'ime S	vstem	s using	g FFT	Algori	thms–	Inver	se DF	Γ using	g FFT	Algoi	orithm.			
UNI	ΤI	Π	INF	INFINITE IMPULSE RESPONSE FILTERS											9		
Freat	ienc	cy response of Analog and Digital IIR filters–Realization of IIR filter–Desi											Desig	n of a	nalog		
low	pass	filter_/	Analog	g to I	Digital	filter	Trans	sforma	tion u	ising	Biline	ar Tra	nsfor	matio	n and		
Impu	lse I	nvariant	t meth	od–De	sign o	f digit	al IIR	filters	(LPF,	HPF,	BPF,	and Bl	RF) u	sing v	arious		
trans	form	ation te	chniqu	les.													
UNI	ΤI	V	FIN	ITE	IMP	ULSE	E RES	SPON	ISE E	FILT	ERS				9		
Linea	ar Ph	ase FIR	filter-	-Phase	delay	-Grou	ıp dela	y–Rea	lizatic	on of F	IR filt	er–De	sign c	of Cau	sal		
and N	Non-	causal F	IR filt	ers (Ll	PF, HI	PF, BP	PF and	BRF)	using	Windo	ow me	thod (	Recta	ngular	,		
Ham	ming	g windov	w, Har	ning v	vindov	w) - Fr	equen	cy San	npling	Techr	ique.				-		
UNI	TV	/	AP	PLIC	ATI	<b>DNS</b>	OF D	SP							9		
Mult	irate	Signal l	Proces	sing: I	Decim	ation,	Interpo	olation	, Spec	trum o	of the s	sample	d sig	nal –			
Proce	essin	g of Au	dio an	d Rada	ar sign	al.		r	ГОТ	AT .	45 DI		DC				
					1		6.1.				45 Pf		D2				
00	ICC	DMES		On	compl	etion	of this	course	e, stud	ents w	III be a	able to					
1	•	Constru	uct ma	thema	tical o	peration	ons on	signal	s.						•		
2	•	Unders get disc	tand the transformed the transformed to the transformed by the tension of tension	ne sam me sig	ipling gnal by	theore / apply	m and /ing ac	perfoi lvance	rm san d knov	npling wledge	on cone of the	ntinuo e samp	us-tin ling t	he sig heory	als to		
3	•	Transla	slate the time domain signal into frequency domain signal and vice-versa														
4	•	Apply given a	the relation	evant ( specif	theore icatior	tical k 1s.	nowlee	dge to	desigr	n the d	igital l	IR/FII	R filte	ers for	the		
5		Analyz	e the a	pplica	tions a	and sa	mpled	signal	s.								
CO	URS	SE AR	ΤΙCU	JLAT	TION	MA	ΓRIX	:									
	PO1	I PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3		
CO1	2	2											1	2			
CO2	2	2											1	3			

CO3	2	3											1	3	
CO4	2	3											1	3	
CO5	2	3											2	3	
(1-Lov	w, 2- N	Moderate	, 3-Higł	ı)											
TEX	KT B	SOOK	S:												
1	<ol> <li>John G. Proakis &amp; Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms &amp; Applications", Fourth Edition, Pearson Education / Prentice Hall, 2007.</li> <li>Emmanuel C.Ifeachor, &amp; Barrie.W.Jervis, —<i>Digital Signal Processing</i>II, Second</li> </ol>														
2	2. Emmanuel C.Ifeachor, & Barrie.W.Jervis, — <i>Digital Signal Processing</i> II, Second Edition, Pearson Education / Prentice Hall, 2002.														
REI	FERENCES:														
1.	Richard G. Lyons, "Understanding Digital Signal Processing" Second Edition, Pearson Education.														
2.	A.V. India	Oppenh an Repr	eim, R int, Pe	.W.Sc arson	chafer , 2004.	and J.	R. Buc	ck, "D	iscrete	e-Time	Signa	l Proc	essing	", 8th	
3.	Willi	iam D. S	Stanley	<i>v, —D</i>	igital ,	Signal	Proce	essing	, Secor	nd Edi	tion, R	Reston	Public	cations	<i>š</i> .
4.	SanjitK.Mitra, —Digital Signal Processing A Computer - Based Approach ^{II} , Second Edition, Tata McGraw-Hill, 2001.														
5.	JohnyR.Johnson, —Introduction to Digital Signal Processing, Prentice Hall of India/Pearson Education, 2002.														

18SPE02	L	Т	P	С		
			3	0	0	3
OBJEC	<b>FIVES</b>	5:				
•	Unde and t	erstand and evaluate the various implementations of diction heir probabilistic analysis.	arie	s and	l skip	lists
•	Eval	uate the various hashing techniques and search data structur	res.			
•	Expe prob	eriment string matching algorithms and algorithms for simplems.	le ge	ome	etrica	1
UNIT I		INTRODUCTION				8
Algorithm	analysi	s – Best, Worst and Average cases, Aysmptotic Analysis –	Up	ber b	ound	s,
Lower boy	unds, 7	Theta notation - Analyzing problems - Space bounds – An	alys	is te	chnic	jues –
Summation	n Techr	niques, Recurrence relations – Substitution method, Recursi	on t	ree r	netho	od,
Master me	ethod,	Amortized analysis - Aggregate analysis, Accounting	me	thod	, Po	tential
method, D	ynamic	tables - Probabilistic analysis and randomized algorithms.				
UNIT II		SORTING AND ORDER STATISTICS				9
Average ca	ase ana	lysis of Quicksort, Randomized version of Quicksort and it	s an	alysi	s - S	orting
in Linear ti	ime – L	ower bounds for sorting, counting sort, radix sort, bucket so	ort –	Ext	ernal	_
sorting - M	Iedians	and Order Statistics - minimum and maximum, selection	in	expe	cted	linear
time and w	orst ca	se linear time.				
UNIT II	Ι	HEAPS, SETS & SEARCH TREES				10
Min max h	neaps –	Deaps - Leftist Heaps - Binomial Heaps - Fibonacci Heap	s – c	lecre	easing	g a
key and de	eleting a	a node, bounding the maximum degree - Disjoint sets – Dyr	nami	c set	t opei	ations
– Analysis	of unio	on by rank with path compression - Van Emde Boas Trees -	- A\	'L T	rees -	– Red
black trees	– Spla	y trees.				
UNIT IV	7	GRAPHS, STRING MATCHING				9
All Pairs S	Shortest	t paths – shortest paths and matrix multiplication, Floyd	War	shall	algo	rithm,
Johnson's	algorith	nm for sparse graphs - Maximum Flow – Flow networks, Fo	ord-l	Fulk	erson	ı.
method, M	laximui	n bipartite matching - String matching – Rabin Karp algori	thm,	Kn	uth-N	Iorris-
Pratt algor	ithm.					
UNIT V		SELECTED TOPICS				9
Multithrea	ded al	gorithms – Dynamic multithreading, multithreaded ma	trix	mu	ltipli	cation,
multithread	ded me	rge sort – Number Theoretic algorithms – Greatest comm	on o	livis	or, S	olving
modular li	near eq	uations, Chinese remainder theorem, Primality testing, Int	ege	fac	toriza	ation –
Computati	onal ge	cometry – Finding convex hull and closest pair of points	– N	P Co	omple	eteness
and reduct	bility –	Approximation algorithms – vertex cover problem, travelin	ng sa	lesn	nan,	subset
sum proble	em.					
0.5.000		TOTAL : 45 PERI	OL	5		
OUTCO	MES:	On completion of this course, students will be able	to			
1. U	tilize tł	ne dictionaries and dictionary abstract data type.				
2. II	lustrate	the implementation of symbol table using hashing techniqu	les.			
3. D	evelop	and analyzing algorithms for red-black trees, B-trees and S	play	tree	es.	
4. C	reate th	e algorithms for text processing applications.				
5. Id	lentify	the suitable data structures .				
COURS	E AR'	IICULATION MATRIX:				

