Learning Outcomes based Curriculum Framework (LOCF)

for

Bachelor of Technology (Computer Science) B.Tech. (CS)

(w.e.f. 2022-23)



Department of Computer Science and Information Technology School of Technology MAULANA AZAD NATIONAL URDU UNIVERSITY

1. Vision and Mission

1.1 Vision

To meet the requirements of the society by imparting knowledge, ethics and moral values with a holistic approach.

1.2 Mission

To impart quality education and to undertake research and extension with emphasis on application and innovation that cater to the emerging societal needs through all-round development of students of all sections enabling them to be globally competitive and socially responsible citizens embedded with ethical values.

1.3 Strategies for Attaining the Vision and Fulfilling the Mission

Following strategies will be used to ensure the accomplishment of the stated vision and mission:

- 1. To create an ambiance for healthy teaching-learning process and attract the motivated students to the Department of Computer Science and Information Technology
- 2. Ensure that the curriculum followed is comparable to the relevance of local, national, regional and global development
- 3. To motivate the potential faculty members/ educators who are constantly upgrading their pedagogical approaches to motivate students and to enhance learning among them
- 4. Provide opportunities to students for global exposure, industrial internships, project based and research-based learning

2. Program Educational Objectives

Program Educational Objectives (PEOs) are broad statements that describe the career and professional accomplishments that CS&IT Department is preparing its graduates to achieve during the graduation. Following four PEOs are defined as:

PEO 1. Graduates using their acquired knowledge, competence and skill sets will develop into globally competent and locally relevant professionals through training and experiential learning enhancing their professional competence throughout their professional career.

PEO 2. Graduates will pursue knowledge and innovation-based development process to find solutions to problems in real life situation that satisfy technical performance specification.

PEO 3. Graduates will play adaptive leadership role in industry, government, education and R&D sectors to boost productivity and contribute economic development.

PEO 4. Graduates will be active members ready to serve the society locally and internationally apart from cultural needs, social awareness and responsibility.

3. Program Outcomes (POs)

Program outcomes are the narrower statements that describe what students are expected to know and be able to do upon graduation. POs represent the knowledge, skills and attitudes the

students should have at the end of a program. Following are the statements for POs for CSE program. At the time of completing their degree requirements, students will be able to:

- **PO₁:** Apply the knowledge of Mathematics, Science, and Engineering fundamentals, and an engineering specialization to solution of complex engineering problems **(Engineering Knowledge)**.
- **PO**₂: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (**Problem analysis**).
- **PO₃:** Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate considerations of public health and safety, and cultural, societal, and environmental considerations (**Design/development of solutions**).
- **PO**₄: Use research-based methods including design of experiments, analysis and interpretation of data and synthesis of information leading to logical conclusions **(Conduct investigations of complex problems)**.
- **PO**₅: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling complex engineering activities with an understanding of limitations (**Modern tool usage**).
- **PO**₆: Apply reasoning within the contextual knowledge to access societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice (**The engineer and society**).
- **PO**₇: Understand the impact of the professional engineering solutions in the societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable developments (Environment and sustainability).
- **PO**₈: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice (**Ethics**).
- **PO**₉: Function effectively as an individual independently and as a member or leader in diverse teams, and in multidisciplinary settings (**Individual and team work**).
- **PO**₁₀: Communicate effectively on complex engineering activities with the engineering community and with society at large such as being able to comprehend and write effective reports and design documentation, make effective oral presentations, and give and receive clear instructions (**Communication**).
- **PO₁₁:** Demonstrate knowledge and understanding of engineering management principles and apply those to one's own work as a member and leader of a team to manage projects in multidisciplinary environments (**Project management and finance**).
- **PO**₁₂: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change (**Life-long Learning**).

4. Program Specific Outcomes (PSOs)

Program Specific Outcomes (PSOs) are the statements that define outcomes of a program which make students realize the fact that knowledge and techniques learnt in a specific course has direct implication for the betterment of society and its sustainability.

- **PSO 1:** The ability to design and develop computing systems using the knowledge of Mathematics, Science and Engineering fundamentals.
- **PSO 2:** Ability to test and analyze the quality of developed applications and to integrate them in order to evolve a larger computing system.
- **PSO 3:** Apply appropriate techniques, resources, and modern engineering and IT tools to address societal, health, safety, legal, and cultural issues.
- **PSO 4:** To analyze and assess various functional and technical security challenges as per local needs and global standards.

PSOs have to be attained by the students in due course of the four years program either as part of their Core, Basic Sciences, Engineering Sciences or as part of their various levels of projects, compulsory courses of Humanities & Social Sciences areas.

5. Mapping between PEOs, POs and PSOs

The following Table lists the relationships between the PEOs, POs. and PSOs. The attainment of POs can be viewed as a strategy for attaining the PEOs. Each PEO is supported by multiple POs to ensure strength in compliance. Also, the relationship between individual PO and PEOs can vary between **Reasonable (1)** and **Strong (3)**.

DEOr							POs							PS	Os	
PEOs	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
PEO1	2	2	1	2	3	2	2	2	2	2	1	2	2	1	2	2
PEO2	2	1	2	1	2	1	1	3	1	1	2	1	2	2	3	2
PEO3	1	2	2	3	3	2	2	1	2	3	1	2	1	3	1	1
PEO4	3	3	1	2	1	1	1	2	1	2	3	2	3	2	2	2

- 1 Reasonable
- 2 Significant
- 3 Strong

6. Course Outcomes (COs)

Course Outcomes are narrower statements that describe what students are expected to know and be able to do at the end of the course. Course outcomes are defined for all courses as part of the syllabus for the course and are measured through performance on assignments, written and oral presentation reports related to individual and team projects and through the mid-term and semester end examinations. Detailed syllabi for each course associated with Course Objectives and Course Outcomes has been for specific outcomes associated with the course. Attaining the COs is at the heart of the educational activity. If COs of individual courses are successfully attained and the curriculum has been designed to achieve the Program Outcomes, then attainment of the POs is also ensured. An effective Assessment Plan has been devised to meet the objective, quantitative and independent measures to demonstrate that all POs and PEOs are being attained by the program.

7. Continuous Quality Improvement and Assessment Plan

The purpose of the Assessment Plan is to ensure attainment of all Program Outcomes (POs) and also the attainment of the Program Educational Objectives (PEOs) and to independently confirm that the POs and PEOs are being attained. Periodic monitoring of progress allows faculty members and the leadership to take corrective actions where the POs and PEOs are not meeting established targets. The process consists of assessing and evaluating the extent to which the student outcomes are being attained. The results of these assessments and evaluations are subsequently used as the primary inputs for making improvements to the program.

MAULANA AZAD NATIONAL URDU UNIVERSITY SCHOOL OF TECHNOLOGY DEPARTMENT OF COMPUTER SCIENCE & IT

B.Tech. (Computer Science)

General, Course structure & Theme & Semester-wise credit distribution

A. Definition of Credit:						
1 1 Hr. Lecture (L) per week 1 credit						
2	1 Hr. Tutorial (T) per week	1 credit				
3 2 Hours Practical (Lab)/week 1 credit						

B. Range of credits:

A student requires to complete total 179 credits to be eligible to get Under Graduate degree in Engineering.

C. Stru	cture of Undergraduate Engineering program:	
S. No.		Credit Breakup for
		B.Tech. Students
1	Humanities and Social Sciences including Management courses	09
2	Basic Science courses	24
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	28
4	Professional core courses	66
5	Professional Elective courses relevant to chosen specialization/branch	32
6	Open subjects – Electives from other technical and/or emerging subjects	6
7	Project work, seminar and internship in industry or elsewhere	15
8	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution]	(non-credit)
	Total	180

PROFESSIONAL CORE COURSES [PCC]								
SL.	Code No.	Course Title	H	ours per w		Total	Semester	
No.	Couc No.	course rule	Lecture	Tutorial	Practical	Credits	Semester	
1	BTCS311PCT	Data Structure & Algorithms	3	1	0	4	3	
2	BTCS362PCP	IT Workshop Python	0	0	4	2	3	
3	BTCS407PCT	Discrete Mathematics	3	1	0	4	4	
4	BTCS511PCT	Computer Organization	3	1	0	4	5	
5	BTCS403PCT	Operating Systems	3	1	0	4	4	
6	BTCS513PCT	Design & Analysis of Algorithms	3	1	0	4	5	
7	BTCS402PCT	Database Management Systems	3	1	0	4	4	
8	BTCS512PCT	Formal Language & Automata Theory	3	1	0	4	5	
9	BTCS405PCT	Object Oriented Programming	3	1	0	4	4	
10	BTCS611PCT	Complier Design	3	1	0	4	6	
11	BTCS612PCT	Computer Networks	3	1	0	4	6	
12	BTCS312PCT	Digital Electronics	3	1	0	4	3	
					Total	46		

PROFESSIONAL CORE COURSES [PCC]

PROFESSIONAL ELECTIVE [PEC]

SL.	Code No.	Course Title	H	ours per w	eek	Total	Semester
No.			Lecture	Tutorial	Practical	Credits	
1	PEC	Elective – I	3	1	0	4	5
2	PEC	Elective – II	3	1	0	4	6
3	PEC	Elective – III	3	1	0	4	6
4	PEC	Elective – IV	3	1	0	4	7
5	PEC	Elective – V	3	1	0	4	7
6	PEC	Elective – VI	3	1	0	4	8
7	PEC	Elective – VII	3	1	0	4	7
8	PEC	Elective – VIII	3	1	0	4	8
					Total	32	

SL.	Code No.	Course Title	H	ours per w	Total	Semester			
No.			Lecture	Tutorial	Practical	Credits			
1	OEC	Open Elective – I	3	0	0	3	6		
2	OEC	Open Elective – II	3	0	0	3	7		
	Total 6								

OPEN ELECTIVE [OEC]

MAULANA AZAD NATIONAL URDU UNIVERSITY

DEPARTMENT OF CS&IT SCHEME OF INSTRUCTIONS, EXAMINATION & EVALUATION (Effective for Batch Admitted from 2022-23 Academic Year)

B.Tech. (Computer Science)

Total Credits (4 Year Course): 179

I. INDUCTION PROGRAM (H	PLEASE REFER APPENDIX-A FOR GUIDELINES)			
Induction Program	3 Weeks duration			
(mandatory)	(Please refer Appendix-A for guidelines & also details			
	available in the curriculum of Mandatory courses)			
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 			

<u>Schedule</u>

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.

Initial Phase	
Time	Activity
Day 0	
Whole day	Students arrive - Hostel allotment. (Preferably do pre-allotment)
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)
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.

3.2.1 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.

Sessn.	Time	Activity	Remarks
Day 3 onw	ards		
	06:00 am	Wake up call	
Ι	06:30 am - 07:10 am	Physical activity (mild exerc	ise/yoga)
	07:15 am - 08:55 am	Bath, Breakfast, etc.	
II	09:00 am - 10:55 am	Creative Arts / Universal Hu	uman Values
		Half the groups do C	Creative Arts
III	11:00 am - 12:55 pm	Universal Human Values /	
	-	Creative Arts C	complementary alternate
	01:00 pm - 02:25 pm	Lunch	
IV	02:30 pm - 03:55 pm	Afternoon Session See below	<i>W</i> .
V	04:00 pm - 05:00 pm	Afternoon Session See below	<i>N</i> .
	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 hos	stels)

Sundays are off and Saturdays have the same schedule as above or have outings.

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	Sessio	on Remarks
Familiarization with Dept/Bra	anch	
& Innovations	IV	For 3 days (Day 3 to 5)
Visits to Local Area	IV, V and VI	for 3- days
		For 3 days - interspersed (e.g., 3 Saturdays)
Lectures by Eminent People	IV	As scheduled - 3-5 lectures
Literary (Play / Book Reading	/ Lecture) IV	For 3-5 days
Proficiency Modules	V	Daily, but only for those who need it
Closing Phase		
Time	Activity	
Last But One Day		
08:30 am - 12 noon	Discussions and finali	ization of presentation within each group
02:00 am - 05:00 pm	Presentation by each	group in front of 4 other groups besides their
	own (about 100 stude	ents)
Last Day		
Whole day Examinations	(if any). May be expand	led to last 2 days, in case needed.

II. SEMESTER WISE STRUCTURE OF CURRICULUM

[L= Lecture, T= Tutorials, P=Practical, C= Credits]

PROC	FRAM	YEAR					SEN	IESTER	
B.Tech	h. (CS)	Ι				Ι			
			Но	Hours/Week			Score		n 1 n
Course Code	Description	Course Title	L	L T P		Credits	Internal	External	End Exam Duration
BTCS101BST	Basic Science	Engineering Mathematics-I	3	1	0	4	30	70	3 Hrs
BTCS102BST	Basic Science	Engineering Physics	3	1	0	4	30	70	3 Hrs
BTCS101EST	Engineering Science	Basic Electrical Engineering	3	1	0	4	30	70	3 Hrs
BTCS111EST	Engineering Science	Engineering Graphics & Design	1	1	4	4	30	70	3 Hrs
BTCS150BSP	Basic Science	Engineering Physics Lab	0	0	4	2	50	50	3 Hrs
BTCS150ESP	Engineering Science	Basic Electrical Engineering Lab	0	0	4	2	50	50	3 Hrs
				20	60	00			
Total Credits per semester20600Mandatory Induction Program- 3 Weeks DurationNote: End Semester Examinations of the subject(s) weighted more than 2 credits will be for three Hrsduration with maximum 100 marks score (30+70)									

PROGRAM		YEAR				SEMESTER				
B.Tech. (CS)		Ι				II				
			Ηοι	ırs/V	Week			ore	End Exam Duration	
Course Code	Description	Course Title	L	Т	Р	Credits	Internal	External		
BTCS201BST	Basic Science	Engineering Mathematics – II	3	1	0	4	30	70	3 Hrs	
BTCS211BST	Basic Science	Engineering Chemistry	3	1	0	4	30	70	3 Hrs	
BTCS211EST	Engineering Science	Programming for Problem Solving	3	1	0	3	30	70	3 Hrs	
BTCS211HST	Humanities & Social Sciences including Management	English Communication	2	0	0	2	15	35	2 Hrs	
BTCS212EST	Engineering Science	Engineering Mechanics	3	1	0	4	30	70	3 Hrs	
BTCS260BSP	Basic Science	Engineering Chemistry Lab	0	0	4	2	50	50	3 Hrs	

BTCS260ESP	Engineering Science	Basic Programming Lab	0	0	4	2	50	50	3 Hrs
BTCS251ESP	Engineering Science	Engineering Workshop	0	0	6	3	50	50	3 Hrs
BTCS260HSP	Humanities & Social Sciences including Management	English Communication LAB	0	0	2	1	50	50	3 Hrs
	Tot					25	85	0	

PROC	RAM	YEAR					SEM	IESTER	
B.Tech	n. (CS)	II						III	
			Ηοι	ırs/'	Week			ore	End
Course Code	Description	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration
BTCS311EST	Engineering Science Course	Analog Electronic Circuits	3	1	0	4	30	70	3 Hrs
BTCS311PCT	Professional Core Courses	Data structure & Algorithms	3	1	0	4	30	70	3 Hrs
BTCS312PCT	Professional Core Courses	Digital Electronics	3	1	0	4	30	70	3 Hrs
BTCS311BST	Basic Science course	Engineering Mathematics-III	3	1	0	4	30	70	3 Hrs
BTCS311HST	Humanities & Social Sciences including Management courses	Technology & Society	2	0	0	2	15	35	2 Hrs
BTCS360ESP	Engineering Science Course	Analog Electronic Circuits LAB	0	0	4	2	50	50	3 Hrs
BTCS360PCP	Professional Core Courses	Data structure & Algorithms LAB	0	0	4	2	50	50	3 Hrs
BTCS361PCP	Professional Core Courses	Digital Electronics LAB	0	0	4	2	50	50	3 Hrs
BTCS362PCP	Professional Core Courses	IT Workshop Python	0	0	4	2	50	50	3 Hrs
BTCS312HST	Mandatory Courses	Environmental Sciences	2	0	0	-	15	35	2 Hrs
		Total				26	90	00	

PROG	RAM	YEAR	2				SEM	ESTER	
B.Tech	n. (CS)	II						IV	
			Ho	ırs/V	Week			ore	End
Course Code	Description	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration
BTCS402PCT	Professional Core Courses	Database Management Systems	3	1	0	4	30	70	3 Hrs
BTCS403PCT	Professional Core Courses	Operating Systems	3	1	0	4	30	70	3 Hrs
BTCS405PCT	Professional Core Courses	Object Oriented Programming	3	1	0	4	30	70	3 Hrs
BTCS406PCT	Professional Core Courses	Software Engineering	3	1	0	4	30	70	3 Hrs
BTCS407PCT	Professional Core Courses	Discrete Mathematics	3	1	0	4	30	70	3 Hrs
BTCS451PCP	Professional Core Courses	Database Management Systems LAB	0	0	4	2	50	50	3 Hrs
BTCS452PCP	Professional Core Courses	Operating Systems LAB	0	0	4	2	50	50	3 Hrs
BTCS453PCP	Professional Core Courses	Object Oriented Programming LAB	0	0	4	2	50	50	3 Hrs
	Total 26 800								

PROG	RAM	YEAR	2				SEM	IESTER	
B.Tech	n. (CS)	III			V				
				ırs/V	Week			ore	End
Course Code	Description	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration
BTCS511PCT	Professional Core Courses	Computer Organization	3	1	0	4	30	70	3 Hrs
BTCS512PCT	Professional Core Courses	Formal Language & Automata Theory	3	1	0	4	30	70	3 Hrs
BTCS513PCT	Professional Core Courses	Design & Analysis of Algorithms	3	1	0	4	30	70	3 Hrs
BTCS511HST	Humanities & Social Sciences including	Organizational Behaviour	2	0	0	2	15	35	2 Hrs

	Management								
BTCS512HST	Humanities & Social Sciences including Management	History of Sciences & Technology in India	2	0	0	2	15	35	2 Hrs
BTCS51xPET	Professional Elective Courses	Elective-I	3	1	0	4	3	70	3 Hrs
BTCS560PCP	Professional Core Courses	Design & Analysis of Algorithms LAB	0	0	4	2	50	50	3 Hrs
BTCS511NCT	Mandatory Courses	Constitution of India	2	0	0	-	15	35	2 Hrs
	То					22	6 5	60	

PROGE	RAM	YEAR				SEMESTER			
B.Tech.	(CS)	III						VI	
			Ηοι	ırs/V	Week			ore	End
Course Code	Description	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration
BTCS611PCT	Professio nal Core Courses	Complier Design	3	1	0	4	30	70	3 Hrs
BTCS612PCT	Professio nal Core Courses	Computer Networks	3	1	0	4	30	70	3 Hrs
BTCS61xPET	Professio nal Elective Courses	Elective-II	3	1	0	4	30	70	3 Hrs
BTCS61xPET	Professio nal Elective Courses	Elective-III	3	1	0	4	30	70	3 Hrs
UGCS61xGET	Open Elective Courses	Open Elective-I	3	0	0	3	30	70	3 Hrs
BTCS660PCP	Professio nal Core Courses	Complier Design LAB	0	0	4	2	50	50	3 Hrs
BTCS661PCP	Professio nal Core Courses	Computer Networks LAB	0	0	4	2	50	50	3 Hrs
BTCS662PCP	Project	Project-1	0	0	6	3	50	50	Viva- voce & Demon stratio n
		Total				26	80	00	

PROC	RAM	YEAR					SEM	IESTER	
B.Tech	n. (CS)	IV			VII				
			Ηοι	ırs/V	Week		Score		End
Course Code	Description	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration
BTCS71xPET	Professional Elective Courses	Elective-IV	3	1	0	4	30	70	3 Hrs
BTCS71xPET	Professional Elective Courses	Elective-V	3	1	0	4	30	70	3 Hrs
UGCS71xGET	Open Elective Courses	Open Elective-II	3	0	0	3	30	70	3 Hrs
BTCS760PCP	Project	Project-II	0	0	12	6	100	100	Viva- voce & Demo nstrati on
	Tota			•	•	17	50)0	

PROC	RAM	Y	EAR					SEM	IESTER	
B.Tech	n. (CS)		IV						VIII	
				Hou	ırs/V	Week		Score		End
Course Code	Description	Course Title		L	Т	Р	Credits	Internal	External	Exam Duration
BTCS83xPET	Professional Elective Courses	Elective-VI		3	1	0	4	30	70	3 Hrs
BTCS83xPET	Professional Elective Courses	Elective-VII		3	1	0	4	30	70	3 Hrs
BTCS83xPET	Professional Elective Courses	Elective-VIII		3	1	0	4	30	70	3 Hrs
BTCS860PCP	Project	Project-III		0	0	12	6	100	100	Viva- voce & Demo nstrati on
	То						18	50	0	

	PROFESSIONAL COURSES -ELECTIVE-I IN FIFTH SEMESTER											
I		Hours/Week				Sc	End					
Course Code	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration				
BTCS511PET	Principles of Programming Languages	3	1	0	4	30	70	3 Hrs				
BTCS512PET	Parallel and Distributed Algorithms	3	1	0	4	30	70	3 Hrs				
BTCS513PET	Signal and Systems	3	1	0	4	30	70	3 Hrs				

PROF	ESSIONAL COURSES -ELECTIVE-II	& ELE	ECTIV	/E-II	I FOR S	IXTH SE	MESTER	
		Hou	rs/V				ore	End
Course Code	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration
BTCS611PET	Data Mining and Data Warehousing	3	1	0	4	30	70	3 Hrs
BTCS612PET	Python Programming	3	1	0	4	30	70	3 Hrs
BTCS613PET	Advanced Computer Architecture	3	1	0	4	30	70	3 Hrs
BTCS614PET	Distributed Systems	3	1	0	4	30	70	3 Hrs
BTCS615PET	Computer Graphics	3	1	0	4	30	70	3 Hrs
BTCS616PET	Advanced Operating Systems	3	1	0	4	30	70	3 Hrs
BTCS617PET	Embedded Systems	3	1	0	4	30	70	3 Hrs

PROFE	SSIONAL COURSES -ELECTIVE-IV &	ELE	CTIV	/E-V F	OR SEV	'ENTH S	EMESTE	R
		Ηοι	ırs/V	Week			ore	End
Course Code	Course Title		Т	Р	Credits	Internal	External	Exam
								Duration
BTCS711PET	Artificial Intelligence	3	1	0	4	30	70	3 Hrs
BTCS712PET	Block Chain Technology	3	1	0	4	30	70	3 Hrs
BTCS713PET	Real Time System	3	1	0	4	30	70	3 Hrs
BTCS714PET	Ad-Hoc and Sensor Network	3	1	0	4	30	70	3 Hrs
BTCS715PET	Internet-of-Things	3	1	0	4	30	70	3 Hrs
BTCS716PET	Machine Learning	3	1	0	4	30	70	3 Hrs

F	PROFESSIONAL COURSES -ELECT	VE-V	I, VI	I FOR	EIGTH	SEMEST	'ER	
		Ho	Hours/Week				ore	End
Course Code	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration
BTCS831PET	Image Processing	3	1	0	4	30	70	3 Hrs
BTCS832PET	Data Analytics	3	1	0	4	30	70	3 Hrs
BTCS833PET	Neural Networks and Deep Learning	3	1	0	4	30	70	3 Hrs
BTCS834PET	Cloud Computing	3	1	0	4	30	70	3 Hrs
BTCS835PET	Human Computer Interaction	3	1	0	4	30	70	3 Hrs
BTCS836PET	Web and Internet Technology	3	1	0	4	30	70	3 Hrs
BTCS837PET	Cryptography and Network Security	3	1	0	4	30	70	3 Hrs
BTCS838PET	Soft Computing	3	1	0	4	30	70	3 Hrs
BTCS839PET	Speech and Natural Language Processing	3	1	0	4	30	70	3 Hrs

OPEN ELECTIVE-I:

A Student need to opt any one subject from the following open electives to be offered by the other Departments

		Ηοι	ırs/V	Week			ore	End
Course Code	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration
UGCS611GET	Soft Skill and Interpersonal Communication	3	0	0	3	30	70	3 Hrs
UGCS612GET	Human Resource Development and Organizational Behavior	3	0	0	3	30	70	3 Hrs
UGCS613GET	Cyber Law and Cyber Security	3	0	0	3	30	70	3 Hrs
UGCS614GET	Comparative Study of Modern Indian Languages	3	0	0	3	30	70	3 Hrs
UGCS615GET	Biology (Basic Science Course)	3	0	0	3	30	70	3 Hrs

OPEN ELECTIVE-II:

A Student need to opt any one subject from the following open electives to be offered by the other Departments

		Ηοι	ırs/V	Week			ore	End
Course Code	Course Title	L	Т	Р	Credits	Internal	External	Exam Duration
UGCS711GET	Intellectual Property Rights	3	0	0	3	30	70	3 Hrs
UGCS712GET	History of Science	3	0	0	3	30	70	3 Hrs
UGCS713GET	Values & Ethics	3	0	0	3	30	70	3 Hrs
UGCS714GET	Economic Policies in India	3	0	0	3	30	70	3 Hrs

Course (Course				Lect			
BTCS101						athemati			LI		Seme	ester: I
Version: 1.2					oval: 16	th BoS 17	-11-2022		3 1	•		
	Scheme			n			S	cheme o				
	Periods) Hrs.						aximum		: 10	
Periods	/ Week	: 4						Inter	nal Eval	uation	: 30	
	Credits	: 4							End Ser	nester	: 70	
Instructio	n Mode	: Le	ecture					E	Exam Du	ration	: 31	Hrs.
Prerequisit	e(s): Basi	c know	ledge o	f Mathe	matics							
Course Obj												
1. To unde								ıs engine	ering pi	oblems	•	
2. To prov												
3. To acqu												
4. To impa		oncept	of parti	al deriv	atives o	of first an	d higher	orders i	n the fie	eld of er	ngineeri	ing and
technol												
Course Out	comes (O	CO):										
COs No.					Staten	nent				Map	oped Pr	ogram
											tcomes	(POs)
CO ₁	Apply o	lifferen	tial and	d integ	ral calc	culus to	notions	of curva	ature to)	PO ₁ , PO) _
						eering p					r 01, PC	
CO ₂							algebra			•	PO ₃ , PO	<u>م</u> ۔
							and orth		ation.		1 O3, P	-2
CO ₃	Evaluat	e the pa	artial de	erivative	es of firs	st and hig	gher orde	ers.			PO ₄	
CO ₄	Demon	strate v	arious a	pplicat	ions wit	th basic ι	inderstai	nding of I	Beta and	L	DO. DO)
	Gamma										PO ₃ , PO	
PO1- Engine												
investigation	s of comp	lex prob	olems, P	D ₅ - Mod	ern tool	usage, PC	6 - The en	gineer an	d society	, РО 7- Е	nvironm	ient and
sustainability			- Individ	ual or tea	am work	, РО 10- Со	mmunicat	ion, PO 11-	Project n	nanagem	ent and	finance,
PO ₁₂ - Life-lor	ng Learnir	<u> </u>		-f								
Course		IVI	apping I	of cour	se outc	omes wi	h progra		mes			
Outcomes	PO ₁	PO_2	PO ₃	PO ₄	PO ₅	PO ₆	PO_7	PO ₈	PO ₉	PO ₁₀	PO ₁₁	PO ₁₂
	2	3										
<u>CO</u> 1	2	3	2		2							
<u>CO2</u>			2	2	2							
CO ₃			0	2						-		0
CO ₄			2		11 0	a : .6						2
D / 11 1 G			1 -	Reason	able; 2 -	- Signific	ant; 3 – 9	Strong				
Detailed Co	ontents:											
				Matrices	s, vect	tore or						
		Matri								ultiplica		
Unit:	1	multij	olication	n; Linea	r syste	ms of eq	uations, l	inear Inc	depende	nce, rai	nk of a	matrix,
Unit:	1	multij deteri	olicatio minants	n; Linea s, Cram	r syster er's Ru	ms of eq le, invers	uations, l se of a n	inear Inc natrix, G	depende lauss eli	nce, rai minatio	nk of a on and	matrix, Gauss-
Unit:	1	multij deteri Jordai	olication minants n elimin	n; Linea s, Cram ation. (r syster er's Ru Cayley-l	ms of eq le, invers Hamiltor	uations, l se of a n i's theore	inear Ind natrix, G m (witho	depende lauss eli out proo	nce, rai minatio f) and it	nk of a on and s applic	matrix, Gauss- cations
Unit:	1	multij detern Jordan Vecto	olication minants n elimin r space	n; Linea s, Cram ation. (s: Vecto	r syster er's Ru Cayley-l or Space	ms of eq le, invers Hamilton e, linear o	uations, l se of a n i's theore lepender	inear Ind natrix, G m (witho nce of veo	depende auss eli out proo ctors, ba	nce, rai minatio f) and it isis, dim	nk of a on and s applic ension	matrix, Gauss- cations ; Linear
		multij detern Jordan Vecto transf	olication minants n elimin r space formatio	n; Linea s, Cram <u>ation. (</u> s: Vecto ons (ma	r syster er's Ru Cayley-l or Space ps), ran	ms of eq le, invers Hamilton e, linear o ge and k	uations, l se of a n <u>'s theore</u> lepender ternel of	inear Ind natrix, G <u>m (withc</u> nce of ved a linear p	depende auss eli out proo ctors, ba map, rar	nce, rai minatio f) and it sis, dim nk and r	nk of a on and <u>s applic</u> ension nullity,	matrix, Gauss- cations ; Linear Inverse
Unit: Unit:		multip detern Jordan Vecto transf of a lin	olication minants n elimin r space formation near tra	n; Linea s, Cram aation. (s: Vecto ons (ma nsform	er's Ru er's Ru Cayley-l or Space ps), ran ation, r	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli	uations, l se of a n i's theore lepender	inear Ind natrix, G <u>m (withc</u> nce of ved a linear p	depende auss eli out proo ctors, ba map, rar	nce, rai minatio f) and it sis, dim nk and r	nk of a on and <u>s applic</u> ension nullity,	matrix, Gauss- cations ; Linear Inverse
		multip detern Jordan Vecto transf of a lin assoc	olication minants n elimin r space formation near tra iated wi	n; Linea s, Cram <u>aation. (</u> s: Vecto ons (ma insform ith a lin	ar system er's Ru <u>Cayley-D</u> or Space ps), ran ation, ran ear map	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli o.	uations, l se of a n 's theore lepender ternel of ty theore	inear Ind natrix, G <u>m (withc</u> nce of ved a linear n em, comp	depende auss eli out proo ctors, ba map, ran position	nce, ran minatio f) and it isis, dim ik and r of linea	nk of a on and s applic eension nullity, r maps,	matrix, Gauss- cations ; Linear Inverse Matrix
Unit:	2	multip detern Jordan Vecto transf of a lin assoc: Vecto	olication minants n elimin r space formation near tra iated with r space	n; Linea s, Cram ation. (s: Vecto ons (ma nsform ith a lin ces: Eig	ar syster er's Ru Cayley-I or Space ps), ran ation, r ear map genvalu	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli o. es, eige	uations, l se of a n <u>'s theore</u> depender ternel of ty theore nvectors	inear Ind natrix, G <u>m (withc</u> nce of ved a linear n em, comp , symm	depende auss eli out proo ctors, ba map, ran position etric, s	nce, ran minatio f) and it isis, dim ik and r of linea kew-sys	nk of a on and <u>s applic</u> nension nullity, r maps, mmetri	matrix, Gauss- cations ; Linear Inverse Matrix c, and
	2	multip detern Jordan Vecto transf of a lin assoc Vecto ortho	olication minants n elimin r space formation near tra iated wi gonal M	n; Linea s, Cram ation. (s: Vecto ons (ma nsform ith a line res: Eią Matrices	ar system er's Ru Cayley-J or Space ps), ran ation, ran ear map genvalu s, eigen	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli o. es, eige	uations, l se of a n 's theore lepender ternel of ty theore	inear Ind natrix, G <u>m (withc</u> nce of ved a linear n em, comp , symm	depende auss eli out proo ctors, ba map, ran position etric, s	nce, ran minatio f) and it isis, dim ik and r of linea kew-sys	nk of a on and <u>s applic</u> nension nullity, r maps, mmetri	matrix, Gauss- cations ; Linear Inverse Matrix c, and
Unit:	2	multin detern Jordan Vecto transf of a lin assoc Vecto ortho Schm	olication minants n elimin r space formation near tra iated with r spac gonal M idt orth	n; Linea s, Cram aation. (s: Vecto ons (ma nsform ith a lin ees: Eig Matrices ogonali	r syster er's Ru Cayley-I or Space ps), ran ation, r ear map genvalu s, eigen zation.	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli o. es, eige bases. I	uations, l se of a n is theore lepender ernel of ty theore nvectors Diagonali	inear Ind matrix, G m (withe nee of veo a linear n em, comp , symm zation; I	depende auss eli out proo ctors, ba map, ran position etric, s inner pr	nce, ran minatio f) and it isis, dim ik and r of linea kew-system	nk of a on and s applic ension nullity, r maps, mmetri spaces,	matrix, Gauss- cations Linear Inverse Matrix c, and Gram-
Unit:	2	multin detern Jordan Vecto transf of a lin assoc Vecto ortho Schm	olication minants n elimin r space formation near tra iated with r spac gonal M idt orth	n; Linea s, Cram aation. (s: Vecto ons (ma nsform ith a lin ees: Eig Matrices ogonali	r syster er's Ru Cayley-I or Space ps), ran ation, r ear map genvalu s, eigen zation.	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli o. es, eige bases. I	uations, l se of a n <u>'s theore</u> depender ternel of ty theore nvectors	inear Ind matrix, G m (withe nee of veo a linear n em, comp , symm zation; I	depende auss eli out proo ctors, ba map, ran position etric, s inner pr	nce, ran minatio f) and it isis, dim ik and r of linea kew-system	nk of a on and s applic ension nullity, r maps, mmetri spaces,	matrix, Gauss- cations Linear Inverse Matrix c, and Gram-
Unit:	2	multij detern Jordan Vecto transf of a lin assoc Vecto ortho Schm Calcu	blication minants n elimir r space ormation near tra iated wi r spac gonal M idt orth lus- I:	n; Linea s, Cram hation. (s: Vecto ons (ma insform ith a lim res: Eiş Matrices ogonali Mean v	r systen er's Ru Cayley-J or Space ps), ran ation, r ear map genvalu s, eigen zation. alue th	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli b. es, eige bases. 1 eorems:	uations, l se of a n is theore lepender ernel of ty theore nvectors Diagonali	inear Ind matrix, G m (withe nee of vec a linear n em, comp , symme zation; I mean valu	depende auss eli out proo ctors, ba map, ran position etric, s inner pr ue theor	nce, rai minatio f) and it sis, dim ik and r of linea kew-sy oduct s	nk of a s applic ension nullity, r maps, mmetri spaces, grange'	matrix, Gauss- <u>cations</u> ; Linear Inverse Matrix c, and Gram- s mean
Unit: Unit:	2 3	multin detern Jordan Vecto transf of a lin assoc Vecto ortho Schm Calcu value	blication minants n elimir r space ormation near tra iated wi r spac gonal M idt orth lus- I:	n; Linea s, Cram hation. C s: Vecto ons (ma nsform ith a lin- tes: Eiş Matrices ogonali Maar v m and	r systen er's Ru Cayley-J or Space ps), ran ation, r ear map genvalu s, eigen zation. alue th	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli b. es, eige bases. 1 eorems:	uations, l se of a n 's theore lepender ernel of ty theore nvectors Diagonali Rolle's n	inear Ind matrix, G m (withe nee of vec a linear n em, comp , symme zation; I mean valu	depende auss eli out proo ctors, ba map, ran position etric, s inner pr ue theor	nce, rai minatio f) and it sis, dim ik and r of linea kew-sy oduct s	nk of a s applic ension nullity, r maps, mmetri spaces, grange'	matrix, Gauss- <u>cations</u> ; Linear Inverse Matrix c, and Gram- s mean
Unit:	2 3	multin detern Jordan Vecto transf of a lin assoc Vecto ortho Schm Calcu value proble	blication minants n elimin r space Formation near tra iated wi r space gonal M idt orth lus- I: theore ems on	n; Linea s, Cram hation. C s: Vecto ons (ma nsform ith a lin- tes: Eig Matrices ogonali Mean v m and it.	rr systen er's Ru Cayley-J or Space ps), ran ation, ra ear map genvalu s, eigen zation. alue th Cauchy	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli o. es, eige bases. l eorems: 's mean	uations, l se of a n <u>'s theore</u> lepender ernel of ty theore nvectors Diagonali Rolle's n value th	inear Ind matrix, G m (withe a linear n em, comp , symme zation; I nean value eorem (a	depende auss eli out proo ctors, ba map, ran position etric, s inner pr ue theor All Theo	nce, rai minatio f) and it sis, dim ik and r of linea kew-sy oduct s rem, Lag rems w	nk of a s applic ension nullity, r maps, mmetri spaces, grange' <i>v</i> ithout	matrix, Gauss- <u>cations</u> ; Linear Inverse Matrix c, and Gram- s mean proof);
Unit: Unit:	2 3	multin detern Jordan Vecto transf of a lin assoc: Vecto ortho, Schm Calcu value proble Succe	blication minants n elimin r space formation near tra- iated with r space gonal M idt orth lus- I : theore ems on ssive C	n; Linea s, Cram hation. C s: Vecto ons (ma nsform ith a line tes: Eig Matrices ogonali Mean v m and it. lifferen	rr systen er's Ru Cayley-J or Space ps), ran ation, ran ear map genvalu s, eigen zation. alue th Cauchy tiation	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli o. es, eige bases. I eorems: 's mean : standa	uations, l se of a m 's theore lepender ernel of ty theore nvectors Diagonali Rolle's n value th	inear Ind matrix, G m (withe nee of ver a linear n em, comp , symm zation; I nean valu eorem (a s; Leibn	depende auss eli out proo ctors, ba map, ran position etric, s inner pr ue theor All Theor itz's the	nce, rai minatio f) and it sis, dim ik and r of linea kew-sy oduct s rem, Lap rems w	nk of a n and s applic rension nullity, r maps, mmetri spaces, grange' vithout Expans	matrix, Gauss- <u>cations</u> ; Linear Inverse Matrix c, and Gram- s mean proof); ions of
Unit: Unit:	2 3	multin detern Jordan Vecto transf of a lin assoc: Vecto ortho Schm Calcu value proble Succe functi	blication minants n elimin r space Formation near tra- iated wi r space gonal M idt orth hus- I: theore ems on ssive cons: , f	n; Linea s, Cram hation. C s: Vecto ons (ma nsform ith a lin res: Eiş Matrices ogonali Mean v m and it. lifferen Faylor's	rr systen er's Ru Cayley-1 or Space ps), ran ation, ran ation, ran genvalu s, eigen zation. alue th Cauchy tiation and M	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli o. es, eige bases. I eorems: 's mean aclaurin'i	uations, l se of a m 's theore depender ernel of ty theore nvectors Diagonali Rolle's m value th of result s series v	inear Ind matrix, G m (withe a linear p em, comp , symme zation; I mean value eorem (a s; Leibni vith rema	depende auss eli out proo ctors, ba map, ran position etric, s inner pr ue theor All Theo ainders	nce, rai minatio f) and it sis, dim ik and r of linea kew-sy oduct s rem, Lap rems w	nk of a n and s applic rension nullity, r maps, mmetri spaces, grange' vithout Expans	matrix, Gauss- <u>cations</u> ; Linear Inverse Matrix c, and Gram- s mean proof); ions of
Unit: Unit:	2 3	multig detern Jordan Vecto transf of a lin assoc: Vecto ortho Schm Calcu value proble Succe functi proof	blication minants n elimin r space Formation near tra- iated with r space gonal M idt orth lus- I: theore ems on essive cons: , ;); Maxim	n; Linea s, Cram hation. C s: Vecto ons (ma nsform ith a lin res: Eiş Matrices ogonali Mean v m and it. lifferen Faylor's	rr systen er's Ru Cayley-1 or Space ps), ran ation, ran ation, ran genvalu s, eigen zation. alue th Cauchy tiation and M	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli o. es, eige bases. I eorems: 's mean aclaurin'i	uations, l se of a m 's theore lepender ernel of ty theore nvectors Diagonali Rolle's n value th	inear Ind matrix, G m (withe a linear p em, comp , symme zation; I mean value eorem (a s; Leibni vith rema	depende auss eli out proo ctors, ba map, ran position etric, s inner pr ue theor All Theo ainders	nce, rai minatio f) and it sis, dim ik and r of linea kew-sy oduct s rem, Lap rems w	nk of a n and s applic rension nullity, r maps, mmetri spaces, grange' vithout Expans	Gauss- cations ; Linear Inverse Matrix c, and Gram- s mean proof); ions of
Unit: Unit: Unit:	2 3 4	multig detern Jordan Vecto transf of a lin assoc Vecto ortho Schm Calcu value proble Succe functi proof	blication minants n elimin r space ormation near tra iated wi r space gonal M idt orth lus- I: theore ems on ssive C ons: , '); Maxin lus-II:	n; Linea s, Cram hation. C s: Vecto ons (ma nsform ith a lin. res: Eig Matrices ogonali Mean v m and it. lifferen Faylor's na and n	r systen er's Ru Cayley-J or Space ps), ran ation, r ear map genvalu s, eigen zation. alue th Cauchy tiation and M minima	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli b. es, eige bases. l eorems: 's mean : standan aclaurin's for funct	uations, l se of a m is theore lepender ternel of ty theore nvectors Diagonali Rolle's m value th of result s series v cion of or	inear Ind matrix, G m (withe nee of vec a linear n em, comp em, comp zation; I nean value eorem (a s; Leibni vith remain le variable	depende auss eli out proo ctors, ba map, ran position etric, s inner pr ue theor All Theor ainders le.	nce, rai minatio f) and it isis, dim ik and r of linea kew-sy oduct s rem, Lap orems w corem; (All The	nk of a s applic ension nullity, r maps, mmetri spaces, grange' rithout Expans orems v	matrix, Gauss- <u>cations</u> ; Linear Inverse Matrix c, and Gram- s mean proof); ions of without
Unit: Unit:	2 3 4	multig detern Jordan Vecto transf of a lin assoc Vecto ortho Schm Calcu value proble Succe functi proof Calcu Partia	blication minants n elimin r space ormation near tra iated wi r space gonal M idt orth lus- I: theore ems on ssive c ons: , '); Maxim lus-II: al Differ	n; Linea s, Cram hation. C s: Vecto ons (ma insform ith a lim res: Eig Matrices ogonali Mean v m and it. lifferen Faylor's na and n	r systen er's Ru Cayley-J or Space ps), ran ation, ran ear map genvalu s, eigen zation. alue th Cauchy tiation and M minima on: Par	ms of eq le, invers Hamilton e, linear o ge and k ank-nulli b. es, eige bases. l eorems: 's mean : standar aclaurin's for funct	uations, l se of a m 's theore depender ernel of ty theore nvectors Diagonali Rolle's m value th of result s series v	inear Ind matrix, G m (withe nee of vec a linear n em, comp man, comp , symm zation; I nean value eorem (a s; Leibn vith reman ie variabl first and	depende auss eli out proo ctors, ba map, ran position etric, s inner pr ue theor All Theor ainders le. higher o	nce, rai minatio f) and it isis, dim ik and r of linea kew-sy: oduct s rem, La; orems w orem; (All The orders,	nk of a s applic ension nullity, r maps, mmetri spaces, grange' rithout Expans orems v	matrix, Gauss- <u>cations</u> ; Linear Inverse Matrix c, and Gram- s mean proof); ions of vithout

	Evaluation of definite and improper integrals; Beta and Gamma functions and their
	properties; Applications of definite integrals to evaluate surface areas and volumes
	of revolutions.
	Multiple Integrals and Their Applications: Double integrals and their evaluation;
	Change of order for integration; Double integrals in polar coordinates; Triple
	integrals;
	Application of multiple integrals to find area, volume, surface area
Exa	mination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks)
whic	ch is mainly end semester examination.
Text	t Books:
1	G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2	Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3	D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
Refe	erence Books:
1	H. Anton, C. Rorres, Elementary Linear Algebra with Supplemental Applications, 11th Edition, Wiley
	Student Edition, New Delhi (2011)
2	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,
	2008.
3	M. D. Weir, J. Hass, Thomas' Calculus,12th Edition, Pearson India Education Services Pvt Ltd., New
	Delhi (2016).
4	V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West
	press, Reprint 2005.