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 1 0	PO 11	PO 1 2	PS O 1	PS O 2	PS O 3
CO 1	3	3	1										3	3	2
CO 2	3	3	2										3	3	1
CO 3	3	3	1										3	3	2
CO 4	3	3	2	2									3	3	1
CO 5	3	3	2	2									3	3	1
(1-Lo	(1-Low, 2- Moderate, 3-High)														
TEX	TEXT BOOKS:														
1	1. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein,														
"Introduction to Algorithms", Third Edition, MIT Press, Massachusetts, 2010.															
2	. M	ark Al	len W	eiss, "I	Data S	tructu	res and	d Algo	rithm	Analy	sis in (	C++",	2nd E	dition,	
	Pe	earson,	2004.												
RE	FERI	ENCE	CS:												
1.	Ellis	Horow	vitz, Sa	rtaj Sa	ahni ar	ıd San	guthe	var Ra	jaseka	ran, '	'Funda	imenta	ls of C	Сотри	ter
	Algoi	rithms'	", Seco	nd Ed	ition,	Univer	sities	Press,	2011.						
2.	Dine	sh P. M	1ehta,	Sartaj	Sahni	<i>"Han</i>	dbook	of Da	ta Stri	ictures	s and A	Applica	ations,	Chap	oman
	& Ha	<u>ell/CRC</u>	2005	<u>" Cha</u>	pman	& Hal	<u>I/CRC</u>	, 2005							
3.	Salar Publi	ia R S, shing,	"Date New L	a Strue Delhi, 2	ctures 2012.	and A	lgorith	ims us	ing C'	', Fifth	ı Editie	on, Kh	anna I	Book	
4.	4. Jean Paul Tremblay and Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill Publishing Company, New Delhi, 2012.														
5.	5. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education, 2011.														

18SI	PEO.	30	OPERATIONS RESEARCH L 7										T	P	С
												2	2 1	0	3
OBJECTIVES:															
Be familiar with resource management techniques															
• Learn to solve problems in linear programming and Integer pro											orogra	mming	5		
• Be exposed to CPM and PERT															
UNI	ΤI		LIN	LINEAR PROGRAMMING											
Principal components of decision problem – Modeling phases – LP Formulation and graphic solution – Resource allocation problems – Simplex method – Sensitivity analysis.															
UNI	TI		DU	ALIT	'Y AN	ND N	ETW	ORE	KS						9
Defir	nition	of dua	l probl	em – l	Primal	– Dua	al relat	ionshi	ps – D	ual si	nplex	metho	ds – P	ost	
optin	nality	analys	is - Tt	anspo	rtation	and a	ssignn	nent m	$\frac{10}{2}$	Short	est rou	te pro	blem.		0
	$\Pi$ $\Pi$	l ma ala	IN I	EGE	K Pk	d hou	KANI	MIIN thoda	$\frac{G}{M_{\rm D}}$	staga (	Dunor	nia) n		mina	9
	$\frac{10}{T}$	$\frac{1}{7}$		- Dia				11005, 7 A TT		stage (		me) pi		mmg.	0
Unco	nstra	, ined ev	ternal	nroble		ewton	_ Ral	nhson	metho	d - Ec	<b>nality</b>	const	raints	- Iaco	) bean
meth	ods –	Lagrar	ngian r	nethoo	1 – Ku	hn – T	ucker	condi	tions –	- Simp	le prol	olems.	lanns	Jaco	ocan
UNI	ΤV		OB.	JECT	SCI	IEDI	JLIN	G		1	1				9
Netw PER	ork d Γ.	liagram	repre	sentati	on – C	ritical	path 1	metho	d – Tir	ne cha	rts and	d resou	irce le	veling	—
							Т	ОТА	L:4	5 PE	RIOI	DS			
OU	ГСО	MES	:	On	compl	etion of	of this	course	e, stud	ents w	ill be a	able to			
1	. S	olvethe	optin	nizatio	n prob	lems u	ising s	imple	x meth	od.					
2	. C	Driginat	e the t	ranspo	rtation	$\frac{1}{2}$ and $\frac{1}{2}$	ssignr	nent p	roblen	ns.		roal	lifa an	nligati	one
4	. Р . Г	oppry un Discuss	classic	al opt	imizat	ion the	eorv.	ear pro	ogrann	ining t			ine ap	piicati	ons.
5	. N	Iake us	e of P	ERT a	nd CP	M for	proble	ems in	projec	t man	ageme	nt.			
COU	URS	E AR'	TICU	JLAT	TION	MA	ΓRIX								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	PSO 1	PSO 2	PSO 3
CO1	2	3			1					0	1	2	3	2	1
CO2	2	3			1								3		1
CO3	2	3	1		1								3		1
CO4	2	3	1		1								3		1
CO5	2	3	1		1								3		1
(1-Lov	w, 2- N	Aoderate	, 3-Hig	h)											

TE	EXT	BOOKS:	
	1.	H.A. Taha, "Oper	rations Research", 10 th Edition, Pearson Education, India, 2017.
	2.	Paneer Selvam, "	Operations Research", 2 nd Edition, Prentice Hall of India, 2004.
RF	EFE	<b>RENCES:</b>	
1.	Vol	hra, "Quantitative	Techniques in Management", 5 th Edition, Tata Mc-Graw Hill
	Edı	ucation, New Delhi	i, 2017
2	Anc	derson D.A, et.al, '	<i>Quantitative Methods for Business'', 13th Edition, Cengage Learning,</i>
۷.	201	15.	
3.	Wa	yne Winston, "Ope	eration Research", 4th Edition, Thomson Learning, 2003.
1	A.M	I.Natarajan, P.Bal	lasubramani, A.Tamilarasi, "Operations Research", Pearson
4.	Edı	ucation, Asia, 2005	5.
5.	And	and Sarma, "Opera	ation Research", Himalaya Publishing House, 2010.

# **OPEN ELECTIVES**

<b>18SOE0</b>	01	PROGRAMMING IN C++											
	3 0												
OBJECTIVES:													
•	To und oriente	To understanding the principles of object oriented programming and object oriented way of problem solving.											
•	To gain	To gain familiarity with the syntax, class hierarchy, environment.											
•	Learn a	plication construction for a	an object-oriented program	mir	ig la	ngua	ge						
UNIT I	INTR CON	INTRODUCTION TO FUNDAMENTAL 8 CONCEPTS OF OOP											
Survey of programming paradigms – Object-Oriented Paradigm: Elements of Object Oriented Programming – Merits and demerits of object oriented methodology. Benefits of object oriented programming - structure of C++ program– Static members, Working with classes, Classes and Objects-Class specification- class objects accessing class members- defining member functions - Passing and returning objects – Array of objects - inline functions - accessing member functions within class													
UNIT II	OBJE	CT INITIALIZATION	N AND CLEANUP				10						
Constructors - Parameterized constructors – Constructor overloading. Copy constructor, Destructors, Default arguments - new, delete operators - "this" pointer, friend classes and friend functions.													
UNIT II	I OVEI	LOADING AND GEN	ERIC PROGRAMMI	NG	r		9						
Function overloading – Operator overloading- Non-over loadable operators- unary operator overloading- operator keyword- limitations of increment/decrement operators- binary operator overloading- Generic programming with templates-Function templates- class templates													
UNIT IV	INHE	RITANCE					9						
Inheritance-Base class and derived class relationship-derived class declaration-Forms of Inheritance- inheritance and member accessibility- constructors in derived class, abstract class, virtual functions, pure virtual function													
UNIT V	EXCI	PTION HANDLING	AND STREAMS				9						
Files and Streams-Opening and Closing a file- file modes- file pointers and their manipulation, sequential access to a file-random access to a file-Reading and Writing – Exception handling.													
TOTAL : 45 PERIODS													
<b>OUTCOMES:</b> On completion of this course, students will be able to													
1.	1. Retrieve a full Object Oriented perspective for analyzing, defining, implementing and Evaluating real world problems.												
2.	Analyze a problem, identifying and defining the computing requirements appropriate to its solution.												
3.	Experiment with interpreted data.												
4.	Make use of current techniques, skills and tools necessary for computing and Engineering practice.												

5. Utilize exception handling methods to solve error															
COURSE ARTICULATION MATRIX:															
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	1								3	3	1
CO2	3	3	2	1									3	2	
CO3	3	3	3	2									3	2	
CO4	3	2	1										3	1	
CO5	3	3											3	1	
(L-Lo	w, M-	Modera	te, H-F	ligh)											
TEX	KT B	OOK	S:												
1		Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C++", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.													
2	•	Yash	avant	P. Kar	etkar.	"Let l	Js C+-	+", BP	B Pub	licatio	ns, 20	11.			
REF	FERF	ENCE	CS:												
1.		Byron S Gottfried, "Programming with C++", Schaum's Outlines, Second Edition,													
		Tata McGraw-Hill, 2006.													
2.		Kerni	ghan, l	B.Wan	d Ritc.	hie,D.	М, "Т	he C+	+ Pros	gramn	ing la	nguag	e", Se	cond	
		Editio	n, Pec	irson E	Educat	ion, 20	)06.								
3.		Bjarne Stroustrup, "The C++ Programming Language", 3rd Edition. Pearson													
		Educa	tion, 2	2007.			0		0 0						
4.		B. Tri	vedi, '	"Progr	ammir	ig with	n ANSI	$C^{++}$	", Oxf	ord U	niversi	ty Pre	ss, 200	)7.	
5.		Micha	el T C	Goodrie	ch. Rol	 berto 'I	Tamas.	sia, Da	avid M	ount.	"Data	Struci	tures a	nd	
		Algorithms in $C++$ ", 7th Edition, Wiley Publishers, 2004.													
18SOE002	JAVA PROGRAMMING	L	Τ	P	С										
--------------------	---------------------------------------------------------------------------------------------------------------------------------------------	----------------	--------------	-----------------	----------	--	--								
		3	0	0	3										
OBJECTIV	ES:														
•	Understand fundamentals of programming such as variables, or iterative execution, methods, etc.	conc	litio	nal a	nd										
•	Understand fundamentals of object-oriented programming in defining classes, invoking methods, using class libraries, etc.	Java	, inc	ludiı	ng										
•	Have the ability to write a computer program to solve specific able to use the Java SDK environment to create, debug and ru programs.	ed pi n sii	oble nple	ems a E Java	and a										
UNIT I	<b>OVERVIEW OF JAVA LANGUAGE</b>				8										
Introduction -	Simple Java Program – Comments – Java Program Structure –	Tol	cens	– Ja	va										
Statements – I	mplementing a Java Program – JVM – Command Line Argume	ents.	Cor	istan	ts –										
Variables – Da	ta Types – Type Casting.														
UNIT II	<b>OPERATORS AND EXPRESSIONS</b>				10										
Arithmetic Op	erators - Relational, Logical, Assignment, Increment and Decr	eme	nt, C	Cond	itional,										
Bitwise, Speci	al Operators - Arithmetic expressions, Evaluation of expressi	on -	- Pre	ecede	ence of										
Arithmetic O	perators – Type Conversions – Operator Precedence a	nd	asso	ciati	vity –										
Mathematical	Functions. Decision Making and Branching: If – ifelse –	Ne	sting	g of i	if										
Else – else if –	switch - ? : Operator. Decision Making and Looping:														
While $-$ do $-$ f	or – jump in loops – labelled loops.				0										
UNIT III	CLASSES-OBJECTS AND METHODS				9										
Defining a clas	ss - Adding variables, methods - Creating objects - Accessing	Cla	ss M	emb	ers-										
Constructors –	Methods overloading – static members – Nesting of Methods	– In	herit	ance	-										
Overriding me	thods – final Variables and methods – Final classes – finalizer	met	hods	-A	bstract										
methods and c	lasses – visibility control. Arrays, Strings and Vectors: Arrays	– Oi	ne D	imen	isional										
Arrays – Creat	ing an array – Two Dimensional Arrays – Strings – Vectors –	Wra	pper	Clas	sses										
Interfaces: Mu	Itiple Inheritance Defining interfaces – Extending interfaces –	imp	eme	nting	5										
interfaces – Ac	ccessing interface variables.				0										
UNITIV	PACKAGES				9										
Java API Pack	ages – Using system packages – Naming conventions – Creatin	ıg P	acka	ges -	-										
Accessing a Pa	ackage – Using a Package – Adding a Class to a Package – hidi	ng c	lass	es.											
Multithreaded	Programming: Creating Threads – Extending the Thread Class	- S	topp	ing a	ind										
Blocking a Th	ocking a Thread – Life Cycle of a Thread – Using Thread methods – Thread Exceptions –														
Thread Priority	y – Synchronization – Implementing the 'Runnable' Interface														
UNIT V	APPLET PROGRAMMING				9										
How applets a	liffer from Applications – preparing to write applets – Build	ling	App	olet (	Code –										
Applet life cy	cle – creating an Executable Applet – Designing a Web Pa	ge -	- Ap	plet	Tag –										
Adding Apple	t to HIML file – Running the Applet – Passing parameters to A	Appl	ets –	-											
Displaying Nu	merical values – Getting input from the user.		20												
	TOTAL : 45 PER	IUI	72												

OU'	ГСС	OMES	•	On co	omplet	ion of	this co	ourse,	studen	ts wil	l be ab	le to			
1		Recogn	nize th	e knov	vledge	of the	e struct	ure an	ld mod	lel of t	he Jav	a prog	ramm	ing	
		langua	ge.		•									•	
2		Make u	ise of	the Jav	va prog	gramm	ing la	nguage	e for v	arious	progr	ammir	ig tech	nologi	es.
3		Develo	p soft	ware in	n the J	ava pr	ogram	ming	langua	ge			-		
4		Remen	nber k	nowled	dge of	progra	ammin	g and	knowl	edge o	of Ope	rating	systen	ns.	
5	•	Create	Packa	iges for	r imple	ementi	ng mo	re fun	ctions.						
COU	JRSI	E ARTI	CUL	ATIO	N MA'	<b>FRIX</b> :	:								
	PO	1 PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO1	PO1	<b>PO1</b>	PSO	PSO	PSO
										0	1	2	1	2	3
CO1	3	2	3	3	1								3	3	1
CO2	3	2	2	1	1								3	2	1
CO3	3	2	3	2	1								3	2	
C04	2	2	1	1										1	
CO5	2	3	2	2	1									2	1
(L- Lo	w. M	- Modera	Aoderate, H-High)												
TEX	KT I	BOOK	OOKS:												
1		Cay S	Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals",												
1	•	Eleve	Eleventh Edition, Sun Microsystems Press, 2018.												
2	,	Herb	Ierbert Schildt, —Java The complete reference, 8th Edition, McGraw Hill												
2		Educ	Education, 2011.												
REI	FER	ENCE	ES:												
1.		Ken A	rnold,	James	s Gosli	ing, De	avid H	olmes,	, "The	JAVA	progr	ammin	ng lang	guage	,, ,
		Third	editio	n, Pear	rson E	ducati	on, 20	05.							
2	•	Timot	hy Bu	dd, "U	Inderst	anding	g Obje	ct-orie	ented p	orogra	mming	g with	Java"	, Upda	ited
		Editio	n, Pec	arson E	Educat	ion, 20	000.								
3	•	C. The	omas	<b>Wu, "</b> A	ln intr	oducti	on to (	<b>D</b> bject	-orient	ted pro	ogram	ming v	vith Ja	va",	
		Fourt	h Edit	ion, Ta	ta Mc	Graw-	Hill P	ublish	ing co	mpany	v Ltd.,	2006.			
4.		Paul I	Deitel,	Harve	ey Deit	tel, —.	Java S	E 8 for	r prog	ramm	ers  , 3	rd Edi	tion, P	earsor	1,
		2015.						-	-						
5.		Steven	ı Holz	ner, —	-Java 2	2 Blac	k book	, Drec	imtech	press	, 2011				