Course C					Course					ture			
BTCS102	BST					g Physics			_	Г Р	S	emes	ster: I
Version: 1.2					oval: 16	th BoS 1	7-11-2022	-	U	1 0			
3.7 0.		r 1	struction	n			S	cheme o			r	40.0	
	Periods		0 Hrs.						aximum		:	100	
Periods	Credits	$\begin{array}{c} : 4 \\ : 4 \end{array}$							nal Eval End Sei		:	30 70	
Instructio		-	ecture						End Sel		•	70 3 H	rc
Prerequisit				f Physic	°S			Ľ		liation	·	511	15.
Course Obje	· · /	C MIOV	neuge o	i i iiyoic	.0								
and tec 2. To dem 3. To learn Newtor	hnology. onstrate ing basic ı's rings,	variou proper interfe	is scient ties and erence ii	ific prin charact n thin fi	ciples, eristics lms.	engineer of light, o	ith adapta ring meth double sli id conser	ods and t and tri	technol iple slit	logical d	leve	lopm	
Course Out			leept of	cicilien	tai y pai	ticies ai	lu consei	vacion la	w 3.				
COs No.		,	ne Bragg	's Law a	Stater		es of laser	s types	oflaser	01	itco		ogram (POs)
	and app			. Lan u	0110	1PK		-, -, PCS		-		•	
CO ₂	Apply permea	various bility, j	s terms polarizat	tion, etc	2.		es of ma				PC	D ₁ , PO	2
CO ₃	magnet	ic and	dielectr	ic prope	erties of	f materia				as	PO ₂ ,	PO 3, 1	PO ₄
CO ₄ PO ₁ - Engine							chanics o					D 2, PO	
PO ₁₂ - Life-lor Course	PO ₁		∕lapping PO₃	of cour PO4	se outc PO5	omes wi	th progra PO 7	m outco PO ₈	mes PO ₉	PO ₁₀	Р	O ₁₁	PO ₁₂
Outcomes CO ₁	3												
CO ₂	2	1											
CO ₃		1	2	2									
CO ₄		2	2										
			1 -	Reason	able; 2	– Signifi	cant; 3 – S	Strong					
Detailed Co	ntents:												
Unit:	1	Fraur and r appli Polar	nhofer a nultiple cations. isation:	nd Fres slits; di Introd	nel diffi iffractic uction,	raction, l on gratin polarisa	erence an Fraunhofe g, charac ation by ar and elli	er diffrac teristics reflecti	of diffra	single s action ខ្ larisatio	lit, d grati n t	loubl ng ai oy d	e slit, nd its ouble
Unit:	2	Fibre reflec optic Laser of la	Optics: ction, nu al fibres rs: Intro ser: poj	Introd Imerica , step an luction oulatior	uction, l apertu nd grad to inte invers	optical ure and v ed index raction c sion, pu	fibre as a various fib fibres, ap of radiatio mping, v semicond	dielect ore parar oplication on with n arious r	ric wave neters, n of opt natter, p nodes,	e guide losses a ical fibr orinciple thresho	tot ssoc es. es ar old	tal in ciated nd wo popu	ternal d with orking
Unit:	3	Elect equat Polar inter	romagnetion, lavisation, nal fields	etism : ws of permea s in a so	Laws magnet bility a lid, Cla	of electr tism. Ar nd diele usius-Me	rostatics, npere's F ctric cons ossotti eq	electric Faraday's stant, po uation, a	curren laws. lar and pplicati	nt and Maxwe non-po ions of c	the Il's Iar Iiele	cont equa diele ctric	ntions. ctrics s.
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	Unit: 5	Quantum Mechanics: de Broglie hypothesis, wave-particle duality, Born's interpretation of the wave function, verification of matter waves, uncertainty principle, Schrodinger wave equation, particle in box, quantum harmonic oscillator, hydrogen atom.
		aluation Pattern: It include both internal evaluation (30 marks) comprising two class
		signments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semest	ter examination.
Text	t Books:	
1	Beiser : Modern	n Physics
2	Mani and Dama	ask : Modern Physics
Refe	erence Books:	
1	Resnick and Ha	lliday : Physics
2	M. Ratner & D.	Ratner (Pearson Ed.): Nanotechnology
3	A.J. Decker (Ma	cmillan): Solid State Physics

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							etric circu				ts.	
							ormers an		pplicati	ons.		
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investigation sustainability PO12- Life-loo Outcomes CO1 CO2 CO3 CO4 Detailed Co Unit: Unit:	s of comp y, PO ₈ - Eth ng Learnir PO ₁ 3 ontents: 1 2 3 4	owledge lex prob ics, PO ₃ - g PO ₂ 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	lems, PC Individ apping PO ₃ 1 2 2 ircuits: off curr positio d RC cir rcuits: connect ical M ng of a t compor -phase peed co ronous	Ds- Mod ual or ter of cour PO4 PO4 1 Reason Electri rent an n, Theve reuits. Repress on, real se ac cin ee-phas tions. rs: Mag es in tr transfo achines hree-pi nents an inducti ontrol c genera	ern tool am work se outco PO5 able; 2 - cal circo d voltagenin and entation power, recuits cose balar metico r ansform rmer cose se balar metico r ansform rmer cose se balar con efficion d efficion too moto of sepan tors.	usage, PG , PO ₁₀ - Co omes wi PO ₆ 1 - Signific uit elem ge laws, d Norton n of sinu reactive onsisting need circo materials ners, reg onnection ration co duction r iency, st cor. Cons rately ex	D_6 - The enomunicat th progra PO7 PO7 PO7 PO7 ents (R, L analysis a Theorem soidal wa power, al g of R, L, C cuits, volt s, ideal a gulation a ns. of rotatin notor, Sig tarting ar struction,	gineer an ion, PO ₁₁ - m outco PO ₈ PO ₈ Strong and C), of simpl as. Time- veforms. pparent c, RL, RC, age and nd prac and effic g magne nificance ad speed working motor. (d societ Project 1 mes PO ₉ Voltage e circui domair , peak a power, RLC co curren tical tra iency. <i>I</i> etic fiel e of torco l contro g, torque Constru	PO10 PO10 PO10 e and cu ts with a analysi nd rms power f mbinati t relation ansform Auto-tra- ds, Con jue-slip pol of ince e-speec loction a	PO ₁₁ PO ₁₁ Irrent sc dc exci is of first values, p factor. An ons (seri ons in st ansformed her, equi ansformed characted luction f characted nd work	PO ₁₂ PO ₁₂ PO ₁₂ purces, tation. -order phasor nalysis es and ar and ivalent er and eristic. motor. eristic ing of

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	Important Characteristics for Batteries. Elementary calculations for energy
	consumption, power factor improvement and battery backup.
Exa	mination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks)
whic	ch is mainly end semester examination.
Text	t Books:
1	D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2	D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
Refe	erence Books:
1	L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
2	E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
3	V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

3 V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Course C					Course				Lec	ture		
BTCS1111	EST		En	igineeri	ng Grap	phics & I	Design		L ′	Г Р	Seme	ster: I
Version: 1.2					oval: 16	th BoS 1	7-11-2022		-	1 4		
	Scheme	e of Inst	tructio	ı			S	cheme o	of Exam	ination		
	Periods) Hrs.						aximum		: 100)
Periods		: 4							nal Eval		: 30	
	Credits	: 4							End Sei		: 70	
Instruction			neory &					E	Exam Dı	iration	: 3 H	lrs.
Prerequisit	()	c know	ledge of	f Mathe	matics	and Phys	sics					
Course Obje												
	erstand t						1 •11					
						e graphic	neering E	rowing				
							ojection,			Isometi	ric View	
						ound So		isoineui	c scale,	isomen		5-
Course Out		0	u cs, 511		u comp	ounu so	nus.					
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005110.					Stutter						tcomes	•
CO ₁	Get ac	quainte	d with	the kr	nowledg	ge of va	rious line	es, geon	netrical			<u>, </u>
-							ds of sca			1	PO ₁ , PO ₃ ,	PO ₉
CO ₂							owledge a			es no		
	and pla	nes.	U			0	e	-		PO	2, PO 3, PO	J ₅ , PO ₉
CO ₃	Become	e profic	ient in c	lrawing	the pro	ojections	of variou	s solids		PO	2, PO5, PO	D 6, PO 9
CO ₄ PO ₁ - Engine							netric pro				2, PO 4, PO	
investigations sustainability PO 12- Life-lor	, PO 8- Eth	ics, PO 9 ng	- Individ	ual or tea	am work	, PO 10- Co	mmunicat	ion, PO 11-	Project			
		M	apping	of cour	se outc	omes wi	th progra	m outco	mes	T		1
Course	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁₀	PO ₁₁	PO ₁₂
Outcomes CO ₁	2		2						1			
CO ₁	2	1	1		2				1			
CO ₃		2	1		2	3			1			
CO ₄		2		1	2	0			1			
004			1-	-		- Sianifi	cant; 3 – S	Strona	1			
Detailed Co	ntents:					2191191						
		Intro	duction	to Eng	ineerin	g Drawi	ng coveri	ng, Princ	ciples of	Engine	ering Gr	aphics
I In the	1						rawing ir					
Unit:	1	incluc	ling the	Recta	ngular 1	Hyperbo	la (Gener	al meth	od only); Cyclo	id, Epic	ycloid,
							Plain, Diag					
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Unit:	2						true angl					an and
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Unit: -	4		der, Pyr				o shupe o	i beetion	, inglie	regulai	bollab	1 1 10111,
						ciples of	Isometrie	c Project	ion, Isoi	netric s	cale, Iso	metric
							simple and				, -	
							nsisting c				g page a	nd the
Unit:	5	print	er, inclu	ding sc	ale setti	ings, sett	ing up of	units an	d drawii	ng limits	s; ISO an	d ANSI
Unit:	0						ing and t					
							natically;					
					ntry me	thods to	draw str	raight lir	nes, App	olying v	arious w	ays of
		draw	ing circ	les								

Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sessional exams/assignments/quiz/seminar presentation etc. and external evaluation (70 marks)
which is mainly end semester examination.

Text Books:

1	Bhatt N.D., Panchal '	V.M. & Ingle P.R.,	(2014), Engir	neering Drawing	Charotar Publishing House.
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2 Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education. **Reference Books:**

1 Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication.

2 Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.

3 (Corresponding set of) CAD Software Theory and User Manuals

Course					Course	Title			Lec	ture		
BTCS150)BSP			Engine	eering P	hysics L	ab.		L	Г Р	Seme	ster: I
Version: 1.2			Date	of Appr	:oval: 16	th BoS 17	7-11-2022		0	0 4		
	Scheme	of Inst	ruction	1			S	cheme o	f Exam	ination		
No. of	Periods	: 60	Hrs.					M	aximun	Score	: 100)
Periods	/ Week	: 4						Inter	nal Eva	luation	: 50	
	Credits	: 2							End Se	mester	: 50	
Instructio	n Mode	: Pra	actical					E	lxam Dı	ıration	: 3 H	lrs.
Prerequisit	e(s): Engi	neering	g Physic	es								
Course Obj	ectives:											
	uire comp											
		e to n	ew de	velopm	ent in	physics	laborato	ry by s	success	fully co	ompletin	g the
experir												
							of science.					
			electri	e effect	- Seeb	eck effec	t and Pelt	ier effec	et.			
Course Out	comes (C	:0):										
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							and appli				DO DO	
CO ₃		magne	tic field	and fo	orces, e	electric fi	eld and u	sage of	quantu	m	PO ₂ , PC	94
	theory.	m 1	1 /	• • • • • • • • • • • • • • • • • • • •		1 1 0		1	r ,		PO ₃ , PC	
CO ₄ PO ₁ - Engine							ect and P			1 (*	- 7	
PO ₁ - Engine	ering Kno	owleage.	PO2-	Problem	i anaivs		Design / de	evelopme	ntots	olutions,	PO ₄ - C	onauc
investigation	s of comp	lex prob	lems, PC	D ₅ - Mod	ern tool	usage, PC	06- The eng	gineer an	d societ	у, РО 7- Е	nvironme	ent an
investigation sustainability	s of comp 7, PO 8- Eth	lex prob ics, PO 9-	lems, PC	D ₅ - Mod	ern tool	usage, PC	06- The eng	gineer an	d societ	у, РО 7- Е	nvironme	ent an
investigation sustainability PO ₁₂ - Life-lo	s of comp 7, PO 8- Eth	lex prob ics, PO 9- g	lems, PC · Individ	D 5- Modual or tea	ern tool am work	usage, PC , PO 10- Co	0 6- The eng mmunicati	gineer an on, PO 11-	d societ Project i	у, РО 7- Е	nvironme	ent an
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investigation sustainability PO12- Life-lo Course Outcomes CO1 CO2 CO3 CO4 Detailed CO 1. Determ 2. Determ 3. Draw th 4. Determ	s of comp y, PO ₈ - Eth ng Learnin PO ₁ 2 2 0 0 0 0 0 0 1 2 0 0 0 1 2 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 1 0 1 0 1 0 1	lex prob ics, PO ₉ - g M. PO2 1 adius of fumeric t Voltag olank's o	lems, PC Individu apping PO ₃ 2 2 1 – Curvat al apert ge (V-I) constant	05- Modual or tea of cour PO₄ 1 Reason cure of l cure of l cure of charac	ern tool am work se outc PO5 1 able; 2 - Plano co the give	usage, PO , PO ₁₀ - Co omes with PO ₆ 2 - Signific onvex ler en optica s of the g	P6- The en mmunicati th program PO7 PO7 cant; 3 – S ns by form I fibre by	n outcom PO ₈ itrong ing New using La -Junctio	d societ Project 1 mes PO ₉ 1 1 rton's ri ser dioo n diode	y, PO ₇ - E managem PO ₁₀ ngs. de.	PO11	PO1
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investigation sustainability PO ₁₂ - Life-lo Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co 1. Determ 2. Determ 3. Draw th 4. Determ 6. Determ 6. Determ 7. Determ 8. Determ 8. Determ	PO1 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1	lex prob ics, PO ₉ - g M. PO ₂ 1 adius of fumeric t Voltago lank's of 4, Red- hysical poecific r nergy g raveleng aluation signmer	PO3 PO3 PO3 PO3 2 2 2 1 - 7 Curvat al apert ge (V-I) constan 4.68x 1 Charac rotation ap of gi gth of a n Patte nts/ qu	D₅- Modual or tea of cour PO₄ 1 Reason Cure of I cure o	ern tool am work se outc PO5 1 1 able; 2 - Plano co the give cteristics g photoo s of the iid by us micondu aser sou nclude b	usage, PC , PO ₁₀ - Co omes with PO ₆ 2 - Signific onvex ler en optica s of the g cell (Free given Th sing pola uctor. <u>urce usin</u> ooth inter	De- The en mmunicati th program PO7 PO7 cant; 3 – S source of siven P-N- quency of nermistor, rimeter. g diffracti rnal evalue	gineer an on, PO ¹¹⁻ n outco PO ⁸ ing New using La -Junctio Blue- 7 60n grati ation (50	d societ Project 1 mes PO ₉ 1 1 rton's ri ser diode .406x10 ndiode .406x10	y, PO ₇ - E managem PO ₁₀ PO ₁₀ ngs. de. 14 Hz, 0	PO11 Green- 6	PO
investigation sustainability PO12- Life-lo Outcomes CO1 CO2 CO3 CO4 Detailed CO 1. Determ 2. Determ 3. Draw tl 4. Determ 6. Determ 6. Determ 7. Determ 8. Determ 8. Determ 8. Determ 5. Seterm 6. Determ 7. Determ 8. Determ	s of comp y, PO ₈ - Eth ng Learnin PO ₁ 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	lex prob ics, PO ₉ - g M. PO ₂ 1 adius of fumeric t Voltago lank's of 4, Red- hysical poecific r nergy g raveleng aluation signmer	PO3 PO3 PO3 PO3 2 2 2 1 - 7 Curvat al apert ge (V-I) constan 4.68x 1 Charac rotation ap of gi gth of a n Patte nts/ qu	D₅- Modual or tea of cour PO₄ 1 Reason Cure of I cure o	ern tool am work se outc PO5 1 1 able; 2 - Plano co the give cteristics g photoo s of the iid by us micondu aser sou nclude b	usage, PC , PO ₁₀ - Co omes with PO ₆ 2 - Signific onvex ler en optica s of the g cell (Free given Th sing pola uctor. <u>urce usin</u> ooth inter	De- The en mmunicati th program PO7 PO7 cant; 3 – S source of siven P-N- quency of nermistor, rimeter. g diffracti rnal evalue	gineer an on, PO ¹¹⁻ n outco PO ⁸ ing New using La -Junctio Blue- 7 60n grati ation (50	d societ Project 1 mes PO ₉ 1 1 rton's ri ser diode .406x10 ndiode .406x10	y, PO ₇ - E managem PO ₁₀ PO ₁₀ ngs. de. 14 Hz, 0	PO11 Green- 6	PO
investigation sustainability PO12- Life-lo Course Outcomes CO1 CO2 CO3 CO4 Detailed Co 1. Determ 3. Draw th 4. Determ 6. Determ 6. Determ 7. Determ 8. Determ 8. Determ 8. Determ 8. Determ 9. Deter	s of comp y, PO ₈ - Eth ng Learnin PO ₁ 2 2 2 2 3 3 3 3 3 3 3 3 4 3 3 3 3 3 4 3 3 3 3	lex prob ics, PO ₉ - g M. PO ₂ 1 adius of umeric t Voltag olank's of 4, Red- hysical pecific r nergy g aveleng aluation signmer	lems, PC Individue apping PO3 2 2 2 1 - 7 Curvat al aperte ge (V-I) constant 4.68x 1 Charac rotatior ap of gi gth of a n Patte nts/ qu	D₅- Modual or tea of cour PO₄ 1 Reason Cure of I cure o	ern tool am work se outc PO5 1 1 able; 2 - Plano co the give cteristics g photoo s of the iid by us micondu aser sou nclude b	usage, PC , PO ₁₀ - Co omes with PO ₆ 2 - Signific onvex ler en optica s of the g cell (Free given Th sing pola uctor. <u>urce usin</u> ooth inter	De- The en mmunicati th program PO7 PO7 cant; 3 – S source of siven P-N- quency of nermistor, rimeter. g diffracti rnal evalue	gineer an on, PO ¹¹⁻ n outco PO ⁸ ing New using La -Junctio Blue- 7 60n grati ation (50	d societ Project 1 mes PO ₉ 1 1 rton's ri ser diode .406x10 ndiode .406x10	y, PO ₇ - E managem PO ₁₀ PO ₁₀ ngs. de. 14 Hz, 0	PO11 Green- 6	PO
investigation sustainability PO₁₂- Life-lo Course Outcomes CO₁ CO₂ CO₃ CO₄ Detailed Cơ 1. Determ 2. Determ 3. Draw tl 4. Determ 6. Determ 6. Determ 7. Determ 8. Determ 8. Determ 8. Determ 8. Determ 9. Determ 9. Determ 1. Determ 1. Determ 1. Determ 1. Determ 2. Determ 3. Determ 3. Determ 3. Determ 4. Determ 5. Determ 5. Determ 5. Determ 6. Determ 7. Determ 8. Determ 7. Determ 8. Determ 8. Determ 7. Determ 8. Determ 7. Determ 8. Determ 8. Determ 7. Determ 8. Determ 8. Determ 7. Determ 8. Determ 8. Determ 8. Determ 7. Determ 8. Dete	s of comp y, PO ₈ - Eth ng Learnin PO ₁ 2 2 2 3 3 3 3 3 3 3 3 3 4 3 3 3 3 3 4 3 3 3 3 3 4 3 3 3 3 3 4 3	lex prob lex prob les, PO ₉ - g M. PO2 PO2 1 adius of fumeric t Voltag olank's of 4, Red- hysical pecific 1 nergy g aveleng aluation signmer semestor n Physic	lems, PC Individue apping PO3 2 2 2 1 - Curvat al aperte ge (V-I) constan 4.68x 1 Charac rotatior rap of gi gth of a n Patte nts/ qu er exam	D₅- Modual or tea of cour PO₄ 1 Reason cure of 1 cure o	ern tool am work se outc PO5 1 1 able; 2 - Plano co the give cteristics g photoo s of the iid by us micondu aser sou nclude b	usage, PC , PO ₁₀ - Co omes with PO ₆ 2 - Signific onvex ler en optica s of the g cell (Free given Th sing pola uctor. <u>urce usin</u> ooth inter	De- The en mmunicati th program PO7 PO7 cant; 3 – S source of siven P-N- quency of nermistor, rimeter. g diffracti rnal evalue	gineer an on, PO ¹¹⁻ n outco PO ⁸ ing New using La -Junctio Blue- 7 on grati ation (50	d societ Project 1 mes PO ₉ 1 1 rton's ri ser diode .406x10 ndiode .406x10	y, PO ₇ - E managem PO ₁₀ PO ₁₀ ngs. de. 14 Hz, 0	PO11 Green- 6	PO
investigation sustainability PO12- Life-lo Outcomes CO1 CO2 CO3 CO4 Detailed Co 1. Determ 2. Determ 3. Draw th 4. Determ 6. Determ 6. Determ 7. Determ 8. Determ 8. Determ 8. Determ 8. Determ 7. Determ 8. Determ 9. Determ 1. Beisen 1. Beisen 2. Mani	PO1 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 PO1 2 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1	lex prob lex prob les, PO ₉ - g M. PO2 PO2 1 adius of fumeric t Voltag olank's of 4, Red- hysical pecific 1 nergy g aveleng aluation signmer semestor n Physic	lems, PC Individue apping PO3 2 2 2 1 - Curvat al aperte ge (V-I) constan 4.68x 1 Charac rotatior rap of gi gth of a n Patte nts/ qu er exam	D₅- Modual or tea of cour PO₄ 1 Reason cure of 1 cure o	ern tool am work se outc PO5 1 1 able; 2 - Plano co the give cteristics g photoo s of the iid by us micondu aser sou nclude b	usage, PC , PO ₁₀ - Co omes with PO ₆ 2 - Signific onvex ler en optica s of the g cell (Free given Th sing pola uctor. <u>urce usin</u> ooth inter	De- The en mmunicati th program PO7 PO7 cant; 3 – S source of siven P-N- quency of nermistor, rimeter. g diffracti rnal evalue	gineer an on, PO ¹¹⁻ n outco PO ⁸ ing New using La -Junctio Blue- 7 on grati ation (50	d societ Project 1 mes PO ₉ 1 1 rton's ri ser diode .406x10 ndiode .406x10	y, PO ₇ - E managem PO ₁₀ PO ₁₀ ngs. de. 14 Hz, 0	PO11 Green- 6	PO
investigation sustainability PO ₁₂ - Life-lo Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co 1. Determ 2. Determ 3. Draw th 4. Determ 6. Determ 7. Determ 8. Determ 8. Determ 7. Determ 8. Determ 8. Determ 9. Determ 9. Determ 1. Determ 9. Determ 1. Determ 2. Mania 1. Beiser 1. Beiser 2. Mania	s of comp y, PO ₈ - Eth ng Learnin PO ₁ 2 2 2 2 3 3 3 3 3 3 3 3 4 4 3 3 3 3 3 3	lex prob lics, PO ₉ - g M. PO2 1 adius of umeric t Voltag olank's of 4, Red- hysical pecific r nergy g aveleng aluation signmer semesto n Physical pecific r nergy g	lems, PC Individue apping PO3 2 2 2 1 - 7 Curvat al apert ge (V-I) constan 4.68x 1 Charac rotation rotation gth of a n Patte nts/ qu er exam	Ds- Modual or ter of cour PO4 1 Reason ure of I cure of	ern tool am work se outc PO5 1 1 able; 2 - Plano co the give cteristics g photoo s of the iid by us micondu aser sou nclude b	usage, PC , PO ₁₀ - Co omes with PO ₆ 2 - Signific onvex ler en optica s of the g cell (Free given Th sing pola uctor. <u>urce usin</u> ooth inter	De- The en mmunicati th program PO7 PO7 cant; 3 – S source of siven P-N- quency of nermistor, rimeter. g diffracti rnal evalue	gineer an on, PO ¹¹⁻ n outco PO ⁸ ing New using La -Junctio Blue- 7 on grati ation (50	d societ Project 1 mes PO ₉ 1 1 rton's ri ser diode .406x10 ndiode .406x10	y, PO ₇ - E managem PO ₁₀ PO ₁₀ ngs. de. 14 Hz, 0	PO11 Green- 6	PO
investigation sustainability PO12- Life-lo Outcomes CO1 CO2 CO3 CO4 Detailed CO 1. Determ 2. Determ 3. Draw th 4. Determ 6. Determ 6. Determ 7. Determ 8. Determ 8. Determ 8. Determ 7. Determ 8. Determ 6. Determ 7. Determ 8. Determ 7. Determ 8. Determ 7. Determ 8. Determ 8. Determ 1 Beiser 2 Mani 3 Reference 1 1 Resnie	PO1 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 2 PO1 PO1 PO1 2 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1	lex prob lex prob lex prob g M. PO2 1 1 adius of fumeric t Voltagolank's of 4, Red- hysical becific r nergy g raveleng aluation signmer semesto n Physica n Physica hysical becific r nergy g aluation signmer semesto n Physica hysical hysical becific r hysical	lems, PC Individue apping PO3 2 2 2 1 - 7 Curvat al apert ge (V-I) constan 4.68x 1 Charac rotation ap of gi gth of a n Patte nts/ qu er exam cs dern Pl Physics	Ds- Modual or tea of cour PO4 1 Reason Lure of I Charact t using 014). teristic of liqu iven ser given la rn: It in iz/ sen hination	ern tool am work se outc PO5 1 1 Plano co the give cteristics g photoo s of the id by us micondu aser sou nclude b ninar pr n.	usage, PC, , PO ₁₀ - Co omes with PO ₆ 2 - Signific onvex ler en optical s of the g cell (Free given Th sing pola uctor. urce usin ooth inter esentatio	De- The en mmunicati th program PO7 PO7 cant; 3 – S source of siven P-N- quency of nermistor, rimeter. g diffracti rnal evalue	gineer an on, PO ¹¹⁻ n outco PO ⁸ ing New using La -Junctio Blue- 7 on grati ation (50	d societ Project 1 mes PO ₉ 1 1 rton's ri ser diode .406x10 ndiode .406x10	y, PO ₇ - E managem PO ₁₀ PO ₁₀ ngs. de. 14 Hz, 0	PO11 Green- 6	PO PO 5x1014

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Course C	ode				Course	Title			L	ectu	re				
BTCS150			Ba			ngineeri	ng Lah		L	ссій Т	P	Seme	ster: I		
Version: 1.2			Da			oproval:	ing Lab		0	0	4	Senie	Ster. 1		
version. 1.2	Scheme	ofIng	truction			provai.	6	cheme o	-	· ·	-				
No. of	Periods) Hrs.	1			0		aximu			: 100)		
Periods		: 4	/ 1115.						nal Ev			: 50)		
,	Credits	· 4 : 2										: 50			
Instructio			actical						End S			: 31	Inc		
				rincori	200			F	Exam	Dura	luon	: 31	11'S.		
Prerequisit		c Elecu	rical En	gineerii	ng										
Course Obje			an af Ci		d Thurson	Dhasate	ansforme								
 To acqui To uno charact 	uire the c lerstand eristics.	oncept the b	s of D.C basic co	C. Machi oncept	ines, co of a	nstructio Three-p	on, armat hase ind y analyzir	ure react uction 1	motoi	· an	d its				
Course Out	comes (C	CO):													
COs No.					Stater	nent					Ma	pped Pr	ogram		
											Ou	tcomes	(POs)		
CO ₁	Explain them to		-			and net	work the	eorems a	ınd aj	oply	Р	O 1, PO 2,	PO ₆		
CO ₂		nance o	f an ele	ectric ci	rcuit as		tions that solving b					PO ₃ , P	D ₆		
CO ₃	Analyze machin					and the	e main fe	atures o	f elec	tric		PO ₉			
CO ₄			<u> </u>	*		measurii	ng device	s.				PO ₄			
sustainability PO ₁₂ - Life-lor Course		ıg					th progra		-		nagem	PO ₁₁	PO ₁₂		
Outcomes							/				10	11	12		
CO ₁	1	1				1									
CO ₂			1			1									
CO ₃									1						
CO ₄				1											
			1 -	Reason	able; 2 ·	- Signifi	cant; 3 – 9	Strong							
Detailed Co List of expe															
 Verificat Measuri change respons differen Transfor shape d Loading 	scillosco tion of T ng the s in voltag e of R-L ces betw rmers: O ue to B- of a trar	ope. Rea hevenin teady-s ge (trar , and R ceen cur bservat -H curv asforme	al-life re a's and N state an asient r R-C circo rrent ar ion of to re nonli er: meas	esistors Norton ' ad trans nay be cuits – ad volta he no-le nearity curemen	, capaci Theorem sient tin observ impeda ge. Rese pad cur should nt of pri	tors and ms. me-respo ed on a nce calc onance in rent wav l be sho mary an	inductor onse of R storage culation a n R-L-C c eform on wn along d seconda	s. -L, R-C, oscillosc nd verifi ircuits. an oscill with a ary voltag	and cope). icatio oscop discu ges ar	R-L- Sinu n. O pe (n ssion nd cu	C cire usoida bserva on-sin n abou	cuits to al steady ation of nusoidal ut harm s, and p	a step y state phase wave- onics) ower.		
seconda	phase-t ry side. (o-neuti Cumula e Perfo	ral volta tive thr rmance	age, line ee-pha Charae	e and p se powe cteristic	hase cu er in bala	rrents). P inced thre ries Moto	hase-shi ee-phase	ifts be	etwe					

- 7. To Determine the Performance Characteristics of a Shunt Motor.
- 8. To Determine the Performance Characteristics of a Compound Motor.
- 9. Speed Control of DC Shunt Motor.
- 10. To Determine the Load Characteristics of a Shunt Generator.
- 11. To Determine the Load Characteristics of a Single Phase Induction Motor.

12. To Determine the Performance Characteristics of a Three Phase Induction Motor.

- 13. Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winging slip ring arrangement).
- 14. Synchronous speed of two and four-pole, three-phase induction motors. Direction reversal by change of phase-sequence of connections. Torque-Slip Characteristic of an induction motor. Generator operation of an induction machine driven at super-synchronous speed.
- 15. Synchronous Machine operating as a generator: stand-alone operation with a load. Control of voltage through field excitation.
- 16. 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 and (d) Components of LT switchgear

Examination and Evaluation Pattern: It include both internal evaluation (50 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (50 marks) which is mainly end semester examination.

Text Books:

1	Basic Electrical Engineering, S.N. Singh, PHI, Learning Private Limited.

2 Electrical Machines M. N. Bandyopadhya, PHI, Learning Private Limited.

Reference Books:

1 Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication.

2 Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.

3 (Corresponding set of) CAD Software Theory and User Manuals

Course C					Course				Lec	ture		
BTCS201	BST					themati			~	Т Р	Semes	ster: II
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PO1- Enginee												
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	mination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks)
whie	ch is mainly end semester examination.
Text	t Books:
1	Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2	P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003.
3	S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
4	W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
Refe	erence Books:
1	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,
	2010.
2	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
3	Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

Course C					Course				-	ture			
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investigations sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con Unit:	ring Kno of comp PO ₈ - Eth g Learnin PO ₁ 2	wiledge lex prob ics, PO ₃ - g PO ₂ 1 2 2 Molec Lineat molec Crysta transi geom Wate water and s Softer	, PO ₂ - lems, PC - Individu apping PO ₃ 1 1 1- cular st r Comb cules, m cular orl al Field tion m etries. E r Treat: , deterr sludge f ning of	Problem Problem of cour of cour PO4 PO4 1 1 Reason ination olecula oitals of Theor etal ion Band str ment: nination formation formation	a analysi ern tool am work se outco PO5 PO5 1 able; 2 - e and ' a of Ato r orbita f butadi y (CFT) n d- or ucture Hardne n of har on in b Lime so	is, PO ₃ - usage, PO , PO ₁₀ - Co omes with PO ₆ - Signific - Signific Theories omic Or al energy ene and : Salient bitals ir of solids ess of wa dness of poilers, o	Contraction of the end of the program is the progra	gineer an ion, PO ₁₁ - m outco PO ₈ PO ₈ Strong ding: Ata CAO), mo agrams o s of CFT edral, Oa ct of dop es of har EDTA m mbrittle: ion exch	d societ Project 1 mes PO ₉ PO ₉ Domic ar oblecular f N2, O C – Cry ctahedr ing on c dness, ethod. ment, p ange pr	y, PO7- manage PO1 PO1 and Mc condu vstal F al and condu unites Boiler primir ocess	Envi emen	PO11 PO11 lar or of dia nolecu Splitt uare j ce hardn bles - nd foa blems	PO ₁₂ PO ₁₂ bitals. tomic ules. π ing of planar ess of scale aming,
investigations sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con Unit:	ring Kno of comp PO ₈ - Eth g Learnin PO ₁ 2	wiedge lex prob ics, PO ³⁻ g PO ² 1 2 Molec Lineat molec Crysta transi geom Wate water and s Softer Electa	, PO ₂ - lems, PC apping PO ₃ PO ₃ 1 1 cular st r Comb cules, m cular orl al Field tion m etries. E r Treat: c, detern sludge f ning of v	Problem Problem of cour of cour PO4 1 1 1 Reason cructur pination olecula bitals of Theor etal ion Band str ment: nination formatii water- istry a	a analysi ern tool am work se outco PO5 PO5 1 able; 2 - a of Ato r orbita f butadi y (CFT) n d- or ucture Hardne n of har on in t Lime so nd cor	is, PO ₃ - usage, PO , PO ₁₀ - Co omes with PO ₆ - Signific Theories omic Orlal energy ene and : Salient bitals ir of solids ess of wa dness of poilers, o da, perm rosion:	De- The en mmunicat th progra PO7 PO7 cant; 3 – S s of Bond bitals (LC 7 level dia benzene. 5 Features 6 Tetrahe and effec ater, type water by caustic e	gineer an ion, PO ₁₁ - m outco PO ₈ PO ₈ Strong ding: Ato CAO), mo agrams o s of CFT edral, Oo ct of dop es of har EDTA m embrittle ion exch	d societ Project Project Proje	y, PO7- manage PO1 PO1 and Mc condu vstal F al and condu unites Boiler primir occess - elec	Envi emen	PO ₁₁ PO ₁₁ lar or of dia nolect Splitt uare <u>ce</u> hardn bles - nd foa <u>blems</u> e pot	ent and inance, PO ₁₂ bitals. tomic ules. π ing of planar ess of scale aming, ential,
investigations sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con Unit: 2	ring Kno of comp PO ₈ - Eth g Learnin 2	wiledge lex probi ics, PO ³⁻ g MO ² 1 2 Molec Linea molec Crysta transi geom Wate water and s Softer Elect stand	, PO ₂ - lems, PC - Individu apping PO ₃ 1 1 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Problem Problem of cour of cour PO4 1 1 1 Reason ination olecula bitals of Theor etal ion Band str ment: nination formatii water- istry a ctrode p	a analysi ern tool am work se outco PO5 PO5 1 able; 2 - e and ' a of Atco r orbita f butadi y (CFT) n d- or fucture Hardne n of har on in t Lime so nd cor pootentia	is, PO ₃ - usage, PO , PO ₁₀ - Co omes with PO ₆ - Signific - Signific - Signific - Salient - S	De- The en mmunicat th progra PO7 PO7 cant; 3 – S s of Bond bitals (LC 7 level dia benzene. 5 Features 6 Tetrahe and effec ater, type water by caustic e nutit and Electro c	gineer an ion, PO ₁₁ - m outco PO ₈ PO ₈ Strong ding: Ato CAO), mo agrams o s of CFT edral, Oo ct of dop es of har EDTA m mbrittle ion exch chemical des – ca	d societ Project P mes PO ₉ PO ₉ Comic an olecular f N2, O C - Cry ctahedr ing on o dness, ethod. ment, p ange pr cells - lomel, (y, PO7- manage PO1 PO1 and Mc corbi 2 and vstal F al and condu unites Boiler primir cocess - elec Quinhy	Envi emen o o lecu cals F2 r ield d sq ctan s of trou g ar Pro trod ydroi	PO11 PO11 lar or of dia nolect Splitt uare ce hardn bles - nd foa blems e pot ne and	ent and inance, PO ₁₂ bitals. tomic ules. π ing of planar ess of scale aming, ential, d glass
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investigations sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con Unit: 2	ring Kno of comp PO ₈ - Eth g Learnin 2	wiedge lex probi ics, PO ₃ - g PO ₂ 1 2 2 Molec Lineat molec Crysta transi geom Wate water and s Softer Electu stand electr and g proble	, PO ₂ - lems, PC - Individu apping PO ₃ PO ₃ 1 1 cular st r Comb cules, m cular orl al Field tion m etries. F r Treat: determ sludge f ning of y rochem ard elector ode. Ne glass e ems. P	Problem Problem of cour of cour PO4 PO4 1 1 1 Reason cructur bination olecula bitals of Theor etal ion Band str ment: nination formatii water istry a cructur a cructur pination formatii water- istry a cructur pinst eq lectrod otentio	a analysi ern tool am work se outco PO5 PO5 able; 2 - e and ' able; 2 - e and ' of Atco r orbita f butadi y (CFT) a d- or fucture Hardne n of har on in t Lime so nd cor pootentia uation i e. Elec metric	is, PO ₃ - usage, PO , PO ₁₀ - Co omes with PO ₆ Signific Signific Theories omic Orlal energy ene and : Salient toitals ir of solids ess of wa dness of poilers, of da, perm rosion: i l, types of Determin trochem	Po- The en mmunicat th progra PO7 PO7 PO7 cant; 3 – S s of Bond bitals (LC v level dia benzene. c Features n Tetraha and effec ater, type water by caustic e nutit and Electro c of electro nation of	gineer an ion, PO ₁₁ - m outco PO ₈ PO ₈ Strong ding: Ato CAO), mo agrams o s of CFT edral, Oo ct of dop es of har EDTA m embrittle ion exch chemical des – ca pH of a s es and eries –	d societ Project Project Proje	y, PO7- manage PO1 PO1 md Mc corbi 2 and vstal F al and condu unites Boiler primir occess - elec Quinhy by us plicati y (Lit	Envi emen emen elecu cals F2 r ield d sq ctan s of trou g ar . Pro trod vdroz ing c ons. hium	PO11 PO11 lar or of dia nolecu Splitt uare ce hardn bles - nd foa blems e pot ne and puinhy Num n cell	ent and inance, PO ₁₂ PO ₁₂ bitals. tomic ules. π ing of planar ess of scale aming, ential, d glass rdrone herical

Causes and Theories of corrosion – Chemical and electrochemical corrosi line and pitting corrosion; Factors affecting rate of corrosion – Nature of Nature of environment. Corrosion control Methods: using pure metal and alloys, modi environment, cathodic protection (sacrificial anodic and impressed cathodic). Surface coatings: Metallic coatings & methods of application of	metal and fying the
Nature of environment. Corrosion control Methods: using pure metal and alloys, modi environment, cathodic protection (sacrificial anodic and impressed	fying the
Corrosion control Methods: using pure metal and alloys, modi environment, cathodic protection (sacrificial anodic and impressed	. 0
environment, cathodic protection (sacrificial anodic and impressed	. 0
	1 current
L cathodic) Surface coatings' Metallic coatings & methods of application (
	of metallic
coatings – hot dipping (galvanization & tinning), electroplating	
Reactivity of Organic Molecules & Types of Reaction and Mechanism :	
effect, Resonance or Mesomeric effect, Electromeric effect, Hyper co	
Unit: 4 Carbocation, Carbanion & Free radical. Substitution, Addition and E	imination
reaction.;Mechanism of the following reactions	
Aldol condensation, Cannizzaro reaction, Hoffmann reaction & Diels-Alde	
Spectroscopic techniques and applications: Principles of spectroscopy,	
Unit: 5 rules and applications of electronic spectroscopy. vibrational and	
spectroscopy. Basic concepts of Nuclear magnetic resonance Spec	ctroscopy,
chemical shift. Introduction to Magnetic resonance imaging.	
Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising	
sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 mat	rks) which
is mainly end semester examination.	
Text Books:	
1 Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane.	
2 Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008))
Reference Books:	
1 Fundamentals of Molecular Spectroscopy, by C. N. Banwell	
2 Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishna	n.
3 Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co,New Delhi(2006)	
4 Engineering Chemistry – Shasi Chawla, Dhantpat Rai publishing Company, NewDelhi (200	
5 Engineering Chemistry – R. Gopalan, D. Venkatappayya, D.V. Sulochana Nagarajan – Vikas	
Publishers (2008)	
6 Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (200-	4).

Course C					Course					ture		
BTCS2111	EST					Problem			L	T P	Sen	nester: II
Version: 1.2					oval: 16	th BoS 1	7-11-2022		3	1 0		
	Scheme			1			S	cheme o				0.0
No. of I			Hrs.							n Score	1	00
Periods	Credits	: 4 : 3						Inter		luation mester		30 70
Instruction			cture					ī		uration		B Hrs.
Prerequisite				es				1		uration		51115.
Course Obje		peeme	requisi	103								
1. To under		ne vario	us step	s in pro	gram d	evelopm	ent.					
2. To impai												
3. To acqui												
4. To learn								roach) ir	C to se	olve prol	blems	
Course Outo	comes (C	:O):										
COs No.					Stater	nent						Program
												es (POs)
CO ₁			rious pr	oblem-	solving	techniq	ues and ir	nplemen	it them	in	PO 1,	PO ₂
	'C' langı	1age.										
CO ₂	Apply th	ne basic	termin	ology u	ised in o	compute	r progran	nming ar	nd write	2,	PO	D _{3,}
	compile											
CO ₃							ures, loo	ps and	functio	ns	PO ₃ ,	PO ₄
	0		^v			tructure						
CO ₄ PO ₁ - Enginee							C langua			1	PO ₄	
sustainability, PO 12- Life-lon		g					th program			managen		
Course Outcomes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁₀	РО	11 PO 12
CO ₁	3	2										
			2	4								
CO ₃	-		2	1	1					-		
CO ₄			1	-	1 ahlar 2	Signifi	cant; 3 – S	Ntwow o				
Detailed Cor	ntonts.		1-	Reuson	ubie, 2 -	- Siyniju	uni, 5 - 5	scrony				
Detaneu Co	itents.	Introd	luction	to Proc	rammi	ng Intro	duction t	o comp	onents	of a cor	nnute	r system
				-	-	-	a prograi	-			-	•
				oilers et			a progra		rea an	a eneca	eeu, e	Perame
.		v	-		,	ning –	definitio	ns and	develo	ning Al	vorith	ims and
Unit: 1	L						oduction					
							lentifiers					
		variab	les op	erators	, symb	olic cor	nstants, l	Expressi	ons, co	ompoun	d sta	tements
							utput fun					
							nts – if r					
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Unit: 2	2						variation					
							and itera					
							break sta ock statei		erių)		, uie	continue
							ray Decla		rrav In	itializati	on – A	ccessing
) Dimensi					
							array. V					
Unit: 3	3						eral Form					
		functi	on cate	gories,	types of	of functi	ons, Func	tion Arg	guments	s Call by	value	e, Call by
		Refere		turn sta	atemen	t. Uses o	f function	s. C pre	- proce	essor, sto	orage	classes -
						and ext			1	,	0	

Unit: 4	Pointers – definition, pointer variables, pointer expressions, arithmetic pointers, pointers and arrays, initializing pointers and functions and problems with pointers. Structures – definition, accessing structure members, structure assignments, array of structures, passing structures, structure pointers, uses of structures Unions – definitions, difference between structure and union, type def. Files – introduction to streams and files, basics of files – file pointer, opening and closing files, writing and reading character, file functions.
	Principles of OOP: Programming paradigms, basic concepts, benefits of OOP,
	applications of OOP Introduction to C++: History of C++, structure of C++, basic data
Unit: 5	types, type casting, type modifiers, operators and control structures, input and
	output statements in C++. Classes and objects: class specification, member function
	specification, scope resolution operator, access qualifiers, instance creation.
Examination and Ev	valuation Pattern: It include both internal evaluation (30 marks) comprising two class
sessional exams/ as	signments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is mainly end semes	ter examination.
Text Books:	
1 Let Us C by Ya	shwanth Kanethar.
2 E. Balagurusw	amy, Programming in ANSI C, Tata McGraw-Hill.
Reference Books:	
1 Object Oriente	ed Programming with C++ By E.Balaguruswamy.