<b>18SOI</b>	E003		DATABASE CONCEPTS	L	Т	P	С				
				3	0	0	3				
OBJE	CTIVE	S:				_					
•	To	learn the	e fundamentals of data models and to represent da	itaba	se s	ystem	using				
		understa	s, SQL and relational database design.	and	inda	vina					
•	tech	niques y	which will help in physical DB design	anu	mud	anig					
•	To	understa	nd the fundamental concepts of transaction processi	ng-	conc	urren	ıcy				
TINIT		troi tech	niques and recovery procedures.				•				
UNIT	1	INT	<b>KODUCTION TO DATABASES</b>				9				
Databas Langua Archite	se-Systen ges, Type cture, Da	n Applic es of Dat tabase U	ations, Purpose of Database Systems, View of Data abase Models, Relational Databases, Database Desi Jsers and Administrators	, Dat gn, ]	abas Data	e base					
UNIT	II	DAT	<b>ABASE DESIGN &amp; RELATIONAL MOI</b>	DEI			9				
Overvie	ew of t	ne Desi	ign Process, The Entity-Relationship Model,	Cons	strair	nts, 🛛	Entity-				
Relation	nship Di	agrams	and it's design issues - Structure of Relational I	Data	base	s, Da	itabase				
Schema	, Keys, S	chema I	Diagrams, Relational Algebra and its Operations – E	ER to	Rel	ation	al				
mappin	g										
UNIT	III	STR	UCTURED QUERY LANGUAGE				9				
Overvie Basic O Modific Data Ty	Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database, Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas.										
UNIT	IV	PL/S	OL				9				
Basic C Built-in Trigger	oncepts, SQL Fu	Types, C nctions,	Control Structures, Expressions and Operators, SQL Cursors, Error Handling, Collections, Procedures, F	witl unct	nin F ions	L/SC , and	ĮL,				
UNIT	V	ADV	ANCED TOPICS				9				
Indexin based re Distribu	ndexing – Basics of Transactions - Concurrency control – 2PL, Dealing with deadlocks – Log ased recovery mechanisms – RAID – Spatial and temporal databases – Information retrieval – Distributed databases – Big data applications. TOTAL : 45 PERIODS										
	OMES	•	On completion of this course students will be able	to	0						
		voiotal n	roblems by identifying describing and analyzing ro	auir	mor	te of	tho				
1.	system	cietai p	Toblems by identifying, describing and analyzing re-	quire	inei		ule				
2.	Apply of the syst	latabase ems	concepts to design and develop the databases are determined at the databases at the databases are determined at the databases are determined at the databases are determined at the databases at the dat	ataba	ase o	bject	s of				
3.	Underst	and data	base server and client systems								
4.	Implem	ent data	base systems								
5.	List the	Big data	a applications.								
COU	RSE AF	TICU	LATION MATRIX:								

	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO 1 0	PO 11	PO 1 2	PS O 1	PS O 2	PS O 3
CO1	3	3		1									3	3	
CO2	3	3		1		1							3	2	1
CO3	3	3		2		1							3	2	1
CO4	3	3		3									3	1	
CO5	3	3		3	2	2					1		3	2	2
(1-Lo	w, 2- N	Ioderate	e, 3-Hig	h)											
TE	XT BOOKS:														
1	. Si M	Silberschatz, Korth and Sudarshan,, "Database System Concepts", Seventh Edition McGraw Hill, 2010													
2	<ul> <li>Ramez Elmasri, Shamkant B. Navathe, —Fundamentals of Database Systems^I, Sixth Edition, Pearson Education, 2011.</li> </ul>														
RE	FERI	Edition, Pearson Education, 2011.													
1.	C.J a	ate," A	1n intr	oducti	on to a	databa	se sys	tems",	Secor	ıd Edi	tion, A	lddiso	n Wels	ley.20	00
2.	George Koch & Kevin Loney, "Oracle 9i Complete reference", Third Edition, McGraw Hill, 2005.														
3.	Scott Urman, "Oracle 9i: PL/SQL Programming", Third Edition, Oracle press 2007.														
4.	Raghu Ramakrishnan, —Database Management Systems, Fourth Edition, McGraw-Hill College Publications, 2015.														
5.	$\overline{G.K.}$	G.K.Gupta, "Database Management Systems", Tata McGraw Hill, 2011.													

<b>18SOE</b>	E004		WEB DESIGNING	L	Τ	P	С		
				3	0	0	3		
OBJE	CTIVES	5:							
	•	To Acc using H	uire knowledge and Skills of Adobe Photoshop and ITML.	d cre	eate '	Web	pages		
	•	To lear ADOB	n the characteristics of Adobe Dreamweaver, Javas E Flash	Scrip	ot, A	JAX	and		
	•	To be f	Camiliarized with Web Hosting and SEO Concepts						
UNIT	Ι	ADO	BE PHOTOSHOP				9		
Stock pl	hotograph	y – Typ	es of Image Graphics – Vector graphics and tools –	Sca	lar g	raph	ics and		
tools –	Adobe ph	otoshop	- interface tour - color modes and resolution op	otion	ıs –	file t	ypes –		
layers, g	grouping	and sm	art objects – image adjustments – layer masking	; – l	ayer	clip	ping –		
blending	g options	– analy	sis, view and window menu - filter effects - ac	tions	s – a	nim	ation –		
applicat	ions - bro	chure de	signing, create business card, design banners for w	ebsi	te – i	real t	ime		
website	layout des	sign							
UNIT	II	HTM	L				9		
Markup	language	– Struc	ture of HTML page – Structure tags – Table, Div	, Fra	ames	- C	ontent/		
Media t	ags – hea	der, par	agraph, span, anchor links, image hotspots, object	tag	– W	orkir	ig with		
frames -	- POST ar	nd GET	- File upload and hidden fields - Creating a live we	ebsit	e for	m –	-		
XHTMI	L – Doc	types, V	Validation – HTML5 – Media tags – Cascading	styl	e sh	eets	– CSS		
Selector	s, Propert	ies – Cu	stom form design	•					
UNIT	III	ADO	BE DREAMWEAVER				9		
Basics -	- types of	views -	defining dreamweaver site – Toolbars – Standard,	Com	mor	n, Lay	yout –		
Text tag	gs – Spry e	elements	- Forms - form validations - FTP Client - Extens	ions	- Te	empla	ate		
design –	- Importin	g a web	site design – compatibility issues.						
UNIT	IV	JAVA	SCRIPT, AJAX & ADOBE FLASH				9		
Client s	ide scripti	ing – Va	ariables and operators in JS – Conditions statement	ts –	Loc	ps –	Popup		
boxes -	JS Even	ts – Ar	rays - Objects - Functions - Using JS in realtin	ne –	Aja	x co	ncepts.		
Introduc	troduction to animation – Tools in adobe flash – shape tween and motion tween – frame								
animatio	on – flash	effects -	- flash banners - Creating flash website - Basics of	acti	on s	cripti	ing		
UNIT	V	Web	Hosting & SEO Concepts				9		
Basics -	types of I	hosting	packages – registering domains – defining name ser	vers	-us	ing c	ontrol		
panel –	anel – creating emails in Cpanel – Using FTP Client – Maintaining a website – SEO Concepts –								
Importa	nce of SE	O - Onp	age optimization basics – Ajax Libraries, Basics of	JQu	iery,	Jque	ry		
scripts.		-			•	-			
			TOTAL : 45 PER	<b>IO</b>	DS				
OUTC	COMES:	:	On completion of this course, students will be able	to					
1.	Improve	the know	wledge in Photography.						
2.	Create an	nd desig	ning the website using HTML language.						
3.	Infer the	layout,	spry elements, form validation in website.						
4.	Build the	e website	e using client side scripting languages.						
5.	Understa	and the h	osting and its packages.						

COI	URSI	E AR'	TICU	JLAT	ION	MA	ΓRIX	:							
	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2	3			1								3		1
CO2	2	3			1								3		1
CO3	2	3	1		1								3		1
CO4	2	3	1		1								2		1
CO5	2	3	1		1								2		1
(1-Lov	(1-Low, 2- Moderate, 3-High)														
TEX	KT B	OOK	S:												
1.	. Th Ea	Themas A. Powell, "The Complete Reference–Web Design", Tata McGraw Hill, Third Edition, 2003.													
2.	. D	Deke Mc Clelland, "Photoshop 7 Bible", Professional Edition", Wiley John and Son													
	In	Inc., 2000.													
REF	ERF	RENCES:													
1.	$H_{L}$	H.M. Deitel, P.J. Deitel, A.B. Goldberg, "Internet and World Wide Web – How to													
	$P_1$	Program", Third Edition, Pearson Education, 2004.													
2.	. <i>Ci</i>	Curtis Hillman, "Flash Web Design", First Edition, New Riders Publishing, 2000													
3.	V	an Duy Tabaita	ne, La " Soa	nday a ond F	and He	ong, "	The Do	esign ( 11 201	of Sites	s: Patt	erns fe	or Cre	ating	Winnir	ıg
1		hn Du	o , Sec	"Dogi	unina.			$\frac{111, 200}{111, 200}$	$\frac{10}{100}$	d Ian	Couin	•" Wa	low Ind	lia 20	10
4. 5.	St	even M	I. Scha	ifer, "	HTML	, XHT	, лпт ML, a	$\frac{1}{nd} CS$	SS, un	e", 5th	<i>editic</i>	n. Wil	lev Ind	ia, 20 ia, 20	10. 10.

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						DEVI	ELO	PME	NI				5	0	0	3
OBJE	CTI	VES	5:										<u> </u>	v	v	
	•		Unde frame	erstand ework	l how s.	to wor	k with	vario	us mol	oile ap	plicati	on de	ve	lopr	nent	
	•		Learn tools	n how used i	UI for in and	roid ap	le appl plication	licatio	n deve velopn	lopme nent	ent is d	one f	or A	And	roid	and
	•		Learn mobi	n the b le app	asic a licatio	nd imp ons and	ortant l the p	desig rocess	n conc of and	epts a lroid a	nd issu applica	ues of tion d	de lev	evelo elop	opme omen	nt of t
UNIT	Ι		INT	ROD	DUCI	TION										9
Mobile Java – C handlin	Appl Classe g.	icatio es ano	ons – ( d Obje	Charac ects — l	teristi Inherit	cs and ance –	Benef Packa	fits – F ages ai	Framev nd Inte	vorks erfaces	and To s – Stri	ools – ngs –	In I/C	trod D – I	uctio Even	n to t
UNIT	Π		USE	CR IN	ITER	RFAC	E									9
Generic	UIE	Devel	opmer	nt – M	ultimo	odal an	d Mul	tichan	nel UI	– Des	signing	g the r	igł	nt U	I–	
Introdu	ction	to XI	ML –>	KML b	oasics -	– Attri	butes	– DTI	) - XM	IL sch	iema –	Scree	en l	Elen	nents	and
Layouts	З. ТТТ		то													
		• 1 5		JLS	1 •	1 4 1	• ,•	A 1	•, ,		1 • 1	<u> </u>			1 .	9
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UNIT	IV					$\frac{1}{2}$ <b>N D</b>	ESIG	N	Dopt	<i>y</i> incl					14110	9
Memor	v Ma	nager	nent –	- Desig	n natt	erns fo	or limi	ted me	emorv	-Wo	rk flov	v for /	Ap	plica	ation	
Develop	pmen	t - Te	echniq	ues fo	or com	posing	Appli	icatior	s - Int	tents a	and Ser	vices	-P	Frag	gmen	ts –
Graphic	s – A	nime	tion.		-											
UNIT	V		APF	PLIC	ATIC	)N D	EVE	LOP	MEN	Т						9
Storing	and I	Retrie	eving of	lata –	Comn	nunica	tion vi	a the	Web –	Notif	ication	and	Ala	arms	s —	
Telepho	ony –	Loca	tion b	ased s	ervice	s – Ap	ps wit	h Fire	base R	leal Ti	ime Da	itabas	e –	- Pro	oject	on
respecti	ve D	iscipl	ine.										_	<u></u>		
									ΓΟΤΑ	AL:	<u>45 PE</u>		D	S		
OUTC	COM	IES:		On	compl	etion of	of this	course	e, stud	ents w	vill be a	able to	)			
1.	Des	ign a	nd im	pleme	nting t	he use	r inter	faces f	for mo	bile aj	pplicat	ions.				
2.	Dev dev	relop ices.	the m	obile a	applica	ations	that ar	e awai	e of th	e resc	ource c	onstra	in	ts of	f mot	vile
3.	Crea	ate ac	lvance	ed mot	oile ap	plicati	ons th	at acce	ess the	datab	ases ar	nd the	W	eb.		
4.	Con Stud	npose lio.	e useft	ıl mob	ile app	plication	ons in	the cu	rrent s	cenari	io usin	g Goo	ogle	e Ar	ndroi	d
5.	Ren	nemb	er the	know	ledge	of java	ι.									
COU	RSE	AR'	ΓΙϹ	JLAT	TION	MA	<b>FRIX</b>	:								
P	01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO 1 0	PO 11	PO 1 2	F	אי 1 כ	PS O 2	PS O 3

CO1	3	3	3			2	1				3		3	2	1
CO2	3	3	3	2		1	2				3		3	2	2
CO3	3	1	3			2	1				3		3	1	1
CO4	3	2					2						3	2	2
CO5	3	2					1						3	2	1
(1-Lo	w, 2- N	Ioderate	e, 3-Hig	jh)											
TEX	KT B	OOK	S:												
	I. Je	ff Frie	sen, "]	Learn.	Java fo	or And	roid D	evelo	oment	: Java	8 and	Andro	id", Fi	fth Ed	ition
	Pa	aperba	ck, 20	14.				-	L						
4	2. SI	nare Co	onder,	Laure	n Darc	ey, "A	ndroi	d Wire	eless A	pplica	tion D	evelo	pment	", Thir	ď
	Edition, Pearson,2009.														
RE	FERI	ERENCES:													
1.	Zigur	Vigurd Mednieks, Laird Dornin, G, Blake Meike and Masumi Nakamura, Third													
	Edition, "Programming Android", O"Reilly, 2011.														
2.	Jeff Mcherter, Scott Gowell, "Professional mobile Application Development", paperback,														
	, Wiley India Private Limited, 2012														
3.	Reto Meier, Wrox Wiley, "Professional Android 2 Application Development", second														
	Edition, 2010.														
4.	Alasa	lair Al	lan, "i	Phone	Progr	rammi	ng", 1	Third E	dition	, <u>O''R</u>	eilly, 2	2010.			
5.	Mich	ael Gr	egg, "	Build	Your	Own S	ecurit	y Lab'	', Wile	y Indi	a Privo	ate Lin	nited,	2012	