2 Programming in C, 2nd Edition, Oxford by Pradip Dey, Mannas Ghosh.

Course					Course					ture	_	
BTCS211				0		nunicati			L		Ser	nester: Il
Version: 1.2					oval: 16	th BoS 1	7-11-2022		2 (
	Scheme			1			S	cheme o			<u>г г</u>	
	Periods		Hrs.						aximum			50
Periods	s/Week	: 4 : 2							nal Eval			15 35
Instructio	Credits		oturo						End Ser xam Du			35 2 Hrs.
Prerequisit			cture	isitos				Ē	xani Du	ration	•	Z HIS.
Course Obj		peeme	prerequ	lisites.								
	erstand t	he conc	ent of e	nhance	ement o	f the sof	t and com	municat	ion skil	ls		
	uire the p						t und con	mamea	JOII SKI	10.		
1	art the w						non-form	al, techn	ical wri	ting.		
	n the con							,		0		
Course Out	tcomes (C	:0):	*		0		0					
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										Ou		es (POs)
CO ₁				-	-	confide	•				PO ₆ ,	PO ₁₀
CO ₂	Differen	ntiate ar	nong h	omonyr	ns, hom	ophones	, synonyn	ns and ar	ntonyms	5.	PO 6,	PO ₁₀
CO ₃							ormation				P	D ₁₂
	applica	tions, fo	rmal le	tters, C	Vs, tecł	nical rej	ports and	project i	reports.			
CO ₄	Commu	inicate	with mo	ore con	fident a	mong st	udents, te	achers 8	tother		PO 8,	PO ₁₂
	stakeho					_						
PO1- Engine												
investigation												
sustainability			Individu	ial or tea	m work,	PO ₁₀ - Co	nmunicati	on, PO 11- l	Project n	nanagem	ent ar	nd finance
PO ₁₂ - Lite-Io	naloornin											
PO ₁₂ - Life-lo	ng Leannin		nning	ofoorm		magnit	h nrograr	n outoor	200			
			apping	of cour	se outco	omes wit	h prograr	n outcor	nes			DO
Course	PO ₁		apping PO3	of cours	se outco PO5	omes wit PO6	h prograf PO 7	n outcor PO ₈	nes PO9	PO ₁₀	РС	11
Course Outcomes	PO ₁	Ma				PO ₆					РС	PO11 PO1
Course Outcomes CO ₁	PO ₁	Ma				PO ₆ 2				3	РС	11
Course Outcomes CO ₁ CO ₂	PO ₁	Ma				PO ₆					PC	2
Course Outcomes CO ₁ CO ₂ CO ₃	PO ₁	Ma				PO ₆ 2				3	PC	2 2 3
Course Outcomes CO ₁ CO ₂	PO ₁	Ma	PO ₃	PO ₄	PO ₅	PO ₆ 2 2	PO ₇	PO ₈		3	PC	2
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁	Ma	PO ₃	PO ₄	PO ₅	PO ₆ 2 2		PO ₈		3	PC	2 2 3
Course Outcomes CO ₁ CO ₂ CO ₃	PO ₁	Ma PO ₂	PO ₃	PO ₄	PO5 able; 2 -	PO ₆ 2 2	PO ₇	PO ₈		3	PC	2 2 3
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁	Ma PO ₂	PO3 1 -	PO ₄	PO5 able; 2 -	PO ₆ 2 2	PO7 ant; 3 - S	PO ₈		3	PC	2 2 3
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO1	Ma PO ₂ Oral C 1.1. Co	PO3 1 – Communi	PO ₄	PO ₅ able; 2 -	PO ₆ 2 2 Signific	PO7 ant; 3 - S	PO ₈		3	PC	2 2 3
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co	PO1	Ma PO2 Oral C 1.1. Co 1.2. Cc 1.3. JA	PO3 1 - Commu mmuni onversa M Sessi	PO ₄ Reasonanication ration: tions arions and	PO5 able; 2 -	PO ₆ 2 Signific and Non- gues Discuss	PO7 ant; 3 – S -Verbal ions	PO ₈		3	PC	2 2 3
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co	PO1	Ma PO2 Oral C 1.1. Co 1.2. Cc 1.3. JA 1.4. Pr	PO ₃ 1 - Commu mmuni onversa M Sessi esentat	PO ₄ Reason nicatior cation: tions ar ions and ion Skil	PO5 able; 2 - n: Verbal a ad Dialo d Group Is and I	PO ₆ 2 2 Signific	PO7 ant; 3 – S -Verbal ions	PO ₈		3	PC	2 2 3
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co	PO1	Ma PO2 Oral C 1.1. Co 1.2. Cc 1.3. JA 1.4. Pr Writir	PO ₃ 1 - Communi onversa M Sessi esentat ng Com	PO ₄ Reason nicatior cation: tions ar tions and tion Skil munica	PO₅ able; 2 - h: Verbal a nd Dialo d Group ls and I tion:	PO ₆ 2 Signific and Non- gues Discuss nterview	PO7 ant; 3 – S -Verbal ions	PO ₈		3	PC	2 2 3
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁ PO ₁ ontents:	Ma PO2 Oral C 1.1. Co 1.2. Cc 1.3. JA 1.4. Pr Writir 2.1. Su	PO ₃ 1 – Communi onversa M Sessi esentat ng Com- bject-v	PO4 Reason nication cation: tions and ion Skil munica erb agr	PO5 able; 2 - n: Verbal a nd Dialo d Group ls and I tion: eement	PO ₆ 2 2 Signific and Non- gues Discuss nterview	PO7 ant; 3 – S -Verbal ions Skills	PO ₈		3	PC	2 2 3
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co	PO ₁ PO ₁ ontents:	Ma PO2 Oral C 1.1. Co 1.2. Cc 1.3. JA 1.4. Pr Writir 2.1. Su 2.2. Pr	PO3 1 - Communi onversa M Sessi esentat ng Com bject-v écis Wi	PO4 Reason nicatior cation: tions and ion Skil munica erb agr riting an	PO5 able; 2 - able; 2 - ab	PO ₆ 2 2 Signific and Non- gues Discuss nterview	PO7 ant; 3 - S -Verbal ions Skills	PO ₈		3	PC	2 2 3
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		Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular).
		Introduction to Kinetics of Rigid Bodies Covering-Basic terms, general principles
		in dynamics; Types of motion, Instantaneous center of rotation in plane motion and
	Unit: 5	simple problems; D'Alembert's principle and its applications in plane motion and
		connected bodies; Work energy principle and its application in plane motion of
		connected bodies; Kinetics of rigid body rotation;
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sess	sional exams/ ass	signments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semest	er examination.
Tex	t Books:	
1	F. P. Beer and E	. R. Johnston (2011), Vector Mechanics for Engineers, Vol I - Statics, Vol II, -
	Dynamics, 9th	Ed, Tata McGraw Hill.
2	R. C. Hibbler (2	006), Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.
Refe	erence Books:	
1	Bansal R.K.(201	0), A Text Book of Engineering Mechanics, Laxmi Publications.
2	Khurmi R.S. (20	10), Engineering Mechanics, S. Chand & Co.

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CO ₂							he quant	itative o	chemica	al	PO ₃	
							, corrosio					
			-	5	1		,					
	and cement analysis.								occ on	d I		PO ₇
CO ₃	Gain ac	quainta	Gain acquaintance in the determination the amount of hardness and chloride in the various samples of water for general purpose and their							u -	PO4, PO6,	10/
CO ₃											P U 4, PU 6,	10/
CO ₃		e in the	various	s sampl	les of w						PO4, PO6,	10,
CO ₃	chloride use its i	e in the ndustri	various es invol	s sampl lving bo	les of wa bilers.	ater for g		urpose a			PO4, PO6, PO7, PO	
CO ₄	chloride use its i Skills in	e in the ndustri estima	various es invol ting aci	s sampl lving bo dity/al	les of wa bilers. kalinity	ater for g	general p water sar	urpose a	nd thei	r	PO 7, PO	D ₉
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14.	adsorption of acetic acid by charcoal
Exa	mination and Evaluation Pattern: It include both internal evaluation (50 marks) comprising two class
sess	ional exams/assignments/quiz/seminar presentation etc. and external evaluation (50 marks) which
is m	ainly end semester examination.
Text	t Books:
1	Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2	Inorganic quantitative analysis, Vogel.
Refe	erence Books:
1	Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel.
2	A text book on experiments and calculation Engg. S.S. Dara.
3	Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

BTCS260	Course Code								Course Title Lectu						
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	Periods		Hrs.							n Score	: 10				
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16. Write a C Program to find the given integer number is even or odd number.17. Write a C Program to calculate the factorial of a given number.

18. Write a C Program to swap the two numbers using temp variable and without using temp variable.

19. Reading and printing a single dimensional array of elements.

20. Ascending and descending of an array.

21. Sum of all odd numbers and sum of all even numbers in a single dimensional array.

22. Mathematical operations on single dimensional arrays.

23. Reading and Printing a multi-dimensional array of elements.

24. Mathematical operations on multi-dimensional array of elements.

25. Passing an array element to a function.

26. Reading and Printing a string.

27. C Programs on String functions.

28. Write a C program to calculate string length by writing the user-define function.

29. Function declaration and initialization.

30. C Program to differentiate the parameters and arguments in functions.

31. Programs for different types of inbuilt functions.

32. Call by value and Call by reference programs in functions.

33. Write a program to swap the given 2 number using passing by reference.

34. Write C Programs to perform all valid arithmetic operations using pointers.

35. C programs on Structures and accessing of members of the structures.

36. Write a C program to print a book information (Book name, Book no, author name) by writing a structure.

37. Write a C program by passing structure elements to a function and display employee Information (emp no, emp name, emp salary, and emp address).

38. C Programs on Reading a file from the secondary storage device.

39. C Program on writing and appending a file on the secondary storage device.

40. C Program on Opening and closing a file.

41. Programs on Classes using C++.

Examination and Evaluation Pattern: It include both internal evaluation (50 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (50 marks) which is mainly end semester examination.

Text Books:

1 E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

2 Object Oriented Programming with C++ By E.Balaguruswamy

Reference Books:

1 Programming in C, 2nd Edition, Oxford by Pradip Dey, Mannas Ghosh

2 Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

						Title			L	ectu	re	Semester:		tor	
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- 1. **House Wiring:** Study of wiring tools, industrial wiring, accessories, earthling, and safety precaution. Practice to make parallel and series connection of three bulbs, stair case wiring, florescent lamp fitting.
- 2. **Machine Tools:** Study and demonstration on working of machine tools. Specification and block diagram of lathe, Drilling machine and grinder. Common lathe operations such as turning, parting, chamfering and facing. Difference between drilling and boring.

3. **Casting:** Study of Moulding Sands, Pattern, Core Prints, Role of Gate runner, riser, core, casting defects like blow holes & cavities. Practical Work: Mould of any pattern Casting of simple pattern, Solid pattern, Split pattern, multi- piece pattern.

Examination and Evaluation Pattern: It include both internal evaluation (50 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (50 marks) which is mainly end semester examination.

Text Books: 1 Work shop Man

1 Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.

2 Elements of Workshop Technology (Volume - 1): Hajra Choudhury.

3 Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition.

Reference Books:

- 1 Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
- 2 Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.

3 Gowri P. Hariharan and A. Suresh Babu,"Manufacturing Technology – I" Pearson Education, 2008.

4 Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

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	Delhi, India.
2	A. S. Sedra and K. C. Smith, "Microelectronic Circuits", New York, Oxford University
	Press, 1998.
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	Circuits", John Wiley & Sons, 2001.
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	theory and applications", McGraw Hill U. S., 1992.

Course (Course Title Lecture Data Structure & Algorithms L T									
BTCS311	РСТ		Γ	Data Str	ructure	& Algorit	hms			Г Р		
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	mination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester examination.
Text	t Books:
1	Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd,
	2nd edition, Universities Press Orient Longman Pvt. Ltd.
2	Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student
	edition, John Wiley and Sons.
Refe	erence Books:
1	Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second
	Edition
2	Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
3	Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
4	Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

BTCS312P	Course Code				Course Title Digital Electronics						Seme	ster
	CT			0						Г Р	II	
Version: 1.2					oval: 16	th BoS 17	7-11-2022	-	0	1 0		-
	Scheme			1			Sc	heme of			100	
No. of F			Hrs.						aximum		: 100	
Periods/		: 4							nal Eval		: 30	
	Credits	: 4							End Ser		: 70	
Instruction			ture	~				E	xam Du	iration	: 3 H	rs.
Prerequisite(Course Object		leering	Physics	5								
1. To impar		nio conc	onts of	digital	alactro	niog						
2. To under												
	nderstand basic concepts about Boolean Algebra. nable to design the digital logic.											
Course Outco		-		- 8								
COs No.		- /-			Statem	nent				Mar	ped Pro	ogram
COS NO. State											tcomes (
CO ₁	Implem	ent wor	king of	logic fa	milies a	and logic	gates.				PO ₁ , PO	
							quential lo	ogic circ	uits.		PO ₃ , PO	9
CO ₃	Underst	and the	e proce	ess of Ai	nalog to) Digital	conversio	on and D	igital to)	PO ₁ , PO ₃	3,
	Analog o											
						using PI					PO ₃ , PO	
PO1- Engineer												
investigations of												
sustainability, PO ₁₂ - Life-long			maiviau	ai oi teai	II WOLK,	PU 10- COL	innunicatio	011, PO 11 ⁻ P	10ject III	anagem	ent and n	nance
Life long	Learning		pping c	of cours	e outco	mes wit	h progran	outcon	nes			
Course										20		PO ₁
Outcomes	PO ₁	PO_2	PO ₃	PO ₄	PO ₅	PO_6	PO ₇	PO ₈	PO ₉	PO ₁₀	PO ₁₁	2
CO ₁	2	1										
CO_2			3						2			
CO ₃	2		3									
CO ₄			3	2								
			1 – I	Reasona	ble; 2 -	Signific	ant. 2 _ Ct	rona				
Detailed Con						Dignijici	ini, 5 - Si	Tong				
	tents:											
	tents:		amenta		gital Sy	stems a	nd logic fa	amilies				
	tents:	Digita	menta l signa	ls, digit	gital Sy tal circ	stems a uits, AN	nd logic fa	a milies OT, NAI				
		Digita opera	menta 1 signa tions, B	ls, digit Boolean	gital Sy tal circ algebra	stems a uits, AN a, exampl	n d logic f a D, OR, N les of IC g	a milies OT, NAl ates, nu	mber sy	stems-	binary, s	signed
Unit: 1		Digita opera binary	menta 1 signa tions, B 7, octal	ls, digit Boolean hexade	gital Sy tal circe algebra cimal nu	stems a uits, AN a, exampl umber, b	nd logic fa D, OR, N les of IC g inary arit	amilies OT, NAI ates, num hmetic, o	mber sy one's an	rstems-l d two's	binary, s complei	signed ments
		Digita opera binary arithn	amenta l signa tions, E 7, octal netic, c	ls, digit Boolean hexade odes, ei	gital Sy tal circu algebra cimal nu rror det	stems a uits, AN , exampl umber, b tecting a	nd logic fa D, OR, N les of IC g inary arit nd correc	amilies OT, NAI ates, num hmetic, o cting coo	mber sy one's an les, cha	rstems-l d two's tracteris	binary, s complei stics of o	signed ments digital
		Digita opera binary arithn lCs, di	menta l signa tions, E /, octal netic, c gital log	ls, digit Boolean hexade odes, e gic fami	gital Sy tal circu algebra cimal nu rror det	stems a uits, AN , exampl umber, b tecting a	nd logic fa D, OR, N les of IC g inary arit	amilies OT, NAI ates, num hmetic, o cting coo	mber sy one's an les, cha	rstems-l d two's tracteris	binary, s complei stics of o	signed ments digital
		Digita opera binary arithn ICs, di TTL, T	amenta 1 signa tions, E 7, octal netic, c gital log Tri-stat	ls, digit Boolean hexade odes, ei gic fami e logic.	gital Sy tal circu algebra cimal nu rror det lies, TT	stems a uits, AN , exampl umber, b tecting a L, Schott	nd logic fa D, OR, N les of IC g inary arit nd correc	amilies OT, NAI ates, num hmetic, o cting coo	mber sy one's an les, cha	rstems-l d two's tracteris	binary, s complei stics of o	signed ments digital
		Digita opera binary arithm ICs, di TTL, T	amenta 1 signa tions, E 7, octal netic, c gital log Fri-stat ination	ls, digit Boolean hexade odes, er gic fami e logic. al Digit	gital Sy tal circu algebra cimal nu rror det lies, TT al Circu	stems and uits, AN a, example umber, b tecting a L, Schott uits	nd logic fa D, OR, N les of IC g inary ariti nd correc ky TTL ar	amilies OT, NAI ates, num hmetic, o cting coo nd CMOS	mber sy one's an les, cha blogic, i	rstems- d two's tracteris nterfaci	binary, s complea stics of c ing CMC	signed ments digital OS and
		Digita opera binary arithm ICs, di TTL, T Comb i Standa	amenta 1 signa tions, E 7, octal netic, c gital log fri-stat ination ard rep	ls, digit Boolean hexade odes, ei gic fami <u>e logic.</u> al Digit resenta	gital Sy tal circe algebra cimal nu rror det lies, TT al Circu tion for	stems an uits, AN a, exampl umber, b tecting a L, Schott uits logic fu	nd logic fa D, OR, N les of IC g inary arit nd correc	amilies OT, NAI ates, num hmetic, o cting coo nd CMOS	mber sy one's an les, cha blogic, i epreser	vstems- d two's aracteris nterfacion ntation,	binary, s compler stics of d ing CMC simplific	signed ments digital OS and cation
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		Digita opera binary arithm ICs, di TTL, T Combi Standa of log condit arithm	amenta l signa tions, E 7, octal netic, c gital log Tri-stat ination ard rep ic func tions, 1 netic, c	ls, digit Boolean hexade odes, e gic fami <u>e logic.</u> al Digit resenta ctions u Multiple arry loo	gital Sy tal circ: algebra cimal nu rror det lies, TT al Circu tion for using K exer, D ok ahea	stems an uits, AN a, exampl umber, b tecting a L, Schott uits logic fu -map, n e-Multip ad adder	nd logic fa D, OR, N les of IC g inary arit nd correc ky TTL ar nctions, I ninimizati olexer/De s serial a	amilies OT, NAI ates, num hmetic, o cting coo nd CMOS d CMOS coders, dder, AI	mber sy one's an des, cha blogic, i epresen ogical fr Adders LU, eler	stems- d two's racteris nterfaci ntation, unction s, Subt nentary	binary, s complet stics of c ing CMC simplific s. Don't ractors, r ALU d	signed ments digital OS and cation cation care BCD esign
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Unit: 1		Digita opera binary arithm ICs, di TTL, 7 Combi Standa of log condit arithm popula priorit	amenta l signa tions, E /, octal netic, c gital log fri-stat ination ard rep ic func- tions, l netic, c ar MSI o y enco	ls, digit Boolean hexade odes, ei gic fami <u>e logic.</u> al Digit resenta ctions u Multiple arry loo chips, d	gital Sy cal circ: algebra cimal nu rror det lies, TT al Circu tion for using K exer, D ok ahea igital co	stems an uits, AN a, exampl umber, b tecting a L, Schott L, Schott uits logic fu -map, n e-Multip ad adder omparate	nd logic fa D, OR, N les of IC g inary arit nd correc ky TTL ar nctions, I ninimizati olexer/De s serial a	amilies OT, NAI ates, num hmetic, o cting coo nd CMOS d CMOS coders, dder, AI checker,	mber sy pne's an des, cha blogic, i epreser ogical fr Adders LU, eler /genera	stems- d two's aracteris nterfaci atation, unction s, Subt nentary tor, coo	binary, s complet stics of c ing CMC simplific s. Don't ractors, ALU d le conve	signed ments digital DS and cation cation cation cates BCD esign, erters,
Unit: 1		Digita opera binary arithm ICs, di TTL, T Combi Standa of log condit arithm popula priorit realiza	amenta l signa tions, E 7, octal netic, c gital log fri-stat ination ard rep ic func- ions, l netic, c ar MSI o y enco tion.	ls, digit Boolean hexade odes, ei gic fami e logic. al Digit resenta ctions u Multiple arry loo chips, d ders, de	gital Sy cal circo algebra cimal nu rror det lies, TT al Circo tion for using K exer, D ok ahea igital co ecoders	stems an uits, AN a, exampl umber, b tecting a L, Schott uits logic fu -map, n re-Multip ad adder omparato	nd logic fa D, OR, N les of IC g inary ariti nd correc ky TTL ar nctions, I ninimizati olexer/De s serial a or, parity o	amilies OT, NAI ates, num hmetic, o cting coo nd CMOS d CMOS coders, dder, AI checker,	mber sy pne's an des, cha blogic, i epreser ogical fr Adders LU, eler /genera	stems- d two's aracteris nterfaci atation, unction s, Subt nentary tor, coo	binary, s complet stics of c ing CMC simplific s. Don't ractors, ALU d le conve	signed ments digital OS and cation cation care BCD esign, erters,
Unit: 1		Digita opera binary arithm ICs, di TTL, T Combi Standa of log condit arithm popula priorit realiza Seque	amenta l signa tions, E 7, octal netic, c gital log fri-stat ination ard rep ic func- ions, 1 netic, c ar MSI o y enco ation. ential c	ls, digit Boolean hexade odes, ei gic fami <u>e logic.</u> al Digit resenta ctions u Multiple arry loo chips, d ders, de ircuits a	gital Sy tal circi algebra cimal nu rror det lies, TT al Circu tion for using K exer, D bk ahea igital cc ecoders and sys	stems an uits, AN a, exampl umber, b tecting a L, Schott uits logic fu -map, n re-Multip ad adder omparato /drivers tems	nd logic fa D, OR, N les of IC g inary arit nd correc ky TTL ar nctions, I ninimizati olexer/De s serial a or, parity o for displ	amilies OT, NAI ates, num hmetic, o cting coo ad CMOS d CMOS coders, dder, AI checker, ay devic	mber sy pne's an des, cha Blogic, i epreser ogical fr Adders LU, eler /genera es, Q-M	stems- d two's racteris nterfaci ntation, unction s, Subt nentary tor, coo 4 metho	binary, s complet stics of d ing CMC simplific s. Don't ractors, ALU d le conve od of fur	signed ments digital OS and cation cation care BCD esign, erters, nction
Unit: 1		Digita opera binary arithm ICs, di TTL, 7 Combi Standa of log condit arithm popula priorit realiza Seque A 1-bi	amenta l signa tions, E 7, octal netic, c gital log Tri-stat ination ard rep ic func- tions, l netic, c ar MSI of y enco- ation. ential c t memo	ls, digit Boolean hexade odes, er gic fami <u>e logic.</u> al Digit resenta ctions u Multiple arry loc chips, d ders, de ircuits a ory, the	gital Sy cal circ: algebra cimal nu rror det lies, TT al Circu tion for using K exer, D bk ahea igital cc ecoders and sys circuit	stems an uits, AN a, exampl umber, b tecting a L, Schott uits c logic fu -map, n re-Multip ad adder omparato c/drivers tems properti	nd logic fa D, OR, N les of IC g inary ariti nd correct ky TTL ar cky TTL ar nctions, I ninimizati blexer/De ; serial a or, parity of a for displ	amilies OT, NAI ates, num hmetic, o cting coo ad CMOS coders, dder, AI checker, ay devic	mber sy pne's an des, cha Blogic, i epreser ogical fr Adders U, eler /genera es, Q-M	stems- d two's rracteris nterfaci ntation, unction s, Subt nentary ttor, coo 4 metho	binary, s complet stics of c ing CMC simplific s. Don't ractors, ALU d le conve od of fur	signed ments digital OS and cation cation cation esign, erters, nction
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Unit: 1		Digita opera binary arithm ICs, di TTL, 7 Combi Standa of log condit arithm popula priorit realiza Seque A 1-bi K-T a shift r	amenta l signa tions, E /, octal netic, c gital log Tri-stat ination ard rep ic func- tions, l netic, c ar MSI of y enco tion. ential cit t memory nd D ty egister	ls, digit Boolean hexade odes, ei gic fami e logic. al Digit resenta ctions u Multiple arry loo chips, d ders, de ircuits a ory, the pes flip s, serial	gital Sy cal circ: algebra cimal nu rror det lies, TT al Circu tion for using K exer, D ok ahea igital co ecoders and sys circuit flops, a to para	stems an uits, AN a, exampl umber, b tecting a L, Schott uits logic fu -map, n e-Multip ad adder omparato (drivers tems properti applicational	nd logic fa D, OR, N les of IC g inary arit: nd correc ky TTL ar nctions, I ninimizati blexer/De s, serial a br, parity o s for displ es of Bi st ons of flip rerter, par	amilies OT, NAI ates, num hmetic, o cting coo nd CMOS der CMOS coders, dder, AI checker, ay devic able lato flops, s allel to s	mber sy pone's an des, cha blogic, i epresen ogical fr Adders LU, eler /genera es, Q-M ch, the c hift reg erial co	stems- d two's racteris nterfaci ntation, unction s, Subt nentary tor, coo 4 metho locked isters, a nverter,	binary, s complet stics of o ing CMC simplifio s. Don't ractors, ALU d le conve od of fur SR flip fl pplicatio , ring con	signed ments digital OS and cation cation cation esign, erters, nction lop, J- ons of unter,
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	Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A
	converter, specifications for D/A converters, examples of D/A converter lCs,
	sample and hold circuit, analog to digital converters: quantization and encoding,
	parallel comparator A/D converter, successive approximation A/D converter,
	counting A/D converter, dual slope A/D converter ,A/D converter using voltage
	to frequency and voltage to time conversion ,specifications of A/D converters,
	example of A/D converter ICs
	Semiconductor memories and Programmable logic devices.
	Memory organization and operation, expanding memory size, classification and
	characteristics of memories, sequential memory, read only memory (ROM), read
Unit: 5	and write memory (RAM), content addressable memory (CAM), charge de coupled
	device memory (CCD), commonly used memory chips, ROM as a PLD,
	Programmable logic array, Programmable array logic, complex Programmable logic
	devices (CPLDS), Field Programmable Gate Array (FPGA).
	aluation Pattern: It include both internal evaluation (30 marks) comprising two class
	ignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is mainly end semest	er examination.
Text Books:	
1 M. M. Mano, "D	igital logic and Computer design", Pearson Education India, 2016.
2 Mansaf Alam, Ba	ashir Alam, "Digital Logic Design", PHI,2016
Reference Books:	
1 A. Kumar, "Fun	damentals of Digital Circuits", Prentice Hall India, 2016.
2 Anil K.Maini,"Di	gital Electronics", Wiley,2016.

Course (Course				-	ture	Semest		
BTCS311	BST	 				thematic				T P	~	III	
Version: 1.2					oval: 16	th BoS 1	7-11-2022		3	1 0			
	Scheme	1 I		1			Sc	heme of			T T	100	
	Periods		Hrs.							1 Score		100	
Periods	Week	: 4						luation		30			
Transformed.	Credits	: 4	4							mester		70	
Instructio			cture Mathor	mation	TT			E	xam D	uration	:	3 Hrs.	
Prerequisite Course Obje	· / · · ·	ieering	mather	naucs-	11								
1. To intro						itial equa	ations, pa	rtial diff	ferentia	al equat	ions,	Laplace	
					hematic	cal struc	tures by	focusing	g on n	nathema	itical	objects	
	ons, and r						_					_	
							hary and I				tions	, Laplace	
							ngineerin		chnolog	gy.			
-		0	e of nur	nerical	integra	tion and	Euler's m	ethod.					
Course Out	comes (C	J):			Ct . t .								
COs No.					State	ment						pped gram	
												comes	
												Os)	
CO ₁	Demon	strate t	he abili	itv to s	olve pr	oblems	using Or	linary a	nd Par	tial	•	1, PO 2	
							and Nun					,	
CO ₂						uations.			2		РО	1, PO 12	
CO ₃							• • •	orating	factor	s -	J	PO 3	
	Use of	equatic	ons rea	ucidie	to exac	et form i	using Inte	graung	naccor				
003	Linear,					t form	using Inte	grading	luctor				
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CO ₄ PO ₁ - Engined investigations sustainability.	Linear, Learn t growth ering Kno of comple PO 8- Ethi	Bernou the app and dec wledge, ex proble cs, PO ₉ -	lli 's equ lication cay. PO2- P ems, PO2 Individu	ations. s to No Problem ₅- Mode: al or teau	ewton's analysis rn tool u m work,	s Law of s, PO 3- 1 1sage, PO 6 PO 10- Con	Cooling Design/dev 5- The eng	- Law o velopmen ineer and n, PO 11- P	of natu t of so society Project n	lutions,	PO ₄ -	Conduc ment an	
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	Function, Differentiation and Integration of Transforms, Application of Laplace
	Transform to Ordinary Differential Equations.
	Numerical Analysis- Numerical Integration, Trapezoidal rule, Simpson's One-
Unit: 5	Third rule, Simpson's Three-Eighth rule and Weddle's rule, Numerical
Unit: 5	Differentiation, Numerical Solution of Ordinary Differential Equations by Euler's
	Method, Euler's Modified Method and Runge-Kutta Method.
Examination and Ev	aluation Pattern: It include both internal evaluation (30 marks) comprising two class
sessional exams/ as	signments/quiz/seminar presentation etc. and external evaluation (70 marks) which
is mainly end semest	er examination.
Text Books:	
1 Differential Cal	culus by shantinarayana
2 Partial Differer	tial Equation by Sneddon
3 Laplace Transf	orm by Schaum's series
Reference Books:	·
1 Numerical Ana	lysis by Shastry
2 Engineering M	athematics by B.V Ramana

Course (Course TitleLectureTechnology and SocietyLT								cture	nester:	
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Periods	s/Week	: 2						Inter	nal Ev	aluatio	n : 15	
	Credits	: 2							End S	emeste	: 3	5
Instruction Mode : Lecture Exam							Exam I	uratio	n : 2	Hrs.		
Prerequisit	e(s): No si	becific r	equisite	e.								
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investigations sustainability PO ₁₂ - Life-lor Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co Unit: Unit: Unit:	s of complete state stat	x problecs, PO ₉ - 3 Ma PO ₂ 2 2 2 7 7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	ems, PO ₃ Individua pping o PO ₃ 2 2 1 - F nology a onship l oure and notation in workpl tial futu relatedn therap nents to is impa orologic er and 7 er influe spaces, f	s- Mode al or tear of cours PO4 PO4 Reasona and Soc betwee l practi and civ cause and Rist and civ cause and civ cause and Rist and civ cause and civ caus and civ	rn tool u m work, l e outco PO5 ble; 2 – iety: n techn ce, tech ric enga social k: orkplace chnolog acts, the society its varie l health climate	sage, PO PO ₁₀ - Con mes with PO ₆ 2 Significa ology an nologies gement: isolation e: Role of gy and in e major i pous form n, Identi change gies and	- The eng munication program PO7 2 mt; 3 - St d society, impacts of thuman sl equality, mpacts of ment, and includin social or perating's	ineer and on, PO ₁₁ - F n outcom PO ₈ 2 trong , Role of ociety. Construct kill? Soci ethics an f nanoted the alth s the iss suses of g econo	roject Project Project Project Project Project Project Project Programmers Programmers Programmers Programmers Programmers Programmers Projection of States Projection of States Projection	y, PO7- manage PO1 ology in of Tech nstruction gy on s ootenti- ce chan eopolition	Environn nent and p PO ₁₁ a Society nology ing auto s of GN ociety ll benef ge, Ass ical, bio	PO1 2 PO1 2 (SCOT) mation (SCOT) mation (SCOT) mation (Scot) (Sco

		Contributions, governance and ethical issues in the context of emerging technologies, constructing risk, role of State, civil society organizations and industry
Exa	mination and Eva	luation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	sional exams/ assi	gnments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semeste	er examination.
Tex	t Books:	
1	Science Techno	logy And Society – 2014,By K Siddhartha, Publisher: Kisalaya Publication; 1 Edition
2	Impact of Science	ce and Technology on Society – 2012,by Ishwar Singh , Publisher: S.K. Kataria &
	Sons; Reprint 20	012 edition
Refe	erence Books:	
1	Technology and	Society - 2010, by R.V.G Menon, Publisher: Pearson Education India; First edition
	(2010)	
2	Book: "The Futu	re: Six Drivers of Global Change"

Course Co	ode	Course Title Lectu							ture					
BTCS312F	IST	Environmental Sciences L T							P Semeste					
Version: 1.2			Date				7-11-2022		2	0	0	1	III	
	Scheme	of Ins	truction					heme of	' Exaı	nin	ation			
	Periods		0 Hrs.								Score	•	50	
Periods		: 2	0 1110.								ation	•	15	
,	Credits	· _									ester	•	35	
Instruction												•	3 Hi	re
Prerequisite(E	лаш	Dui	ation	·	511	15.
Course Objec	/ 1	ecine	requisite											
1. To impai	rt the k					Natural	resource	es: Wate	er res	soui	rces; u	ise	and	over
utilizatio			0											
2. To study														
3. To learn								water po	ollutio	on,	soil po	llut	ion, r	noise
pollution														
4. To learn							s: Climat	e change	e, glo	bal	warmi	ng,	acid	rain,
ozone lay	-		nd Disas	ter Mar	nagemei	nt.								
Course Outco	omes (CC	D):												
COs No.					Statem	lent					Map	ped	Prog	gram
											Out	con	nes (P	POs)
CO ₁	Demons	strate	the impo	ortance	of Natu	iral resou	irces.					PO	1, PO 2	
CO ₂	Explain	renew	able and	l non –	renewa	ble ener	gy source	s.			P	O3, F	PO5, PO	D 7
CO ₃							neasures		olluti	on,	P	04, F	PO ₈ , PC) 9
							on, therm							
	1		anageme		,	1	,	1						
CO ₄					ciples	of disas	ster mitig	vation.	disas	ter	P	O _{3.} P	O4, PO) ₁₂
							ment with							
	0		easures.			8-			,					
sustainability, F PO 12- Life-long							municatio		-	mai	nageme	ent a	nd fin	
Course Outcomes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	РО	9	PO ₁₀	P	O 11	PO ₁
	1	1	1											-
CO ₂			1		1		2							
CO ₃				2				1	1					
CO4			1	2				-	-					2
004			1 – R	-	hle [.] 2 -	Sianifica	ınt; 3 – St	rona						<u> </u>
Detailed Con	tents'					significi	, 0	rong						
Unit: 1		awar Natu grou wate	eness. ral reso nd water	urces: , floods g, salini	Water , droug ty. Ener	resource ht, confli rgy reso	a, scope es; use a cts over v urces, gro	nd over vater, da	utili: ms - 1	zati ben	on of efits ar	sur nd p	face proble	and ems,
Unit: 2		Envi pollu solid Envi	ronment ition, wa waste m ronment	ater po ater po anager Prote	lution: Ilution, nent. ection	Cause soil poll Act: Air	es, effect ution, no r, water, mental le	ise pollu forest a	tion, and v	the	rmal p	ollu	ition	and
Unit: 3		Socia ethic Disa infra	al Aspects: Ster Man Ster Climates Structure	ts and te chan nageme e and d	the En ge, glob ent: Typ levelopr	al warm es of dis nent. Ba	ent: Wat ing, acid r sasters, ir sic princi agement	er conse ain, ozoi npact of ples of c	rvati ne lay disa	ver o ster	depleti 's on e	on. envi	ronm	ent,

	mination and Evaluation Pattern: It include both internal evaluation (15 marks) comprising two class
sess	ional exams/assignments/quiz/seminar presentation etc. and external evaluation (35 marks) which
is m	ainly end semester examination.
Tex	t Books:
1	A.K. De, Environmental Chemistry, New Age Publications, 2002.
2	E.P. Odum, Fundamentals of Ecology, W.B. Sunders Co., U.S.A.
Refe	erence Books:
1	G.L. Karia and R.A. Christain, Waste Water Treatment, Concepts and Design Approach, Prentice Hall
	of India, 2005.
2	Benny Joseph, Environmental Studies, Tata McGraw – Hill, 2005.
3	V.K. Sharna, Disaster Management, National Centre for Disaster Management, IIPE, Delhi, 1999.

Course C		Course Title Lect									1	S	emes	ster
BTCS360	ESP	0								Т	Р		III	
Version: 1.2					oval: 16	th BoS 17			0	0	4			
	Scheme	of Ins	truction				Se	cheme of	f Exan	nina	tion			
	Periods	: 6	0 Hrs.						aximu			:	100	
Periods	/ Week	: 4						Inter	nal Ev	alua	tion	:	50	
	Credits	: 2							End S	eme	ester	:	50	
Instructio	n Mode	: P	ractical					E	lxam l	Dura	tion	:	3 H	rs.
Prerequisite	(s): Analo	g Elec	tronic C	ircuits										
Course Objec	tives:													
I. To under	stand th	e desi	gn proce	dure of	various	s electro	nic circui	t configu	iratioi	ıs.				
2. To desig	n and co	ntrol t	he frequ	ency re	sponse	of ampli	fiers.							
							rs and po							
4. To acqu	ire the l	knowl	edge of	Monos	table M	lultivaria	ate, Bista	ble Mult	tivibra	tor	and	Ard	uino	and
Raspberr	y Pi base	ed exp	eriments											
Course Outc	omes (CC	D):												
COs No.					Statem	lent					Map	ped	Prog	grar
											Out	com	nes (F	POs
CO ₁	Design	and co	onduct ex	xperime	ents on a	amplifiei	rs, oscilla	tors and				Р	O 3	
	multivit	orator	5.											
CO ₂	Apply th	ne tecl	nniques,	skills ar	nd mode	ern engir	neering to	ols of ele	ectror	ic		Р	O 3	
			igineerin											
CO ₃						nd powe	er supplie	s				PO ₂	2, PO 4	
CO ₄	Evaluat	e the	know	ledge	of Mo	nostable	e Multiv	ariate,	Bistat	ole	P	0 _{5,} P	O ₆ , PO	D 9
	Multivit	orator	and Ard	uino an	d Raspb	erry Pi b	ased exp	eriments						
sustainability, l	PO8- Ethic	es, PO 9 ⁻	- Individua	al or tear	n work, I	2 0 10- Con		on, PO 11- P	roject					
sustainability, 1 P O 12- Life-long Course	PO8- Ethic	es, PO 9 ⁻	- Individua	al or tear	n work, I	2 0 10- Con	nmunicatio	on, PO 11- P	roject	mana		nt ai		anc PC
sustainability, 1 PO12- Life-long Course Outcomes	P O 8- Ethic Learning	es, PO 9 ⁻ M	- Individua apping o PO ₃	al or tear	n work, I e outco	?O 10- Con mes with	nmunicatio n program	n, PO 11- P	roject	mana	ageme	nt ai	nd fin	anc PC
sustainability, l PO ₁₂ - Life-long Course Outcomes CO ₁	P O 8- Ethic Learning	es, PO 9 ⁻ M	- Individua apping o PO ₃ 2	al or tear	n work, I e outco	?O 10- Con mes with	nmunicatio n program	n, PO 11- P	roject	mana	ageme	nt ai	nd fin	anc PC
Outcomes CO ₁ CO ₂	P O 8- Ethic Learning	es, PO 9 M PO 2	- Individua apping o PO ₃	f cours PO4	n work, I e outco	?O 10- Con mes with	nmunicatio n program	n, PO 11- P	roject	mana	ageme	nt ai	nd fin	anc PC
sustainability, J PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃	P O 8- Ethic Learning	es, PO 9 ⁻ M	- Individua apping o PO ₃ 2	al or tear	n work, H e outcor PO 5	PO ₁₀ - Com mes with PO ₆	nmunicatio n program	n, PO 11- P	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
Course Outcomes CO ₁ Outcomes CO ₁ CO ₂	P O 8- Ethic Learning	es, PO 9 M PO 2	- Individua apping o PO ₃ 2 2	f cours PO4 2	n work, F e outcom PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject	mana	ageme	nt ai	nd fin	anc PC
Course Outcomes CO1 CO2 CO2 CO3 CO4	PO ₈ - Ethic (Learning PO ₁	es, PO 9 M PO 2	- Individua apping o PO ₃ 2 2	f cours PO4 2	n work, F e outcom PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatio n program	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
Course Outcomes CO ₁ CO ₂ CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con	PO ₈ - Ethic (Learning PO ₁ tents:	M PO2 2	- Individua apping o PO ₃ 2 2	f cours PO4 2	n work, F e outcom PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
sustainability, l PO_{12} - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con 1. Diode Cl	PO ₈ - Ethic <u>PO1</u> PO1 tents: haracteri	M PO ₂ 2 stics.	- Individua apping o PO ₃ 2 2 2 1 - F	f cours PO4 2	n work, F e outcom PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con 1. Diode Cl 2. Transist	PO ₈ - Ethic <u>Eearning</u> PO ₁ tents: haracteri or charac	PO ₂ 2 stics.	- Individua apping o PO ₃ 2 2 1 - F ics.	PO4	n work, F e outcom PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
Course Outcomes CO ₁ CO ₂ CO ₂ CO ₃ CO ₄ Detailed Con 1. Diode Cl 2. Transist 3. Series an	PO ₈ - Ethic (Learning PO ₁ tents: naracteri or charac nd Shunt	M PO ₂ 2 stics. cterist feedb	- Individua apping o PO ₃ 2 2 1 - F ics. ack amp	el or tear f cours PO4 2 Reasona	n work, F e outcom PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
Course Outcomes CO1 CO2 CO2 CO3 CO4 Detailed Con 1. Diode Cl 2. Transist 3. Series an 4. Design C	PO ₈ - Ethic Ethic PO ₁ PO ₁ tents: naracteric or characteric of Shunt f Wein b	method states and stat	- Individua apping o PO ₃ 2 2 1 - F ics. ack amp oscillator	al or tear f cours PO4 2 Reasona	n work, F e outcor PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
Sustainability, J PO12- Life-long Outcomes CO1 CO2 CO3 CO4 Detailed Con 1. Diode Cl 2. Transist 3. Series ar 4. Design co 5. Design co	PO ₈ - Ethic r Learning PO ₁ tents: naracteri or characteri of Shunt of Wein b f transis	stics. 2 stics. feedb ridge tor RC	Individua apping o PO ₃ 2 2 1 - F ics. ack amp oscillator phase s	al or tear f cours PO4 2 Reasona	n work, F e outcor PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
Sustainability, J PO12- Life-long Outcomes CO1 CO2 CO3 CO4 Detailed Con 1. Diode Cl 2. Transist 3. Series ar 4. Design c 5. Design c 6. Integrat	PO ₈ - Ethic Elearning PO ₁ tents: maracteri or charac of Shunt of Wein b of transis ors and I	stics. 2 stics. cterist feedb ridge tor RC Differe	Individua apping o PO ₃ 2 2 1 - F ics. ack amp oscillator phase s	al or tear f cours PO4 2 Reasona	n work, F e outcor PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
Course Outcomes CO ₁ CO ₂ CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con 1. Diode Cl 2. Transist 3. Series ar 4. Design c 5. Design c 6. Integrat 7. Clippers	PO ₈ - Ethic <u>Elearning</u> PO ₁ tents: maracteri or characteri of characteri of Shunt f Wein b of transis ors and I and Clar	stics. 2 stics. cterist feedb ridge tor RC Differe npers	Individua apping o PO ₃ 2 2 1 - F ics. ack amp oscillator phase si ntiators	al or tear f cours PO4 2 Reasona	n work, F e outcor PO ₅	PO ₁₀ - Commes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
sustainability, IPO12- Life-longCourseOutcomesCO1CO2CO3CO4Detailed Con1.Diode Cl2.Transist3.Series an4.Design cl5.Design cl6.Integrat7.Clippers8.Darlingt	PO ₈ - Ethic <u>Elearning</u> PO ₁ tents: maracteri or characteri of characteri of Shunt of Wein b f transis: ors and I and Clar on Emitt	stics. 2 stics. cterist feedb ridge tor RC Differe npers er follo	Individua apping o PO ₃ 2 2 1 - F ics. ack amp oscillator phase s ntiators ower	el or tear	n work, F e outcor PO ₅ 1 ble; 2 – 3	PO ₁₀ - Com mes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
sustainability, IPO12- Life-longCourseOutcomesCO1CO2CO3CO4Detailed Com1.Diode Cl2.Transist3.Series an4.Design cl5.Design cl6.Integrat7.Clippers8.Darlingt9.Complet	PO ₈ - Ethic <u>PO1</u> PO1 PO1 tents: naracteri or characteri or characteri on characteri o	s, PO ⁹ M PO ² 2 stics. cterist feedb ridge tor RC Differe npers er foll Symm	- Individua apping o PO ₃ 2 2 1 - F ics. ack amp oscillator phase s ntiators ower etry Pusl	Al or tear	n work, F e outcor PO ₅ 1 ble; 2 – 3	PO ₁₀ - Com mes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con 1. Diode Cl 2. Transist 3. Series an 4. Design c 5. Design c 6. Integrat 7. Clippers 8. Darlingt 9. Compler 10. Design c	PO ₈ - Ethic <u>PO1</u> PO1 PO1 tents: haracteri or characteri or characteri o	s, PO ₉ M PO ₂ 2 stics. cterist feedb ridge tor RC Differe npers er foll Symm table I	- Individua apping o PO ₃ 2 2 1 - F ics. ack amp oscillator phase si ntiators ower etry Pusl Multivibr	Al or tear f cours FO4 PO4 2 2 2 2 2 2 2 2 2 2 2 2 2	n work, F e outcor PO ₅ 1 ble; 2 – 3	PO ₁₀ - Com mes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
Course Outcomes CO ₁ CO ₂ CO ₂ CO ₃ CO ₄ Detailed Con 1. Diode Cl 2. Transist 3. Series an 4. Design c 5. Design c 6. Integrat 7. Clippers 8. Darlingt 9. Compler 10. Design c 11. Design c	PO ₈ - Ethic Elearning PO ₁ PO ₁ tents: naracteri or characteri or chara	stics. 2 stics. cterist feedb ridge tor RC Differe npers er foll Symm table I e Mult	- Individua apping o PO ₃ 2 2 1 - F ics. ack amp oscillator phase si ntiators ower etry Pusi Multivibr ivibrator	al or tear f cours f cours PO4 2 2 Reasona hift osc h-pull a ato	n work, F e outcor PO ₅ 1 ble; 2 – i illator	PO ₁₀ - Com mes with PO ₆	nmunicatic	PO ₁₁ - P n outcom PO ₈	roject nes POs	mana	ageme	nt ai	nd fin	anc PC
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sustainability, IPO12- Life-longCourseOutcomesCO1CO2CO3CO4Detailed Com1.Diode Cl2.Transist3.Series an4.Design cl5.Design cl6.Integrate7.Clippers8.Darlingt9.Complen10.Design cl11.Design cl12.ArduinoExamination	PO ₈ - Ethic Learning PO ₁ PO ₁ tents: haracteri or characteri or charac	s, PO ₉ M PO ₂ 2 stics. cterist feedb ridge tor RC Differe npers er foll Symm table I e Mult oberry luatio	Individua apping o PO ₃ 2 2 1 - F ics. ack amp oscillator phase si ntiators ower etry Pusl Multivibr ivibrator Pi basec n Patter	al or tear f cours PO4 2 2 2 2 2 2 2 2 2 2 2 2 2	n work, F e outcor PO 5 1 ble; 2 – 3 illator ments.	PO10- Com mes with PO6 2 Significa	nmunicatio	n, PO ₁₁ - P n outcom PO ₈ rong	marks		PO10	nt ar	nd fin On	
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2 Microelectronics circuits, Sedra and Smith, Oxford University Press, 1998.

Course Code Course T											cture Semest		
BTCS360)PCP	Data structure & Algorithms LAB L T							Т	Р	Sei	III	
Version: 1.2			Date o	of Appr	oval: 16	th BoS 17	7-11-2022		0	0	4		111
	Scheme	e of Instruction Scheme of Ex								nina	tion		
No. of	Periods	: 60	Hrs.					Ma	aximu	ım S	core	: 1	100
Period	s/Week	: 4						Inter	nal Ev	zalua	ation	: !	50
	Credits	: 2							End S	Seme	ester	: :	50
Instruction	on Mode										ation	: :	3 Hrs.
Prerequisite	erequisite(s): Data structure & Algorithms												
Course Obje	<u> </u>		0	·									
1. To unde	erstand th	e linear	and no	n-linea	r data s	tructure	s and algo	orithms.					
2. To iden	tify the su	itable d	lata stru	icture a	nd algo	rithm fo	r the give	n real-w	orld j	prob	lem.		
3. To gain	knowledg	e in pra	actical a	pplicati	ons of o	data stru	ctures an	d algorit	hms.				
4. To expe	riments tl	ne vario	ous appl	ications	s of Sea	rching a	nd sorting	g.					
Course Out	comes (CC)):						2					
COs No.		,			Statem	ent					Map	ped F	rogram
												-	s (POs)
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	and algo				1		5						
CO ₂				priate	data st	tructure	for give	n proble	em a	nd	Р	O ₃ , PO	4, PO 5
	algorith	ms.		I ····			0	I		-			
CO ₃	U		lvze da	ta struc	ture an	d algorit	hms.					PO ₂ , I	PO 3
CO ₄							on applic	ation ne	eds.			PO ₄ , I	
PO ₁ - Enginee										solut			
investigations													
investigations			\mathbf{D}								0 En:		
sustainability,	PO ₈ - Ethic	s, PO 9- I											l finance
	PO ₈ - Ethic	s, PO 9- I	ndividua	ll or tean	n work, F	PO 10 - Com	munication	n, PO 11- Pi	roject				l finance.
sustainability, PO 12- Life-lon	PO ₈ - Ethic	s, PO 9- I	ndividua	ll or tean	n work, F	PO 10 - Com		n, PO 11- Pi	roject				1
sustainability, PO ₁₂ - Life-lon Course	PO ₈ - Ethic g Learning	s, PO 9- I Maj	ndividua	ll or tean f course	n work, F	PO ₁₀ - Com	munication	n, PO 11- Pi	roject	man	ageme	ent and	PO
sustainability, PO ₁₂ - Life-lon Course Outcomes	PO ₈ - Ethic	s, PO 9- I	ndividua pping o PO 3	ll or tean	n work, F e outcor	PO 10 - Com	munication	n, PO 11- Pi	roject ies	man			PO
sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁	PO ₈ - Ethic g Learning	s, PO 9- I Maj	pping of PO ₃	ll or tean f course PO 4	n work, F e outcor PO 5	PO ₁₀ - Com	munication	n, PO 11- Pi	roject ies	man	ageme	ent and	PO ₁
sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁ CO ₂	PO ₈ - Ethic g Learning	s, PO 9- I Ма PO 2	pping of PO3	ll or tean f course	n work, F e outcor	PO ₁₀ - Com	munication	n, PO 11- Pi	roject ies	man	ageme	ent and	PO ₁
sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁ CO ₂ CO ₃	PO ₈ - Ethic g Learning	s, PO 9- I Maj	pping of PO ₃	ll or tean f course PO 4 2	n work, F e outcor PO 5	PO ₁₀ - Com	munication	n, PO 11- Pi	roject es PO	man	ageme	ent and	PO ₁
sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁ CO ₂	PO ₈ - Ethic g Learning	s, PO 9- I Ма PO 2	pping or PO ₃ 2 2 2	ll or tean	e outcon PO5	PO ₁₀ - Com mes with PO ₆	PO7	n, PO ₁₁ - Province of the second sec	roject ies	man	ageme	ent and	PO ₁
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sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con 1. Implem 2. Stacks,	POs- Ethic g Learning PO1 ntents: entation of Queues, O	As, PO ₉ - 1 Ma PO ₂ 2 of array Circular	pping of PO ₃ 2 2 2 1 - R operation	I or tean f course PO4 2 2 easonal ions, Striss, Priori	e outcon PO5 2 ble; 2 - 3	PO ₁₀ - Com mes with PO ₆ Significa s & Unio	PO7 PO7 mt; 3 – Sta	n, PO ₁₁ - P: outcom PO ₈ rong	PO PO	9 9	ageme	ent and	PO ₁
sustainability, PO ₁₂ - Life-lon Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con 1. Implem 2. Stacks, 3. Infix to	POs- Ethic g Learning PO1 ntents: entation o Queues, C postfix ex	PO2 PO2 2 of array Circular pressic	pping of PO ₃ 2 2 2 1 - R operati Queues	l or tean f course PO4 2 2 easonal ions, Stri s, Priori stack	e outcon PO5 2 ble; 2 - 5 ructure ty Quer	PO ₁₀ - Com mes with PO ₆ Significa s & Unio ues, Mult	PO7 PO7 mt; 3 – Stans iple stack	n, PO ₁₁ - P: outcom PO ₈ rong	PO PO	9 9	ageme	ent and	PO ₁
sustainability, PO ₁₂ - Life-lon Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co 1. Implem 2. Stacks, 3. Infix to 4. Implem	POs- Ethic g Learning PO1 ntents: entation of Queues, C postfix ex entation of	PO2 PO2 2 Df array Circular pressic of linked	ndividua pping or PO ₃ 2 2 2 2 1 – R r operati v Queues on using d lists: s	I or tean f course PO4 2 2 easonal ions, Stu s, Priori stack tacks, o	e outcor PO5 2 ble; 2 - 2 ructure ty Queues,	PO ₁₀ - Com mes with PO ₆ Significa s & Unio ues, Mult single lir	PO7 PO7 mt; 3 – Stanting sheed lists.	n, PO ₁₁ - P: outcom PO ₈ rong	PO PO	9 9	ageme	ent and	PO ₁
sustainability, PO12- Life-lon Outcomes CO1 CO2 CO3 CO4 Detailed Co3 1. Implem 2. Stacks, 3. Infix to 4. Implem 5. Implem	POs- Ethic g Learning PO1 ntents: entation of Queues, O postfix ex entation of entation of	PO2 PO2 2 of array Circular pressio of linked of polym	ndividua pping or PO ₃ 2 2 2 2 1 – R 7 operati 7 Queues on using d lists: s	I or tean f course PO4 2 2 easonal is, Priori stack tacks, o peratio	e outcor PO5 2 ble; 2 - 3 ructure ty Queues, ns. Dou	PO10- Com mes with PO6 Significa s & Unio ues, Mult single lir ıbly linke	PO7 PO7 mt; 3 – Sta ns. tiple stack aked lists.	n, PO ₁₁ - P: outcom PO ₈ rong	PO PO	9 9	ageme	ent and	PO ₁
sustainability, PO12- Life-lon Course Outcomes CO1 CO2 CO3 CO4 Detailed Co 1. Implem 2. Stacks, 3. Infix to 4. Implem 5. Implem 6. Tree tra	POs- Ethic g Learning PO1 ntents: entation of Queues, O postfix ex entation of entation of entation of entation of	An and a second	ndividua pping or PO ₃ 2 2 2 2 1 – R operati c Queues on using d lists: s nomial o implem	I or tean f course PO4 2 2 easonal is, Priori stack tacks, o peratio	e outcor PO5 2 ble; 2 - 3 ructure ty Queues, ns. Dou	PO10- Com mes with PO6 Significa s & Unio ues, Mult single lir ıbly linke	PO7 PO7 mt; 3 – Sta ns. tiple stack aked lists.	n, PO ₁₁ - P: outcom PO ₈ rong	PO PO	9 9	ageme	ent and	
sustainability, PO ₁₂ - Life-lon Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co 1. Implem 2. Stacks, 3. Infix to 4. Implem 5. Implem 6. Tree tra 7. Implem	POs- Ethic g Learning PO1 ntents: entation of queues, C postfix ex entation of aversal: AV entation of	s, PO ₉ - 1 Ma PO ₂ 2 of array Circular pressic of linkee of polyn /L tree of Hash	ndividua pping or PO ₃ 2 2 2 2 1 – R operati c Queues on using d lists: s nomial o implem	I or tean f course PO4 2 2 easonal is, Priori stack tacks, o peratio	e outcor PO5 2 ble; 2 - 3 ructure ty Queues, ns. Dou	PO10- Com mes with PO6 Significa s & Unio ues, Mult single lir ıbly linke	PO7 PO7 mt; 3 – Sta ns. tiple stack aked lists.	n, PO ₁₁ - P: outcom PO ₈ rong	PO PO	9 9	ageme	ent and	
sustainability, PO ₁₂ - Life-lon Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co 1. Implem 2. Stacks, 3. Infix to 4. Implem 5. Implem 6. Tree tra 7. Implem 8. Searchi	POs- Ethic g Learning PO1 PO1 ntents: entation of Queues, O postfix ex entation of entation of entation of aversal: AV entation of ng and so	s, PO ₉ - 1 Ma PO ₂ 2 of array Circular pressic of finked of polym /L tree of Hash rting	ndividua pping or PO ₃ 2 2 2 2 1 – R operati c Queues on using d lists: s nomial o implem	I or tean f course PO4 2 2 easonal is, Priori stack tacks, o peratio	e outcor PO5 2 ble; 2 - 3 ructure ty Queues, ns. Dou	PO10- Com mes with PO6 Significa s & Unio ues, Mult single lir ıbly linke	PO7 PO7 mt; 3 – Sta ns. tiple stack aked lists.	n, PO ₁₁ - P: outcom PO ₈ rong	PO PO	9 9	ageme	ent and	
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No. of	Periods	: 6) Hrs.					M	aximu	m Sco	ore	:	100	
Periods	/ Week	: 4						Inter	nal Ev	aluat	ion	:	50	
	Credits : 2 End S											:	50	
Instruction Mode : Practical Exam Du									Durat	ion	:	3 Hrs.		
Prerequisite(l Elect	ronics											
Course Objec														
1. To impar														
2. To under					nd sequ	iential ci	rcuits.							
3. To acquir			-	-										
To design			shift reg	gisters.										
Course Outco	omes (CC)):												
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Course (Code	Course Title Lectu							cture Seme				
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Course Outcomes CO1 CO2 CO3 CO4 Detailed Con Unit:	PO1 2 1 1 2 3	Ma PO ₂ Introd and Da Functi Break, String Lists: Functi Argum Import Regula Patter	PO ₃ 3 3 1 – F ata Type: ons, If, If Continu Manipu s: Access Introductions and tents, An ting mod ar expre- ns	PO4 History, s, Opera f- else, N e, Pass lation action, acco module onymou lule, Mat ssions: 1	PO5 2 ble; 2 – Features tor, Inpu Vested if nd Lists: ngs, Basi cessing li s: Definin s functic h modul Match fu	PO ₆ Significa , setting u t-Output -else, Loo c Operati st, Opera ng a funct ons, Globa e, Randor inction, S	PO7 PO7 Int; 3 – St Ip path, Wo , Printing o ping, For, V ons, String tions, Worl cion, Calling I and local n module, J Gearch func	PO ₈ rong orking with on screen, While, Ne slices, Fu ding with g a function variables, Packages, ction, Mat	PO ₉ 1 h Pytho sted lo inction lists, Fro on, Typ Composition	on, Basicon ops, Co and Me inction es of fu osition VS Sear	e Syn ntrol thod and 1 nctio	tax, Va Stater S Metho ns, Fu	2 ariabl ments ds nctio
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Course Outcomes CO1 CO2 CO3 CO4 Detailed Con Unit: Unit: Unit: Unit: Unit:	PO1 2	Ma PO2 Introd and Da Functi Break, String Lists: I Functi Argum Import Regula Patter Readir Databa	PO ₃ 3 3 1 - F ata Type: ons, If, Ii Continu Manipu s: Access Introductions and ting mode ar expre- ns ng data fr ase: Introd	PO4 Reasona History, s, Opera f- else, N e, Pass lation ac module onymou lule, Mat ssions: 1 rom keyt oduction	PO5 2 ble; 2 – Features tor, Inpu Jested if nd Lists: ngs, Basi ressing li s: Definin s functic h modul Match fu Dooard, Op a, Conned	PO ₆ Significa s, setting u -else, Loo c Operati st, Operati st, Operati ons, Globa e, Randor inction, S pening an ctions, Ex	PO7 PO7 Int; 3 – St Int; 3 – S	PO ₈ rong orking with on screen, While, Ne slices, Fu king with g a function variables, Packages, ction, Matelle, Readir eries, Tra	PO9 1 1 h Pytho sted lo inction lists, Ft on, Typ Comp- cching ng and nsactic	on, Basi- ops, Co and Me inction es of fu osition VS Sear writing ns, Han	e Syn ntrol and 1 nctio ching files, dling	tax, Va Stater S Metho ns, Fu g, Moo g error	2 ariabl ments ds nctio
Course Outcomes CO1 CO2 CO3 CO4 Detailed Con Unit: Unit: Unit: Unit: Unit: Examination	PO1 2 1 1 2 3 4 5 and Evalu	Ma PO2 Introd and Da Functi Break, String Lists: Functi Argum Import Regula Patter Readir Databa	PO ₃ 3 3 1 - F ata Type: ons, If, Ii Continu Manipu S: Access Introduce intro	PO4 Reasona History, s, Opera f- else, N e, Pass lation ac module onymou lule, Mat ssions: 1 rom keyt oduction t include	PO5 2 ble; 2 – Features tor, Inpu Jested if nd Lists: ngs, Basi cessing li s: Defini s functio h modul Match fu Dooard, Op a, Connece e both in	PO ₆ Significa s, setting u c, setting u c Operati st, Opera ng a funct ons, Globa e, Randor inction, S pening an ctions, Ex iternal ev	PO7 PO7 Int; 3 – St Int; 3 – S	PO ₈ rong orking with on screen, While, Ne slices, Fu king with g a function variables, Packages, ction, Mate eries, Tra 0 marks)	PO9 1 1 h Pytho sted lo notion lists, Ft on, Typ Comp cching ng and nsactio compr	on, Basicops, Co and Me inction es of fu vys Sear writing ns, Han ising tw	thod and 1 nctio	tax, Va Stater s Metho ns, Fu g, Moo g error	2 ariabl ments dds nction
Course Outcomes CO1 CO2 CO3 CO4 Detailed Con Unit: Unit: Unit: Unit: Unit: Examination exams/ assign	PO1 2 1 1 2 3 4 5 and Evalu	Ma PO2 Introd and Da Functi Break, String Lists: Functi Argum Import Regula Patter Readir Databa	PO ₃ 3 3 1 - F ata Type: ons, If, Ii Continu Manipu S: Access Introduce intro	PO4 Reasona History, s, Opera f- else, N e, Pass lation ac module onymou lule, Mat ssions: 1 rom keyt oduction t include	PO5 2 ble; 2 – Features tor, Inpu Jested if nd Lists: ngs, Basi cessing li s: Defini s functio h modul Match fu Dooard, Op a, Connece e both in	PO ₆ Significa s, setting u c, setting u c Operati st, Opera ng a funct ons, Globa e, Randor inction, S pening an ctions, Ex iternal ev	PO7 PO7 Int; 3 – St Int; 3 – S	PO ₈ rong orking with on screen, While, Ne slices, Fu king with g a function variables, Packages, ction, Mate eries, Tra 0 marks)	PO9 1 1 h Pytho sted lo notion lists, Ft on, Typ Comp cching ng and nsactio compr	on, Basicops, Co and Me inction es of fu vys Sear writing ns, Han ising tw	thod and 1 nctio	tax, Va Stater s Metho ns, Fu g, Moo g error	2 ariabl ments dds nction
Course Outcomes CO1 CO2 CO3 CO4 Detailed Con Unit: Unit: Unit: Unit: Unit: Examination exams/ assign examination.	PO1 2 1 1 2 3 4 5 and Evalu	Ma PO2 Introd and Da Functi Break, String Lists: Functi Argum Import Regula Patter Readir Databa	PO ₃ 3 3 1 - F ata Type: ons, If, Ii Continu Manipu S: Access Introduce intro	PO4 Reasona History, s, Opera f- else, N e, Pass lation ac module onymou lule, Mat ssions: 1 rom keyt oduction t include	PO5 2 ble; 2 – Features tor, Inpu Jested if nd Lists: ngs, Basi cessing li s: Defini s functio h modul Match fu Dooard, Op a, Connece e both in	PO ₆ Significa s, setting u c, setting u c Operati st, Opera ng a funct ons, Globa e, Randor inction, S pening an ctions, Ex iternal ev	PO7 PO7 Int; 3 – St Int; 3 – S	PO ₈ rong orking with on screen, While, Ne slices, Fu king with g a function variables, Packages, ction, Mate eries, Tra 0 marks)	PO9 1 1 h Pytho sted lo notion lists, Ft on, Typ Comp cching ng and nsactio compr	on, Basicops, Co and Me inction es of fu vys Sear writing ns, Han ising tw	thod and 1 nctio	tax, Va Stater s Metho ns, Fu g, Moo g error	2 ariabl ments dds nction
Course Outcomes CO1 CO2 CO3 CO4 Detailed Con Unit: Unit: Unit: Unit: Unit: Examination exams/ assign examination. Text Books:	PO1 2 intents: 1 2 3 4 5 and Evalu nments/ q	Ma PO2 Introd and Da Functi Break, String Lists: I Functi Argum Import Regula Patter Readir Databa ation Pa	PO ₃ 3 3 1 - F ata Type: ons, If, If Continu Manipu s: Access Introduce ins and ting mod ar expre ns g data fr ase: Introd ting ree	PO4 Reasona History, s, Opera f- else, N e, Pass lation ac module onymou lule, Mat ssions: 1 rom keyb oduction c include sentatio	PO ₅ 2 ble; 2 – Featuress tor, Inpu Jested if- nd Lists: ngs, Basi essing li s: Defini s functio h modul Match fu Doard, Op a, Connece b both in n etc. an	PO ₆ Significa s, setting u tt-Output -else, Loo c Operati st, Opera ng a funct ons, Globa e, Randor inction, S pening an ctions, Ex iternal ev d externa	PO7 PO7 ant; 3 – St up path, Wo , Printing o ping, For, ' ons, String tions, Worl tion, Calling and local n module, J earch func d closing fi ecuting qu aluation (3 l evaluation	PO ₈ rong orking with on screen, While, Ne slices, Fu king with g a functic variables, Packages, tion, Mat eries, Tra 0 marks) n (70 mark	PO9 1 1 h Pytho sted lo unction lists, Fu on, Typ Comp cching ng and nsactic compr s) whice	on, Basicops, Co and Me inction es of fu vy Sear writing ns, Han ising tw h is ma	c Syn ntrol thod and 1 nctio ching files, dling vo cla inly e	tax, Va Staten s Metho ns, Fu g, Moo g error ass ses and ser	2 ariable ments dds nction
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Course C					Course					cture	Sei	mester:
BTCS402	PCT					ement Sy			L	Т Р	30	IV IV
Version: 1.2					·oval: 16	th BoS 1	7-11-2022		3	1 0		1.
	Scheme	1 1					Sc	cheme of				
	Periods) Hrs.							n Score		100
Periods		: 4								luation		30
	Credits	: 4								mester		70
Instructio			ecture					E	lxam D	uration	: :	3 Hrs.
Prerequisite		Struct	are and A	Algorith	Im							
Course Object1.To under with vary2.To handle controlling	stand th ring skill e differer ng concu	levels. nt user irrent i	views of updates	the sar so as to	ne store mainta	ed data, c in data i	combining ntegrity.	ginterrel	ated da	ata, setti	ng sta	andards,
 To mana complex To acquir 	system.					-	-	ns acros	s muit	ipie usei	rs ior	a large
Course Outco				0			0					
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												s (POs)
CO1	algebra	expre		or queri	es, logi	cal desig	e able to n of data				РО	3
CO ₂	Apply	and a	nalyze	the da	tabase	storage	structur	es and	acces	s	PO ₂ , 1	PO3
			e file an									
CO ₃			pply ind hniques				ng B-tree 1.	, hashing	g, quer	у	PO ₃ , 1	PO5
CO ₄		by des	igning a				essing an tabase ap				PO _{4,} I	PO ₉
PO ₁ - Engineer investigations sustainability, I PO ₁₂ - Life-long	of comple PO 8- Ethic	x probl s, PO 9-	ems, PO ₅ Individua	- Moder al or tear	n tool us n work, F	sage, PO 6 O 10- Con	- The engi	neer and n, PO 11- Pi	society roject n	, PO 7- En	vironi	ment and
Course	PO ₁	PO ₂	DO.	PO ₄	PO ₅	PO ₆	PO ₇	PO ₈	PO ₉	PO ₁₀	РО	PO ₁
Outcomes	PO ₁	PO ₂	PO ₃	PO4	PO ₅	PO ₆	P07	PO ₈	PO9	PO10	PO	11 2
CO ₁			2									
CO_2		2	3									
CO ₃			3		2							
CO ₄				1					1			
			1 – R	leasona	ble; 2 – 1	Significa	nt; 3 – St	rong				
Detailed Con	tents:	Data	base S	vstem	Applica	tions, da	ata base	System	VS fil	e Syster	n –	View of
Unit: 1		Data – Rel Acce Tran Quer – Be Relat <u>ER M</u> Intro Enfo	– Data ational M ss for a saction I y Proces yond ER ionship iodel – C duction rcing Inf	Abstra Model – applicat Manage sor. His Cosign sets – <u>concept</u> to the tegrity	ction – Other N tions P ment – story of h Entitio Additio ual Des e Relatio constrai	Instance Models – rograms data bas Data bas es, Attril onal feat ign for L onal Mo ints – C	s and Sch Database - data se System se System outes and cures of arge ente del – Int Querying s – Dest	e Langua base U Structu s. Data b d Entity ER Mode rprises. egrity C relationa	data M ges – D lsers a ure – S base de sets el – Con Constra il data	odels – DL – DN and Adr torage M sign and – Relat ncept De int Ove – Logio	the E AL – C ninist I ER d ionsh sign r rela cal da	R Model latabase grator – the liagrams ips and with the ations – ata base
Unit: 2	2	Relat Divis	ional Alg ion – Ex	gebra – amples	Selection of Alge	on and p bra over	views – I s – Expre	set oper Relationa	rations l calcu	– renan lus – Tu	ning - ple re	- Joins – elational

		Form of Pagia SOL Quarty Examples of Pagia SOL Quaries Introduction to
		Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries Correlated Nested Queries Set – Comparison Operators –
		Aggregative Operators – NULL values – Comparison using Null values – Logical
		connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins –
		Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and
	Unit: 3	Active Data bases. Schema refinement – Problems Caused by redundancy
		Decompositions – Problem related to decomposition – reasoning about FDS –
		FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition –
		Dependency preserving Decomposition – Schema refinement in Data base Design
		- Multi valued Dependencies - FORTH Normal Form.
		Transaction Concept- Transaction State- Implementation of Atomicity and
		Durability Concurrent – Executions – Serializability- Recoverability –
		Implementation of Isolation – Testing for serializability- Lock –Based Protocols –
	Unit: 4	Timestamp Based Protocols- Validation- Base Protocols - Multiple Granularity.
		Recovery and Atomicity - Log - Based Recovery - Recovery with Concurrent
		Transactions - Buffer Management - Failure with loss of nonvolatile storage-
		Advance Recovery systems- Remote Backup systems.
		Data on External Storage – File Organization and Indexing – Cluster Indexes,
		Primary and Secondary Indexes – Index data Structures – Hash Based
	Unit: 5	Indexing - Tree base Indexing Comparison of File Organizations - Indexes and
		Performance Tuning- Intuitions for tree Indexes - Indexed Sequential Access
		Methods (ISAM) – B+ Trees: A Dynamic Index Structure.
		luation Pattern: It include both internal evaluation (30 marks) comprising two class
	, ,	gnments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
	ainly end semeste t Books:	r examination.
1		nagement Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill
1	3rd Edition	agement systems, Ragnurania Rusinian, Johannes Ochrec, IATA McOrdwillin
2		n Concepts, Silberschatz, Korth, McGraw hill, V edition
	erence Books:	······································
1	Fundamentals of	Database Systems, Elmasri Navrate Pearson Education
2	Introduction to I	Database Systems, C.J.Date Pearson Education
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BTCS403	ode				Course					ture	Sen	ester:
	PCT				0	Systems				Т Р		IV IV
Version: 1.2				of Appr	oval: 16	th BoS 1	7-11-2022		3	1 0		
	Scheme						Se	cheme of	Exami	nation	 	
	Periods		Hrs.					Ma	aximun	n Score	: 10	
Periods	/ Week	: 4						Inter	nal Eva	luation	: 3	
	Credits	: 4								mester	: 70	
Instructio			cture					E	xam D	uration	: 3	Hrs.
Prerequisite	`	g Electi	onic Ci	rcuits/	Digital	Electror	nics					
Course Object												
							ractions	such as	proce	esses, th	nreads	, files,
semapho					2	0						
						ons can	be used	in the o	develop	oment o	f appl	ication
program												
					ncy an	d synchi	ronizatio	n, and ap	oply th	em to v	vrite o	correct
concurre												
•		U	e of varie	ous kine	is of de	sign prir	nciple of o	operating	g syster	ns.		
Course Outc	omes (CC	D):										
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							ses and t		contex	t		
		0,					ne, and de				DO	
$CO_2$							r-based s				PO ₃	
	-		r progra	am to m	eet des	ired nee	ds in cont	ext of op	erating	S		
	system.		<b>Q</b> (	11			• .	, 1	1		DO	
CO ₃			•		-		interrup	its and	know	7	PO ₄	
						ns facilit			11	1 D4	0 00	DO
CO ₄	Apply synchro	-			onitors	for C	assical	and rea	I-world		O ₃ , PO ₄ ,	$PO_6$
											v II () I I I I	ent and
sustainability, PO ₁₂ - Life-long		s, <b>PO</b> 9- I	ndividua	l or tean	n work, <b>F</b>	<b>O</b> 10- Com		n, <b>PO</b> 11- P1	roject m			
PO ₁₂ - Life-long Course		s, <b>PO</b> 9- I	ndividua	l or tean	n work, <b>F</b>	<b>O</b> 10- Com	municatio	n, <b>PO</b> 11- P1	roject m			Finance,
PO ₁₂ - Life-long Course Outcomes	g Learning PO1	еs, <b>РО</b> 9- I Мај <b>РО</b> 2	ndividua	l or team f course PO4	n work, <b>F</b> e outcoi	nes with	municatio	n, <b>PO</b> 11- PI	es	anageme	nt and	finance,
PO ₁₂ - Life-long Course Outcomes CO ₁	g Learning	s, <b>PO</b> 9- I Maj	ndividua pping of PO3	l or team f course	n work, <b>F</b> e outcoi	nes with	municatio	n, <b>PO</b> 11- PI	es	anageme	nt and	Finance,
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂	g Learning PO1	еs, <b>РО</b> 9- I Мај <b>РО</b> 2	ndividua	l or team f course <b>PO</b> 4 1	n work, <b>F</b> e outcoi	nes with	municatio	n, <b>PO</b> 11- PI	es	anageme	nt and	Finance,
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃	g Learning PO1	еs, <b>РО</b> 9- I Мај <b>РО</b> 2	ndividua pping of PO3 2	l or team	n work, <b>F</b> e outcoi	PO ₁₀ - Com nes with PO ₆	municatio	n, <b>PO</b> 11- PI	es	anageme	nt and	finance,
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂	g Learning PO1	еs, <b>РО</b> 9- I Мај <b>РО</b> 2	ndividua pping of PO3 2 2 2	l or team	n work, <b>F</b> e outcor <b>PO</b> 5	PO ₁₀ - Com nes with PO ₆	PO7	n, PO ₁₁ - Pr	es	anageme	nt and	Finance PO ₁
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁ 2	еs, <b>РО</b> 9- I Мај <b>РО</b> 2	ndividua pping of PO3 2 2 2	l or team	n work, <b>F</b> e outcor <b>PO</b> 5	PO ₁₀ - Com nes with PO ₆	municatio	n, PO ₁₁ - Pr	es	anageme	nt and	Finance,
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃	PO ₁ 2	Ma Ma PO ₂	ndividua pping of PO ₃ 2 2 2 1 – R	l or team f course PO4 1 1 1 easonal	PO5	PO ₁₀ - Com nes with PO ₆ 2 Significa	PO7 PO7 nt; 3 – St	n, PO ₁₁ - Pi	es PO9	PO ₁₀	PO ₁₁	PO ₁
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁ 2	Na           Ma           PO2           1           Syste	ndividua pping of PO ₃ 2 2 1 - R m Softv	l or team f course PO4 1 1 1 easonal vare: M	PO5 PO5 Ple; 2 – S achine,	PO ₁₀ - Com nes with PO ₆ 2 Significa Assemb	PO7 PO7 nt; 3 – St	n, PO ₁₁ - Pr	PO9	PO ₁₀	PO ₁₁	PO ₁
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con	PO1 2	Na Ma PO ₂ 1 Syste Interp	ndividua pping of PO ₃ 2 2 1 – R m Softv preters;	l or team f course PO4 1 1 1 easonal vare: M Loading	e outcor PO5 Dle; 2 – S achine, g, Linkin	PO ₁₀ - Com nes with PO ₆ 2 Significa Assemb	PO7 PO7 nt; 3 – St ly and H elocation	n, PO ₁₁ - Provide the second	PO9 PO9	PO ₁₀ PO ₁₀ lages; Coggers.	PO ₁₁	PO ₁ 2 ers and
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO1 2	Na PO2 1 Syste Interp Basic:	ndividua pping of PO ₃ 2 2 1 - R m Softv oreters; s of O	l or team f course PO4 1 1 easonal vare: M Loading peratin	e outcor PO5 ble; 2 – S achine, g, Linkin g Syste	PO ₁₀ - Com nes with PO ₆ 2 Significa Assemb ng and R ems: Op	nt; 3 – St program PO7 nt; 3 – St ply and H elocation perating	n, PO ₁₁ - Pi outcom PO ₈ rong igh-Leve ; Macros System	PO9 PO9 I Langu , Debuş Structu	PO10 PO10 ages; Coggers. ure, Opo	PO ₁₁	PO ₁ 2 ers and as and
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con	PO1 2	Na PO2 1 Syste Interp Basic: Service	ndividua pping of PO ₃ 2 2 1 - R m Softv oreters; s of O	l or team f course PO4 1 1 easonal vare: M Loading peratin	e outcor PO5 ble; 2 – S achine, g, Linkin g Syste	PO ₁₀ - Com nes with PO ₆ 2 Significa Assemb ng and R ems: Op	PO7 PO7 nt; 3 – St ly and H elocation	n, PO ₁₁ - Pi outcom PO ₈ rong igh-Leve ; Macros System	PO9 PO9 I Langu , Debuş Structu	PO10 PO10 ages; Coggers. ure, Opo	PO ₁₁	PO ₁ 2 ers and as and
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con	PO1 2	Syste Interp Basic: Servic Boot.	ndividua pping of PO ₃ 2 2 1 - R m Softv oreters; s of O ces; Sys	l or team f course PO ₄ 1 1 easonal vare: M Loading peratin tem Ca	e outcor PO5 ple; 2 – 5 achine, g, Linkin g Syst ulls, Op	PO ₁₀ - Commes with PO ₆ 2 Significa Assemb and R ems: Operating-	municatio program PO7 mt; 3 – St ly and H elocation perating System I	n, <b>PO</b> ₁₁ - Pr outcom <b>PO</b> ₈ <b>PO</b> ₈ igh-Leve ; Macros System Design ar	PO9 PO9 I Langu , Debuş Structu nd Imp	PO10 PO10 lages; Cu ggers. Irre, Opo lementa	PO ₁₁ PO ₁₁ ompile eration	PO ₁ 2 ers and System
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con	PO1 2 tents:	Syste Interp Basic Servic Boot. CPU	ndividua pping of PO ₃ 2 2 2 1 - R m Softv preters; s of Op pres; Sys Schedu	l or team f course PO4 1 1 easonal vare: M Loading peratin tem Ca iling: S	e outcon PO₅ PO₅ ole; 2 – 5 achine, g, Linkin g Syste Ills, Op	PO ₁₀ - Com nes with PO ₆ 2 Significa Assemb ng and R ems: Op erating- ing Cri	nt; 3 – St program PO7 nt; 3 – St ply and H elocation perating	n, PO ₁₁ - Pi outcom PO ₈ rong igh-Leve ; Macros System Design ar	PO9 PO9 I Langu , Debuş Structu nd Imp	PO10 PO10 lages; Cu ggers. Irre, Opo lementa	PO ₁₁ PO ₁₁ ompile eration	PO ₁ 2 ers and System
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con	PO1 2 tents:	Syste Basic: Service Boot. CPU Multi	ndividua pping of PO ₃ 2 2 1 - R m Softv preters; s of Op pres; Sys Schedu	l or team f course PO4 1 1 2 easonal vare: M Loadiną peratin tem Ca iling: S cessor S	e outcor PO5 PO5 achine, g, Linkin g Systa Schedul Schedul	PO ₁₀ - Com nes with PO ₆ 2 Significa Assemb ng and R ems: Op erating- ing Cri ing, Real	PO7 PO7 MIT; 3 – St NU; 3 – St NU; 3 – St NU; AND H PO PO NU; 3 – St NU; 3 –	n, PO ₁₁ - Pi outcom PO ₈ igh-Leve ; Macros System Design ar d Algori PU Sched	PO9 PO9 I Langu , Debuş Structu nd Imp thms; uling.	PO10 PO10 lages; Cuggers. lire, Opolementa Thread	PO ₁₁ PO ₁₁ ompile eration; \$ Sche	PO ₁ 2 PO ₁ 2 Prs and System duling,
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con	PO1 2 tents:	Syste Interp Basic: Servic Boot. CPU Multij Deadl	ndividua pping of PO ₃ 2 2 1 - R m Softv preters; s of Oj ces; Sys Schedu ple-Proo ocks: D	l or team f course PO4 1 1 1 easonal vare: M Loading peratin tem Ca iling: S cessor S eadlock	e outcor PO5 PO5 achine, g, Linkin g Syst Schedul Schedul	PO ₁₀ - Com nes with PO ₆ 2 Significa Assemb ng and R erating- ing Cri ing, Real cterizatio	PO7 PO7 PO7 Int; 3 – St Ily and H elocation berating System I teria and -Time CI	n, PO ₁₁ - Pi outcom PO ₈ pO ₈ igh-Leve ; Macros System Design ar d Algori PU Sched ods for Ha	PO9 PO9 I Langu, Debuş Structu nd Imp thms; uling. andling	PO ₁₀ PO ₁₀ lages; Coggers. Ire, Opolementa Thread	PO ₁₁ PO ₁₁ ompile eration; \$ Sche	PO ₁ 2 PO ₁ 2 Prs and System duling
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PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con	PO1 2 tents:	Syste Interp Basic: Servic Boot. CPU Multij Deadl Preve Memo	ndividua pping of PO ₃ 2 2 1 - R m Softv oreters; s of Op ces; Sys Schedu ole-Proc ocks: D ntion, A pry Ma	l or team f course PO4 1 1 1 easonal vare: M Loading peratin tem Ca cling: S cessor S eadlock voidance magem	e outcor PO5 PO5 Jele; 2 – S achine, g, Linkin g Syste Ills, Op Schedul Schedul c Charac ce and I ent: C	PO10- Com nes with PO6 2 Significa Assemb ng and R ems: Op erating- ing, Real cterizatio Detection ontiguou	nt; 3 – St program PO ₇ nt; 3 – St ly and H elocation perating System D teria and -Time CI on, Metho n; Recove	n, PO ₁₁ - Pr outcom PO ₈ PO ₈ igh-Leve ; Macros System besign ar d Algori PU Sched ids for Ha ry from I bry Allo	PO9 PO9 I Langu , Debuş Structu and Imp thms; uling. andling Deadloo cation,	PO10 PO10 ages; Coggers. ure, Opolementa Thread Deadloock. Swapp	POn POn ompile eration tion; s Sche eks, De	Finance PO ₁ 2 ers and System duling adlock Paging
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con	g Learning PO1 2	Syste Interp Basic Servic Boot. CPU Multi Deadl Preve Memo Segm	ndividua pping of PO ₃ 2 2 1 - R m Softv oreters; s of Op ces; Sys Schedu ole-Proc ocks: D ntion, A pry Ma	l or team f course PO4 1 1 1 easonal vare: M Loading peratin tem Ca iling: S cessor S eadlock voidance nagem h, Dem	e outcor PO5 PO5 Je; 2 – S achine, g, Linkin g Syste Schedul Schedul Schedul Charac ce and I ent: C nand P	PO10- Com nes with PO6 2 Significa Assemb ng and R ems: Operating- ing, Real cterizatio Detection ontiguon aging,	municatio	n, PO ₁₁ - Pr outcom PO ₈ PO ₈ igh-Leve ; Macros System besign ar d Algori PU Sched ids for Ha ry from I bry Allo	PO9 PO9 I Langu , Debuş Structu and Imp thms; uling. andling Deadloo cation,	PO10 PO10 ages; Coggers. ure, Opolementa Thread Deadloock. Swapp	POn POn ompile eration tion; s Sche eks, De	Finance.
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con Unit: 1	g Learning PO1 2	Syste Interp Basic: Servic Boot. CPU Multi Deadl Preve Memo Segm Thras	ndividua pping of PO ₃ 2 2 1 – R m Softv oreters; s of Op ces; Sys Schedu ble-Proo ocks: D ntion, A ory Ma entation hing, M	l or team f course PO ₄ 1 1 2 asonal vare: M Loading peratin tem Ca lling: S cessor S eadlock voidance magem h, Dem emory-	e outcor PO5 PO5 ole; 2 – 5 achine, g, Linkin g Systa Schedul Schedul Schedul Charac ce and I ent: C nand P Mappeo	PO ₁₀ - Com nes with PO ₆ 2 Significa Assemb ng and R ems: Operating- ing Cri ing, Real cterization Detection ontiguon aging, d Files.	municatio	n, PO ₁₁ - Pr outcom PO ₈ PO ₈ rong rong rong rong rong rong rong rong	PO9 PO9 I Langu , Debuş Structu ad Imp thms; uling. andling Deadloo cation, nt, All	PO10 PO10 ages; Cogers. ure, Opolementa Thread Deadloock. Swapp ocation	POn POn ompile eration tion; 5 Sche cks, De	rames,
PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Con Unit: 1	g Learning PO1 2	Syste Interp Basic Servic Boot. CPU Multij Deadl Preve Memo Segm Thras Disk	ndividua pping of PO ₃ 2 2 1 – R m Softv oreters; s of Op ces; Sys Schedu ble-Proo ocks: D ntion, A ory Ma entation hing, M	l or team f course PO ₄ 1 1 easonal vare: M Loading peratin tem Ca cling: S cessor S eadlock voidanc magem n, Dem emory- ement:	e outcor PO5 PO5 ole; 2 – 9 achine, g, Linkin g Syst Schedul Schedul Charac ce and I ent: C hand P Mappee Mass-	PO10- Com nes with PO6 2 Significa Assemb ng and R ems: Operating- ing Cri ing, Real cterizatio Detection ontiguon aging, 1 Files. Storage	municatio program PO7 PO7 nt; 3 – St ly and H elocation berating System E teria and -Time CH on, Methol n; Recove us Memo Page Re	n, PO ₁₁ - Pr outcom PO ₈ PO ₈ rong rong rong rong rong rong rong rong	PO9 PO9 I Langu , Debuş Structu ad Imp thms; uling. andling Deadloo cation, nt, All	PO10 PO10 ages; Cogers. ure, Opolementa Thread Deadloock. Swapp ocation	POn POn ompile eration tion; 5 Sche cks, De	rames,
PO12- Life-long Course Outcomes CO1 CO2 CO3 CO4 Detailed Con Unit: 2	PO1       2	s, PO ₉ - I Ma PO ₂ 1 Syste Interp Basic: Servic Boot. CPU Multij Deadl Preve Memo Segm Thras Disk Mana File a	ndividua pping of PO ₃ 2 2 1 - R m Softv oreters; s of O ces; Sys Schedu ole-Proo ocks: D ntion, A ory Ma entation hing, M Manag gement nd Inpu	l or team f course PO4 1 1 1 2 asonal vare: M Loading peratin tem Ca lling: S cessor S eadlock voidance n, Dem emory- ement: , RAID S it/Outj	e outcor PO5 PO5 achine, g, Linkin g Syste Schedul Schedul Charac ce and I ent: C happed Mapped Mass- Structur put Sys	PO10- Com nes with PO6 2 Significa Assemb ng and R erating- ing Cri ing, Real cterizatio Detection ontiguon aging, d Files. Storage e. tems: Ac	municatio program PO7 PO7 nt; 3 – St ly and H elocation berating System E teria and -Time CH on, Methol n; Recove us Memo Page Re	n, PO ₁₁ - Pi outcom PO ₈ PO ₈ igh-Leve ; Macros System Design ar d Algori PU Sched ods for Ha ry from I Dry Allo placemen e, Disk	PO9 es PO9 I Langu, Debug Structu nd Imp thms; uling. andling Deadloo cation, nt, All Structu	PO10 PO10 Iages; Co ggers. Ire, Opo lementa Thread Deadloo ck. Swapp ocation Ire, Sch v and Di	POn POn ompile eration; S che cks, De cks, De of F nedulir	rrs and duling, adlock Paging, rames, ag and

		Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance; Recovery, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations.
	Unit: 5	Security: Protection, Access Matrix, Access Control, Revocation of Access Rights, Program Threats, System and Network Threats; Cryptography as a Security Tool, User Authentication, Implementing Security Defenses. Windows and Linux Operating Systems: Design Principles, File Systems, Input and Output; Inter-process Communication, Network Structure.
		uation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	sional exams/ assig	gnments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semeste	r examination.
Tex	t Books:	
1	Silberschatz, Gal	vin and Gagne, "Operating Systems Concepts", Wiley
2	SibsankarHalder	and Alex A Aravind, "Operating Systems", Pearson Education
Ref	erence Books:	
1	Harvey M Dietel,	"An Introduction to Operating System", Pearson Education
2	D M Dhamdhere	, "Operating Systems: A Concept based Approach", McGraw Hill
3	Charles Crowley	, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Education".
4	Stuart E. Madnic	k & John J. Donovan. Operating Systems. McGraw Hill

Course Co	ode			С	ourse T	itle			Leo	ture		Som	octor
BTCS405F	РСТ		Object C	)rientec	l Progra	amming a	using Jav	a	L	T I	P		ester: V
Version: 1.2			Date o	f Appro	val: 16t	h BoS 17-	-11-2022		3	1 (	0	1	V
	Scheme	of Ins	struction				S	cheme	of Exar	ninatio	n		
No. of	Periods	:	60 Hrs.					N	laximur	n Score	,	: 10	)0
Periods	/ Week	:	4					Inte	rnal Eva	aluatior	1	: 3	0
1	Credits	:	4						End Se	emeste	r	: 70	C
Instruction	n Mode	:	Lecture					]	Exam D	uration	ı	: 3	Hrs.
Prerequisite(s	s): Progra	ammi	ng for Pro	blem S	olving								
Course Object	, 0		0		0								
<ol> <li>To under language.</li> <li>To elabor</li> </ol>	ate varia	ble s	copes, me	emory r	nanage	-	-			-		-	_
<ul><li>paramete</li><li>3. To demor features.</li><li>4. To acquir</li></ul>	nstrate th	ne prii	nciples of	object-	oriente			progra	mming	langua	ge v	vith s	ecurity
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005110.					Statem								(POs)
CO ₁	Unders	tand t	the princi	nles of	object-	oriented	Inrogra	nmino	naradio			PO1, PO	· /
		ally	including								-	01,2	- 2,
CO ₂	Demons	strate	best pra	ctices i	n desigi	ning clas	ses and	class hi	erarchi	es		PO ₃	
	from p	roblei	m statem achieve p	ents us	sing sul	b-classin	ıg, abstr	act cla	sses, a				
CO ₃	Demons	strate	informe	ed use	of en					ss	I	PO ₄ , P	05
			nponents							_			
CO ₄			ion handl			n and eso	calation	mechar	nisms ai	nd	F	PO5, P	O9
PO ₁ - Engineeri			vriting Ja										
investigations of sustainability, <b>P</b> <b>PO</b> ₁₂ - Life-long	of complex O ₈ - Ethics	x prob s, <b>PO</b> 9	lems, <b>PO</b> 5- - Individua	- Moder l or team	n tool us 1 work, <b>P</b>	age, <b>PO</b> 6- <b>O</b> 10- Com	- The eng municatio	ineer an on, <b>PO</b> 11-	d societ Project	y, <b>PO</b> ₇ -	Env	ironm	ent and
Courses		IVI	apping of	course		nes with	program	1 outco	mes		<b>_</b>		
Course Outcomes	PO ₁	PO	2 <b>PO</b> 3	PO ₄	<b>PO</b> ₅	PO ₆	<b>PO</b> ₇	PO ₈	PO ₉	PO ₁₀		<b>PO</b> 11	<b>PO</b> ₁₂
CO ₁	2	2											
$CO_2$			3										
CO ₃				2	2								
CO ₄					2				1				
			1 – R	easonał	ole; 2 – 8	Significa	nt; 3 – Si	trong					
Detailed Cont	ents:												
Unit: 1		data hier bloc java poly field	a <b>Basics</b> - a types, va archy, exp k scope, o program, morphism ls and m structors,	riables, pression conditio arrays, n, class nethods	constar as, type o onal stat input an es, obje , acces	nts, scope conversion tements, ad output cts, cons s contro	e and life on and ca loops, b , formatt structors ol, this	time o sting, e reak an ing out , metho keywor	f variab numera d conti put, enc ods, pa d, over	les, ope ited typ nue sta capsulat ramete rloading	erato es, o item tion r pa g n	ors, oj contre nents, , inher assing netho	perator ol flow- simple ritance, ç, static
Unit: 2		Inhe class inhe met	eritance - ses, Mem eritance: f hod overr	- Inheri ber acc inal cla iding, al	tance c ess rule sses and bstract	oncept, l es, Inheri d metho classes a	oenefits itance hi ds, castii nd methe	of inher erarching, poly ods, the	ritance es, supe morphi Object	,Super er keyw sm - d class a	clas vorc lyna nd it	sses a l, pre mic t ts me	venting pinding, thods.
Unit: 3		inte	r <b>faces</b> – rfaces, ao rface.										