18S	OE0	06	COMPUTER ARCHITECTURE     L     T     P     C												
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OBJ	<b>EC</b>	<b>FIVE</b>	S:												
•		To n and 1	nake st hardwa	tudent are-so	s unde ftware	rstand interf	the ba ace	asic str	ucture	and o	peration	on of d	igital	comp	uter
•		To f fixed syste	amilia 1 poir em inc	rize th it and luding	ne stud float cache	lents ing-po memo	with a bint an ories a	rithme rithme nd vir	tic an tic op tual m	d logi eration emory	c unit ns and	and in d hier	nplen archic	nentati al me	on of emory
•		To e stand	xpose dard I/	the stu O inte	idents rfaces.	with c	liffere	nt way	rs of co	ommu	nicatin	ig with	I/O c	levices	s and
UNI	ΤI		OV	ERV	<b>IEW</b>	& IN	STR	UCT	IONS	5					9
Eight Unip instru	t ideas rocess action	s – Cor sors to s – Log	npone multip gical o	nts of a process peration	a comj sors; In ons – c	puter s nstruct control	ystem ions – opera	– Tec opera tions -	hnolog tions a - Addı	gy – P and op ressing	erform erands g and a	ance – – repr ddress	- Pow esenti ing m	er wal ing odes.	1 –
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ALU Subw	- Ade ord p	dition a	und sul ism.	otracti	on - N	Iultipl	icatior	n – Div	vision	– Floa	ting Po	oint op	eratio	ons –	
UNI	TI	[	PRO	OCES	SSOR	R ANI	D CO	NTR	OL U	JNIT	١				11
Basic – Pip	elinec	S imple l datap	ementa ath an	ation – d cont	- Build rol – H	ling da Iandlii	itapath 1g Dat	ı – Coı a haza	ntrol Iı rds &	nplem Contre	entation ol haza	on sche ards – I	eme – Excep	Pipel tions.	ining
UNI	TIV	T	PAI	RALI	ELI	SM									9
Instru multi	uction thread	-level- ding –	paralle Multic	Illelism – Parallel processing challenges – Flynn's classification – Hardware ticore processors         EMODY AND LO SYSTEMS											
UNI	TV		ME	MOF	RY A	ND I/	<u>'0 SY</u>	STE	MS						9
Mem perfo interr	ory h rman rupts,	ierarch ce - Vi I/O pro	y - Me rtual n ocesso	emory nemor rs.	techno y, TLF	ologies 3s - Inj	s – Cao put/ou	che bas tput sy	sics – stem,	Measu progra	ammed	nd imp l I/O, I	orovin DMA	g cach and	ie
					1		6.41				45 Pł		DS		
		MES:	<b>IES:</b> On completion of this course, students will be able to												
2	. D . A	nalvze	gn arithmetic and logic unit.												
3	. E	valuate	hate performance of memory systems.												
4	. U	ndersta	erstand parallel processing architectures.												
5	. R	ecogni	ze the	memo	ry tecl	hnolog	gies an	d hiera	archy.						
COI	JRS	E AR'	FICU	LAT	ION	MA	<b>FRIX</b>	•							
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	1	1						-			3	1	3
CO2	3	2	1	1									3	1	

CO3	3	2	1	1									3	1	
CO4	3	3	2	2									3	2	
CO5	3	3	2	1		1						1	3	2	
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TEX	KT BO	OOK	S:												
1	. Da ed	avid A ition, 1	Patte Morga	erson a in Kau	nd Joh ffman	n L. F / Else	Iennes vier , 2	sey, "( 2014.	Compı	uter or	ganiza	tion a	nd des	ign", I	Fifth
2	. V. Si.	Carl H xth edi	Hamac ition, 1	her, Z [.] Mc Gre	vonko aw-Hil	G. Va l Inc,	ranesi 2012	c and .	Safat (	G. Zak	у, "Сс	ompute	er Org	anisati	ion",
REI	FERE	<b>ENCE</b>	ES:												
1.	М. М. 2017.	M. Morris Mano "Computer System Architecture", Third Edition, Pearson Education, 2017.													
2.	2017. William Stallings "Computer Organization and Architecture", Seventh Edition, Pearson Education, 2006.														
3.	Vincent P. Heuring, Harry F. Jordan, "Computer System Architecture", Second Edition, Pearson Education, 2005														
4.	Govindarajalu, "Computer Architecture and Organization, Design Principles and         Applications", first edition, Tata McGraw Hill, New Delhi, 2005														
5.	Applications", first edition, Tata McGraw Hill, New Delhi, 2005 John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata Mc Graw Hill, 1998.														

<b>18S</b>	OE0	07		FUN	DAM	ENT	AL C	F CO	OMP	UTE	R	]	L	Τ	P	С
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OB.	JEC	TIVE	S:													
	•	U	nderst	tand th	e divis	sion of	netwo	ork fur	nctiona	lities	into la	yers.				
	•	В	e fami	iliar wi	th the	comp	onents	requir	red to	build	differe	ent type	es o	of n	etwoi	·ks.
	•	B co	e expo ongest	osed to ion co	the re ntrol a	quired lgorith	functi ms.	ionalit	y at ea	ich lay	ver and	l flow	coi	ntro	l and	
UNI	ΤI	F	'UND	AMF	ENTA	LS &	k LIN	KL	AYE	R						8
Build softw	ling a /are -	a netwo - Perfor	rk – R mance	equire e ; Linl	ments < layer	– Lay Servi	ering a ces – H	und pro Framin	otocols 1g – E1	s – Int ror De	ernet A	Archite on – Fl	ecti ow	ure cor	– Net ntrol.	work
UNI	TI	[ ] N	1EDI		CCES	<b>S &amp;</b> ]	INTE	RNE	TW	ORK	ING					10
Medi bridg	ia acc ging –	cess cor - Basic	trol – Intern	Etherr etwork	et (80 ing (Il	2.3) – P, CID	Wirel R, AR	ess LA P, DH	Ns – S ICP, IO	802.11 CMP).	– Blı	ietootł	1 –	Swi	itchin	g and
UN	TI	II R	OUI	ring												9
Rout	ing (I	RIP, OS	SPF, n	netrics)	-Sw	itch ba	sics –	Globa	l Inter	net (A	reas, I	BGP, 1	IPv	6), ]	Multi	cast –
addre	esses	– multi	cast ro	outing	(DVM	(RP, P)	IM).									
UNI	ΤΓ	V 1	'RAN	<b>SPO</b>	RT L	AYE	R									9
Over Flow RED	view $cont$ (-0) - 0	of Trai trol – R oS – A	nsport etrans pplica	layer - mission tion re	- UDP n — TC quiren	– Reli CP Con nents	iable b igestio	yte str n cont	ream (' rol – <b>(</b>	TCP) Conge	– Con stion a	nection voidat	n m nce	nana (D	igeme EC bi	ent – it,
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OU'	ГСС	<b>MES</b>	•	On co	omplet	ion of	this co	ourse,	studer	ıts wil	l be at	ole to				
1		Identif	y the c	compoi	nents r	require	d to bi	uild di	fferen	t types	s of ne	tworks	s.			
2		Select	the rec	quired	function	onality	at eac	h laye	er for g	given a	applica	ation.				
3		Measu	re solu	ition fo	or each	funct	ionalit	y at ea	ich lay	er.		·			.1_	
4	•	Suppor	the flo	OW OI 1 itional	niormannic	ation I	rom o	ne nod	le to ai	nother	node	in the	net	woi	к.	
COL	· JRSF	E ARTI			N MA'	<b>FRIX</b> :										
	PO1	I PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	РО	PO	PO	P	S	PS	PS
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CO1	3	2	2	2	1						1		3		2	1
CO3	3	3	2	2	1						1		3		2	
CO4	3	3	2	1							1		3		2	
<b>CO5</b>	3	3 Modar	2	3 Ligh)	2						2		3		2	
	ow, M ZT T		ие, н-н С•	ngn)												
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З.	Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open
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<b>18S</b>	OE0	08			L	INUX	K ANI	D RT	OS			Ι	L T	P	С
													<b>B O</b>	0	3
OB.	<b>OBJECTIVES:</b>														
	•	To learn the concepts linux Kernel and RTOS concept													
	٠	U	Jse cas	ses for	tasks,	semap	ohores,	, queu	es, eve	nt flag	gs and	timers			
	•	Γ	Design	conce	pts nee	eded to	o build	an en	nbedde	d syst	em us	ing RT	OS.		
UNI	[ <b>T</b> ]	I	NTR	ODU	CTIC	)N									9
Basic	c Ope	rating S	Systen	n Conc	cepts-L	linux a	ıs Emt	bedded	l Opera	ating S	System	n-Com	pariso	on of	
Emb	edded	OS Er	nbedd	ed OS	Tools	and D	evelop	pment	-Discu	ssion	on Em	bedde	d OS		
Appi LINI		ns and	Produ VST	ICTS	RCI	IITF	CTI	RF (	F A	RASI		2	T		0
Inter	nalso	f L inuy	<u>101</u>	System	Calle		$\frac{CIU}{x Com}$	niler o	ntions	Mak	eProce	$\mathbf{S}$	ıltithi	eading	y and
Svnc	hroni	zation.	Serial	port a	nd Ne	twork	brogra	mmin	g with	Embe	edded	Linux	Kern	el mod	ule
prog	ramm	ing and	l Devi	ce driv	/ers.		P**8**		8	21110					
UNI	T II	I I	NTE	R PR	OCE	SS C	OMN	<b>IUN</b>	<b>ICAT</b>	ION					9
Pipe	and F	IFOs, S	Shared	l mem	ory, So	ockets,	, Getti	ng Lin	ux on	a devi	ce-Lir	nux bo	ot seq	uence,	,
Build	ling K	Cernel,	Build	ing Bo	ot ima	ge									
UNI	T IV	7 <b>E</b>	MBI	EDDF	ED R'	ГOS-	INTI	ROD	UCTI	ON					9
Emb	edded	Softw	are – l	Real-ti	me Vs	Non I	Real-ti	me-In	troduc	tion to	Real-	time s	ystem	is and	
Emb	edded	Real-t	ime S	ystems	s-Discu	ussion	of pop	oular F	RTOS-	Comp	arison	of Em	bedd	ed RT	OSs ,
Desig	gn Go	als for	Real-	time so	oftwar	e-Disc	ussion	on Er	nbedd	ed Rea	al-time	e appli	cation	lS,	
	$\mathbf{T} \mathbf{V}$		VST	$\overline{\mathbf{EM}}$		HITE	<b>CTI</b> T	RE C	FRI	TIN	UX				9
Intro	ductio	on RTI	inux-'	Thread	l Creat	ion an	d Man	ageme	ent- Th	read S	Svnchi	ronizat	ion N	lechan	isms
IPC -	– RTF	FIFO, S	hared	Memo	ory-Int	errupt	Hand	ling			- J				
				T					TOT	AL:	45 P	ERIC	DDS		
OU'	ГСО	MES	:	On co	omplet	ion of	this co	ourse,	studen	ts wil	l be ab	ole to			
1	•	Identif	y Linu	x utili	ties to	create	and m	nanage	simpl	e file j	proces	sing o	perati	ons,	
		organiz	ze dire	ectory s	structu	res wi	th app	ropriat	te sec	urity,	and	devel	op she	ell scri	pts to
2		Make	n mor	the III	$\frac{1}{1}$	SKS.	ustem	to acc	omnlis	h tyni	cal ne	reonal	offic	e tech	nical
2	•	and so	ftware	devel	opmer	nt tasks	s. Mon	itor sy	vstem t	berfor	nance	and no	etwor	k activ	ities.
3	3. Utilize software development tools including libraries, preprocessors, compilers														
	linkers, and make files.														
4	4. Understand technical documentation, prepare simple readable user documentation and							n and							
	adhere to style guidelines .Collaborate in teams on system tasks.														
5	•	Build a	ın emt	bedded	syster	n usin	g RTC	DS.							
COL	JRSE	ARTI	CULA	ATION	N MA'	TRIX	:								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO	РО	РО	PS	PS	PS
001	2	1	2							10	11	12	01	02	03
CO1	3	1	Z								3		3	1	2