		Inner classes – Uses of inner classes, local inner classes, anonymous inner classes,
		static inner classes.
		<b>Packages</b> -Defining, Creating and Accessing a Package, Understanding CLASSPATH,
		importing packages.
		<b>Exception handling</b> – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re-throwing exceptions,
		exceptions, usage of dy, each, unow, unows and infany, ite unowing exceptions, exception specification, built in exceptions, creating own exception sub classes,
	Unit: 4	Guide lines for proper use of exceptions.
		<b>Multi-threading</b> - Differences between multiple processes and multiple threads, thread states areating threads interrupting threads thread priorities graphenizing
		thread states, creating threads, interrupting threads, thread priorities, synchronizing
		threads, inter-thread communication, thread groups, daemon threads.
		Applets, JAVA GUI And Database Connectivity, Networking - Applets - Applet life
		cycle methods – Applets based GUI – AWT Introduction – GUI components – Basics
	Unit: 5	of Swings – Accessing database with JDBC basics- Types of Drivers – Basics of
		Networks Programming, Addresses, Ports, Sockets, Simple Client and Server
		Program, Multiple Clients and Single Server.
		uation Pattern: It include both internal evaluation (30 marks) comprising two class
		gnments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
	ainly end semester	r examination.
Text	Books:	
1		te reference, 7 th editon, 2007, Herbert schildt, TMH.
2		OOP with Java, updated edition, T. Budd, Pearson education.
Refe	erence Books:	
1	An Introduction	to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2		1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson
	Education.	·
3	Core Java 2, Vol 2	2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson
	Education	
4	Introduction to J	ava programming 6th edition, Y. Daniel Liang, pearson education

Course (	Code				Course	Title			Le	ecture	2		
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Version: 1.2			Date				ь 7-11-2022		3	1	0	I	V
10151011112	Scheme	of In	struction	<u></u>	<b>0141.</b> 10			heme of	-	-	•		
No of	Periods		60 Hrs.						aximu			· 1(	00
	s/Week		4						mal Ev			: 3	
1 0110 0	Credits		4						End S			: 7	
Instructio			Lecture					ŀ	Exam I				Hrs.
Prerequisite				orithm				-		- ai at		.   3	111.01
Course Obje													
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	re softwa rt the con										pro	ducts.	
Course Outo			01 0110 1110	<u>abar on</u>	10110 000	iniques,	quanty c	01101 01 01	peets.				
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CO ₂	softwar	e sys			-				· ·			PO ₃	
CO ₃			est specif tionship v					h a prod	luctive	:		PO _{3,} PO	5
CO ₄	Verify a softwar		lidate var trics.	ious so	oftware	prototyp	es and to	develop	qualit	y		PO4, PO	9
sustainability, PO ₁₂ - Life-long			apping of										
Course Outcomes	PO ₁	PO	2 <b>PO</b> 3	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	POs	P	<b>D</b> ₁₀	<b>PO</b> ₁₁	<b>PO</b> ₁
CO ₁	2	2											
CO ₂			2										
CO ₃			2		2								
CO ₄				2					1				
			1 – R	easonal	ble; 2 – S	Significa	nt; 3 – St	rong					
Detailed Cor	itents:												
Unit:	1	pro Tec Soft	tware En cess, Sof hnologies tware En hniques o	tware , Proce gineeri	esses a ing, Sc	Characte nd Prod oftware	eristics, ( uct, Met Crisis, S	Compon hods ar Software	ents, nd Too deve	Applie ols, C elopm	catio lene ent	ons, La eric Vie parae	yered ew of
Unit:	2	Soft requ Ana	tware Requirements lysis and lel, Contr	uireme specif d Des	e <b>nts An</b> fication sign N	alysis & S (SRS) s ⁄Iodelling	S <b>pecificat</b> tandards, g: ER Diag	<b>ion:</b> Sys gram, Da	tem sp itaflow	ecific	eatio	on, Sof	
		Soft Pro- inte	ware Des cess-orier rface des ign, Proce	<b>ign:</b> So nted de sign, Re	oftware esign, Pi	architect ocess ar	ture, Mod nd Optimi	ular Des zation, I	sign-co Data-o	riente	ed d	esign,	User-

	Coding and Testing: Choice of Programming languages, Coding standards for
	Software. User Interface Design: Concepts of Ui, Interface Design Model, Internal
Unit: 4	and External Design, Evaluation, Interaction and Information Display
	Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing,
	Regression Testing, Testing for Functionality and Testing for Performance, Top-
	Down and Bottom-Up Testing.
	Configuration Management: Concepts in Configuration Management, The
	Configuration Management Process: Planning and Setting up Configuration
	Management, Perform Configuration Control, Status Monitoring and Audits.
Unit: 5	Software Maintenance: What is software maintenance, Maintenance Process &
	Models, Reverse Engineering, Software re-engineering, Configuration
	Management issues and concept, Configuration planning & techniques,
	Software versions and change control process, Documentation.
	uation Pattern: It include both internal evaluation (30 marks) comprising two class
	gnments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is mainly end semester	r examination.
Text Books:	
	ftware Engineering", 7th Edition, 2010, McGraw-Hill.
2 Yogesh Singh "So	oftware Engineering", 3 rd Edition, 2007, New Age Publications, Delhi.
<b>Reference Books:</b>	

W.S. Jawadekar, "Software Engineering", 2008, A Primer, TMH. 1

Shari Pfleeger, "Software Engineering", 2010, Pearson Education.
 Stephen Schach, "Software Engineering", 2007, TMH.

Course C					Course					ecture		Sem	ester:
BTCS407	РСТ		<b>F</b> :			thematic			L	T	P		V
Version: 1.2					<b>oval:</b> 16	th BoS 1	7-11-2022		3	1	0		
	Scheme						S	cheme of					
	Periods		Hrs.						aximu			: 10	
Periods	/ Week	: 4							nal Ev			: 30	
	Credits	: 4							End S			: 70	
Instructio			cture					E	xam l	Jurat	ion	: 3	Hrs.
Prerequisite		leering	Mathen	natics-l	11								
Course Obje			C			1	ures by fo			<u>+1</u>			4 :
objects, 2. To devel to analyz 3. To impa Trees, an	operation op forma zing and v rt the co nd Planar	ns, and i l logical writing oncept o Graphs	resultin   reason proofs, of relati s.	g prope ing tecl technic on thro	erties. hniques ques for ough va	and not countin rious re	ation and g, permu presentat ions, ison	demons tations a ions of (	trate nd co Graph	the ap mbina s, DF	oplic atior S, B	ation c is FS, Spa	of logio
							tic Numb			0	- 1	-,	
Course Outo			,	to man	5. aprilo,	0111 01114		0101					
COs No.		<u>,</u>			Statem	ient						ped Proceed	
CO ₁	Unders equival quantifi	ence i	Well-for mplicat		formul Iormal	as, Tr forms,	uth Tab Quanti		utolog nivers			PO _{1,} PC	2
<b>CO</b> ₂	and res	ulting p	roperti	es.	·		ical obje	-				PO ₂ , PC	3
CO ₃	techniq	ues for	countir	ng, pern	nutation	ns and co	zing and ombinatio	ns				PO ₃	
CO ₄							anning Ti ng applic		l Plan	ar		$PO_{3}$ , $PC$	) ₅
investigations sustainability, PO ₁₂ - Life-lon Course	PO ₈ - Ethic g Learning	es, <b>PO</b> 9- I Maj	ndividua pping o	al or tear	n work, <b>I</b> e outcor	PO ₁₀ - Com	nmunication program	n, <b>PO</b> 11- P	roject ies	manag	geme	nt and f	
Outcomes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	PO	• P	<b>O</b> 10	PO ₁₁	2
CO ₁	2	1	-										
		1	2										
CO ₃			2										-
CO ₄			2		1								
			1 – R	leasona	ble; 2 –	Significo	ınt; 3 – St	rong					
Detailed Cor Unit:		formu Quant variab	llas, Ti tifiers, t	ruth T univers les of	ables, † al quan	tautolog tifiers. I	and not y, equiva Predicates sistency,	lence ir s: Predic	nplica ative	tion, logic	No , Fre	rmal f ee & E	orms, Bound
Unit:	2	<b>Relati</b> compa Invers	<b>ons:</b> P atibility se Func	roperti and pa tion, Co	artial or omposit	dering r tion of fu	Relations, relations, inctions, nd its app	Lattices, recursiv	Hass	e diag	gran	n. Func	tions
Unit:	3	Eleme with r	entary (	C <b>ombin</b> ons, C	<b>atorics</b> onstraiı	: Basics ned rep	of count petitions, ciples of I	ing, Con Binomi	al C	oeffic	ient		
Unit:	4	<b>Recur</b> Coeffi	<b>rence I</b> cients (	Relation	<b>ns:</b> Gene erating	erating F function	unctions s, Recuri	Functio ence re	n of S lation	equer s, sol	nces ving		rence

		<b>Graph Theory:</b> Representation of Graphs, DFS, BFS, Spanning Trees, Planar Graphs. Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers. <b>Juation Pattern:</b> It include both internal evaluation (30 marks) comprising two class gnments/quiz/seminar presentation etc. and external evaluation (70 marks) which
	nly end semeste	
Text B		
1 N	Mathematical Fo	undation of Computer Science – Shahnaz Bathul, PHI.
2 H	Elements of	Discrete Mathematics- A Computer Oriented Approach, C.L.Liu, D.P.
Ν	Mohapatra,3edit	ion,TMH.
		natics for Computer Scientists & Mathematicians, second edition, J.L.Mott, A.
	Kandel, T.P. Bake	
		nbinatorial Mathematics- An Applied Introduction-5th Edition– Ralph. P.Grimaldi,
	Pearson Educati	on
Refere	ence Books:	
1 I	Discrete Mathen	natics and its applications, 6th edition, K.H. Rosen, TMH.
2 I	Discrete Mathen	natical Structures, Mallik and Sen, Cengage Learning
3 I	Discrete Mather	natical Structures, Bernand Kolman, Robert C. Busby, Sharon Cutler Ross, PHI/
I	Pearson Educati	on
4 I	Discrete Mathen	natics with Applications, Thomas Koshy, Elsevier.
5 I	Logic and Discre	te Mathematics, Grass Man and Tremblay, Pearson Education

Course Co					Course	Title			Leo	cture	Som	ester:
BTCS451F	РСР						ems LAB		L	Т Р		V
Version: 1.2			Date	of Appr	<b>·oval:</b> 16	th BoS 1	7-11-2022		0	0 4	1	v
	Scheme	of Inst	ruction				Sc	heme of	Exami	nation		
No. of	Periods	: 6	0 Hrs.					M	aximun	n Score	: 10	00
Periods	/ Week	: 4						Inter	nal Eva	luation	: 5	0
	Credits	: 2							End Se	mester	: 5	0
Instructio	n Mode	: P	ractical					F	lxam D	uration	: 3	Hrs.
Prerequisite(	s): Datab	ase Ma	nageme	nt Syst	ems							
Course Objec	tives:											
<ol> <li>To acquir</li> <li>To under with vary</li> <li>To handle controllin</li> <li>To write j</li> </ol>	stand the ing skill l e differen ng concur programi	e conce evels. t user rrent u me by t	ept of da views of pdates s	ata plan the san so as to	ning an ne store mainta	id databa ed data, c	ase desigr ombining	for serv	ving dif			
Course Outco	omes (CO	):										
COs No.					Statem	ent				Mapp	ped Pro	ogran
										Outo	comes	(POs)
CO1	relation includir	al alge 1g the l	bra expi E-R met	ressions hod and	s for qu 1 norma	eries, log lization	r, and be gical desig approach	gn of dat	abases		PO ₃	
$CO_2$	Illustrat	e com	mercial	relation	nal datal	base syst	em by wr	iting SQ	L.		PO ₃ , PO	5
CO ₃	Analyze	the da	tabase s	storage	structu	res.				PC	D2, PO6, B	PO9
CO ₄							organiza	tions, ir	dexing	{	PO ₃ , PO	5
					ashing,							
<b>PO</b> 1- Engineer investigations o sustainability, <b>P</b> <b>PO</b> 12- Life-long	query o ing Know of complex <b>'O</b> 8- Ethics	ptimiza vledge, k proble s, <b>PO</b> 9- 1	<b>PO</b> 2- Pr PO2- Pr ems, <b>PO</b> 5- Individua	oblem - Moder l or team	n tool us 1 work, <b>P</b>	<b>PO</b> ₃ - D sage, <b>PO</b> ₆ - P <b>O</b> ₁₀ - Com	esign/dev - The engin munication	elopment neer and n, <b>PO</b> 11- P1	of sol society, oject m	utions, <b>I</b> <b>PO</b> 7- Env	vironme	ent an
investigations o sustainability, <b>P</b>	query o ing Know of complex O ₈ - Ethics Learning	ptimiz: /ledge, k proble s, <b>PO</b> 9- 1 Ma	ation. PO ₂ - Pr ems, PO ₅ - individua	oblem - Moder l or tean	n tool us n work, <b>P</b> e outcor	PO ₃ - D sage, PO ₆ - PO ₁₀ - Com nes with	esign/dev - The engi munication program	elopment neer and n, <b>PO</b> 11- Pr outcome	of sol society, roject m es	utions, <b>I</b> <b>PO</b> ₇ - Env anagemen	vironme nt and fi	ent an
investigations c sustainability, <b>P</b> PO ₁₂ - Life-long	query o ing Know of complex <b>'O</b> 8- Ethics	ptimiza vledge, k proble s, <b>PO</b> 9- 1	<b>PO</b> 2- Pr PO2- Pr ems, <b>PO</b> 5- Individua	oblem - Moder l or team	n tool us 1 work, <b>P</b>	<b>PO</b> ₃ - D sage, <b>PO</b> ₆ - P <b>O</b> ₁₀ - Com	esign/dev - The engin munication	elopment neer and n, <b>PO</b> 11- P1	of sol society, oject m	utions, <b>I</b> <b>PO</b> 7- Env	vironme	ent an inance
investigations of sustainability, <b>P</b> PO ₁₂ - Life-long Course	query o ing Know of complex O ₈ - Ethics Learning	ptimiz: /ledge, k proble s, <b>PO</b> 9- 1 Ma	ation. PO ₂ - Pr ems, PO ₅ - individua	oblem - Moder l or tean	n tool us n work, <b>P</b> e outcor	PO ₃ - D sage, PO ₆ - PO ₁₀ - Com nes with	esign/dev - The engi munication program	elopment neer and n, <b>PO</b> 11- Pr outcome	of sol society, roject m es	utions, <b>I</b> <b>PO</b> ₇ - Env anagemen	vironme nt and fi	ent and inance <b>PO</b>
investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes	query o ing Know of complex O ₈ - Ethics Learning	ptimiz: /ledge, k proble s, <b>PO</b> 9- 1 Ma	ation. PO ₂ - Pr ems, PO ₅ - individua pping of PO ₃	oblem - Moder l or tean	n tool us n work, <b>P</b> e outcor	PO ₃ - D sage, PO ₆ - PO ₁₀ - Com nes with	esign/dev - The engi munication program	elopment neer and n, <b>PO</b> 11- Pr outcome	of sol society, roject m es	utions, <b>I</b> <b>PO</b> ₇ - Env anagemen	vironme nt and fi	ent an inance PO
nvestigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁	query o ing Know of complex O ₈ - Ethics Learning	ptimiz: /ledge, k proble s, <b>PO</b> 9- 1 Ma	ation. PO ₂ - Pr ems, PO ₅ - individua pping of PO ₃ 2	oblem - Moder l or tean	n tool us work, P e outcor PO5	PO ₃ - D sage, PO ₆ - PO ₁₀ - Com nes with	esign/dev - The engi munication program	elopment neer and n, <b>PO</b> 11- Pr outcome	of sol society, roject m es	utions, <b>I</b> <b>PO</b> ₇ - Env anagemen	vironme nt and fi	ent an inance PO
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nvestigations c sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃	query o ing Know of complex O ₈ - Ethics Learning	ptimiz: /ledge, k proble s, <b>PO</b> ₉ - 1 Ma <b>PO</b> ₂	ation. PO ₂ - Pr ems, PO ₅ - individua pping of PO ₃ 2 2 3	roblem - Moder l or team F course PO4	n tool us work, P e outcor PO ₅ 2 2 2	PO ₃ - D sage, PO ₆ - O ₁₀ - Com mes with PO ₆	esign/dev - The engi munication program	elopment neer and n, PO ₁₁ - Pr outcom PO ₈	of sol society, roject m es <b>PO</b> ₉	utions, <b>I</b> <b>PO</b> ₇ - Env anagemen	vironme nt and fi	ent an inance PO
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1. To demo		he feat	ures of	advanc	ed java	program	nming lar	nguage s	uch	as A	WT. A	pplet.	IDBC
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2. To elabor	ate varia	ble sco	pes, me	emory n	nanagei	ment, an	d referer	ice versu	ıs val	ue t	types in	n rela	tion to
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3. To unders	stand the	princi	ples of c	object-c	oriented	l feature	s of Java p	orogrami	ning	lang	guage v	vith s	ecurit
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4. To solve v	•		using o	bject-o	riented	progran	nming lan	guage.					
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<b>PO</b> 1- Engineeri	Describ oriented upon ac ing Know of complex	e and d solut cepted ledge, c proble	explain ion, ref l good p <b>PO</b> 2- Pr ms, <b>PO</b> 5-	the fac lecting ractices oblem a Modern	etors th on you s. analysis, n tool us	r own e PO3- D age, PO6-	xperienco esign/dev • The engin	es and d	rawin of s	ng olut y, <b>P</b>	<b>0</b> 7- Env	<b>PO₄</b> − ( vironm	ent an
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<b>PO</b> 1- Engineeri investigations c sustainability, <b>P</b>	Describ oriented upon ac ing Know of complex O ₈ - Ethics Learning	e and d solut ccepted dedge, g proble s, <b>PO</b> 9- In Mag	explain ion, refi l good p PO ₂ - Pr ms, PO ₅ - ndividual	the fac lecting ractices oblem a - Moderr l or team	ctors th on you s. analysis, tool us work, <b>P</b>	r own e $PO_3$ - D age, $PO_6$ - $O_{10}$ - Commons with	xperience esign/dev The engin munication program	elopment neer and s n, <b>PO</b> 1- Pr outcome	of societ	ng olut y, <b>P</b> man	<b>O</b> 7- Env agemer	PO₄- C rironm nt and :	ent an finance
<b>PO</b> 1- Engineeri investigations c sustainability, <b>P</b> <b>PO</b> 12- Life-long	Describ oriented upon ac ing Know of complex Os- Ethics	e and d solut cepted dedge, k proble s, <b>PO</b> 9- In	explain ion, ref l good p PO2- Pr ms, PO5- ndividual	the fac lecting ractices oblem a Moderr l or team	ctors th on you s. analysis, n tool us work, <b>P</b>	r own e PO ₃ - D age, PO ₆ - O ₁₀ - Com	xperience esign/dev · The engin munication	elopment neer and s n, <b>PO</b> 11- Pr	of societ	ng olut y, <b>P</b> man	<b>0</b> 7- Env	<b>PO₄</b> − ( vironm	ent an finance
PO ₁ - Engineeri investigations c sustainability, P PO ₁₂ - Life-long Course	Describ oriented upon ac ing Know of complex O ₈ - Ethics Learning	e and d solut ccepted dedge, g proble s, <b>PO</b> 9- In Mag	explain ion, refi l good p PO ₂ - Pr ms, PO ₅ - ndividual	the fac lecting ractices oblem a - Moderr l or team	ctors th on you s. analysis, tool us work, <b>P</b>	r own e $PO_3$ - D age, $PO_6$ - $O_{10}$ - Commons with	xperience esign/dev The engin munication program	elopment neer and s n, <b>PO</b> 1- Pr outcome	of societ	ng olut y, <b>P</b> man	<b>O</b> 7- Env agemer	PO₄- C rironm nt and :	ent an financo PC
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- 17. Write a Java Program to demonstrate about the final method?
- 18. Write a Java Program to demonstrate the operation of super keyword in Java?
- 19. Write a Java Program to define and implements an interface?
- 20. Write a Java program to demonstrate the operation of scanner class?
- 21. Write a Java Program to define and import the user defined package?
- 22. Write a Java Program to describe about try and catch blocks for handling exceptions?
- 23. Write a Java Program to raise and handle custom or user defined exceptions in java?
- 24. Write a Java Program to demonstrate about throw and throws keywords?
- 25. Write a Java Program to create threads in java by extending Thread Class?
- 26. Write a Java Program to create threads in java by implementing Runnable Interface?
- 27. Write a Java program to print a message using applet concept?
- 28. Write a Java Program to pass the parameters using applet concept?
- 29. Write a Java Program demonstrating accessing of database with JDBC?

**Examination and Evaluation Pattern:** It include both internal evaluation (50 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (50 marks) which is mainly end semester examination.

## Text Books:

- 1 Understanding OOP with Java, updated edition, T. Budd, Pearson education.
- 2 Programming with Java, Balaguruswamy, TMH

## **Reference Books:**

An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
 An Introduction to OOP, second edition, T. Budd, pearson education.

Course C				(	Course	Title			Le	cture	е	Som	ester:
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CO ₂	Unders compu		/O sys	tem ar	nd inter	connec	tion stru	ictures	of		]	PO ₂ , PO	6
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PO ₁₂ - Life-long Course							program				•	DO	PO ₁
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	Unit: 5	Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware
		uation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assig	nments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester	r examination.
Text	Books:	
1	Computer Syster	ns Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI
2	Computer Organ	ization and Architecture–William Stallings Sixth Edition, Pearson/PHI
Refe	erence Books:	
1	Computer Organ	ization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill
2	Structured Comp	outer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3	Fundamentals of	Computer Organization and Design, -Sivaraama Dandamudi Springer Int.
	Edition.	
4	Computer Archi	tecture a quantitative approach, John L. Hennessy and David A. Patterson,
	Fourth Edition El	sevier
5	Computer Archit	ecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS
	Publication	

Course C					ourse T				Lect	ure		
BTCS512	РСТ					utomata			L	T P	Sem	ester: V
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<b>.</b>	Credits	: 4							End Se		-	70
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Prerequisite Course Object		ete Mat	hematic	es								
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						d contex						
CO ₃		ng regu	ılar, coı	ntext-fi	ree, coi	s betwe ntext-sei					PO ₃ , PC	)4
CO ₄						ools and	l formal	l metho	ds		PO ₃ , PO	)4
investigations sustainability, I PO ₁₂ - Life-long Course	O8- Ethics	s, <b>PO</b> 9- I	ndividua	l or team	n work, <b>P</b>	<b>O</b> 10- Com	municat	ion, <b>PO</b> 11	- Project r	nanagem	ent and	finance,
Outcomes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	PO ₁₁	<b>PO</b> ₁₂
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CO ₂	_	2	2									
CO ₃			3	2								
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			1 – R	easonat	ole; 2 – S	Significa	nt; 3 – S	Strong				
Detailed Con Unit:		Deter transi Autor and D	ministic ition gr nata (NF 0FA, Min	e finite aph, T FA), NFA imizatio	Automa ransitio with e on of Fir	ta (DFA) n table, psilon tra nite Auto	-Forma Langu ansition mata.	l Defini age of , Langu	s; Autor tion, Sim DFA, N age of NI	plified ondeter FA, Equi	notatio ministi valence	n: State c finite e of NFA
Unit: 1	2	prece expre Langu Closu	dence, ssion to lages, Po re propo ith outp	Algebra o FA, l umping erties of	ic laws DFA to Lemma f Regula	for Reg Regular for regu r Langua	gular e: expre lar Lang ges, De	xpressic ssion, A guages. A cision p	regular ons, Klee Arden Tl Application roperties ivalence	n's The neorem, on of Pu s of Regu	orem, Non mping ılar Lar	Regulai Regulai Lemma iguages
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	Unit: 4	Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA.
	Unit: 5	Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, Universal TM, Church's Thesis, Chomsky hierarchy of languages, Recursive and recursively enumerable languages, Halting problem, Undecidable problems about TMs. Post correspondence problem (PCP).
Exar	nination and Eval	uation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assig	nments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is ma	ainly end semester	examination.
Text	Books:	
1		Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D.
	Pearson Education	on
2		mputer Science: Automata, Languages and Computation, K.L.P.Mishra,
	N.Chandrasekara	n
Refe	rence Books:	
1	Introduction to C	Computer Theory, Daniel I.A. Cohen, John Wiley
2	Introduction to la	anguages and the Theory of Computation ,John C Martin, TMH
3	Elements of The	ory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.

Course Co					Course				Le	cture	Som	octor
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;	Scheme	of Insti	uction				Sc	heme of	Exam	ination		
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Periods		: 4						Inter	nal Eva	aluation		30
	Credits	: 4								emester		70
Instructio			cture							uration		B Hrs.
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and analyz						iiiii uesiş	gii, iiipiei	nentai se	JIIIE wo	-II-KHOW	ii aigu	11011115
2. To define						ingahau	t the com	ootnoog	oftho	algorithe	~	
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							rrence e			S		
							nd Maste					
CO ₂							r Strateg		ompare	è.	PO ₃ , PO	04
	Dynami	c Progr	ammin	g and D	ivide ar	nd Conqu	ier Strate	gies.				
CO ₃	Solve (	Optimiz	ation p	oroblem	ns usin	g Greed	ly strateg	gy and	Desigr	1	PO ₄ , PO	)9
	efficien	t algo	rithms	using	Back	Trackin	g and	Branch	Bound	1		
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CO ₄	Technic Classify	ues for comp	• solving utation	g proble al prob	ems. olems i	nto P,	NP, NP-1				PO _{2,} PO	<b>)</b> ₄
CO ₄	Technic Classify Comple	ues for comp te and	• solving utation to unde	g proble al prob erstandi	ems. olems i ng abou	nto P, ut writin	NP, NP-1 g algorith	ms and s	step by		PO _{2,} PO	<b>)</b> ₄
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<b>PO</b> 1- Engineerin investigations of	Technic Classify Comple step ap ng Know f complex Os- Ethics	te and proach dedge, s, <b>PO</b> 9- In	solving utation to unde in solvin PO ₂ - Pr ms, PO ₅ - ndividual	g proble al prot erstandi ng prob roblem a - Modern l or team	ems. olems i ng abou lems w analysis, n tool us work, <b>P</b>	nto P, ut writin ith the h PO ₃ - D sage, PO ₆ - O ₁₀ - Com	NP, NP- g algorith elp of dat esign/dev The engin munication	ams and s a structu elopment neer and s n, <b>PO</b> 11- Pr	step by ires. of so society, roject m	/ lutions, I <b>PO</b> 7- Env	PO4- C	Conduct ent and
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	<b>mination and Evaluation Pattern:</b> It include both internal evaluation (30 marks) comprising two class sional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester examination.
Text	t Books:
1	Thomas H. Coreman, Charles E. Leiserson and Ronald L. Rivest, "Introduction to Algorithms", Printice
	Hall of India.
2	Anany Levitin, "Introduction to the Design & Analysis of Algorithms", Pearson Education, 2007.
Refe	erence Books:
1	RCT Lee, SS Tseng, RC Chang and YT Tsai, "Introduction to the Design and Analysis of Algorithms",
	Mc Graw Hill, 2005.
2	E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms", Berman, Paul," Algorithms", Cengage
	Learning.
3	Aho, Hopcraft, Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education, 2008.

Course C	ode			(	Course	Title			Leo	cture	0	
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Periods	/ Week	: 2						Inter	nal Eva	luation	: 15	
	Credits	: 2							End Se	mester	: 3	5
Instructio			cture					E	Exam D	uration	: 2	Hrs.
Prerequisite(		ecific re	quisites	5.								
Course Objec												
1. To develo												
2. To descri												
3. To analys											1	,
4. To synthe											olutior	1 such
that they			o predic	t and c	ontrol h	iuman be	ehaviour a	and impr	ove res	sults.		
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	Elements and dimensions of organizational culture, Importance of organizational
	culture in shaping the behaviour of people.
Exa	mination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester examination.
Tex	t Books:
1	Robbins, S. P., & Judge, T. (2013). Organizational behavior (15th ed.). Boston: Pearson.
2	Newstrom J. W., & Davis, K. (2011). Human behavior at work (12th ed.). Tata McGraw Hill
3	Nelson, D , Quick, J.C., & Khandelwal, P., (2011). ORGB . Cengage Learning.
4	Udai Pareek, Understanding Organisational Behaviour, 2 nd Edition, Oxford Higher Education, 2004.
Refe	erence Books:
1	Pareek, U. (2010), Understanding Organizational Behavior (2nd ed.), Oxford University Press

1Pareek. U. (2010). Understanding Organizational Behavior (2nd ed.). Oxford University Press2Schermerhorn, J. R., Osborn, R.N., Hunt, M.U.J (2016). Organizational Behavior (12th ed.). Wiley

Course Co					Course				Lec	ture	Se	emester:
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No. of	Periods	: 30	Hrs.					Ма	ximum	Score	:	50
Periods	/ Week	: 2						Intern	al Eval	uation	:	15
	Credits	: 2						E	End Sei	nester	:	35
Instructio		: Le	cture							iration	:	2 Hrs.
Prerequisite(s				cience								
Course Object	/		0									
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2. To unders												
3. To identif									tal in a	ncient	India	).
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PO1- Engineeri												
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sustainability, P		s, <b>PO</b> 9- Ir	ndividual	or team	work, P	<b>0</b> 10- Comr	nunication	, <b>PO</b> 11- Pr	oject ma	anageme	nt an	d finance,
PO12- Life-long	Learning											
		Мар	ping of	course	outcon	nes with	program	outcome	es	r	1	
Course	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	РС	$\mathbf{PO}_1$
Outcomes	101	102	103	104								- 11
					-	- 0		-	-	- 10		2
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	mination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester examination.
Text	t Books:
1	George G Joseph, Crest of the Peacock, Non-European roots of mathematics, Third edition,
	Princeton University Press, Princeton, NJ, 2011.
2	Agrawal, D.P., Ancient Metal Technology and Archaeology of South Asia (A Pan-Asian Perspective),
	Aryan Books International, New Delhi, 2000
Refe	erence Books:
1	Cunningham , Alexander , The Ancient Geography of India. Indological Book House, Varanasi, 1963.
2	Dey, N. L., The Geographical Dictionary of Ancient and Medieval India. Luzac and Co., London, 1927.

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3. To experin								amic pro	gramn	ning tec	hnic	jues.	•
4. To implem		-	blems of	of searc	hing an	d sorting	5.						
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## Note: Students can implement more algorithms based on prescribed syllabus.

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sess	sional exams/assignments/quiz/seminar presentation etc. and external evaluation (50 marks) which
is m	nainly end semester examination.
Tex	t Books:
1	Data structures, Algorithms and Applications in java, 2nd Edition, S. Sahani, Universities Press.
2	Data structures and Algorithms in java, 3rd edition, A. Drozdek, Cengage Learning.
Ref	erence Books:
1	Data structures with Java J R Hubbard 2nd edition Schaum's Outlines TMH

2 Data Structures using Java, D. S. Malik and P.S. Nair, Cengage Learning

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Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5 <b>Examination</b> 3	and Evalu	and c and E Union Feder and C State Coun Local Muni- Officia Organ and A Electi Comr Funct	duction onstitut outies, E Govern alism, C ouncil c Govern cil of m Admin cipalitie cipal Cc als and nization ppointe on Com nissione cioning, <b>Pattern</b>	ional h pirective nment entre- f minis ment a inisters istratio s: Intro prporati their al Hiera ad offici mission er and E Institut I tinch	istory, l e Princi and it State re- ters, Ca nd its A , State S on: Dist duction roles, Ca archy (I als, Imp n: Election clection ce and B ude bot	meaning Features ples of S s Admir elationsh binet and dministri Secretari rict's Ad h, Mayor chayati r CEO Zila Different contance fon Comis codies fo h interna	g of the t : Citizens tate Polic nistration: nip, Presid d Central ration: Go at: Organ dministra and role aj: Introd a Pachaya departm of grass r mission: F sioners, S r the welf al evaluat	erm, Ind hip, Pres y Struct lent: Rol Secretar overnor: isation, S tion hea of Elect uction, I at: Posit ents), Vi oot dem tate Elect are of SC ion (15 m	amble, ure of le, pow- riat, Lo Role a Structu ad: Ro red Rep PRI: Zi ion an llage lo cocracy Function C/ST/ narks) o	Fundar the Ir ver and k Sabha nd Posi <u>ure and</u> le and presenta la Pach d role, evel: Ro <u>7</u> oning, C ommiss OBC an compris	nental ndian position, Rajya tion, C Functi Impo ative, C ayat, H Block le of H Chief E sion: Ro d worr ing tw	Right Union on, Ph Sabh CM an cons rtance CEO c Electe c leve Electe c leve c lecto oble an cons c class
Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5	and Evalu	and c and E Union Feder and C State Coun Local Muni- officia Organ and A Electi Comr Funct <b>iation</b> I	duction onstitut outies, E Govern alism, C ouncil of Govern cil of m cipalitie cipal Co als and hization ppointe on Com nissione cioning, Pattern / quiz/	ional h pirective nment entre- f minis ment a inisters istratio s: Intro prporati their al Hiera ad offici mission er and E Institut I tinch	istory, l e Princi and it State re- ters, Ca nd its A , State S on: Dist duction roles, Ca archy (I als, Imp n: Election clection ce and B ude bot	meaning Features ples of S s Admir elationsh binet and dministri Secretari rict's Ad h, Mayor chayati r CEO Zila Different contance fon Comis codies fo h interna	g of the t : Citizens tate Polic nistration: nip, Presid d Central ration: Go at: Organ dministra and role aj: Introd a Pachaya departm of grass r mission: F sioners, S r the welf al evaluat	erm, Ind hip, Pres y Struct lent: Rol Secretar overnor: isation, S tion hea of Elect uction, I at: Posit ents), Vi oot dem tate Elect are of SC ion (15 m	amble, ure of le, pow- riat, Lo Role a Structu ad: Ro red Rep PRI: Zi ion an llage lo cocracy Function C/ST/ narks) o	Fundar the Ir ver and k Sabha nd Posi <u>ure and</u> le and presenta la Pach d role, evel: Ro <u>7</u> oning, C ommiss OBC an compris	nental ndian position, Rajya tion, C Functi Impo ative, C ayat, H Block le of H Chief E sion: Ro d worr ing tw	Right Union on, Ph Sabh CM an cons rtance CEO c Electe c leve Electe c leve c lecto oble an cons c class

1	'Indian Polity' by Laxmikanth
2	'Indian Administration' by Subhash Kashyap
Refe	erence Books:
1	'Indian Constitution' by D.D. Basu
2	'Indian Administration' by Avasti and Avasti

Course Co					ourse T				Lect		Sem	ester:
BTCS611PC	CT				nplier D				L	T P		/I
Version: 1.2				f Appro	<b>val:</b> 16tl	n BoS 17	-11-202		3	1 0		, 1
	Scheme of	of Insti	ruction					Scheme	e of Exan	nination	1	
No. of I		: 60	Hrs.						laximum		: 100	
Periods	/ Week	: 4						Inte	rnal Eval	uation	: 30	
(	Credits	: 4							End Ser	nester	: 70	
Instruction	n Mode	: Le	cture						Exam Dı	iration	: 3 H	Irs.
Prerequisite(s)	: Formal	Langu	age & A	utomat	a Theor	Y						
Course Objecti	ives:											
1. To unders	stand an	d list t	he diffe	erent st	tages ir	n the p	rocess	of comp	oilation a	and ide	ntify di	fferer
methods o	f lexical	analysi	s.		-	-		-			-	
2. To design	top-dow	n and l	bottom-	up pars	sers.							
3. To identify						and dev	velop sy	ntax dir	ected tra	anslatio	n schen	nes
4. To develop												
Course Outcor	0		0			0						
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				2		-					comes (	
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	Apply gi									P	O ₃ , PO ₄ , P	
	parsers.	-	iser spe	cincati	on uesi	5 top-t	10 W II dl	10 00110	m up	1	J, I J4, I	
CO ₃	Develop		v direct	ad trans	alation	chome					PO ₃ , PO ₄	
CO ₃ CO ₄	-	5						meat	0		PO ₃ , PO ₄ PO ₃ , PO ₅	
PO ₁ - Engineerin	Implem									1	-,	
sustainability, <b>PC</b> <b>PO₁₂-</b> Life-long L								ion, <b>PO</b> 11- m outco	-	nanagem	ent and f	financ
Course												PC
Outcomes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	<b>PO</b> ₁₁	2
$CO_1$	2		2									
CO1 CO2	2		2	2	2							
$CO_2$	2		2	2	2							
CO ₂ CO ₃	2		2 2	2 2								
$CO_2$	2		2 2 2	2	2	iamifica	mt: 2 _ 1	Strong				
CO ₂ CO ₃ CO ₄			2 2 2	2	2	ignifica	nt; 3 – :	Strong				
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CO ₂ CO ₃ CO ₄ Detailed Conte			2 2 2 1 – Re	2 asonabl : Phase	2 le; 2 – S	ompilati	on and	overvie	w. Lexic	_		
CO ₂ CO ₃ CO ₄		Regu	2 2 1 – Re duction	2 asonab : Phase : ages, fi	2 le; 2 – S es of co inite au	ompilati tomata,	on and regular	overvie express	w. Lexic	_		
CO2 CO3 CO4 Detailed Conte		Regu to fin	2 2 1 – Re duction lar languite auto	2 asonabl : Phase 1ages, fi mata, s	2 le; 2 – S es of co inite autoria	ompilati tomata, generat	on and regular or (lex,	overvie express flex).	sions, fro	m regul	ar expre	ession
CO2 CO3 CO4 Detailed Conte		Regu to fin <b>Synta</b>	2 2 1 – Re duction lar langu ite auto x Analy	2 asonabl : Phase iages, fi mata, s ysis (Pa	2 le; 2 – S es of co inite aut canner arser):	ompilati tomata, generat Context	on and regular or (lex, -free l	overvie express flex). anguage	ions, fro	m regula	ar expre	ession -dow
CO ₂ CO ₃ CO ₄ Detailed Conte		Regu to fin <b>Synta</b> auton	2 2 1 – Re duction lar langu ite auto <b>x Analy</b> nata, LI	2 asonabl a: Phase ages, fi mata, s ysis (Pa (1) gran	2 le; 2 – S es of co inite aut canner arser): m-mars	ompilati tomata, generat Context and to	on and regular or (lex, -free 1 p-dow	overvie express flex). anguage n parsin	sions, fro	m regula	ar expre	ession -dow
CO ₂ CO ₃ CO ₄ Detailed Conte		Regu to fin <b>Synta</b> auton SLR(1)	2 2 1 – Re duction lar languite auto ite auto ite auto ix Analy nata, LL ), LR(1), J	2 asonabl ages, fi mata, s ysis (Pa (1) gran LALR(1)	2 le; 2 – S es of co inite aut canner arser): m-mars gramm	ompilati tomata, generat Context and to ars and	on and regular or (lex, -free l p-down botton	overvie express flex). anguage n parsin	sions, fro s and g g, opera	m regula rammar tor grai	ar expre s, push mmars,	-dow LR(O
CO2 CO3 CO4 Detailed Conte Unit: 1		Regu to fin <b>Synta</b> auton SLR(1) up pa	2 2 1 – Re duction lar languite auto x Analy nata, LI ), LR(1), I rsing, au	2 asonabl a: Phase iages, fi mata, s ysis (Pa (1) gran LALR(1) nbiguit	2 le; 2 – S es of cc inite aut canner arser): m-mars gramm y and L	ompilati tomata, generat Context and to ars and R parsir	on and regular or (lex, -free 1 p-down bottom g, LALl	overvie express flex). anguage n parsin r- R(1) parso	s and g g, opera	m regula rammar tor gran ator (yao	ar expre s, push mmars, cc, bisoi	ession -dow LR(O n).
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CO2 CO3 CO4 Detailed Conte Unit: 1 Unit: 2		Regu to fin <b>Synta</b> auton SLR(1) up pa <b>Sema</b> and f attrib paran <b>Inter</b>	2 2 1 – Re duction lar languite auto ite	2 asonabl ages, fi mata, s ysis (Pa (1) grar LALR(1) mbiguit alysis: attribu d mar ssing, v e Code	2 le; 2 – S canner arser): m-mars gramm y and L Attribu te in a nageme value rei Gener	ompilati tomata, generat Context and to ars and R parsir te gram syntax nt. Rur turn, me ration:	on and regular or (lex, -free 1 p-down bottom bottom ag, LAL1 mars, tree. a-time emory a Transla	overvie express flex). anguage parsin (1) parse (1) parse syntax o Symbol environ illocatio ttion of	sions, fro s and g g, opera er genera lirected Table: 1 ment: F n, and so differer	m regula rammar tor gran ator (yao definitio definitio ts struc Procedu ope. at langu	s, push mmars, cc, bison on, eval cture, s re acti 1age fea	-dow LR(O n). luatio symbo vatior
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CO2 CO3 CO4 Detailed Conte Unit: 1 Unit: 2 Unit: 3		Regu to fin <b>Synta</b> auton SLR(1) up pa <b>Sema</b> and f attrib paran <b>Inter</b> differ Analy optin	2 2 1 – Re duction lar languite auto x Analy nata, LL ), LR(1), L rsing, au ntic Analy low of utes an neter par rent typy rsis: con nization	2 asonabl a: Phase iages, fi mata, s ysis (Pa (1) grar LALR(1) mbiguit alysis: attribu nd mar ssing, v e Code pes of ntrol-flo , global	2 es of cc inite aur canner arser): o n-mars gramm y and L Attribu te in a hageme value re- denen interm ow, dat optimiz	ompilati tomata, generat Context and to ars and R parsir te gram syntax nt. Rur turn, me ration: mediate ca-flow zation, le	on and regular or (lex, -free 1 p-down bottom ig, LALI imars, t tree. a-time emory a forms. depend cop opt	overvie express flex). anguage parsin (1) parso syntax o Symbol environ illocatio ttion of Code lence e imizatio	sions, fro s and g g, opera er genera lirected Table: 1 ment: F n, and so differer Improve tc.; Cod n, peep-	m regula rammar tor gran ator (yaa definitio ts strue Procedu ope. nt langu ement ( e impro hole op	s, push mmars, cc, bisor on, eval cture, s re acti- iage fea (optimiz ovemen timizati	-dow LR(O n). luatio symbo vation atures ation t loca on eto
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Text	t Books:
1	Principles of compiler design -A.V. Aho .J.D.Ullman; Pearson Education.
2	Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.
Refe	erence Books:
1	lex&yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2	Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech. 3.
3	Engineering a Compiler-Cooper & Linda, Elsevier
4	Compiler Construction, Louden, Thomson.

Course Co	da				Course				Loc	<b>.</b>			
BTCS612P									Lec	ture T	e P	Se	mester:
Version: 1.2	CI		Data			etworks		0	 З	1	P 0		VI
	Scheme	finata		а аррго	<b>Jval:</b> 101	11 605 1	7-11-202	Z Scheme o	-	-	0		
	Periods												100
		: 60	Hrs.						ximum 1al Eval			:	100 30
	/ Week Credits	: 4							End Sei			•	<u> </u>
Instructio		-	cture						xam Di			•	3 Hrs.
								E2		irati	on	•	5 HIS.
Prerequisite(s Course Object		ing sys	tem										
		fundar	ontala	oncont	a of dot		unicatio	ng and a	omput	or M	otur	orka	
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4. To provide									strator	5, INC	two	n KS U	csigners.
Course Outcon		-	world	white we		nen gei		3.					
COs No.		•			Statem	ent					Mar	ned	Program
COS NO.					Statem	ciit					-	-	es (POs)
CO ₁	Demon	strate	he dif	ferent	protoco	ls lave	rs of th	e OSI n	nodel	&	Ou	PO ₁	· · · ·
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CO ₃	Unders			nportan	ce of	netwo	ork see	curity i	n dat	а		PC	D ₆
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CO ₄				etworki	ng sub-	systems	s and the	eir functi	ons in	а	I	PO2, PO	<b>D</b> 3, <b>PO</b> 4
001	telecon					Sjocom	, and on		0110 111	-		,	-,
PO ₁₂ - Life-long I							· · ·	n outcom					
Outcomes	PO ₁	PO ₂	PO ₃	$PO_4$	PO ₅	PO ₆	$\mathbf{PO}_7$	PO ₈	PO ₉	PO	<b>D</b> ₁₀	PO ₁	1 <b>PO</b> ₁₂
CO ₁	2					2							
CO ₂		1	2					2					
CO ₃						2							
CO ₄		2	2	2									
			1 – Re	asonabl	le; 2 – S	ignifica	nt; 3 – S	trong	•				•
Detailed Cont	ents:												
Unit: 1		Half-I Noise Analo Baseb	Duplex less and g Trans and Tra	and Du 1 Noisy missior ansmiss	iplex M Channe i; Data B	odes of els; Ban Encodin Iltiplexin	Commu dwidth, g and Me	inication Through odulation	; Analo put an Techr	og an d La nique	nd E teno es; B	Digital cy; Di broadl	Simplex, Signals; gital and pand and n Errors,
Unit: 2		Area Metwo TCP/	vetwori ork Mo	ks, Wid <b>dels</b> : La	e Area N ayered A	letwork Architec	, Wirele ture, OS	ss Netwo SI Refere	orks, In nce Mo	tern odel	et. and	its P	ropolitan rotocols; witching
Unit: 3		Flow CSMA	and Er ./CD, C	ror Co SMA/C	ntrol; S CA, Rese	liding V rvation,	Vindow Polling,	Protoco	l, HDL assing,	C, N	/ult	iple A	rrection; Access – A, TDMA,

Unit: 4	IPv4 Structure and Address Space; Classful and Classless Addressing; Datagram, Fragmentation and Checksum; IPv6 Packet Format, Mapping Logical to Physical Address (ARP), Direct and Indirect Network Layer Delivery; Routing Algorithms, TCP, UDP and SCTP Protocols; Flow Control, Error Control and Congestion Control in TCP and SCTP.
Unit: 5	World Wide Web (WWW): Uniform Resource Locator (URL), Domain Name Service (DNS), Resolution - Mapping Names to Addresses and Addresses to Names; Electronic Mail Architecture, SMTP, POP and IMAP; TELNET and FTP. Network Security: Malwares, Cryptography and Steganography; Secret-Key Algorithms, Public-Key Algorithms, Digital Signature, Virtual Private Networks, Firewalls.
	uation Pattern: It include both internal evaluation (30 marks) comprising two class
is mainly end semeste	gnments/quiz/seminar presentation etc. and external evaluation (70 marks) which
Text Books:	
	Communication and Networks ing", TMH
	"Computer Networks s", 3rd Edition, Prentice Hall India, 1997.
Reference Books:	
1 S. Keshav, "An Er	gineering Approach on Computer Networks ing", Addison Wesley, 1997
2 W. Stallings, "Dat	a and Computer Communication", Macmillan Press, 1989

Course Co	de			(	Course '	Title			Leo	ture		
BTCS660P						sign LAI	2		L	TI	Se	mester
Version: 1.2	Cr		Data				, 7-11-2022	)	0	$\frac{1}{0}$		VI
	Scheme	ofIncta		л аррт	<b>Uval.</b> 10			cheme o	-	-	-	
	Periods	1 1	0 Hrs.			-	3		aximum		1	100
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Periods		$\begin{array}{c} : 4 \\ : 2 \end{array}$				Internal Evaluation End Semester						
Instructio	Credits											50
			ractical					E	lxam Dı	iration	1 :	3 Hrs
Prerequisite(s)		ler Desi	gn									
Course Objecti		h 1										
1. To identify		•										
<ol> <li>To design</li> <li>To develor</li> </ol>					homog							
							hino					
4. To develop	0		generat	e code l	for a tar	get mac	nine.					
Course Outcor	nes (CO)	•									1.5	
COs No.				2	Stateme	ent						rogran
<u> </u>	A					11	1		11			s (POs)
CO ₁	analyze		ammar	specific	cation o	levelop	the prog	ram for	lexical	1	PO3, PO4	i, <b>PO</b> 5
$CO_2$	Implem	ent give	en parse	er speci	fication	develop	the prog	gram for	top-		PO ₃ , P	04,
	down a	nd bott	om-up	<u>parser</u> s								
CO ₃	Develop	o progra	am for s	syntax d	lirected	translat	ion sche	me			PO _{3,} P	<b>O</b> ₄
CO ₄	Develop	o algorit	thms to	genera	te code	for a ta	rget mac	hine		I	PO _{3,} PO ₄	1, <b>PO</b> 5
Course Outcomes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	PO	
Outcomes	<b>PO</b> ₁	$PO_2$	PO ₃	$PO_4$	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	PO	11 2
CO ₁			2	2	2							
CO ₂			2	2								
CO ₃			2	2								
CO ₄			2	2	2							
			1 – Re	asonabl	e; 2 - S	ignificar	ıt; 3 – St	rong				
Detailed Conte												
1. Simulation												
2. Simulation		nite stat	te mach	ine to	distingı	iish amc	ong Integ	gers, Rea	l Numb	ers &	Numb	ers wi
Exponents										~	_	
3. Program ir							rn the to	ken four	nd for a	C like	Langu	age
4. Program to					Left fac	toring						
5. Program to				sets								
6. Program to												
7. Parsing of												
8. Use of YAC						ke Langi	lage					
9. Program to						ora						
10. Program to <b>Examination a</b>							lovoluot	ion (EO )	morka)	oompr	icing to	
sessional exam is mainly end s				SCHIIIG	n prese	intation	eitt, and (	CALCINAL	evaluat	1011 (30	inal K	5) winc
Text Books:	emestel	сланин	auon.									
1 Principles	a of com	niler do	sign _^	V Abo		nan. Doc	rson Ed	leation				
2 Modern C									niversit	v Proc		
Reference Boo		mplen	nentatio	JIIII C-	Anure	w м. арг	iei, Caint	n luge U	niversit	y rres	5.	
		Dioria	o Ton-	Magar	Dava	Brown	Vroiller					
1lex&yacc2Modern 0								Inoche	Wilcre	Income	ooh 1	
2 Modern C 3 Engineer	-	0						. Jacobs,	whey t	ii Cdiill	ecn. 3.	
5 Engineeri	ing a COI	- ipnei	Cooper	a rung	a, llisevi							

4 Compiler Construction, Louden, Thomson.

Course C				C	Course T	litle			Lec	ture	Some	octor
BTCS661F	PCP		(	Compu	ter Netv	vorks LA	AB		L	Т Р	Seme	
Version: 1.2			Date of	f Appro	oval: 16t	h BoS 17	-11-2022		0	0 4		ΛI
	Scheme of	of Instr	uction				S	cheme o	of Exam	ination		
No. of	Periods	: 60	Hrs.					М	aximun	n Score	: 10	00
Periods	s/Week	: 4						Inter	nal Eva	luation	: 5	0
	Credits	: 2							End Se	mester	: 5	0
Instructio	on Mode	: Pra	ctical					Ι	Exam D	uration	: 3	Hrs.
Prerequisite(s	s): Compu	ter Net	works									
Course Object	tives:											
1. To under	stand the	functio	nalities	s of vari	ious laye	ers of OS	SI model.					
2. To under	stand the	operat	ing Syst	tem fur	nctionali	ties.						
3. To implei	ment Dijks	stra 's a	lgorithi	m to co	mpute t	he shor	test path	throug	h a grap	oh.		
4. To write a	a progran	n to bre	ak the a	above E	DES codi	ing.	-					
Course Outco	mes (CO)	:										
COs No.				ç	Stateme	ent				Марр	oed Pro	grar
											comes (	
CO ₁	Apply th	ne encr	yption a	and dec	ryption	concept	ts in Linu	IX		PC	D ₂ , PO ₃ , P	<b>O</b> 4,
	environ											
$CO_2$	Ability t	o apply	approp	oriate a	lgorithn	n for the	finding	of short	est	PC	<b>D</b> 3, <b>PO</b> 4, <b>P</b>	<b>PO</b> 5
	route.											
CO ₃	Ability t										PO ₄ , PO	
CO ₄				ential	protoco	ols in	network	desig	n and	PC	<b>D</b> _{3,} <b>PO</b> _{5,} <b>P</b>	<b>PO</b> 9
	implem	entatio	n									
nvestigations o sustainability, <b>P</b>	of complex <b>O</b> 8- Ethics,	edge, <b>P</b> problem <b>PO</b> 9- Ine	<b>O</b> ₂- Pro ns, <b>PO</b> ₅- dividual	Modern or team	tool usa work, <b>PC</b>	nge, <b>PO</b> 6- D10- Comm	The engine	neer and n, <b>PO</b> 11- P	society, Project m	<b>PO</b> ₇ - En	vironme	ent ar
nvestigations o sustainability, <b>P</b> PO ₁₂ - Life-long	of complex <b>O</b> 8- Ethics, Learning	edge, <b>P</b> problem <b>PO</b> 9- Ind Mapj	O₂- Prons, PO₅- dividual	Modern or team course	outcom	nge, <b>PO</b> 6- D10- Comr es with	The engin	neer and n, <b>PO</b> 11- P outcom	society, Project m	<b>PO</b> ₇ - En	vironme	ent ai inanc
nvestigations o ustainability, <b>P</b> O ₁₂ - Life-long <b>Course</b>	of complex <b>O</b> 8- Ethics,	edge, <b>P</b> problem <b>PO</b> 9- Ine	<b>O</b> ₂- Pro ns, <b>PO</b> ₅- dividual	Modern or team	tool usa work, <b>PC</b>	nge, <b>PO</b> 6- D10- Comm	The engine	neer and n, <b>PO</b> 11- P	society, Project m	<b>PO</b> ₇ - En	vironme	ent an inanc
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Prerequisite(		mming	for Pro	blem Sc	lving &	Design a	and Anal	ysis of A	lgorith	m			
Course Objec			•						1.1				
<ol> <li>To famili languages</li> <li>To apply</li> </ol>	stand Soft arize of t s. ER Diagra ment the s	the syn m, DFD	ntax, se ), UML f	emantic for desig	s, data-	-types a	nd libra	ry func			ур	rogran	nming
Course Outco	mes (CO)	:											
COs No.					Statemo	ent				(	Outo	comes	· /
CO ₁	Applyin	0	-									PO3, PO PO11	
CO ₂	Apply D										,	PO ₅ , PO	,
CO ₃						ned Frai		1				PO ₃ , PC	
CO ₄ PO ₁ - Engineer	Able to											PO ₅ , PO	-
PO ₁₂ - Life-long							orogram						PO ₁
Outcomes	PO ₁	$PO_2$	PO ₃	$PO_4$	PO ₅	$PO_6$	<b>PO</b> ₇	PO ₈	PO ₉	P	O ₁₀	<b>PO</b> ₁₁	2
CO ₁		2	2					2	2			2	_
CO ₂			2		2				2			2	
CO ₃			2		2								
CO ₄			2		0								
004			2		2				2			2	
			_	asonabl	-	gnifican	.t; 3 – Sti	rong	2			2	
Detailed Cont	tents:		_	asonabl	-	gnifican	t; 3 – Sti	rong	2			2	
Detailed Cont Based	d on real-1		<b>1 – Re</b>	e/prob	e; 2 – Si	ecific				com	pris		) class
Detailed Cont Based Examination sessional exar is mainly end	d on real-t <b>and Evalu</b> ns/ assigr	<b>ation I</b>	<u>1 – Re</u> n-house Pattern: / quiz/	e/ prob	e; 2 – Si elem spe	ecific 1 interna	l evaluat	ion (50	marks)			ing two	
Detailed Cont Based Examination sessional exar	d on real-t <b>and Evalu</b> ns/ assigr	<b>ation I</b>	<u>1 – Re</u> n-house Pattern: / quiz/	e/ prob	e; 2 – Si elem spe	ecific 1 interna	l evaluat	ion (50	marks)			ing two	
Detailed Cont Based Examination sessional exar is mainly end Text Books:	d on real-t <b>and Evalu</b> ns/ assigr	<b>ation I</b>	<u>1 – Re</u> n-house Pattern: / quiz/	e/ prob	e; 2 – Si elem spe	ecific 1 interna	l evaluat	ion (50	marks)			ing two	
Detailed Cont     Based     Based     Examination     sessional exar     is mainly end     Text Books:     1     2     Reference Bo	d on real-1 <b>and Evalu</b> ns/ assigr semester	<b>ation I</b>	<u>1 – Re</u> n-house Pattern: / quiz/	e/ prob	e; 2 – Si elem spe	ecific 1 interna	l evaluat	ion (50	marks)			ing two	
Detailed Cont     Based     Based     Examination     sessional exar     is mainly end     Text Books:     1     2	d on real-1 <b>and Evalu</b> ns/ assigr semester	<b>ation I</b>	<u>1 – Re</u> n-house Pattern: / quiz/	e/ prob	e; 2 – Si elem spe	ecific 1 interna	l evaluat	ion (50	marks)			ing two	

Course C	ode			Co	ourse Ti	itle			Le	ectu	re	5.	
BTCS760	PCP			I	Project-	II			L	Т	Р	Se	mester:
Version: 1.2		]	Date of	Approv	v <b>al:</b> 16th	BoS 17	-11-202	2	0	0	6		VII
	Scheme of	of Instr	uction					Schem	e of Ex	ami	natio	n	
No. o	Periods	: 30	Hrs.					Ν	Maximu	ım S	core	:	200
Lab Hour	s/Week	: 6						Inte	ernal E	valua	ation	:	100
	Credits	: 6							End S	Seme	ester	:	100
Instructi	on Mode	: Pra	ictical						Exam	Dura	ation	:	-
Prerequisite(	s): Project	-I											
Course Objec	tives:												
1. To under	stand Soft	ware re	equirem	ent spe	ecificati	on and	designi	ing metł	nodolo	gy.			
2. Familiariz	ation of	the syr	ntax, se	emantic	s, data	-types	and lit	orary fu	nction	s of	any	prog	ramming
languages	5.	Ū.						·			·		C
3. To apply	ER Diagrai	m, DFD	, UML f	or desig	gning th	e softw	are ap	plicatior	ı.				
4. To impler	nent the s	pecifie	d proble	ems.									
Course Outco	mes (CO):												
COs No.				1	Statem	ent						Mar	ped
												Prog	ram
													es (POs)
CO ₁	Applyin	g SRS, t	echniq	ues							PO		PO ₈ , PO ₉ ,
													D ₁₁
$CO_2$	Apply D	esign n	nethods	s for giv	en SRS						PC		PO ₉ , PO ₁₁
CO ₃	Write th	ne code	s as per	r SRS ar	nd desig							PO ₃	
CO ₃ CO ₄		ne code	s as per	r SRS ar	nd desig				on		РО	3, PO5,	PO ₉ , PO ₁₁ ,
CO4 PO1- Engineer investigations o sustainability, P	Write th Able to ng Knowle f complex <b>O</b> ₈ - Ethics,	ne code implem edge, <b>P</b> problem	s as per ent rea O ₂ - Pro is, <b>PO</b> 5-	r SRS ar l world blem ar Modern	nd desig probler nalysis, tool usa	n into s PO3- D ge, PO6-	oftwar esign/d - The er	e solutio levelopm ngineer a	ent of nd soci	ety, <b>I</b>	tions, <b>20</b> 7- E	93, PO5, PO PO4- Inviror	PO ₉ , PO ₁₁ , D ₁₂ Conduc iment and
CO ₄ PO ₁ - Engineer investigations o sustainability, P PO ₁₂ - Life-long	Write th Able to ng Knowle f complex <b>O</b> ₈ - Ethics,	ne code implem edge, <b>P</b> problem <b>PO</b> 9- Inc	s as per ent rea O₂- Pro s, <b>PO₅-</b> dividual o	r SRS ar l world blem ar Modern or team	nd desig probler nalysis, tool usa work, <b>PC</b>	n into s PO3- D ge, PO6- D10-Com	softwar esign/d - The er municat	e solutio levelopm ngineer a	ent of nd soci - Projec	ety, <b>I</b>	tions, <b>20</b> 7- E	93, PO5, PO PO4- Inviror	PO ₉ , PO ₁₁ , D ₁₂ Conduct iment and
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course	Write th Able to ng Knowle f complex <b>O</b> ₈ - Ethics,	ne code implem edge, <b>P</b> problem <b>PO</b> 9- Inc	s as per ent rea O₂- Pro s, <b>PO₅-</b> dividual o	r SRS ar l world blem ar Modern or team	nd desig probler nalysis, tool usa work, <b>PC</b>	n into s PO3- D ge, PO6- D10-Com	softwar esign/d - The er municat	e solutio levelopm Igineer a tion, <b>PO</b> 11	ent of nd soci - Projec	ety, <b>I</b> et mar	tions, <b>20</b> 7- E	93, PO5, PO PO4- Inviror	PO ₉ , PO ₁₁ , D <u>12</u> Conduct ament and d finance
CO ₄ PO ₁ - Engineer investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes	Write th Able to ng Knowle f complex <b>O</b> ₈ - Ethics, Learning	ne code implem edge, P problem PO ₉ - Inc Mapp PO ₂	s as per ent rea O ₂ - Pro is, <b>PO</b> 5- dividual o ping of o <b>PO</b> 3	r SRS ar l world blem ar Modern or team	nd desig probler nalysis, tool usa work, <b>PO</b> outcom	n into s PO ₃ - D ge, PO ₆ - D ₁₀ - Com es with	oftwar esign/d - The er municat progra	e solutio levelopm ngineer a cion, <b>PO</b> 11 nm outco <b>PO</b> 8	ent of nd soci- Projec omes <b>PO</b> 9	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	93, PO5, PO4- nviror nent ar PO4	PO9, PO11, D12 Conduct Iment and Id finance
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁	Write th Able to ng Knowle f complex <b>O</b> ₈ - Ethics, Learning	ne code implem edge, <b>P</b> problem <b>PO</b> 9- Inc Mapp	s as per ent rea O ₂ - Pro is, PO ₅ - dividual o ping of o PO ₃ 2	r SRS ar l world blem ar Modern or team	nd desig probler nalysis, tool usa work, <b>PC</b> outcom <b>PO</b> 5	n into s PO ₃ - D ge, PO ₆ - D ₁₀ - Com es with	oftwar esign/d - The er municat progra	e solutio levelopm ngineer a cion, <b>PO</b> 11 nm outco	ent of nd socia - Projec omes <b>PO</b> ₉ 2	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	<b>P3, PO5,</b> <b>P04</b> - nviror nent ar <b>P04</b> - 2	PO9, PO11, D12 Conduct Iment and Id finance
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂	Write th Able to ng Knowle f complex <b>O</b> ₈ - Ethics, Learning	ne code implem edge, P problem PO ₉ - Inc Mapp PO ₂	s as per ent rea O ₂ - Pro is, PO ₅ - dividual o ping of c PO ₃ 2 2	r SRS ar l world blem ar Modern or team	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> 5 2	n into s PO ₃ - D ge, PO ₆ - D ₁₀ - Com es with	oftwar esign/d - The er municat progra	e solutio levelopm ngineer a cion, <b>PO</b> 11 nm outco <b>PO</b> 8	ent of nd soci- Projec omes <b>PO</b> 9	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	93, PO5, PO4- nviror nent ar PO4	PO9, PO11, D12 Conduct Iment and Id finance
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃	Write th Able to ng Knowle f complex <b>O</b> ₈ - Ethics, Learning	ne code implem edge, P problem PO ₉ - Inc Mapp PO ₂	s as per ent rea 0 ₂ - Pro ls, <b>PO</b> ₅ - dividual o ping of c <b>PO</b> ₃ 2 2 2	r SRS ar l world blem ar Modern or team	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅	n into s PO ₃ - D ge, PO ₆ - D ₁₀ - Com es with	oftwar esign/d - The er municat progra	e solutio levelopm ngineer a cion, <b>PO</b> 11 nm outco <b>PO</b> 8	ent of nd soci- Projec Domes PO ₉ 2 2	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	P3, PO5,           P0           P04-           Invironment and           PO2           2           2           2           2	PO ₉ , PO ₁₁ , D ₁₂ Conduction International Conduction International Conductional Conduction International Conduction International Conduction International Conduction International Conductional Conduction International Conductional Conduction International Conduction
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂	Write th Able to ng Knowle f complex <b>O</b> ₈ - Ethics, Learning	ne code implem edge, P problem PO ₉ - Inc Mapp PO ₂	s as per eent rea 02- Pro is, PO5- dividual o ping of o PO3 2 2 2 2 2 2	r SRS ar l world blem an Modern or team course o <b>PO</b> ₄	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> 5 2 2 2 2	n into s <b>PO</b> ₃ - D ge, <b>PO</b> ₆ - <b>D</b> ₁₀ - Com es with <b>PO</b> ₆	esign/d - The er municat progra PO ₇	e solutio levelopm ngineer a cion, <b>PO</b> 11 mm outco <b>PO</b> 8 2	ent of nd socia - Projec omes <b>PO</b> ₉ 2	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	<b>P3, PO5,</b> <b>P04</b> - nviror nent ar <b>P04</b> - 2	PO9, PO11, D12 Conduct Iment and Id finance
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁	ne code implem edge, P problem PO ₉ - Inc Mapp PO ₂	s as per eent rea 02- Pro is, PO5- dividual o ping of o PO3 2 2 2 2 2 2	r SRS ar l world blem an Modern or team course o <b>PO</b> ₄	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅	n into s <b>PO</b> ₃ - D ge, <b>PO</b> ₆ - <b>D</b> ₁₀ - Com es with <b>PO</b> ₆	esign/d - The er municat progra PO ₇	e solutio levelopm ngineer a cion, <b>PO</b> 11 mm outco <b>PO</b> 8 2	ent of nd soci- Projec Domes PO ₉ 2 2	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	P3, PO5,           P0           P04-           Invironment and           PO2           2           2           2           2	PO ₉ , PO ₁₁ , D ₁₂ Conduction International Conduction International Conductional Conduction International Conduction International Conduction International Conduction International Conductional Conduction International Conductional Conduction International Conduction
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁	ne code implem edge, P problem PO ₉ - Inc Mapp PO ₂	s as per eent rea 02- Pro is, PO5- dividual o ping of o PO3 2 2 2 2 2 2	r SRS ar l world blem an Modern or team course o <b>PO</b> ₄	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> 5 2 2 2 2	n into s <b>PO</b> ₃ - D ge, <b>PO</b> ₆ - <b>D</b> ₁₀ - Com es with <b>PO</b> ₆	esign/d - The er municat progra PO ₇	e solutio levelopm ngineer a cion, <b>PO</b> 11 mm outco <b>PO</b> 8 2	ent of nd soci- Projec Domes PO ₉ 2 2	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	P3, PO5,           P0           P04-           Invironment and           PO2           2           2           2           2	PO ₉ , PO ₁₁ , D ₁₂ Conduc ument and id finance
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁	ne code implem edge, P problem PO ₉ - Inc Mapp PO ₂	s as per eent rea 02- Pro is, PO5- dividual o ping of o PO3 2 2 2 2 2 2	r SRS ar l world blem an Modern or team course o <b>PO</b> ₄	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> 5 2 2 2 2	n into s <b>PO</b> ₃ - D ge, <b>PO</b> ₆ - <b>D</b> ₁₀ - Com es with <b>PO</b> ₆	esign/d - The er municat progra PO ₇	e solutio levelopm ngineer a cion, <b>PO</b> 11 mm outco <b>PO</b> 8 2	ent of nd soci- Projec Domes PO ₉ 2 2	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	P3, PO5,           P0           P04-           Invironment and           PO2           2           2           2           2	PO ₉ , PO ₁₁ , D ₁₂ Conduction International Conduction International Conductional Conduction International Conduction International Conduction International Conduction International Conduction International Conduction International Conductional Conduction International Conductional Conduction International Conductional Conduction International Conductional Conduction International Conduction
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁	ne code implem edge, Pr problem PO ₉ - Inc Mapp PO ₂ 2	s as per ent rea 02- Pro is, P05- dividual o ping of c PO3 2 2 2 2 2 2 1 - Rea	r SRS ar l world blem an Modern or team v course o PO4 asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	n into s PO3- D ge, PO6- ho- Com es with PO6 gnifica	esign/d - The er municat progra PO ₇	e solutio levelopm ngineer a cion, <b>PO</b> 11 mm outco <b>PO</b> 8 2	ent of nd soci- Projec Domes PO ₉ 2 2	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	P3, PO5,           P0           P04-           Invironment and           PO2           2           2           2           2	PO ₉ , PO ₁₁ , D ₁₂ Conduction International Conduction International Conductional Conduction International Conduction International Conduction International Conduction International Conduction International Conduction International Conduction International Conduction International Conductional Conduction International Conductional Conduction International Conductional Conduction International Conductional Conduction
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁	ne code implem edge, Pr problem PO ₉ - Inc Mapp PO ₂ 2	s as per ent rea 02- Pro is, P05- dividual o ping of c PO3 2 2 2 2 2 2 1 - Rea	r SRS ar l world blem an Modern or team v course o PO4 asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	n into s PO3- D ge, PO6- ho- Com es with PO6 gnifica	esign/d - The er municat progra PO ₇	e solutio levelopm ngineer a cion, <b>PO</b> 11 mm outco <b>PO</b> 8 2	ent of nd soci- Projec Domes PO ₉ 2 2	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	P3, PO5,           P0           P04-           Invironment and           PO2           2           2           2           2	PO ₉ , PO ₁₁ , D ₁₂ Conduction International Conduction International Conductional Conduction International Conduction International Conduction International Conduction International Conduction International Conduction International Conductional Conduction International Conductional Conduction International Conductional Conduction International Conductional Conduction
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁	ne code implem edge, Pr problem PO ₉ - Inc Mapp PO ₂ 2	s as per ent rea 02- Pro is, P05- dividual o ping of c PO3 2 2 2 2 2 2 1 - Rea	r SRS ar l world blem an Modern or team v course o PO4 asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	n into s PO3- D ge, PO6- ho- Com es with PO6 gnifica	esign/d - The er municat progra PO ₇	e solutio levelopm ngineer a cion, <b>PO</b> 11 mm outco <b>PO</b> 8 2	ent of nd soci- Projec Domes PO ₉ 2 2	ety, <b>I</b> et mar	tions, 2 <b>0</b> 7- E nagem	P3, PO5,           P0           P04-           Invironment and           PO2           2           2           2           2	PO ₉ , PO ₁₁ , D ₁₂ Conduction International Conduction International Conductional Conduction International Conduction International Conduction International Conduction International Conduction International Conduction International Conduction International Conduction International Conductional Conduction International Conductional Conduction International Conductional Conduction International Conductional Conduction
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents:	ne code implem edge, P problem PO ₉ - Inc Mapp PO ₂ 2	s as per ent rea O ₂ - Pro is, PO ₅ - dividual o ping of o PO ₃ 2 2 2 2 1 - Rea	r SRS ar l world blem an Modern or team v course o <b>PO</b> ₄ asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 2 <b>e; 2 – Si</b> lem spe	n into s PO3- D ge, PO6- bo- Com es with PO6 gnifica	oftwar esign/d - The er municat progra PO ₇	e solutio levelopm ngineer a cion, <b>PO</b> 11 m outco <b>PO</b> 8 2 Strong	ent of nd soci- Projec PO9 2 2 2 2	P	D10	<b>PO</b> ₅ , <b>PO</b> ₅ , <b>PO PO</b> ₄ -       inviror       inent ar <b>PO</b> 2       2       2       2       2	PO ₉ , PO ₁₁ , D ₁₂ Conduction international and international an
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont Based Examination	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents: d on real-t	ne code implem edge, Pr problem PO ₉ - Inc Mapp PO ₂ 2 2	s as per ent rea O ₂ - Pro is, PO ₅ - dividual o ping of o PO ₃ 2 2 2 2 1 - Rea a-house	r SRS ar l world blem an Modern or team v course o <b>PO4</b> asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 <b>e; 2 - Si</b> lem spe	n into s PO3- D ge, PO6- bo-Com es with PO6 gnifica ecific interna	oftwar esign/d - The er municat progra PO ₇ nt; 3 –	e solutio levelopm ngineer a cion, PO ₁₁ m outco PO ₈ 2 Strong ation (10	ent of nd soci- Projec PO9 2 2 2 2 2 2	ks) cc	O10	P3, PO5, P04- nviror ient ar PO2 2 2 2 2 2 2 2 2 2	PO9, PO11, D12 Conduction international 1 PO12 2 2 two class
CO ₄ PO ₁ - Engineer investigations of sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont Based Examination sessional exa	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents: d on real-t	ne code implem edge, Pr problem PO ₉ - Inc Mapp PO ₂ 2 2	s as per ent rea O ₂ - Pro is, PO ₅ - dividual o poing of o PO ₃ 2 2 2 2 2 1 - Rea n-house attern: s/ quiz	r SRS ar l world blem an Modern or team course of PO4 PO4 asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 <b>e; 2 - Si</b> lem spe	n into s PO3- D ge, PO6- bo-Com es with PO6 gnifica ecific interna	oftwar esign/d - The er municat progra PO ₇ nt; 3 –	e solutio levelopm ngineer a cion, PO ₁₁ m outco PO ₈ 2 Strong ation (10	ent of nd soci- Projec PO9 2 2 2 2 2 2	ks) cc	O10	P3, PO5, P04- nviror ient ar PO2 2 2 2 2 2 2 2 2 2	PO9, PO11, D12 Conduction international 1 PO12 2 2 two class
CO4 PO1- Engineer investigations of sustainability, P PO12- Life-long Course Outcomes CO1 CO2 CO3 CO4 Detailed Cont Based Examination sessional exa which is main	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents: d on real-t	ne code implem edge, Pr problem PO ₉ - Inc Mapp PO ₂ 2 2	s as per ent rea O ₂ - Pro is, PO ₅ - dividual o poing of o PO ₃ 2 2 2 2 2 1 - Rea n-house attern: s/ quiz	r SRS ar l world blem an Modern or team course of PO4 PO4 asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 <b>e; 2 - Si</b> lem spe	n into s PO3- D ge, PO6- bo-Com es with PO6 gnifica ecific interna	oftwar esign/d - The er municat progra PO ₇ nt; 3 –	e solutio levelopm ngineer a cion, PO ₁₁ m outco PO ₈ 2 Strong ation (10	ent of nd soci- Projec PO9 2 2 2 2 2 2	ks) cc	O10	P3, PO5, P04- nviror ient ar PO2 2 2 2 2 2 2 2 2 2	PO9, PO11, D12 Conduction international 1 PO12 2 2 two class
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CO4 PO1- Engineer investigations of sustainability, P PO12- Life-long Course Outcomes CO1 CO2 CO3 CO4 Detailed Cont Based Examination sessional exa which is main Text Books: 1 2	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents: d on real-t	ne code implem edge, Pr problem PO ₉ - Inc Mapp PO ₂ 2 2	s as per ent rea O ₂ - Pro is, PO ₅ - dividual o poing of o PO ₃ 2 2 2 2 2 1 - Rea n-house attern: s/ quiz	r SRS ar l world blem an Modern or team course of PO4 PO4 asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 <b>e; 2 - Si</b> lem spe	n into s PO3- D ge, PO6- bo-Com es with PO6 gnifica ecific interna	oftwar esign/d - The er municat progra PO ₇ nt; 3 –	e solutio levelopm ngineer a cion, PO ₁₁ m outco PO ₈ 2 Strong ation (10	ent of nd soci- Projec PO9 2 2 2 2 2 2	ety, I mar	O10	P3, PO5, P04- nviror ient ar PO2 2 2 2 2 2 2 2 2 2	PO ₉ , PO ₁₁ , D ₁₂ Conduction international finance 1 PO ₁₂ 2 2 two class
CO4 PO1- Engineer investigations of sustainability, P PO12- Life-long Course Outcomes CO1 CO2 CO3 CO4 Detailed Cont Based Examination sessional exa which is main Text Books: 1 2 Reference Bo	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents: d on real-t	ne code implem edge, Pr problem PO ₉ - Inc Mapp PO ₂ 2 2	s as per ent rea O ₂ - Pro is, PO ₅ - dividual o poing of o PO ₃ 2 2 2 2 2 1 - Rea n-house attern: s/ quiz	r SRS ar l world blem an Modern or team course of PO4 PO4 asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 <b>e; 2 - Si</b> lem spe	n into s PO3- D ge, PO6- bo-Com es with PO6 gnifica ecific interna	oftwar esign/d - The er municat progra PO ₇ nt; 3 –	e solutio levelopm ngineer a cion, PO ₁₁ m outco PO ₈ 2 Strong ation (10	ent of nd soci- Projec PO9 2 2 2 2 2 2	ety, I mar	O10	P3, PO5, P04- nviror ient ar PO2 2 2 2 2 2 2 2 2 2	PO ₉ , PO ₁₁ , D ₁₂ Conduction international finance 1 PO ₁₂ 2 2 two class
CO4 PO1- Engineer investigations of sustainability, P PO12- Life-long Course Outcomes CO1 CO2 CO3 CO4 Detailed Cont Based Examination sessional exa which is main Text Books: 1 2	Write th Able to ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents: d on real-t	ne code implem edge, Pr problem PO ₉ - Inc Mapp PO ₂ 2 2	s as per ent rea O ₂ - Pro is, PO ₅ - dividual o poing of o PO ₃ 2 2 2 2 2 1 - Rea n-house attern: s/ quiz	r SRS ar l world blem an Modern or team course of PO4 PO4 asonabl	nd desig probler nalysis, tool usa work, <b>PO</b> outcom <b>PO</b> ₅ 2 2 2 2 <b>e; 2 - Si</b> lem spe	n into s PO3- D ge, PO6- bo-Com es with PO6 gnifica ecific interna	oftwar esign/d - The er municat progra PO ₇ nt; 3 –	e solutio levelopm ngineer a cion, PO ₁₁ m outco PO ₈ 2 Strong ation (10	ent of nd soci- Projec PO9 2 2 2 2 2 2	ety, I mar	O10	P3, PO5, P04- nviror ient ar PO2 2 2 2 2 2 2 2 2 2	PO ₉ , PO ₁₁ , D ₁₂ Conduction international finance 1 PO ₁₂ 2 2 two class

Course C	ode			Co	urse T	itle			L	ectu	re	Sor	anton
BTCS860	PCP			P	roject-	·III			L	Т	Р		nester: VII
Version: 1.2			Date of	f Approv	7 <b>al:</b> 16tł	h BoS 17-	-11-2022		0	0	6		VII
	Scheme of	of Instr	uction				S	cheme o	of Exa	min	ation		
No. of	f Periods	: 30	) Hrs.					М	axim	um S	Score	:	200
Lab Hours	/ Week	: 6						Inter	nal E	valua	ation	:	100
	Credits	: 6							End	Sem	ester	:	100
Instructi	on Mode	: Pr	actical					E	lxam	Dura	ation	:	-
Prerequisite(s	s): Project	-I & Pro	ject-II										
Course Object	tives:												
1. To unders	stand Soft	ware re	quirem	ent spec	cificatio	on and d	esigning	g metho	lolog	ÿ.			
2. Familiariz	ation of	the syr	ntax, sei	mantics,	, data-	-types a	nd libra	ry func	tions	of	any p	rogra	mming
languages												-	_
3. To apply l	ER Diagra	m, DFD	, UML fo	or desigr	ning th	e softwa	re appli	cation.					
4. To impler	nent the s	pecifie	d proble	ms.									
Course Outco	mes (CO):												
COs No.				St	tateme	ent							rogram
													s (POs)
CO ₁	Applyin	g SRS, t	echniqu	ies							<b>PO</b> _{2,}		O8, PO9,
				<u> </u>	~~~~							PO ₁	
CO ₂				for give		1.5					,	,	O ₉ , PO ₁₁
CO ₃				SRS and								PO ₃ , P	
		imnlem	ont roal			• .		colution			PO ₃ ,	PO5, P	<b>D</b> 9, <b>PO</b> 11,
investigations o sustainability, <b>P</b>	ng Knowle f complex <b>O</b> 8- Ethics,	edge, <b>P</b> problem	<b>0</b> 2- Prob s, <b>PO</b> 5- M	olem ana Modern te	alysis, 1 ool usa	ge, <b>PO</b> 6-	sign/dev The engi	elopmen neer and	socie	ty, P	<b>0</b> 7- Env	vironn	Conduc ient and
<b>PO</b> 1- Engineeri investigations o sustainability, <b>P</b>	ng Knowle f complex <b>O</b> 8- Ethics,	edge, <b>P</b> problem <b>PO</b> 9- Inc	<b>O</b> ₂- Prob s, <b>PO</b> ₅- M lividual o	olem ana Modern te	alysis, 1 ool usaş ork, <b>PO</b>	<b>PO</b> 3- De ge, <b>PO</b> 6- 110-Comm	sign/dev The engin nunication	elopmen neer and n, <b>PO</b> 11- P	socie roject	ty, P	<b>0</b> 7- Env	<b>PO</b> ₄− vironn	Conduc ient and
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course	ng Knowle f complex <b>O</b> ₈ - Ethics, Learning	edge, <b>P</b> problem <b>PO</b> 9- Inc Mapp	<b>O</b> 2- Prob s, <b>PO</b> 5- M lividual o bing of c	olem ana Modern te or team we	alysis, 1 ool usa ork, <b>PO</b> utcomo	PO3- Deg ge, PO6- ' 10- Comm es with p	sign/dev The engin nunication program	elopmen neer and n, <b>PO</b> 11- P outcom	socie roject ies	ty, <b>P</b> man	<b>O</b> 7- Env ageme	PO4- vironn nt and	Conduc nent and finance
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes	ng Knowle f complex <b>O</b> 8- Ethics,	edge, <b>P</b> problem <b>PO</b> ₉ - Inc Mapp <b>PO</b> ₂	O ₂ - Prob s, <b>PO</b> 5- M lividual o bing of c <b>PO</b> 3	olem ana Modern te or team we	alysis, 1 ool usaş ork, <b>PO</b>	<b>PO</b> 3- De ge, <b>PO</b> 6- 110-Comm	sign/dev The engin nunication	elopmen neer and n, <b>PO</b> 11- P outcom <b>PO</b> 8	socie roject ies PO	ty, <b>P</b> man	<b>0</b> 7- Env	PO ₄ - vironn nt and PO ₁	Conduc nent and finance
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁	ng Knowle f complex <b>O</b> ₈ - Ethics, Learning	edge, <b>P</b> problem <b>PO</b> 9- Inc Mapp	O ₂ - Prob s, <b>PO</b> 5- M lividual o ping of c <b>PO</b> 3 2	olem ana Modern te or team we	alysis, 1 ool usaş ork, <b>PO</b> utcome <b>PO</b> 5	PO3- Deg ge, PO6- ' 10- Comm es with p	sign/dev The engin nunication program	elopmen neer and n, <b>PO</b> 11- P outcom	socie roject es <b>PO</b> 2	ty, <b>P</b> man	<b>O</b> 7- Env ageme	PO ₄ - vironn nt and PO ₁ 2	Conduc nent and finance <b>PO</b>
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PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont	ng Knowle f complex Os- Ethics, Learning PO1	edge, Pi problem PO ₉ - Inc Mapp PO ₂ 2	$O_2$ - Prob $S, PO_5$ - M dividual of ping of c $PO_3$ 2 2 2 2 1 - Rea	PO4	alysis, 1 ool usa; ork, <b>PO</b> utcome PO5 2 2 2 2 ; 2 – Si	PO ₃ - De ge, PO ₆ - ' to- Comm es with p PO ₆ gnifican	sign/dev The engin nunication program <b>PO</b> 7	elopmen neer and n, <b>PO</b> ₁₁ - P outcom <b>PO</b> ₈ 2	socie roject es PO 2 2	ty, <b>P</b> man	<b>O</b> 7- Env ageme	PO ₄ - vironn nt and PO ₁ 2 2	Conduction finance
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont	ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents:	edge, Pi problem PO ₉ - Inc Mapp PO ₂ 2	$O_2$ - Prob $S, PO_5$ - M dividual of ping of c $PO_3$ 2 2 2 2 1 - Rea	PO4	alysis, 1 ool usa; ork, <b>PO</b> utcome PO5 2 2 2 2 ; 2 – Si	PO ₃ - De ge, PO ₆ - ' to- Comm es with p PO ₆ gnifican	sign/dev The engin nunication program <b>PO</b> 7	elopmen neer and n, <b>PO</b> ₁₁ - P outcom <b>PO</b> ₈ 2	socie roject es PO 2 2	ty, <b>P</b> man	<b>O</b> 7- Env ageme	PO ₄ - vironn nt and PO ₁ 2 2	Conduction finance
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont	ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents:	edge, Pi problem PO ₉ - Ind Mapp PO ₂ 2	$O_2$ - Prob $PO_5$ - N dividual o ping of c $PO_3$ 2 2 2 2 1 - Rea n-house	plem ana Modern to or team we rourse ou PO4 PO4 soonable;	alysis, 1 ool usa; ork, <b>PO</b> <u>utcoma</u> <u>2</u> <u>2</u> <u>2</u> <u>2</u> <u>2</u> <u>2</u> <u>2</u> <u>2</u> <u>2</u> <u>2</u>	PO ₃ - De: ge, PO ₆ - ' to- Comm es with p PO ₆ gnifican	sign/dev The engination program PO7 t; 3 – Sta	elopmen neer and n, PO ₁₁ - P outcom PO ₈ 2 2 rong	socie roject es PO 2 2 2 2	ly ly	O7- Envageme	PO ₄ - vironn nt and PO ₁ 2 2	PO PO 2 2
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont Based Examination a	ng Knowle f complex Os- Ethics, Learning PO1 ents: l on real-t	edge, P problem PO ₉ - Inc Mapp PO ₂ 2 2	$O_2$ - Prob $S$ , $PO_5$ - N dividual o ping of c $PO_3$ 2 2 2 2 1 - Rea n-house attern: I	plem ana Modern te or team we course ou PO4 PO4 ksonable;	alysis, 1 ool usa; ork, <b>PO</b> utcome <u>PO</u> 5 2 2 2 2 ; <b>2 - Si</b> em spe e both	PO ₃ - De ge, PO ₆ - ' es with p PO ₆ gnifican	sign/dev The engination program PO7 t; 3 – Sta	elopmen neer and n, PO ₁₁ - P outcom PO ₈ 2 2 rong	socie roject es PO 2 2 2 2 2 2	rty, Pu man	O7- Envageme ageme PO10	PO4- vironn nt and PO1 2 2 2	PO PO 2 2 2 2 2 2 2 2 2
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont Based Examination a sessional examination	ng Knowle f complex Os- Ethics, Learning PO1 ents: d on real-t and Evalue ns/ assig	edge, P problem PO ₉ - Inc Mapp PO ₂ 2 2	$O_2$ - Prob $S$ , $PO_5$ - N dividual o ping of c $PO_3$ 2 2 2 2 1 - Rea n-house attern: I S/ quiz/	PO4 PO4 proble	alysis, 1 ool usa; ork, <b>PO</b> utcome <u>PO</u> 5 2 2 2 2 ; <b>2 - Si</b> em spe e both	PO ₃ - De ge, PO ₆ - ' es with p PO ₆ gnifican	sign/dev The engination program PO7 t; 3 – Sta	elopmen neer and n, PO ₁₁ - P outcom PO ₈ 2 2 rong	socie roject es PO 2 2 2 2 2 2	rty, Pu man	O7- Envageme ageme PO10	PO4- vironn nt and PO1 2 2 2	PO PO 2 2 2 2 2 2 2 2 2
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont Based Examination a sessional examination a	ng Knowle f complex Os- Ethics, Learning PO1 ents: d on real-t and Evalue ns/ assig	edge, P problem PO ₉ - Inc Mapp PO ₂ 2 2	$O_2$ - Prob $S$ , $PO_5$ - N dividual o ping of c $PO_3$ 2 2 2 2 1 - Rea n-house attern: I S/ quiz/	PO4 PO4 proble	alysis, 1 ool usa; ork, <b>PO</b> utcome <u>PO</u> 5 2 2 2 2 ; <b>2 - Si</b> em spe e both	PO ₃ - De ge, PO ₆ - ' es with p PO ₆ gnifican	sign/dev The engination program PO7 t; 3 – Sta	elopmen neer and n, PO ₁₁ - P outcom PO ₈ 2 2 rong	socie roject es PO 2 2 2 2 2 2	rty, Pu man	O7- Envageme ageme PO10	PO4- vironn nt and PO1 2 2 2	PO PO 2 2 2 2 2 2 2
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont Based Examination a sessional examination a sessional examination a	ng Knowle f complex Os- Ethics, Learning PO1 ents: d on real-t and Evalue ns/ assig	edge, P problem PO ₉ - Inc Mapp PO ₂ 2 2	$O_2$ - Prob $S$ , $PO_5$ - N dividual o ping of c $PO_3$ 2 2 2 2 1 - Rea n-house attern: I S/ quiz/	PO4 PO4 proble	alysis, 1 ool usa; ork, <b>PO</b> utcome <u>PO</u> 5 2 2 2 2 ; <b>2 - Si</b> em spe e both	PO ₃ - De ge, PO ₆ - ' es with p PO ₆ gnifican	sign/dev The engination program PO7 t; 3 – Sta	elopmen neer and n, PO ₁₁ - P outcom PO ₈ 2 2 rong	socie roject es PO 2 2 2 2 2 2	rty, Pu man	O7- Envageme ageme PO10	PO4- vironn nt and PO1 2 2 2	PO PO 2 2 2 2 2 2 2
PO1- Engineeri investigations o sustainability, P PO12- Life-long Course Outcomes CO1 CO2 CO3 CO4 Detailed Cont Based Examination a sessional exam which is main Text Books: 1	ng Knowle f complex Os- Ethics, Learning PO1 ents: d on real-t and Evalue ns/ assig	edge, P problem PO ₉ - Inc Mapp PO ₂ 2 2	$O_2$ - Prob $S$ , $PO_5$ - N dividual o ping of c $PO_3$ 2 2 2 2 1 - Rea n-house attern: I S/ quiz/	PO4 PO4 proble	alysis, 1 ool usa; ork, <b>PO</b> utcome <u>PO</u> 5 2 2 2 2 ; <b>2 - Si</b> em spe e both	PO ₃ - De ge, PO ₆ - ' es with p PO ₆ gnifican	sign/dev The engination program PO7 t; 3 – Sta	elopmen neer and n, PO ₁₁ - P outcom PO ₈ 2 2 rong	socie roject es PO 2 2 2 2 2 2	rty, Pu man	O7- Envageme ageme PO10	PO4- vironn nt and PO1 2 2 2	PO: PO: 2 2 2 2 2 2 2 2 2 2 2 2 2
PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont Based Examination a sessional exam which is main Text Books: 1 2	ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents: d on real-t and Evalue ns/ assig ly end sen	edge, P problem PO ₉ - Inc Mapp PO ₂ 2 2	$O_2$ - Prob $S$ , $PO_5$ - N dividual o ping of c $PO_3$ 2 2 2 2 1 - Rea n-house attern: I S/ quiz/	PO4 PO4 proble	alysis, 1 ool usa; ork, <b>PO</b> utcome <u>PO</u> 5 2 2 2 2 ; <b>2 - Si</b> em spe e both	PO ₃ - De ge, PO ₆ - ' es with p PO ₆ gnifican	sign/dev The engination program PO7 t; 3 – Sta	elopmen neer and n, PO ₁₁ - P outcom PO ₈ 2 2 rong	socie roject es PO 2 2 2 2 2 2	rty, Pu man	O7- Envageme ageme PO10	PO4- vironn nt and PO1 2 2 2	PO: PO: 2 2 2 2 2 2 2 2 2 2 2 2 2
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PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cont Based Examination a sessional exam which is main Text Books: 1	ng Knowle f complex O ₈ - Ethics, Learning PO ₁ ents: d on real-t and Evalue ns/ assig ly end sen	edge, P problem PO ₉ - Inc Mapp PO ₂ 2 2	$O_2$ - Prob $S$ , $PO_5$ - N dividual o ping of c $PO_3$ 2 2 2 2 1 - Rea n-house attern: I S/ quiz/	PO4 PO4 proble	alysis, 1 ool usa; ork, <b>PO</b> utcome <u>PO</u> 5 2 2 2 2 ; <b>2 - Si</b> em spe e both	PO ₃ - De ge, PO ₆ - ' es with p PO ₆ gnifican	sign/dev The engination program PO7 t; 3 – Sta	elopmen neer and n, PO ₁₁ - P outcom PO ₈ 2 2 rong	socie roject es PO 2 2 2 2 2 2	rty, Pu man	O7- Envageme ageme PO10	PO4- vironn nt and PO1 2 2 2	POn POn 2 2 2 2 2 2 2 2