<b>CO1</b>			2	2	2						
<b>CO2</b> 3	1 2	3	3	2	2						
<b>CO3</b> 3	1 2	3	3								
<b>CO4</b> 3	1 3	3	2	1	2						
<b>CO5</b> 3	3	3	2	1	2						
(L-Low, N	A- Moderate, H-High)										
TEXT	BOOKS:										
1.	M. Tim Jones, "GNU/ Linux Application programming", Second edition, Cengage										
	Learning, 2008										
2.	Craig Hollabaugh, "Embedded Linux: Hardware	, Software, and	Interfacing	", Add	lison						
	Wesley, 2002	· ·	e								
REFE	RENCES:										
1.	Karim Yaghmour, Jon Masters, Gilad Ben-Yoss	sef, Philippe Ge	rum, "Build	ding							
	Embedded Linux Systems: Concepts, technique	s, tricks and tra	ps", Second	d Editi	on,						
	O'Reilly Media, 2008.		-								
2.	David E. Simon, "An Embedded Software Primer", Pearson Education, 2002										
3.	Michael Beck, Harald Bohme, Mirko Dziadzka,	Ulrich Kunitz,	Robert Ma	gnus, l	Dirk						
	Verworner, "Linux Kernel Internals", Second Edition, Addison Wesley, 1998										
4.	Raj Kamal, "Embedded Systems: Architecture	Programming a	nd Design'	', Tata							
	McGraw Hill Education, 2003		2								
5.	K.V.K. Prasad, "Embedded / Real-Time	Systems: Co	oncepts, D	esign	and						
	Programming", Dreamtech Press, 2003.	•	•	U							

<b>18SOE0</b>	9 PROBLEM SOLVING AND PYTHON	L	Τ	P	С						
	PROGRAMMING										
		0	0	3							
OBJECTIVES:											
•	• To know the basics of algorithmic problem solving and simple Python										
	programs.										
•	To develop Python programs with conditionals and loops, functions and call them.										
•	To use Python data structures – lists, tuples, dictionaries, inp in Python.	out/c	utpu	t wit	h files						
UNIT I	ALGORITHMIC PROBLEM SOLVING				9						
Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, and guess an integer number in a range, Towers of Userai											
UNIT II	DATA, EXPRESSIONS, STATEMENTS				9						
Python int	erpreter and interactive mode; values and types: int, float, boole	an,	strin	g, an	d list;						
variables,	expressions, statements, tuple assignment, precedence of op	erato	ors,	com	nents;						
modules ar	d functions, function definition and use, flow of execution, param	eters	s and	l							
arguments;	Illustrative programs: exchange the values of two variables, circu	ılate	the	value	es of n						
variables, c	istance between two points.										
UNIT II	CONTROL FLOW, FUNCTIONS				9						
Conditiona	ls: Boolean values and operators, conditional (if), alternative	e (if	else	e), c	hained						
conditional	(if-elif-else); Iteration: state, while, for, break, continue, pass;	Frı	itfu	fun	ctions:						
return valu	es, parameters, local and global scope, function composition,	rec	ursic	on; S	trings:						
string slice	es, immutability, string functions and methods, string modul	e; I	Lists	as	arrays.						
Illustrative	programs: square root, gcd, exponentiation, sum an array of num	bers	s, lin	ear s	earch,						
binary sear					0						
UNITIV	LISTS, TUPLES, DICTIONARIES				9						
Lists: list o	perations, list slices, list methods, list loop, mutability, aliasing, cl	onin	g lis	ts, lis	st						
parameters	, Tuples: tuple assignment, tuple as return value; Dictionaries: ope	ratio	ons a	nd							
methods; advanced list processing - list comprehension; Illustrative programs: selection sort,											
insertion sort, mergesort, nistogram.											
UNITV	FILES, MODULES, PACKAGES				9						
Files and e	ception: text files, reading and writing files, format operator; com	imai	nd lii	ne							
arguments,	errors and exceptions, handling exceptions, modules, packages; Il	lust	rativ	e							
programs: word count, copy file.											
	TOTAL : 45 PER	101	<b>JS</b>								
OUTCO	<b>MES:</b> On completion of this course, students will be able to	)									
1. I	Develop algorithmic solutions to simple computational problems.										
2.	Solve operations on hand simple Python programs.										
3. 1	Examine simple Python programs for solving problems.										
4. 1	Modify a Python program into functions.										