## <mark>LIST OF</mark> PROFESSIONAL ELECTIVES

Course Code         Course Title         Letture         Bernster           Precision: 12         Date of Approval: 16th BoS 17-11-202         3         1         0         V           Scheme of Instruction         Scheme of Stamination         Maximum Score         1         100           Periods/Week 1:         4         Internal Evaluation         1:         30           Credits 1:         1         Letture         Exam Duration         1:         30           Prerequisticle/Programming for Problem Solving         Exam Duration         1:         31 His.           Prerequisticle/Programming for Problem Solving         Exam Duration         1:         31 His.           To strudy and appreciate different types of languages and the underlying mathematical theories.         2:         To introduce important paradigms of programming languages.           Course Outcomes(UQ):         Course outcomes(UQ):         Statement         Mapped Program           Course Outcomes(UQ):         Course outcomes (OQ):         Pox Pox Pox         Pox Pox Pox           CO         Apply sitiable programming paradigm for the application.         Pox Pox Pox         Pox Pox Pox           CO         Apply sitiable programming paradigm for the application.         Pox Pox Pox         Pox Pox Pox           CO         Apply sitiable progr	a a	1	[											
Version: 12         Date of Approval: 16th BoS 17-11-2022         3         1         0         V           Scheme of Instruction         Scheme of Examination         No. of Periods         1         60         1         100           Periods Veck         1         60 Hrs.         Maximum Score         1         100           Periods Veck         1         4         Internal Evaluation         1         30           Credits         1         Lecture         Exam Duration         1         31 Hrs.           Prerequisite(s): Programming for Problem Solving         Course Objectives:         1         To provide conceptual understanding of high-level languages.           3         To provide conceptual understanding of high-level language design and implementation.         Pog. Pog.           COs No.         Statement         Mapped Programming anguages.           Conso Objectives:         Conson Objectives:         Pog.Pog.           COs         Understand to express syntax and semantics in formal notation.         POg.Pog.           COs         Analyze and apply of high-level language design and implementation.         POg.Pog.           COs         Analyze and apply of high-level language design and implementation.         POg.Pog.           Por<- Engineering Knowledge, POr- Problem analysis, Por- Design/development of				Duinai								D	Sen	nester:
Scheme of Instruction         Scheme of Examination           No. of Periods         1: 60 Hrs.         Maximum Score         1: 10           Periods/Week         1: 4         Internal Evaluation         1: 30           Credits         1: 4         End Semester         1: 30           Instruction Mode         1: Lecture         Exam Duration         1: 3Hrs.           Prerequisite(s): Programming for Problem Solving         Course Objectives:         1: To study and appreciate different types of languages and the underlying mathematical theories.         2: To introduce important paradigms of programming languages.           3: To provide the concept of syntax and semantics, concurrency, functional, logic programming languages.         Mapped Program           Course Outcomes (CO):         CO         Mapped Program         Outcomes (POs)           CO,         Understand to express syntax and semantics in formal notation.         POo, POo,           CO,         Apply suitable programming paradigm for the application.         POo, POo,           CO,         Apply suitable programming paradigm for the application.         POo, POo,           CO,         Cain knowledge and comparison of the features programming         POo, POo,           CO,         Cain knowledge. POr- Problem analysis, POr- Conduction, POr, Poolet management and financ         POo,           POi- Expideening Knowledge, POr- Pr		51				0	U	0 0				_		V
No. of Periods         1:         60 Hrs.         Maximum Score         1:         100           Periods/Week         i         4         Internal Evaluation         :         30           Credits         i         Lecture         Exam Duration         :         30           Prerequisite(P) Programming for Problem Solving         Exam Duration         :         3 Hrs.           Prerequisite(P) Programming for Problem Solving         Exam Duration         :         3 Hrs.           To introduce important paradigms of programming languages.         :         To introduce inportant paradigms of programming languages.           Cor provide conceptual understanding of high-level language design and implementation.         4.         To provide the concept of syntax and semantics in formal notation.         PO ₂ PO ₃ PO ₂ PO ₃ PO ₄ PO ₅ PO ₄ PO ₅ PO ₄ PO ₃ PO ₄ PO ₄ PO ₃ PO ₄ PO ₅ PO ₆ PO ₇ PO ₈ PO ₆ PO ₆ PO ₆ PO ₆ PO ₇ PO ₈ PO ₆		homo	ofInate		I Appro	oval: 101	11 605 17			-	-	•		
Periods/ Weck         1         Internal Evaluation         1:         30           Credits         1:         4         End Semester         1:         70           Instruction Mode         1:         Lecture         Exam Duration         1:         31           Prerequisite(s): Programming for Problem Solving         Course Objectives:         1:         To study and appreciate different types of languages and the underlying mathematical theories.           2: To provide the concept of syntax and semantics, concurrency, functional, logic programming languages.         Course Objectives:         Course Objectives:           Course Objectives:         Course Objectives:         Mapped Program         Outcomes (POs)           Course Outcomes (CO):         COs         Statement         Mapped Program           COa         Understand to express syntax and semantics in formal notation.         POs PO, PO,           COa         Analyze and apply of high-level language design and implementation.         POs PO, PO,           COa         Analyze and apply of high-level language, POr The englication.         POs PO, PO,           COa         Cain knowledge, POr Problem analysis, POr Design/development of solutions, POr Condu unvestigations of compte profoseming por course outcomes with program outcomes           POr         Englineering Knowledge, POr Individual or team work, POs POs POs POs POs POs         POn POs<								2				-	•	100
Credits         :         4         End Semester         :         70           Instruction Mode         :         Lecture         Exam Duration         :         3 Hrs.           Prerequisite(s): Programming for Problem Solving         :         3 Hrs.         Stam Duration         :         3 Hrs.           Course Objectives:         :         To introduce important paradigms of programming languages and the underlying mathematical theories.           1:         To study and appreciate different types of languages and implementation.         :         To provide the concept of syntax and semantics, concurrency, functional, logic programmin languages and scripting languages.           Course Outcomes (CO):         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :         :				1115.										
Instruction Mode         I. Lecture         Exam Duration         ?         3 Hrs.           Prerequisite(s): Programming for Problem Solving         Course Objectives:         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         7         5         5         7         5         5         7         5         7         5         7         5         7         5         7         5         7         6         7         5         7         5         7         5         7         6         7         5         7         5         7         5         7         5         7         5         7         5         7         5         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7 <td< td=""><td>,</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>inter</td><td></td><td></td><td></td><td></td><td></td></td<>	,								inter					
Prerequisite(s): Programming for Problem Solving           Course Objectives:           1         To study and appreciate different types of languages and the underlying mathematical theories.           2. To introduce important paradigms of programming languages.         To provide the concept of syntax and semantics, concurrency, functional, logic programming languages and scripting languages.           Course Outcomes (CO):         Statement         Mapped Program           COs No.         Statement         Dutcomes (POs)           CO         Understand to express syntax and semantics in formal notation.         POs, PO, PO           CO2         Analyze and apply of high-level language design and implementation.         POs, PO, PO           CO3         Analyze and apply of high-level language design and implementation.         POs, POs, POs           CO4         Gain knowledge and comparison of the features programming languages.         POs, POs, POs           PO- Engineering Knowledge, PO- Problem analysis, POs- Cosign/development of solutions, POs- Condu investigations of complex problems, POs- Modern tool usage, POs- The engineer and society, PO- Environment an sustainability, POs- Environmest and finame POs, POs         P				cture					I					
Course Objectives:         1. To study and appreciate different types of languages and the underlying mathematical theories.         2. To introduce important paradigms of programming languages.         3. To provide conceptual understanding of high-level language design and implementation.         4. To provide the concept of syntax and semantics, concurrency, functional, logic programmin languages and scripting languages.         Course Outcomes (CO):         Course Outcomes (Pos)         Opto: Engineering Knowledge, Por Problem analysis, POs- Design/development of solutions, POs- Conduinvestigations of complex problems, POs- Modern tool usage, POs- The engineer and society, POr- Environment an sustainability, POr- Ethics, POs- Individual or team work, POs- Communication, POn- POs POs       POs       POn					hlem Sc	lving			1		urativ	JII	•	5 111 5.
1. To study and appreciate different types of languages and the underlying mathematical theories.         2. To provide conceptual understanding of high-level languages.         3. To provide the concept of syntax and semantics, concurrency, functional, logic programming languages and scripting languages.         Course Outcomes (CO):         Course Outcomes (CO):         Conse Outcomes (CO):         Conse Outcomes (CO):         Course Outcomes (CO):         CO ₂ Outcomes (CO):         CO ₂ Outcomes (CO):         CO ₄ CO ₄ CO ₄ CO ₄ CO ₄ CO ₄ Mapping of course outcomes with program outcomes         Course         Outcomes         PO ₄ PO ₄ PO ₅ PO ₈ PO ₉ PO ₁₀ PO ₁₁ PC         Outcomes       PO ₁ PO ₂ PO ₂ PO ₂ PO ₁₀ PO ₁₀ PO ₁₁ PC         CO ₁ 2       2       1       1       1       2<				101 1 10		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								
2. To introduce important paradigms of programming languages.         3. To provide conceptual understanding of high-level language design and implementation.         4. To provide the concept of syntax and semantics, concurrency, functional, logic programming languages and scripting languages.         Course Outcomes (CO):         Consol         Statement         Mapped Program         OC0, Understand to express syntax and semantics in formal notation.       PO, PO, PO,         CO2       Apply suitable programming paradigm for the application.       PO, PO, PO,         CO4       Gain knowledge and comparison of the features programming       PO, PO,         CO5       Analyze and apply of high-level language design and implementation.       PO, PO, PO         Out comes fromles, POr- Problem analysis, POr- Design/development of solutions, PO Condu         Introduce important paradigm of course outcomes with program outcomes         Ourse         Outcomes         PO,			eciate d	ifferent	types of	of langu	ages and	the un	derlving	mather	natic	al tł	neorie	es.
<ul> <li>To provide conceptual understanding of high-level language design and implementation.</li> <li>To provide the concept of syntax and semantics, concurrency, functional, logic programmin languages and scripting languages.</li> <li>Course Outcomes (CO):         <ul> <li>Course Outcomes (CO):</li> <li>CO₂</li> <li>Understand to express syntax and semantics in formal notation.</li> <li>PO₃ PO₄ PO₅</li> <li>CO₂</li> <li>Apply suitable programming paradigm for the application.</li> <li>PO₃ PO₄ PO₅</li> <li>CO₄</li> <li>CO₄</li> <li>Gain knowledge and comparison of the features programming languages.</li> </ul> </li> <li>PO₇ Engineering Knowledge, PO₂ Problem analysis, PO₅ Design/development of solutions, PO₆ - Condu investigations of complex problems, PO₅ - Modern tool usage, PO₇ PO₈ PO₈ PO₉ PO₉ PO₁ PO₂ PO₁ Endividual or team work, PO₉ - Communication, PO₁ - Project management and finance PO₉ - Lift-long Learning</li> </ul> <li>Mapping of course outcomes with program outcomes</li> <li>CO₁</li> <ul> <li>Q</li> <li>PO₂</li> <li>PO₂</li> <li>PO₃</li> <li>PO₄</li> <li>PO₈</li> <li>PO₉</li> <l< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></l<></ul>														
4. To provide the concept of syntax and semantics, concurrency, functional, logic programmin languages and scripting languages.       Mapped Program Output Description (1998)         Course Outcomes (CO):         Cons No.       Statement       Mapped Program Output On (1998)         COS No.       Outcomes (POS)         CO       Understand to express syntax and semantics in formal notation.       PO, PO, PO         CO2       Apply suitable programming paradigm for the application.       PO, PO, PO, PO       PO, PO, CO3         Analyze and apply of high-level language design and implementation.       PO, PO, CO3       Analyze and apply of high-level language design and implementation.       PO, PO, PO         PO- Engineering Knowledge, PO2- Problem analysis, PO4- Design/development of solutions, PO4- Environment an sustainability. PO7- Environment an sustainability. PO7- Environment and finance PO4- D06 in PO4 in PO4 in PO4 in PO4- PO4- PO4- PO4- PO4- PO4- PO4- PO4-									sign and	implem	entat	tion		
Course Outcomes (CO):         COs       No.       Statement       Mapped Program Outcomes (POs)         CO2       Apply suitable programming paradigm for the application.       POs.POs         CO3       Analyze and apply of high-level language design and implementation.       POs.POs.POs         CO4       Gain knowledge and comparison of the features programming languages.       POs.POs.         POr       Engineering Knowledge, POs- Problem analysis, POs- Design/development of solutions, POs- Environment an sustainability.POs- Ethics, POr- Individual or team work, POs- Communication, POn- Project management and finance POs- Engineering Knowledge, POs- Modern tool usage, POs- The engineer and society, POs- Environment an sustainability.POs- Ethics, POr- Individual or team work, POs- Communication, POn- Project management and finance POs- Engineering Knowledge, POs POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs       POs														mming
COs No.         Statement         Mapped Program Outcomes (POs)           CO1         Understand to express syntax and semantics in formal notation.         POs.POs         POs.POs           CO2         Apply suitable programming paradigm for the application.         POs.POs         POs.POs           CO3         Analyze and apply of high-level language design and implementation.         POs.POs         POs.POs           CO4         Gain knowledge and comparison of the features programming languages.         POs.POs         POs.POs         POs.POs           POr - Engineering Knowledge, POs- Problem analysis, POs - Design/development of solutions, POs - Environment an sustainability, POs - Ethics, POs Modern tool usage, POs - The engineer and society, POs - Environment an sustainability, POs - Ethics, POs - Modern tool usage, POs - Communication, POn - Project management and finance POs - Ucromes         POs POs         POs POs         POs         POn - 2         POs         POs         POs - 2         POs         POs         POs - 2         POs - 2         POs         POs - 2				nguage	s.				-		-	_	-	-
CO₁         Understand to express syntax and semantics in formal notation.         PO₂ PO₃         PO₂         PO₃         PO₂ PO₃         PO₃         PO₂ PO₃         PO₂         PO₃         PO₂         PO₂ </td <td>Course Outcon</td> <td>nes (CO)</td> <td>:</td> <td></td>	Course Outcon	nes (CO)	:											
CO₁         Understand to express syntax and semantics in formal notation.         PO₂.PO₂           CO₂         Apply suitable programming paradigm for the application.         PO₂.PO₂           CO₂         Analyze and apply of high-level language design and implementation.         PO₂.PO₂           CO₃         Gain knowledge and comparison of the features programming         PO₂. Fo₃           PO₁- Engineering Knowledge, PO₂- Problem analysis, PO₂- Design/development of solutions, PO₂- Conduction solutions, PO₂- Environment an sustainability, PO₂- Ethics, PO₂- Individual or team work, PO₂- Communication, PO₁- Project management and finance PO₂-PO₂         PO₂	COs No.				Ş	Stateme	ent				Μ	app	ed Pr	ogram
CO2       Apply suitable programming paradigm for the application.       PO ₄ , PO ₄ , PO ₆ , PO ₆ , PO ₇ , PO ₈ , PO ₇ , Codu         CO3       Analyze and apply of high-level language design and implementation.       PO ₄ , PO ₅ , PO ₆ , PO ₇ , PO ₈ , PO ₇ , PO ₈ , PO ₇ , PO ₈ , PO ₇ PO1- Engineering Knowledge, PO2- Problem analysis, PO3- Design/development of solutions, PO4- Condumerstigations of complex problems, PO3- Modern tool usage, PO4- The engineer and society, PO- Environment an sustainability, PO4- Ethics, PO3- Individual or team work, PO6- Communication, POn- Project management and finance PO4- Life-long Learning         Mapping of course outcomes with program outcomes         Course       PO1       PO2       PO3       PO4       PO5       PO6       PO7       PO8       PO9       PO10       PO1       PC         CO4       2       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											0			
CO3       Analyze and apply of high-level language design and implementation.       PO4. PO5         CO4       Gain knowledge and comparison of the features programming languages.       PO3. PO4.         PO1-       Engineering Knowledge, PO2-       Problem analysis, PO3-       Design/development of solutions, PO4-       Condu investigations of complex problems, PO3-       Modern tool usage, PO4-       The engineer and society, PO7-       Environment an sustainability, PO4-       Environment an finance         PO1-       Engineering Knowledge, PO2-       Problem analysis, PO3-       PO3-       Design/development of solutions, PO4-       Condu investigations of complex problems, PO3-       PO3-       PO4-       Environment an finance         PO1-       Environment and finance       PO3-       PO										on.			,	
CO4         Gain         Knowledge         and comparison         of         the features         programming         POs.PO4           Inguages.         Inguages.         POr - Engineering         Nowledge, PO2-         Problem analysis, PO3-         Design/development of solutions, PO4-         Condu           Investigations of complex problems, PO3-         Individual or team work, PO4-         Communication, PO1-         Project management and finance           PO1-         Engineer         Mapping of course outcomes with program outcomes         PO3-         PO4-         PO4- <td></td>														
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investigations of complex problems, PO ₅ - Modern tool usage, PO ₆ - The engineer and society, PO ₇ - Environment and sustainability, PO ₈ - Ethics, PO ₉ - Individual or team work, PO ₁₀ - Communication, PO ₁₁ - Project management and finance PO ₁₂ -Life-long Learning $\begin{array}{c c c c c c } \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes with program outcomes \\ \hline Mapping of course outcomes outcomes outcomes \\ \hline Mapping of course outcomes outcomes \\ \hline Mapping of course \\ \hline Mapping of course outcomes outcomes \\ \hline Mapping of course outcomes outcomes \\ \hline Mapping of course \\ \hline Mapping of course outcomes outcomes \\ \hline Mapping of course \\ \hline Mapping o$														
Course Outcomes         PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PC2           CO1         2         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 <td>investigations of sustainability, <b>PC</b></td> <td>complex 08- Ethics</td> <td>probler , <b>PO</b>9- In</td> <td>ns, <b>PO</b>5- dividual</td> <td>Modern or team</td> <td>tool usa work, <b>PC</b></td> <td>age, <b>PO</b>6- D10- Comr</td> <td>The eng nunicatio</td> <td>ineer and on, <b>PO</b>11- P</td> <td>society Project n</td> <td>, <b>PO</b>7-</td> <td>Env</td> <td>vironm</td> <td>ent and</td>	investigations of sustainability, <b>PC</b>	complex 08- Ethics	probler , <b>PO</b> 9- In	ns, <b>PO</b> 5- dividual	Modern or team	tool usa work, <b>PC</b>	age, <b>PO</b> 6- D10- Comr	The eng nunicatio	ineer and on, <b>PO</b> 11- P	society Project n	, <b>PO</b> 7-	Env	vironm	ent and
Outcomes         PO ₁ PO ₂ PO ₃ PO ₄ PO ₅ PO ₆ PO ₇ PO ₈ PO ₉ PO ₁₀ PO ₁₁ 2           CO1         2         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		-	Мар	ping of	course	outcom	es with	progran	n outcon	nes			0	
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CO3       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       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	CO ₁		2	2										
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I - Reasonable; 2 - Significant; 3 - Strong           Detailed Contents:           Unit: 1         Introduction: Overview of different programming paradigms e.g. imperative, object oriented, functional, logic and concurrent programming. Syntax and semantics of programming languages: A quick overview of syntax specification and semiformal semantic specification using attribute grammar.           Unit: 2         Imperative and OO Languages: Names, their scope, life and binding. Control-flow, contro abstraction, inheritance, type checking and polymorphism.           Functional Languages: Typed-calculus, higher order functions and types, evaluation strategies, type checking, implementation, case study.           Unit: 3         Logic Programming Languages: Computing with relation, first-order logic, SLD-resolution, unification, sequencing of control, negation, implementation, case study.           Unit: 4         Concurrency: Communication and synchronization, shared memory and message passing safety and liveness properties, multithreaded program.           Formal Semantics: Operational, denotational and axiomatic semantics of toy languages languages with higher order constructs and types, recursive type, subtype, semantics of nondeterminism and concurrency.           Examination and Evaluation Pattern: It include both internal evaluation (70 marks) which is mainly end semeste examination.           Text Books:         1           1         Forouzen, "Data Communication and Networks ing", TMH           2         A.S. Tanenbaum, "Computer Networks s", 3rd Edition, Prentice Hall India, 1997.	CO ₃				2	1								
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1   S. Keshav, "An Engineering Approach on Computer Networks ing", Addison Wesley, 1997														
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2 W. Stallings, "Data and Computer Communication", Macmillan Press, 1989	2 W. Stallin	gs, "Data	a and C	ompute	r Comn	nunicati	ion", Ma	cmillan	Press, 19	89				

Course Co	de			C	ourse T	litle			Lect	ture	Som	octor
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Version: 1.2			Date o	f Appro	val: 16t	h BoS 17-	-11-2022		3	1 0		v
1	Scheme o	of Instr	uction				Se	cheme o	of Exam	ination		
No. of	Periods	: 60	Hrs.					Μ	laximum	n Score	: 1	00
Periods	/ Week	: 4						Inter	rnal Eval	luation	: 3	30
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Prerequisite(s	: Design	& Anal	ysis of A	lgorith	m	•						
Course Object	ives:			0								
<ol> <li>To learn passing me</li> <li>To unders</li> </ol>	odels. tand the	main c	lasses o	f paralle	el algori	ithms.	-		shared r	nemory	and m	essage
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Outcomes CO ₁	<b>PO</b> ₁		PO ₃	PO ₄						PO ₁₀	PO ₁₁	
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No. of	Periods	: 60	) Hrs.					Ma	aximum	Score	:	100
Period	s/Week	: 4						Inter	nal Eval	uation	:	30
	Credits	: 4							End Ser	nester	:	70
Instructio	on Mode	: Le	ecture					Е	xam Du	iration	:	3 Hrs
Prerequisite(s	s): Databa	se Mana	agemer	nt Syste	m							
Course Object	ives:											
1. To under	stand the	concep	ot of da	ta minii	ng princ	ciples an	d techni	ques wit	th data	mining	as a ci	utting
edge busi												
2. To develo		thinkin	ig, prob	olem sol	ving an	d decisio	on-maki	ng skills	in term	s of dat	a ware	ehous
and data												
3. To learn y								Data Wa	rehouse	2.		
<ol><li>To provid</li></ol>		-	classifi	cation a	and clus	tering m	ethods.					
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<b>PO</b> 1- Engineeri investigations c sustainability, <b>P</b> <b>PO</b> 12- Life-long	potenti data wa ng Knowl f complex <b>O</b> 8- Ethics, Learning	al impa rehous edge, <b>P</b> problem <b>PO</b> 9- Ind Mapp	ct on y e/data O ₂ - Pro as, PO ₅ - dividual ping of	our info mart. oblem a: Modern or team course	nalysis, tool usa work, <b>PC</b>	n resour $PO_3$ - De $ge, PO_6$ - $D_{10}$ - Comn es with	rce for a sign/dev The enginumication	large co elopment neer and n, <b>PO</b> ₁₁ - Pr outcom	omplex of solicity, roject ma	utions, 1 PO7- En anageme	PO ₄ - C vironm nt and f	Conduc ent and finance
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		methods, Classification using Frequent patterns, Model Evaluation and
		selection
		Cluster Analysis: Basic Clustering methods, Partitioning methods, Density -
	Unit: 5	Based Methods, Grid- based methods, and Evaluation of Clustering, Outlier
	Unit. 5	Analysis and Detection methods. Data Mining Trends and Research Frontiers:
		Mining Complex Data Types, Data Mining Applications, Data Mining Trends
Exa	mination and Evalu	ation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/assigr	nments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
	ainly end semester	
	t Books:	
1	Han J & Kamber M	, "Data Mining: Concepts and Techniques", Harcourt India, Elsevier India, Second
	Edition.	
2	Pang-NingTan. M	ichaelSteinback,VipinKumar, "Introduction to Data Mining", Pearson Education,
	2008.	
Refe	erence Books:	
1	Margaret H Dunha	am,S.Sridhar, "Data mining: Introductory and Advanced Topics", Pearson Education,
	2008.	
2	Humphires,hawki	ns,Dy, "Data Warehousing: Architecture and Implementation", Pearson Education,
	2009.	
3	Anahory, Murray,	"Data Warehousing in the Real World", PearsonEçiucation, 2008.
4		c., "Data Mining: Next Generation Challenges and Future Directions" Prentice Hall
-	of IndiaPvtLtd, 20	
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BTCS61	Code				Course '				1	ture	Sen	nester
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Perio	ds/Week	: 4							nal Eval		:	30
Instruct	Credits tion Mode	: 4	ecture						End Sei xam Di		:	70 3 Hrs
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Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Cor	2	Intro Synta Readi Funct State Strin Strin Lists: Meth Funct funct Impo Excej	PO ₃ 3 3 1 - Ree duction x, Varia ng data ions, If, ments, I g Manip gs: Acce Introdu ods cions an ions, Fu	PO ₄ asonable : Historible and from ke If- else Break, C pulation essing Sr action, s and mod nction A podule, M andling	PO ₅ 2 2 2 2 2 e; 2 – Si e; 2 – Si eyboard c, Neste Continue and Li trings, I accessi dules: I Argume Math mo Excep	PO ₆ gnifican cures, Se Types, C d, Openir d if-else e, Pass asts: Basic Ope ng list, C Defining nts, Anor odule, Ra tion, Exc	PO ₇ t; 3 – Str tting up perator, a and c , Loopin erations, peration a func nymous ndom m	PO ₈ rong o path, V , Input-O losing fil g, For, V , String s as, Work tion, Ca function odule, P	PO9 1 Vorkiną Dutput, e, Read Vhile, N lices, Fr ing wit lling a s, Glob ackage	g with I Printir ing and lested lo unction h lists, function al and lo s, Comp	Pythor og on writin pops, ( and M Function, Ty ocal va	n, Basi screer ng files Contro lethod ion an /pes c riables n

	Unit: 5	Networking: Socket, Socket Module, Methods, Client and server, Internet modules Multithreading: Thread, Starting a thread, Threading module, Synchronizing
		threads, Multithreaded Priority Queue
		GUI Programming: Introduction, Tkinter programming, Tkinter widgets,
		Sending email
Exar	mination and Evalu	ation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assigr	nments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester	examination.
Text	t Books:	
1	Sheetal Taneja a	nd Naveen Kumar, "Python Programming - A Modular Approach", Pearson
	education.	
2	Cay S. Horstmann	and Rance D. Necaise, "Python for Everyone", Wiley.
Refe	erence Books:	
1	Allen Downe, "Lea	arning With Python", Wiley.
2	Jake VanderPlas, '	'Python Data Science Handbook", O'Reilly' Publisher

	rse Cod				C	Course 7	ſitle			Lec	ture	Som	ester:
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	No. of P			0 Hrs.						aximum		:	100
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PO ₁ - Engi										of sol	utions,		
investigati sustainabil <b>PO</b> ₁₂ - Life-	lity, <b>PO</b> 8	- Ethics,											
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Outcor	mes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	$PO_6$	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	<b>PO</b> ₁₁	2
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	Unit: 5	Inter Connection and Networks: Introduction, Interconnection network media, Practical issues in interconnecting networks, Examples of inter connection, Cluster, Designing of clusters.
Exa	mination and Evalu	ation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assign	ments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester	examination.
Text	t Books:	
1	John L. Hennessy,	David A. Patterson – Computer Architecture: A Quantitative Approach, 3rd
	Edition, An Imprin	t of Elsevier.
2	John P. Shen and M	Miikko H. Lipasti – Modern Processor Design : Fundamentals of Super Scalar
	Processors	
Refe	erence Books:	
1	Computer Archite	cture and Parallel Processing – Kai Hwang, Faye A.Brigs., MC Graw Hill.
2	Advanced Comput	er Architecture – A Design Space Approach – Dezso Sima, Terence Fountain,
	Peter Kacsuk , Pea	rson Ed.

Course Co	ode			С	ourse T	'itle			Leo	ture		~	
BTCS614F				Distr	ibuted S	Systems			L	Т	Р		ester:
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Prerequisite(s		se Man	agemen	t Svstei	m. Oper	ating Sv	stem &						
Course Object			0	j	/ - <b>r</b> -	8-7		- 1					
1. To familiar		udents	with th	e basics	of dist	ributed o	computi	ng syste	ems.				
2. To underst										sage r	bass	sing sy	stems,
synchroniz										01		0.	
3. To learn th						cation, A	PI for th	he Inter	net Pro	otocol	s, E	Extern	al Data
Representa	tion and	Marsh	alling –	Client	-Serve	r Comm	unicatio	on – Gr	oup Co	mmu	nica	ation	- Case
Study.			-						-				
4. To know t	he conc	ept of	distribu	ited Ob	jects a	nd Remo	ote Invo	ocation	- Con	muni	cati	ion Be	etween
Distributed	Objects	– Remo	ote Proc	edure C	Call – Ev	ents and	l Notific	ations -	- Java R	MI – (	Case	e Stud	y.
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	like Am	loeba, l	Hadoop,	, HDFS	archite	cture, se	etting u	p the H	adoop				
	enviror	ment.											
CO ₃	enviror		sign di	stribute	ed syst	ems for	variou	ıs real-	-world		Р	PO ₃ , PO	5
CO ₃	enviror	to de	sign di	stribute	ed syst	ems for	variou	ıs real-	-world		P	PO3, PO	5
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		Systems – File Service Architecture – Sun Networks File System – The Andrew
		File System.
		OPERATING SYSTEM ISSUES
	Unit: 4	Name Services – Domain Name System – Directory and Discovery Services – Global Name Service – X.500 Directory Service – Clocks – Events and Process
	Unit. 4	States - Synchronizing Physical Clocks - Logical Time And Logical Clocks -
		Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.
-		DISTRIBUTED TRANSACTION PROCESSING
		Transactions – Nested Transactions – Locks – Optimistic Concurrency Control –
	Unit: 5	Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions -
	Unit: 5	Atomic Commit Protocols - Concurrency Control in Distributed Transactions -
		Distributed Deadlocks - Transaction Recovery - Overview of Replication And
		Distributed Multimedia Systems.
Exa	mination and Evalu	ation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	sional exams/ assign	nments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester	examination.
Tex	t Books:	
1		Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", 3rd
	Edition, Pearson E	Education, 2002.
2	Andrew S. Tanent	baum, Maartenvan Steen, Distibuted Systems, "Principles and Pardigms", Pearson
	Education, 2002	
3	John W.Rittinghou	use and James F.Ransome, "Cloud Computing: Implementation, Management, and
	Security", CRC Pre	ess, 2010.
Refe	erence Books:	
1	Sape Mullender, "	Distributed Systems", 2nd Edition, Addison Wesley, 1993.
2		Distributes Systems, "Software Design and Implementation", Springer, Verlag, 1994.
3	M. L. Liu, "Distribu	ited Computing Principles and Applications", Pearson Education, 2004
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Course Code			Course Title Lectu							ture	Semester			
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		3-D object representation: Polygon surfaces, quadric surfaces, spline
	Unit: 3	representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-
		Spline surfaces. Basic illumination models, polygon rendering methods.
		3-D Geometric transformations: Translation, rotation, scaling, reflection and
	Unit: 4	shear transformations, composite transformations.
	Onit. 4	<b>3-D viewing:</b> Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.
		Visible surface detection methods: Classification, back-face detection, depth-
		buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree
	Unit: 5	methods
	onic. 5	Computer animation: Design of animation sequence, general computer
		animation functions, raster animation, computer animation languages, key frame
		systems, motion specifications.
		ation Pattern: It include both internal evaluation (30 marks) comprising two class
	, 0	ments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
	ainly end semester	examination.
	Books:	
1	<u>1</u>	cs C version", Donald Hearn and M.Pauline Baker, Pearson Education.
2	1 1	cs Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes,
	Pearson Education	1.
Refe	erence Books:	
1	Principles of Com	puter Graphics, Shalini Govil, Pai, 2005, Springer
2	Computer Graphic	cs, Steven Harrington, TMH

Course Co			Co	ourse T	itle			Leo	ture	0		
BTCS616F	'ET		Ad	vanced	Operat	ing Syste	ems		L	T P	Seme	ester:
Version: 1.2						1 BoS 17-			3	1 0	v v	1
	Scheme o	of Insti	uction				S	cheme	of Exan	nination		
No. of	Periods	: 60	) Hrs.					Μ	laximur	n Score	: 10	)0
Periods	s/ Week	: 4						Inter	rnal Eva	aluation	: 30	0
	Credits	: 4							End Se	emester	: 70	)
Instructio	on Mode	: Le	ecture					]	Exam D	uration	: 3	Hrs.
Prerequisite(s		ng Sys	tems									
Course Object												
1. To define,										s manage	ement, i	nter-
process co												
2. To utilize t											anguag	e.
3. To design										210n.		
4. To impart			real time	operat	ing syst	em and	their cla	issificat	lons.			
Course Outcor COs No.	$\frac{1}{1}$			C+	ateme	.+				Monn	od Droc	(mo mo
COS NO.				51	atemer	IL					ed Prog omes (I	
CO ₁	Able to	under	tand Ur	iv kern	el and f	ile mana	rement				PO ₁ , PO ₂	Usj
						erating					PO ₂	
<u> </u>			÷			ocessor	-		m		PO ₆	
CO ₄			<u> </u>		-	uch as re					PO ₂	
PO ₁ - Engineerir	or Knowle	edve F	$\mathbf{O}_{2}$ - Prol	olem an	alvsis 1	$PO_{3}$ - Des	sign /dev	elopmen	t of sc	lutions		onduct
investigations of	complex	problen	ns, <b>PO</b> 5- 1	Modern 1	tool usag	ge, <b>PO</b> 6- '	The engi	neer and	l society	, <b>PO</b> 7- En	vironme	nt and
sustainability, PC	<b>D</b> ₈ - Ethics,											
PO12- Life-long I	earning											
		Map	ping of c	ourse o	utcome	es with p	rogram	outcon	nes	1	1	
Course Outcomes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	<b>PO</b> ₁₁	PO ₁
CO ₁	2	2										
CO ₂	-	2				2						
CO ₃												
CO ₄		2										
			1 – Rea	isonable	; 2 – Si	gnifican	t; 3 – Stı	rong				
Detailed Conte	ents:											
										approac		
										ed opera	ating sy	stems
						OS, Mob					D	
Unit: 1										e, User		
							Architecture of Unix Operating System, Buffer cache: Header, Buffer					
Retrieving, Reading and Writing Buffer. File Representation: inode file Directories, Path conversion to inode, superblock, inode					for File I	Donrogo	I. modes	. Struct				
			0	0		0		-			acción	mont
		file l	Director	ies, Pat	h con	0		-			assign	ment,
		file l alloca	Director ation of	ies, Pat disk blo	th conv cks	version	to inoc	le, sup	erblock	x, inode		
		file l alloca <b>Unix</b>	Director ation of <b>Process</b>	ies, Pat disk blo <b>and M</b>	th conv cks <b>emory</b>	wersion	to inoc ment: D	le, sup	erblock design	x, inode of Proce	ess Stru	cture:
Unit: 2		file l alloca <b>Unix</b> Kern	Director ation of <b>Process</b> el Data s	ies, Pat disk blo <b>and M</b> tructure	th conv cks <b>emory</b> es for pr	wersion manage rocess, S	to inoc ment: D tructure	le, sup etailed e of Uar	erblock design ea and l	x, inode of Proce Process t	ess Stru able, Pr	cture: ocess
Unit: 2		file l alloca <b>Unix</b> Kern state	Director ation of <b>Process</b> el Data s s and Tra	ies, Pat disk blo <b>and M</b> tructure ansition	ch conv cks <b>emory</b> es for pr as. Cont	manage rocess, S ext of a 1	to inoc ment: D structure Process:	le, sup etailed e of Uar Static a	erblock design ea and I and Dyr	of Proce Process t namic are	ess Stru able, Pr	cture: ocess
Unit: 2		file l alloca <b>Unix</b> Kern state Savin	Director ation of <b>Process</b> el Data s s and Tra g the Co	ies, Pat disk blo and M tructure ansition ontext I	th conv cks emory es for pr is. Cont Layout	manage manage rocess, S ext of a l of Syste	to inoc ment: D tructure Process: m Mem	le, sup etailed e of Uar Static a ory, Re	erblock design ea and I and Dyr gions, N	x, inode of Proce Process t	ess Stru able, Pr ea of co regions	cture: ocess
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Unit: 2 Unit: 3		file I alloca Unix Kerna state Savin Proce Distr Hard	Director ation of o <b>Process</b> el Data s s and Tra g the Co ess, page <b>ibuted (</b> ware Co	ies, Pat disk blo <b>and M</b> tructure ansition ontext I table a <b>Dperati</b> oncepts,	ch conv cks emory es for pr s. Cont Layout nd map ng syste Softwa	manage rocess, S ext of a l of Syste oping vir em conc are Con-	to inoc ment: D tructure Process: m Mem- tual add epts: Go cepts, A	le, sup etailed e of Uar Static a ory, Re ress to pals, Dis rchitec	erblock design ea and l and Dyr gions, N physica stribute ture of	of Proces Process to namic are Mapping al addres ed Compu	ess Stru able, Pr ea of co regions s. iting M esign Is	cture: cocess ntext, with odels, ssues:
		file I alloca Unix Kern- state Savin Proce Distr Hard Trans	Director ation of o <b>Process</b> el Data s s and Tra g the Co ess, page <b>ibuted C</b> ware Co sparency	ies, Pat disk blo s and M tructure ansition ontext I e table a <b>Dperatin</b> oncepts, 7, Flexib	th conv cks emory es for parts. Cont Layout nd map ng syste Softwa ility, Sc	manage rocess, S ext of a l of Syste oping vir em conc are Con- alability.	to inoc ment: D tructure Process: m Mem tual add epts: Go cepts, A , Reliabil	le, sup etailed e of Uar Static a ory, Re ress to oals, Dis rchitec lity, Per	erblock design ea and Dyr gions, N physica stribute ture of forman	of Proces Process t namic are Mapping al addres of Compu- DOS. D Ice, fault	ess Stru able, Pr ea of co regions s. uting M esign Is toleran	cture: rocess ntext, s with odels, ssues: ce
		file I alloca Unix Kern state Savin Proce Distr Hard Trans Mult	Director ation of o <b>Process</b> el Data s s and Tra g the Co ess, page <b>ibuted C</b> ware Co sparency <b>iprocess</b>	ies, Pat disk blo and M tructure ansition ontext 1 e table a <b>Dperati</b> oncepts, y, Flexib <b>sor Ope</b>	th com cks emory es for pus. Cont Layout nd map ng syste , Softwa ility, Sc rating	manage rocess, S ext of a l of Syste pping vir em conc are Con- alability. System:	to inoc ment: D tructure Process: m Mem tual add epts: Go cepts, A , Reliabil Introdu	le, sup etailed e of Uar Static a ory, Rej ress to oals, Dis rchitec lity, Per action, D	erblock design ea and i and Dyn gions, N physica stribute ture of forman Basic m	of Proces Process t namic are Mapping al addres d Compu ² DOS. D ace, fault nultiproc	ess Stru able, Pr ea of co regions s. iting M esign Is toleran essor s	cture: rocess ntext, s with odels, ssues: ce ystem
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		file l alloca Unix Kern- state Savin Proce Distr Hard Trans Mult archi instru	Director ation of of <b>Process</b> el Data s s and Tra g the Co ess, page <b>ibuted (</b> ware Co sparency <b>iprocess</b> tectures uction, t	ies, Pat disk blo a and M tructure ansition ontext 1 e table a <b>Dperatin</b> oncepts, 7, Flexib <b>sor Ope</b> a, design he swap	ch con- cks emory es for pi s. Cont Layout nd map ng syste Softwa ility, Sc rating i ssues instrue	wersion manages rocess, S ext of a l of Syste pping vir em conc are Con- alability System: , Thread ction, im	to inoc ment: D tructure Process: m Mem- tual add epts: Go cepts, A , Reliabil Introdu s, Proce plement	etailed e of Uar Static a ory, Rep ress to pals, Dis rchitec lity, Per rection, 1 ss sync tation o	erblock design ea and i and Dyn gions, N physica stribute ture of forman Basic m hroniza f the pr	of Process Process t namic are Mapping al addres d Compu Computer DOS. D ace, fault nultiproc ation: the ocess wa	ss Stru able, Pr ea of co regions s. uting M esign Is toleran essor s e test an ait. Proc	cture: rocess ntext, s with odels, ssues: ce ystem nd set cessor
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Unit: 3 Unit: 4		file I alloca Unix Kern- state Savin Proce Distr Hard Trans Mult archi instru schee Real	Director ation of of <b>Process</b> el Data s s and Tr: g the Co ess, page <b>ibuted (</b> ware Co sparency <b>iprocess</b> tectures action, ti <u>duling: Is</u> <b>Time O</b>	ies, Pat disk blo and M tructure ansition ontext 1 table a <b>Dperatin</b> oncepts, 7, Flexib <b>cor Ope</b> 4, design he swap <u>ssues, C</u> <b>peratin</b>	ch com cks emory es for pr s. Cont Layout nd map ng syste , Softwa ility, Sc rating n issues o instruct o-scher g Syste	manages rocess, S ext of a l of Syste oping vir em conc are Con- alability System: , Thread ction, im duling, S ems and	to inoc ment: D tructure Process: m Mem- tual add epts: Go cepts, A , Reliabil Introdu s, Proce plement mart sci I Mobile	etailed e of Uar Static a ory, Reg ress to pals, Dis rchitec lity, Per lection, I ess sync tation o hedulin e <b>OS</b> : (	erblock design ea and i and Dyr gions, N physica stribute ture of forman Basic m hroniza f the pr g, Affin Charact	of Process t namic are Mapping al address d Compu- book Dos. D ace, fault nultiproc ation: the rocess wa ity Based eristics	ess Stru able, Pr ea of co regions s. uting M esign Is toleran essor sy e test an ait. Proo I schedu of Real	cture: cocess ntext, s with odels, ssues: ce ystem d set cessor aling Time
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	Mobile OS: Architecture, Android OS, iOS, Virtual OS, Cloud OS and their design						
	issues						
Exar	nination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class						
sess	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which						
is m	is mainly end semester examination.						
Text	Text Books:						
1	Charles Crowley, "Operating Systems: A Design-Oriented Aproach", Tata McGraw Hill Education".						
2	Stuart E. Madnick & John J. Donovan. Operating Systems. McGraw Hill						
Refe	Reference Books:						
1	Harvey M Dietel, " An Introduction to Operating System", Pearson Education						
2	D M Dhamdhere, "Operating Systems :A Concept basedAproach", McGraw Hill						