5		Recommend compound data using Python lists, tuples, and dictionaries.													
COU	COURSE ARTICULATION MATRIX:														
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	<b>PO1</b>	P01	P01	PSO	PSO	PSO
										0	1	2	1	2	3
CO1	( ¹ )	5	1		3							3	3		
CO2	0	3	1		3							3	3		
CO3	3	3	1		3							3	3		
CO4	3	8 2	1		3							3	3		
CO5	3	8 2	1		3							3	3		
(L- Lo	ow, M	- Modera	te, H-H	igh)											
ТЕХ	KT F	BOOK	.S:												
1		Allen E	B. Dow	ney, "	Think	Pytho	n: Hov	w to T	hink L	ike a (	Compu	ter Sc	ientist'	", 2 nd	
		edition	, Up	dated	for	Pyt	hon	3,	Shroff	f/O'Re	eilly	Publi	shers,	201	6
		(http://g	greente	eapres	s.com/	wp/thi	nk- py	thon/)							
2		Guido	van Ro	ssum	and Fr	ed L.	Drake	Jr, "A	n Intro	oductio	on to P	ython	- Rev	ised ar	nd
		updated	d for P	ython	3.2", 1	Vetwor	rk The	ory Lt	d., 201	11.					
3		-		•											
REF	FER	ENCE	ES:												
1.		Rober	t Sedg	ewick,	Kevin	Wayn	e, Rol	oert Do	ondero	, "Int	roduct	ion to	Progr	ammin	g in
		Pytho	n: An I	Inter-a	liscipli	nary A	1 pprod	ich", I	Pearso	n Indi	a Edu	cation	Servic	es Pvt.	
		Ltd., 2	2016.		1	2	11								
2		Timot	hv A. I	Budd.	"Explo	oring I	vthon	". Mc-	-Graw	Hill E	Educat	ion (In	dia) P	rivate	Ltd
		2015.	2	, i	1	0		,				(	,		
3		Kenne	eth A. I	Lambe	rt. "Fi	undam	entals	of Pvt	thon: I	First P	rogra	ns". (	CENG/	1GE	
		Learn	ing. 20	)12.	,		••••••	0) 1 ) (				, c	21101	.02	
4		Dr.A	Kanna	n. Dr	L.Saira	amesh	"Pro	hlem S	Solving	and i	Python	nrogi	ammin	19". T	hird
		Editio	n.Unit	ed Gl	bal P	ublish	ers Pv	t. Ltd	2017	,	<i>y</i>	r·•8'			
5		Charl	es D	ierhac	h "	Introdi	uction	to	Comp	uter	Scien	e us	ing 1	Python	· A
		Comp	utation	nal Pr	, 1 ohlem.	Solvir	o For	ис" И	Vilev II	ndia F	dition	2013		ymon	
		Comp	пино		ooiem-	Solvin	ig roc	us , n	ney II	iuiu L	union,	2013.			

<b>18SO</b>	E010				DA	TA .	ANA	LYT	ICS			Ι	L T	P	С
												3	6 0	0	3
<b>OBJECTIVES:</b>															
	•	G	aining	g factua	al knov	wledge	e (term	inolog	gy, clas	ssifica	tions,	metho	ds, tre	ends)	
	•	Le	earnin	g fund	ament	al prin	ciples	, gener	ralizati	ions, c	or theo	ries			
	•	Le	earnin	g to ap	ply co	ourse n	nateria	l (to ii	nprov	e thin	king, p	roblen	n solv	ing, a	nd
	-	D	ecisio	ns) and	d data	collect	tion, c	leansii	ng, and	l anal	ytics.				-
UNIT	Ι	11	NTR	ODU	CTIC	)N									8
What is big data – Why big data matters – Big data and the Business case – Building the big data team – Big data sources – The Nuts and Bolts of big data – Security, compliance, auditing and protection- Evolution of big data – Best practices – Big data pipeline in depth – Big data visualization and privacy.															
UNIT	П	P	RED	ICTI	VE A	NAL	LYTI	CS							10
Data Co	ollecti	on -	Samp	ling - I	Pre-pr	ocessii	ng - Li	near F	Regress	sion -	Logist	tic Reg	ressic	n -	
Decisio Classifi	on Tre	es - 1 1 Tec	neura chniqu	i netw	orks - valuati	Suppo ing Pré	ort vec edictiv	tor M e Mod	acnine lels	s - En	isembl	e Metr	ioas -	Mult	iciass
UNIT	III	D	ESC	RIPT	IVE	AND	SUF	RVIV	AL A	NAI	<b>YTI</b>	CS			9
Associa	ation 1	Rules	s - Sec	quence	Rules	- Seg	mentat	tion - S	Surviv	al Ana	alysis l	Measu	remen	ts - K	Laplan
Meier A	Analy	sis - I	Param	netric S	Surviva	al Ana	lysis -	Propo	rtional	l Haza	irds Re	egressi	on - E	xtens	sions
of Surv	ival A	unaly	$\frac{1}{1}$	odels -	Evalu	ating	Surviv	$\frac{1}{\alpha}$	alysis	Mode	ls.				0
UNIT	10		KAN		UKK	& T		<u>8</u>	1	•	<b>TT</b> 1		1.	•	9
RHado	op - P	redic	ze and t usin	d explo	ore dat che M	a usin ahout	g R - M - Data	visual	educe izatio	using n and	Hadoo optimi	op - Pr zation	in R.	lsing	
UNIT	V	A	PPL	ICAT	TION	S									9
Credit I	Risk N	Mode	lling -	– Frau	d deteo	ction -	Net L	lift res	ponse	mode	lling –	Churr	n pred	iction	l —
Recom	mend	er sy	stems	– Weł	o analy	rtics –	Social	media	a analy	tics –	Busin	less pro	ocess	analy	tics
									TOT	'AL :	45 P	PERI(	DDS		
OUT	COM	<b>ES</b> :		On co	omplet	ion of	this co	ourse,	studen	ts wil	l be at	ole to			
1.	Or	ganiz	ze the	compo	onents	requir	red to l	build c	lifferen	nt type	es of n	etwork	(S		
2.		loose	the re	equired	1 tunct	functi	$\frac{\text{ty at ea}}{\text{onality}}$	ach lay	yer tor	given	appli	cation			
3. 4	Ex	amir	$\frac{1}{1}$ solution $\frac{1}{1}$	flow o	f infor	matio	n from	one n	ode to	anoth	ner noo	le in th	e netv	vork	
5.	5. Understand the applications of data analytics.														
COURSE ARTICULATION MATRIX:															
P	01	PO2	٩О	PO4	PO5	PO6	P07	PO8	PO9	PO	PO	PO	PS	PS	PS
CO1	3	3	3							ΙU	11	12	3	2	2
CO2	3	2	2										2	2	1
CO3	3	3	3										3		1
CO4	3	3	3										2		1
005	~	~													

TEXT B	BOOKS:	
1	Bart Baese	ns, "Analytics in a Big Data World: The Essential Guide to Data Science
1.	and its App	blications", Third Edition, Wiley, USA, 2014.
n	Ohlhorst an	nd Frank J, "Big Data Analytics: Turning Big Data into Big Money",
2.	Third Editi	on,Wiley, USA, 2012.
REFER	<b>ENCES:</b>	
1.	Michael Mir	nelli, Michele Chambers and Ambiga Dhiraj, "Big Data, Big Analytics:
	Emerging B	usiness Intelligence and Analytic Trends for Today's Businesses", John
	Wiley and S	ons, New Delhi, 2013.
2.	Thomas A R	unkler, "Data Analytics - Models and Algorithms for Intelligent Data
	Analysis, Sp	ringer Verlag", Germany, 2012.
3.	Sarah Stowe	ell, "Instant R: An Introduction to R for Statistical Analysis", Jotunheim
	Publishing,	Norway, 2012.
4.	Michael Ber	rthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
5.	Anand Raja	raman and Jeffrey David Ullman, "Mining of Massive Datasets"
	,Cambridge	University Press, 2012.