Course C	Course Title Lectur									Semecter'							
BTCS617	PET										P VI						
Version: 1.2										-	•						
	Scheme of										n						
	f Periods		Hrs.							n Score	:	100					
Period	s/Week	: 4						Inte		luation		30					
	Credits	: 4								emester		70					
Instructi	on Mode	: Le	cture						Exam D	uration	:	3					
<b>D</b>	<u>)                                    </u>											Hrs.					
Prerequisite(s		Electron	nics														
Course Object			t of ome	h			a h a u	+: -+:		م معمله مع ط							
1. To unders applicatio							- char	acteristi	cs of	embedd	ed con	iputing					
2. To explain							– Selec	rtion of	nroces	or Me	norv de	tahase					
security, i						system	- Selec		process	sor, mer	nory, uz	itabase					
3. To learn th						nunica	tion Int	errupt	driven I	nnut an	d Outpu	it Non-					
maskable						numeu		lerrape		iip ut uii	u outpe						
4. To acquir						tithrea	d conce	ept; mult	itasking	g semap	hores.						
Course Outco		<u> </u>															
COs No.				S	Stateme	ent				Ма	pped Pi	rogram					
											itcomes	s (POs)					
CO ₁							comput	ing app	lication	s,	PO ₁ , PO	<b>O</b> 3					
	embede						-										
$CO_2$								cessor;	Memor	·y;	PO ₂ , P	O ₃					
	databas								<b>.</b> .		<b>DO D</b>						
CO ₃		the mechanism of Inter Process communication, Interrupt PO ₂ , PO ₄															
		<b>T</b> 4	1 0	<b>`</b> · · ·	<b>Ъ</b> Т	1	11 • /	Input and Output Non- maskable interrupt, Software									
	driven	-	and C	Dutput	Non-	maska	ble int	errupt,	Softwa	re							
	driven interru	pt.		-				-		re	PO₂ P	O⊧					
CO ₄	driven interru Implem	pt. Ient mu	ltithrea	d conce	ept and	multita	asking s	emapho	ores.		PO ₃ , P						
	driven interru Implem ng Knowle	pt. ient mu edge, <b>PC</b>	ltithrea D2- Prot	d conce	ept and alysis, <b>I</b>	multita P <b>O</b> 3- D	asking s esign/d	emapho evelopme	eres.	olutions	PO ₄ - (	Conduct					
CO ₄ PO ₁ - Engineeri investigations o sustainability, P	driven interrug Implem ng Knowle f complex p <b>O</b> ₈ - Ethics,	pt. ient mu edge, <b>PC</b> problems	ltithrea D₂- Proł s, <b>PO</b> ₅- M	d conce blem an Modern 1	ept and alysis, <b>I</b> tool usag	multita P <b>O</b> 3- D ge, PO6-	asking s esign/de - The en	emapho evelopme gineer ar	eres. ent of s	olutions y, <b>PO</b> 7- l	<b>PO</b> 4- ( Environm	Conduct ent and					
CO ₄ PO ₁ - Engineeri investigations o	driven interrug Implem ng Knowle f complex p <b>O</b> ₈ - Ethics,	pt. ent mu edge, <b>PC</b> problems <b>PO</b> ₉ - Ind	ltithrea D ₂ - Prob s, <b>PO</b> 5- M ividual o	d conce blem an Modern t or team w	ept and alysis, <b>I</b> tool usag 70rk, <b>PO</b>	multita ₽ <b>0</b> ₃- D ge, ₽ <b>0</b> ₅- 10- Com	asking s esign/de - The en municat	emapho evelopme gineer ar ion, <b>PO</b> 11-	ent of s ad societ Project	olutions y, <b>PO</b> 7- l	<b>PO</b> 4- ( Environm	Conduct ent and					
CO ₄ PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long	driven interrug Implem ng Knowle f complex p <b>O</b> ₈ - Ethics,	pt. ent mu edge, <b>PC</b> problems <b>PO</b> ₉ - Ind	ltithrea D ₂ - Prob s, <b>PO</b> 5- M ividual o	d conce blem an Modern t or team w	ept and alysis, <b>I</b> tool usag 70rk, <b>PO</b>	multita ₽ <b>0</b> ₃- D ge, ₽ <b>0</b> ₅- 10- Com	asking s esign/de - The en municat	emapho evelopme gineer ar	ent of s ad societ Project	olutions y, <b>PO</b> 7- l	<b>PO</b> 4- ( Environm	Conduct ent and					
CO ₄ PO ₁ - Engineeri investigations o sustainability, P PO ₁₂ - Life-long Course	driven interrug Implem ng Knowle f complex p <b>O</b> ₈ - Ethics,	pt. ent mu edge, <b>PC</b> problems <b>PO</b> ₉ - Ind	ltithrea D ₂ - Prob s, <b>PO</b> 5- M ividual o	d conce blem an Modern t or team w	ept and alysis, <b>I</b> tool usag 70rk, <b>PO</b>	multita ₽ <b>0</b> ₃- D ge, ₽ <b>0</b> ₅- 10- Com	asking s esign/de - The en municat	emapho evelopme gineer ar ion, <b>PO</b> 11-	ent of s ad societ Project	olutions y, <b>PO</b> 7- l	<b>PO</b> 4- ( Environm	Conduct ent and					
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		Debugging with benchmarking Real-time system software – basics of contemporary RTOS – VXWorks, UC/OS-II			
		Interfacing with Embedded Controller			
		Programmable interface with A/D & D/A interface; Digital voltmeter, control-			
		Robot system; - PWM motor speed controller, serial communication			
	Unit: 5	interface. Standard single purpose processor's peripherals: timers, counters, watchdog timers, UART, LCD controllers, keypad controllers.			
		Applications: Digital camera-washing machine-cell phones-home security			
		systems-finger print identifiers-cruise control-printers Automated teller			
		machine			
Exar	nination and Evalua	ation Pattern: It include both internal evaluation (30 marks) comprising two class			
sess	ional exams/ assign	ments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which			
is m	ainly end semester o	examination.			
Text	Books:				
1	1 Steven F. Barrett, Daniel J. Pack, "Embedded Systems – Design and Applications with the 68HC				
	12 and HCS12", Pea	rson Education, 2008.			
2	Raj Kamal, "Embe	dded Systems- Architecture, Programming and Design" Tata McGraw			
	Hill,2006.				
Refe	erence Books:				
1	Daniel W. Lewis, "I	Fundamentals of Embedded Software", Prentice Hall India, 2004.			
2	Jack R Smith "Prog	ramming the PIC microcontroller with MBasic" Elsevier, 2007.			

Course Code		Course Title			Lecture			Semester:	
BTCS711PET		Artificial Intelli	igence	L	Т	Р		VII	
Version: 1.2		Date of Approval: 16th	BoS 17-11-2022	3	1	0		V 11	
Scheme of	Scheme of Instruction				amina	ntior	1		
No. of Periods	:	60 Hrs.		Maximum Score : 100					
Periods/ Week	:	4	Int	on	:	30			
Credits	Credits : 4			er	:	70			
Instruction Mode	Instruction Mode : Lecture			Exam I	Duratio	on	:	3 Hrs.	
Prerequisite(s): Comput	er /	Architecture & Organizati	on						

## **Course Objectives:**

1. To understand the concept of intelligent human behaviors on a computer.

2. To learn the concept of Artificial intelligence, include: problem solving, reasoning, planning, natural language understanding, computer vision, automatic programming, and machine learning.

3. To learn and possess a firm grounding in the existing techniques and component areas of Artificial Intelligence.

4. To apply this knowledge to the development of Artificial Intelligent Systems and to the exploration of research problems.

Course Outcomes (CO):								
COs No.	Statement	Mapped Program Outcomes (POs)						
CO ₁	Understand the concept of intelligent human behaviors on a computer	<b>PO</b> ₁ , <b>PO</b> ₂						
CO ₂	Be familiar with techniques for computer-based representation and manipulation of complex information, knowledge, and uncertainty.	PO ₂ , PO ₄						
CO ₃	Gain awareness of several advanced AI applications and concepts	PO ₂ , PO ₉						
CO ₄	Apply various machine learning algorithms to solve real-life problem.	PO ₃ , PO ₅ , PO ₉						
DO Engineerin	v Knowledge <b>DO</b> Droblem englygig <b>DO</b> Degign (development of gelyt	tiona DO Conduct						

		Mappi	ing of c	ourse o	utcom	es wit	h prog	ram ou	tcomes			
Course Outcomes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	<b>PO</b> 6	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	<b>PO</b> ₁₁	<b>PO</b> ₁₂
CO ₁	2	2										
CO ₂		2		2								
CO ₃		2							1			
CO ₄			2		2				1			
	1 – Reasonable; 2 – Significant; 3 – Strong											
Detailed Conten	ts:											

Unit: 1	<b>Introduction</b> : Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.
Unit: 2	<b>Introduction to Search</b> : Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha – Beta pruning.
Unit: 3	<b>Knowledge Representation</b> & Reasoning: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.
Unit: 4	<b>Machine Learning</b> : Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data - Naive Bayes models, Learning with hidden data - EM algorithm, Reinforcement learning.
Unit: 5	<b>Pattern Recognition</b> : Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods – Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbor (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.

sess	<b>mination and Evaluation Pattern:</b> It include both internal evaluation (30 marks) comprising two class ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which ainly end semester examination.
	t Books:
1	Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Pearson Education.
2	Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw-Hill.
Refe	erence Books:

E Charniak and D McDermott, "Introduction to Artificial Intelligence", Pearson Education. 1

Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall of India. 2

Course	e Code	e			(	Course '	Title			Lee	cture	Sem	ester:
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Version: 1.2				Date o				7-11-2022		3	1 0		
	Sc	heme o	f Instr	uction				Scl	neme of	Exam	ination		
No	. of Pe	eriods	:	60 Hrs.					Max	kimum	n Score	:	100
Peri		Week		4							luation	:	30
		redits	:	4							mester	:	70
Instru	ction	Mode	:	Lecture	e				Ex	am Dı	uration	:	3 Hrs.
Prerequisit	<b>e(s):</b> P	ython 1	Prograi	nming									
Course Obj			0	0									
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Course Out			vicuge	or Ether					tual ivia	.mne.			
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COS NO. Statement											comes		
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CO ₃								chnical g				PO4, PO	9
							tocurren			8		,	
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investigation: sustainability PO ₁₂ - Life-lor Course Outcome CO ₁ CO ₂ CO ₃ CO ₄ Detailed Co Uni	s of cc 7, PO ₈ - ng Lea es	PO1 2	PO ₉ - Ind Mapp PO ₂ 2 2 2 2 2 2 2 3 1ntro Techi Block Digitz Cons its an Naka Abstr ( PoW treati Chair Block Lifecy Actor regul Block	s, PO ₅ - N lividual c ing of c PO ₃ PO ₃ 1 - Rea duction nology, s, Block al Signa ensus F alysis - moto C act Moo /) as rar ment of as - Hyt schain ycle of H s of Blo ator, Block ator, Block	PO4 PO4 PO4 PO4 2 sonable sonable roblem consense dels for dels for dels for dels for dels for dom or f consiss orid moo Workin Blockcha jockcha jockcha	alysis, I tool usag vork, PO; utcome PO₅ <b>PO</b> ₅ <b>i</b> ; <b>2 – Sig</b> <b>Blockch</b> of netw PKI and gital To gital To ain Asyn us on p BLOCK cacle - f tency, I dels ( Pc ng: Blo ain, Sm n, Bloc in user on	PO ₃ - Des ge, PO ₆ - 7 10 ⁻ Comm es with p PO ₆ gnificant gnificant main: Ba work, Co d Crypto oken, Cry ochronou bermissio CHAIN - formal liveness oW + PoS ock, Has art Cont kchain d r, Memb	PO7 PO7 PO7 PO7 sics of omponent ography: F ptocurre is Byzanti on-less, r - GARAY r and fairm S) ch, Struc ract, Con leveloper	ppment er and s PO ₁₁ - Pro- Utcome PO ₈ PO ₈ Blockcl s of Bl Private H ncy. ne Agre ameless nodel - ess - P ture of sensus A , Blockce	PO PO PO PO PO PO PO PO PO PO	PO ₇ - En anageme PO ₁₀ PO ₁₀ Distribu ain or D Public K t - AAP r-to-pee Iodel - F of Stake kchain, thm, Fau operator	PO ₁₁ PO ₁₁ Ited DLT, L eys, H protoc Proof o ( PoS) Distri Ilt Tole r, Bloc ling A	ent an finance PC 2 PC 2 Ledge ashin col an work f Wor base ibutec erance kchai Sma
investigation sustainability PO12- Life-lor Course Outcome CO1 CO2 CO3 CO4 Detailed Co Uni	s of cc y, PO ₈ - ng Lear es ontent it: 1 t: 2 t: 3	PO1 2	PO ₉ - Ind Mapp PO ₂ 2 2 2 2 2 2 2 3 1ntro Techi Block Digitz Cons its an Naka Abstr ( PoW treati Chair Block Lifecy Actor regul Block	s, PO5- N lividual c ing of c PO3 PO3 1 - Rea duction nology, s, Block al Signa ensus F alysis - moto C cact Moo l') as rar ment of as - Hyb cchain ycle of H s's of Blo ator, Bi cchain A duction	PO4 PO4 PO4 PO4 PO4 2 sonable sonable roblem Problem Consense dels for adom or f consiss orid moor f consiss orid moor Workin Blockcha ilockcha ilockcha ilockcha ilockcha in to Bit	alysis, I tool usag vork, PO; PO5 PO5 PO5 PO5 PO5 PO5 PO5 PO5 PO5 PO5	PO ₃ - Des ge, PO ₆ - 7 10 ⁻ Comm es with p PO ₆ <b>PO</b> 6 <b>gnificant</b> <b>gnificant</b> <b>ain:</b> Ba work, Co d Crypto bken, Cry tochronou bermissio CCHAIN - formal liveness oW + PoS ock, Has art Cont kchain d c, Memb Bitcoin, 7	The engine unication, rogram o PO ₇ <b>PO</b> 7 <b>sics of</b> omponent ography: F ptocurre us Byzanti on-less, r - GARAY r and fairm S) wh, Struc ract, Con leveloper ership se	ppment er and s PO ₁₁ - Pro- PO ₈ PO ₈ PO ₈ PO ₈ Blockcl s of Bl Private H ncy. ne Agree aameless nodel - ess - P ture of sensus A , Blockcc crvice p	s PO 9 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PO ₇ - En anageme PO ₁₀ PO ₁₀ Distribu ain or D Public K t - AAP r-to-pee Iodel - F of Stake kchain, thm, Fau operator	POn POn ated D DLT, L eys, H protoc er netv Proof o ( PoS) Distri alt Tole r, Bloc ling A hardn	ent an financ PC 2 PC 2 Col an work f Wor base base ibuted crance kchai Sma

	Unit: 5	<b>Ethereum</b> - Ethereum network, Ethereum Virtual Machine (EVM), Wallets for Ethereum, Solidity - Smart Contracts, some attacks on smart contracts, Design and issue Cryptocurrency.
Exa	mination and Evalua	ation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assign	ments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester e	examination.
Text	t Books:	
1		, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder, "Bitcoin cy Technologies: A Comprehensive Introduction", Princeton University Press,
2	Arshdeep Bahga a	nd Vijay Madisetti, "Blockchain Application: A Hnads-on Approach".
Refe	erence Books:	
1	Xiwei (Sherry) Xu,	Ingo Weber and Mark Staples "Architecture for Blockchain Applications", Springer.
2	Andreas Antonopo	oulos, "Mastering Bitcoin", O'Reilly' Publisher.

Course Co					urse Ti					ture		
BTCS713P	ET				Гime Sy					Т Р	Seme	ster: VII
Version: 1.2				Approv	r <b>al:</b> 16th	BoS 17-			3	1 0		
	Scheme o						S			minati	on	
	Periods		Hrs.						aximum		:	100
Periods	s/Week	: 4							nal Eval		:	30
	Credits	: 4							End Sei		:	70
Instructio		• = • •	cture					Ε	xam Dı	iration	:	3 Hrs.
Prerequisite(s)		led Syst	em									
Course Objecti												
<ol> <li>To develop</li> <li>To obtain domain of</li> <li>To acquire</li> <li>To unders system.</li> </ol>	a broad u real-time the conc tand in-d	ndersta e systen cept of l	nding c ns. Real tim	of the te e Comi	chnolo; nunicat	gies and tion, Sof	applica t and Ha	tions f ard RT	for the Comm	unicatio	on syste	ems.
Course Outcon	nes (CO):											
COs No.				S	stateme	ent						Program es (POs)
CO ₁						ystems a		lelling			PO	,
$CO_2$						al-time s					PO	=
CO ₃				gn docu	iment o	on an ar	chitect	ıral de	esign of	fa	PO _{3,} 1	<b>PO</b> ₆
CO ₄	real-tin Develop	2									PO ₃ .1	
PO ₁ - Engineerin investigations of sustainability, PC PO ₁₂ - Life-long L	complex p 08- Ethics, l	problems P <b>O</b> 9- Ind	s, <b>PO</b> ₅- N ividual o	1odern t r team w	ool usag ork, <b>PO</b> 1	ge, <b>PO</b> 6- 7 0- Comm	The engineration	neer an n, <b>PO</b> 11-	nd societ Project	y, <b>PO</b> 7- 1	Environi	nent and
		Марр	ing of c	ourse o	utcome	s with p	rogram		mes	1	1	1
Course	PO ₁	PO ₂	PO ₃	$PO_4$	PO ₅	PO ₆	<b>PO</b> ₇	РО	PO ₉	<b>PO</b> ₁₀	<b>PO</b> ₁₁	<b>PO</b> ₁₂
Outcomes	2							8				
CO ₁ CO ₂		2										<u> </u>
CO ₂ CO ₃		2	2			2			}			
CO ₃			2			2			1			
CO4				sonahla	· 2 - Sic	nificant	· 3 _ St	rona	1			
Detailed Conte	nte		I – Keu	sonuble	, 2 - Siy	Ingican	., 5 - 50	ong				
Unit: 1		Level Const Mode of Res Depe	Contro traints, els for Ro al Time ndency.	ols, Sigr Hard R eal Time Worklo	al Proc eal Tim Syster ad, Per	ypical Re cessing one System ns: Proco iodic Tab	etc., Rel ms and essors a sk Mode	ease 7 Soft F nd Res el, Preo	Fimes, Real Tin sources cedence	Deadlin ne Syste , Tempo e Const	es, and ems, Re oral Par raints a	Timing eference ameters nd Data
Unit: 2 Unit: 3		Driver Dynar and Lo Versu Driver <b>Resou</b> (RAC). Priori Priori	n Appro nic Ver east-Sla s Onlin <u>n and C</u> <b>urces Sh</b> , Non- ty-Ceili ty-Ceili	ach, W sus Sta ck-Tim e Scheo lock Dr aring: I preemp ng Pro ng Pro	eighted tic Sys e-First luling, i iven Sys Effect o otive C tocols, tocol in	f Resour ritical Stack n Dynai	Robin A ptimalit gorithm ing Ape ce Cont Section Based nic Pri	Approa y of E s, Rate riodic centior s, Bas Priorit Sriorit	ch, Prie Effective Monot and Sp n and Re sic Pri y- Cei System	ority Dr e-Deadl conic Alg ooradic esource ority-In ling Press, Prees	iven Ap ine-Fir gorithm jobs in Access heritan otocol, mption	oproach st (EDF , Offline Priority Contro .ce and Use o Ceiling
Unit: 3Priority-Ceiling Protocols, Stack Based Priority- Ceiling Priority-Ceiling Protocol in Dynamic Priority Systems, Protocol, Access Control in Multiple-Module Resources, Co Accesses to Data Objects.Unit: 4Real Time Communication: Basic Concepts in Real time and Hard RT Communication systems, Model of Real T Priority-Based Service and Weighted Round-Robin Se								Controll	ing Cor	icurren		

		Switched Networks, Medium Access Control Protocols for Broadcast Networks,
		Internet and Resource Reservation Protocols.
	Unit: 5	<b>Real Time Operating Systems and Databases:</b> Features of RTOS, Time Services, UNIX as RTOS, POSIX Issues, Characteristic of Temporal data, Temporal Consistency, Concurrency Control, Overview of Commercial Real Time
		databases.
sessio	nal exams/ assign	<b>Ation Pattern:</b> It include both internal evaluation (30 marks) comprising two class ments/quiz/seminar presentation etc. and external evaluation (70 marks) which
-	nly end semester e	xamination.
Text B	Books:	
1 F	Real Time Systems	by Jane W. S. Liu, Pearson Education Publication
Refere	ence Books:	
1 N	Mall Rajib, "Real T	TIME SYSTEMS", PEARSON EDUCATION
2 A	Albert M. K. Cheng	, "Real-Time Systems: Scheduling, Analysis, and Verification", Wiley.

BTCS714P Version: 1.2	de				rse Tit					cture	Semest		nester:
Version: 1.2	ΞT			Hoc and					L	Т	Р		VII
				Approval	:16th	BoS 17-	11-202		3	1	0		• 11
	Scheme	1 1							e of Ex			n	
	Periods		0 Hrs.						Maximu			:	100
Periods	/ Week	: 4						Inte	ernal Ev	aluat	ion	:	30
	Credits	: 4							End S			:	70
Instructio		-	ecture						Exam l	Durat	ion	:	3 Hrs.
Prerequisite(s)	Python	Progra	mming										
Course Objecti													
1. To learn Ao a MAC Pro	tocol foi	· Ad hoo	e Wirele	ss Netwoi	rks.								0 0
2. To underst													
and Comm					Energ	y consı	ımptio	n, Clust	tering o	of Sen	sors	, Appli	cations
Data Retrie													
3. To provide												t layer	, High-
level applic							dynar	nic nati	ure of V	VSNs.			
4. To acquire	the con	cept of	operatii	ng system	n in se	ensors.							
<b>Course Outcon</b>	es (CO)												
COs No.				Sta	ateme	ent							rogram s (POs)
CO ₁	Unders	stand a	d hoc w	vireless Ir	nterne	et, MAC	C prote	ocols fo	or Ad h	oc		PO	
	Wirele	ss Netw	orks Iss	sues			-						
CO ₂	Analyz	e Rou	ting Pi	rotocol f	for A	Ad hoo	e Wir	eless	Networ	·ks,		PO	2
				iting Prot									
		ss Netw		0				5					
CO ₃				cation of	f WSN	ls. MA	C lave	er. Rou	ting lay	ver.		PO ₃ , F	<b>O</b> 10
				-level ap								,	
		erent d					ci sup	p 01 0, 11	aaptiiig	,			
CO ₄	the inh Design	and i	lynamic	nature of ent the a	f WSN	ls.					I	PO3, PO	4, <b>PO</b> 9
	the inf Design sensor	and i s.	lynamic mpleme	nature of ent the a	f WSN Ipplica	ls. ation o	f opei	rating	system	in		,	
PO1- Engineerin	the inh Design sensor g Knowl	and i s. edge, <b>P</b>	lynamic mpleme <b>O</b> 2- Prol	nature of ent the a	f WSN pplica ysis, <b>P</b>	ls. ation o <b>PO</b> 3- De	f oper	rating evelopm	system ent of	in soluti	ons,	PO ₄ -	Conduct
<b>PO</b> ₁ - Engineerin investigations of	the inh Design sensor g Knowl complex	and i s. edge, <b>P</b> problem	lynamic mpleme <b>O</b> 2- Prol Is, <b>PO</b> 5- N	nature of ent the a blem analy Modern too	f WSN pplica ysis, <b>P</b> ol usag	Is. ation o <b>PO</b> 3- De ge, <b>PO</b> 6-	f oper esign/d The en	rating evelopm gineer a	system ent of nd socie	in soluti ety, <b>PC</b>	ons, <b>)</b> 7- E1	PO ₄ -	Conduct nent and
<b>PO</b> ₁ - Engineerin investigations of sustainability, <b>PO</b>	the inf Design sensor g Knowl complex s- Ethics,	and i s. edge, <b>P</b> problem	lynamic mpleme <b>O</b> 2- Prol Is, <b>PO</b> 5- N	nature of ent the a blem analy Modern too	f WSN pplica ysis, <b>P</b> ol usag	Is. ation o <b>PO</b> 3- De ge, <b>PO</b> 6-	f oper esign/d The en	rating evelopm gineer a	system ent of nd socie	in soluti ety, <b>PC</b>	ons, <b>)</b> 7- E1	PO ₄ -	Conduct nent and
PO ₁ - Engineerin	the inf Design sensor g Knowl complex s- Ethics,	and i s. edge, <b>P</b> problem <b>PO</b> 9- Inc	lynamic mpleme O ₂ - Prol Is, <b>PO</b> 5- N dividual c	nature of ent the a olem analy Modern too or team wor	f WSN applica ysis, <b>P</b> ol usag rk, <b>PO</b> 1	Is. ation o PO ₃ - De ge, PO ₆ - o- Comm	f oper esign/d The en nunicat	rating evelopm gineer a ion, <b>PO</b> 11	system ent of nd socie - Project	in soluti ety, <b>PC</b>	ons, <b>)</b> 7- E1	PO ₄ -	Conduct nent and
PO ₁ - Engineerin investigations of sustainability, PO PO ₁₂ - Life-long L	the inf Design sensor g Knowl complex s- Ethics, earning	and i s. edge, <b>P</b> problem <b>PO</b> 9- Ind Mapp	lynamic mpleme O ₂ - Prol Is, <b>PO</b> 5- M dividual c	nature of ent the a blem analy Modern too	f WSN applica ysis, <b>P</b> ol usag rk, <b>PO</b> 1	Is. ation o PO ₃ - De ge, PO ₆ - o- Comm	f oper esign/d The en nunicat	rating evelopm gineer a ion, <b>PO</b> 11	system ent of nd socie - Project	in soluti ety, <b>PC</b>	ons, <b>)</b> 7- E1	PO ₄ -	Conduct nent and l finance,
PO ₁ - Engineerin investigations of sustainability, PO PO ₁₂ - Life-long Lo Course	the inf Design sensor g Knowl complex s- Ethics,	and i s. edge, <b>P</b> problem <b>PO</b> 9- Inc	lynamic mpleme O ₂ - Prol Is, <b>PO</b> 5- N dividual c	nature of ant the a blem analy Modern too or team wor	f WSN applica ysis, <b>P</b> ol usag rk, <b>PO</b> 1	Is. ation o PO ₃ - De ge, PO ₆ - o- Comm	f oper esign/d The en nunicat	rating evelopm gineer a ion, <b>PO</b> 11	system ent of nd socie - Project	in soluti ety, <b>PC</b>	ons, D7- Ei agem	PO ₄ -	Conduct nent and l finance,
PO ₁ - Engineerin investigations of sustainability, PO PO ₁₂ - Life-long Le Course Outcomes	the inh Design sensor g Knowl complex erthics, earning PO ₁	and i s. edge, <b>P</b> problem <b>PO</b> 9- Ind Mapp	lynamic mpleme O ₂ - Prol Is, <b>PO</b> 5- M dividual c	nature of ant the a blem analy Modern too or team wor	f WSN applica ysis, P ol usag rk, PO tcome	Is. ation o $PO_3$ - De ge, $PO_6$ - $_0$ - Comm es with	f oper esign/d The en nunicat progra	rating evelopm gineer a ion, <b>PO</b> n m outc	ent of nd socie - Project	in soluti ety, <b>PC</b> t mana	ons, D7- Ei agem	PO ₄ - nvironr ent and	Conduct nent and l finance,
PO ₁ - Engineerin investigations of sustainability, PO PO ₁₂ - Life-long Lo Course Outcomes CO ₁	the inf Design sensor g Knowl complex s- Ethics, earning	and i s. edge, <b>P</b> problem <b>PO</b> 9- Inc Mapp <b>PO</b> 2	lynamic mpleme O ₂ - Prol Is, <b>PO</b> 5- M dividual c	nature of ant the a blem analy Modern too or team wor	f WSN applica ysis, P ol usag rk, PO tcome	Is. ation o $PO_3$ - De ge, $PO_6$ - $_0$ - Comm es with	f oper esign/d The en nunicat progra	rating evelopm gineer a ion, <b>PO</b> n m outc	ent of nd socie - Project	in soluti ety, <b>PC</b> t mana	ons, D7- Ei agem	PO ₄ - nvironr ent and	Conduct nent and l finance.
PO ₁ - Engineerin investigations of sustainability, PO PO ₁₂ - Life-long La Course Outcomes CO ₁ CO ₂	the inh Design sensor g Knowl complex erthics, earning PO ₁	and i s. edge, <b>P</b> problem <b>PO</b> 9- Ind Mapp	$\frac{ ynamic}{mpleme}$ $O_2- Prolos, PO_5- M$ dividual control of c	nature of ant the a blem analy Modern too or team wor	f WSN applica ysis, P ol usag rk, PO tcome	Is. ation o $PO_3$ - De ge, $PO_6$ - $_0$ - Comm es with	f oper esign/d The en nunicat progra	rating evelopm gineer a ion, <b>PO</b> n m outc	ent of nd socie - Project	in soluti ety, <b>PC</b>	ons, D7- E1 agem D10	PO ₄ - nvironr ent and	Conduct nent and l finance,
PO ₁ - Engineerin investigations of sustainability, PO PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂ CO ₃	the inh Design sensor g Knowl complex erthics, earning <b>PO</b> ₁	and i s. edge, <b>P</b> problem <b>PO</b> 9- Inc Mapp <b>PO</b> 2	$\frac{ ynamic}{mpleme}$ $O_2 - Proles, PO_5 - N$ dividual c ping of c $PO_3$ $2$	nature of ent the a blem analy Modern too or team wor course out PO ₄	f WSN applica ysis, P ol usag rk, PO tcome	Is. ation o $PO_3$ - De ge, $PO_6$ - $_0$ - Comm es with	f oper esign/d The en nunicat progra	rating evelopm gineer a ion, <b>PO</b> n m outc	system ent of nd socie - Project omes PO ₉	in soluti ety, <b>PC</b> t mana	ons, D7- E1 agem D10	PO ₄ - nvironr ent and	Conduct nent and l finance.
PO ₁ - Engineerin investigations of sustainability, PO PO ₁₂ - Life-long La Course Outcomes CO ₁ CO ₂	the inh Design sensor g Knowl complex erthics, earning <b>PO</b> ₁	and i s. edge, <b>P</b> problem <b>PO</b> 9- Inc Mapp <b>PO</b> 2	$\frac{\text{lynamic}}{\text{mpleme}}$ $O_2 - \text{ Prol}$ $\frac{O_2 - \text{ Prol}}{\text{dividual c}}$ $\frac{O_3 - 1}{PO_3}$ $\frac{2}{2}$	nature of ent the a blem analy Modern too or team wor course out PO4 2	f WSN applica ysis, P ol usag rk, PO ₁₀ tcome PO ₅	Is. ation o PO ₃ - De ge, PO ₆ - o- Comm s with PO ₆	f open esign/d The en nunicat progra <b>PO</b> 7	rating evelopm gineer a ion, <b>PO</b> 11 m outco <b>PO</b> 8	ent of nd socie - Project	in soluti ety, <b>PC</b>	ons, D7- E1 agem D10	PO ₄ - nvironr ent and	Conduct nent and l finance.
PO ₁ - Engineerin investigations of sustainability, PO PO ₁₂ - Life-long Lu Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	the inh Design sensor g Knowl complex s- Ethics, earning PO ₁ 2	and i s. edge, <b>P</b> problem <b>PO</b> 9- Inc Mapp <b>PO</b> 2	$\frac{\text{lynamic}}{\text{mpleme}}$ $O_2 - \text{ Prol}$ $\frac{O_2 - \text{ Prol}}{\text{dividual c}}$ $\frac{O_3 - 1}{PO_3}$ $\frac{2}{2}$	nature of ent the a blem analy Modern too or team wor course out PO ₄	f WSN applica ysis, P ol usag rk, PO ₁₀ tcome PO ₅	Is. ation o PO ₃ - De ge, PO ₆ - o- Comm s with PO ₆	f open esign/d The en nunicat progra <b>PO</b> 7	rating evelopm gineer a ion, <b>PO</b> 11 m outco <b>PO</b> 8	system ent of nd socie - Project omes PO ₉	in soluti ety, <b>PC</b>	ons, D7- E1 agem D10	PO ₄ - nvironr ent and	Conduct nent and l finance.
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PO ₁ - Engineerin investigations of sustainability, PO PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂ CO ₃	the inh Design sensor g Knowl complex s- Ethics, earning PO ₁ 2	and i s. edge, <b>P</b> problem <b>PO</b> ₉ - Inc <b>Mapp</b> <b>PO</b> ₂ 2 2 2 4 4 4 4 4 4 4 4 4 4	lynamic         mpleme $O_2$ -       Prol $Iss$ , $PO_5$ -       N         dividual c       Ding of c $PO_3$ PO_3         2       2         1 - Real       Doc Wire	nature of int the a blem analy Modern too or team wor course out PO4 2 asonable; 2 less Netw	f WSN applica ysis, P ol usag rk, PO tcome PO 5 2 – Sig	Is. ation o PO ₃ - De ge, PO ₆ - o- Comm PO ₆ PO ₆	f oper esign/d The en nunicat progra PO7	rating evelopm gineer a ion, PO ₁₁ m outc PO ₈	system ent of nd socie - Project omes <b>PO</b> 9	in soluti ety, <b>PC</b>	ons, D7- E1 agem D10	PO ₄ - nvironn ent and PO ₁₁	PO ₁₂
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	Challenges in Security Provisioning, Networks Security Attacks, Key Management, Secure Routing in Ad hoc Wireless Networks.
Unit: 4	<b>Basics of Wireless, Sensors and Applications:</b> The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications <b>Data Retrieval in Sensor Networks s:</b> Classification of WSNs, MAC layer, Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.
Unit: 5	<ul> <li>Sensor Networks Hardware: Components of Sensor Mote, Operating System in Sensors- TinyOS, LA-TinyOS, SOS, RETOS</li> <li>Imperative Language: nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor Networks extension, TOSSIM.</li> </ul>
	nd Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
	s/assignments/quiz/seminar presentation etc. and external evaluation (70 marks) which
, , , , , , , , , , , , , , , , , , ,	emester examination.
Text Books:	
	Morais Cordeiro and Dharma Prakash Agrawal, "Ad Hoc and Sensor Networks: Theory and
Applicatio	ns", Second Edition, World Scientific Publishers, 2011.
Reference Book	<b>ζS</b> :
1 Kazem Sol	hraby, Daniel Minoli, Taieb Znati, "Wireless Sensor Networks s', A John Wiley & Sons Inc.
Publicatio	n, 2007.
	<i>M</i> ohapatra and Sriramamurtyhy, "Ad Hoc Networks s: Technologies and Protocols", nternational Edition, 2009.

	ode	Course TitleLectInternet-of-ThingsL								ture	Sem	nester:
BTCS715P	ET								L	ΤP		VII
Version: 1.2				f Appro	<b>val:</b> 16t	h BoS 17			3	1 0		• 11
	Scheme o						Sch			ination	1 1	
	Periods		) Hrs.						iximum			100
Periods	s/ Week	: 4							nal Eval			30
	Credits	: 4							End Ser			70
Instructio			ecture						xam Du			3 Hrs.
Prerequisite(s)	1	ected th	hat the s	student	s have c	lone BTC	CS711ET ai	nd BTC	CS714PE	ET cours	ses.	
Course Objecti												
1. To underst	and the c	oncepts	s of Inte	ernet of	Things	and can	able to b	uild Io'	T applio	cations		
2. To learn th	e archited	cture ar	nd appli	cations	of IoT.							
3. To learn th	e importa	nce of	python	for the	implem	entatior	n of IoT.					
4. To impart t	he knowl	edge of	challer	nges in l	loT and	their po	ssible sol	utions.				
Course Outcom	nes (CO):											
COs No.				S	tateme	nt					-	ogram (POs)
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001	leading					iges po	Sed by R	)1 Hee	WOIRD		- 01, - 1	02
CO ₂						cols fo	or efficie	ent ne	etwork		PO ₂ , PO	<b>D</b> 5
001	commu				proto	0015 10					_,	
CO ₃				· Data A	nalvtics	and Sec	curity in I	т			PO ₃ , PO	<b>O</b> 5
CO ₄							nsing real		l	P	O ₃ , PO ₉ ,	PO ₁₀
							Industry					
PO1- Engineerin									of sol	utions,	PO ₄ - (	Conduc
investigations of												
sustainability, PO		<b>∙O</b> 9- Indi	vidual o	r team w	ork, <b>PO</b> 1	o- Commu	unication, <b>I</b>	<b>PO</b> 11- Pr	oject ma	anageme	ent and	finance
PO ₁₂ - Life-long Le	earning					• 1						
~		Маррі	ing of co	ourse o	utcome	s with p	rogram oı		es	1		
Course								PO			PO ₁	
	<b>PO</b> ₁	$PO_2$	PO ₃	$PO_4$	PO ₅	$PO_6$	<b>PO</b> ₇	_	PO ₉	<b>PO</b> ₁₀	-	<b>PO</b> 12
Outcomes			PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	8	PO ₉	<b>PO</b> ₁₀	1	PO ₁₂
Outcomes CO ₁	<b>PO</b> ₁	2	PO ₃	PO ₄		PO ₆	<b>PO</b> ₇	_	PO ₉	PO ₁₀	-	PO ₁₂
Outcomes           CO1           CO2				PO ₄	1	PO ₆	<b>PO</b> ₇	_	PO ₉	PO ₁₀	-	
Outcomes           CO1           CO2           CO3		2	2	PO ₄		PO ₆	PO ₇	_			-	
Outcomes           CO1           CO2		2 2	2 2 2		1 2			8	<b>PO</b> ₉	PO ₁₀	-	
Outcomes           CO1           CO2           CO3           CO4	2	2 2	2 2 2		1 2		PO7	8			-	
Outcomes           CO1           CO2           CO3	2	2 2	2 2 <b>1 - Rea</b>	sonable	1 2 ; <b>2 - Sig</b>	nificant	; 3 – Stron	8 	1	2	1	
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Outcomes           CO1           CO2           CO3           CO4	2	2 2 Introd design	2 2 1 – Reas	sonable to IoT: D	1 2 ; <b>2 – Sig</b> Defining anal block	nificant IoT, Char s of IoT, C	; 3 – Stron	8 ng of IoT, ation m	1 Physica odels &	2 I design APIs	1 of IoT,	, Logica
Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conte	2	2 2 Introd design IoT & Netwo	2 2 1 – Reas luction ( n of IoT, 1 M2M: N ork	sonable to IoT: E Function Machine	1 2 <b>2</b> Defining al block to Mach	nificant IoT, Char s of IoT, C hine, Diff	; <b>3 – Stron</b> acteristics Communica erence bet	8 of IoT, ation m ween I	1 Physica odels & oT and	l design APIs M2M, S	of IoT,	, Logica
Outcomes CO1 CO2 CO3 CO4 Detailed Conte	2	2 2 Introd design IoT & Netwo	2 2 1 - Rea luction to of IoT, 1 M2M: N ork rk & Co	sonable to IoT: E Functior Machine	1 2 ; <b>2 – Sig</b> pefining jaal block to Macl	nificant IoT, Char s of IoT, C nine, Diff	; <b>3 – Stron</b> acteristics Communica erence bet Wireless m	8 of IoT, ation m ween I	1 Physica odels & oT and access	l design APIs M2M, S issues,	of IoT, oftward	, Logica
Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conte	2	2 2 Introd design IoT & Netwo Survey	2 2 1 - Rea luction to of IoT, 1 M2M: Nork rk & Co , Survey	sonable to IoT: D Functior Machine ommuni routing	1 2 ; <b>2 – Sig</b> pefining jaal block to Macl	nificant IoT, Char s of IoT, C nine, Diff	; <b>3 – Stron</b> acteristics Communica erence bet	8 of IoT, ation m ween I	1 Physica odels & oT and access	l design APIs M2M, S issues,	of IoT, oftward	, Logica
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	<b>Bayesian Learning:</b> theory and Bayes rule. Naive Bayes learning algorithm. Parameter smoothing. Generative vs. discriminative training. Logisitic regression. Bayes nets and Markov nets for representing dependencies.
	Instance-Based Learning: Constructing explicit generalizations versus
	comparing to past specific examples. k-Nearest neighbour algorithm, Case-
	based learning.
Exa	mination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	sional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester examination.
Tex	t Books:
1	Machine Learning – Tom M. Mitchell, - MGH
2	Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)
Refe	erence Books:
1	Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh,
	Cambridge Univ Press.
2	Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995

Course Coo					urse Ti				Leo	ture	Se	mester:
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sustainability, PO8		<b>O</b> ₉ − Indi	vidual or	team wo	ork, <b>PO</b> 10	o- Comn	nunicatio	on, <b>PO</b> 11-	Project	managei	nent ar	ld finance
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Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1 Unit: 2	<b>PO</b> ₁ 2	PO ₂ 2 2 Intro- persp perce proce Signal and I convo specif pseud Image restor corre comp codin Segm appro	PO ₃ 2 2 1 - Reas duction ective eption.D essing. I Proces Hotellin livers. ication, colou e Rest ration V ction In pression g, run le entatio baches,	PO ₄ conable; to In and ot igital In ssing: Si g tran Image smoo Ir oration Wiener mage co , predie ength c n Tec region	PO₅ 2 - Sig 2 - Sig mage i her tra mage-s ignal Pr sforms e enh othing, i: Imag filter, data coo ctive c oding, a chnique growin	PO ₆ nifican Proces ansform amplin occessin and nancem sharp ge Res motion ompress ompress and cor es: Se g, relax	PO7 sing: Ination, g and g - Fou their Ination, g - Fou t	PO ₈ trong mage stereo quantiz trier, W propert ontrast freque n-Cons remove uffman wo ton oding. ation line and	mes PO ₉ 1 formati imagir ation s alsh-Ha ies, filt mod r, geom and of e Imag Techni d edge	PO ₁₀ ion, in admard ters, c ification omain l and ather co e comp ques-th detecti	age g parall discre orrelat n, H enhan uncor nd rac odes t oressic uresh on app	geometry of visua el Image te cosine cors and istogram ncement hostraineo liometrio ransform on, bloch holding proaches
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Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1 Unit: 2	<b>PO</b> ₁ 2	PO2 2 2 Introo persp perce proce Signal and I convo specif pseud Image restor corre comp codin Segm appro edge sense	PO ₃ 2 2 1 - Reas duction ective ption.D essing. I Proces Hotellin olvers. ication, lo-colou e Rest ration V ction In ression g, run le entatio paches, linking, ed image	PO ₄ onable; a to In and ot igital In issing: Si g tran Image smoo Ir oration Viener mage co, predicength con n Teo region superv e analys	PO₅ 2 - Sig 2 - Sig 2 - Sig mage = her tra mage-s ignal Pr sforms e enh othing, : Imag filter , lata coo ctive cc oding, a chnique growin ised an is and a	PO ₆ nifican Process ansform amplin rocessir and nancem sharp ge Res motion ompress ompress ompress and cor es: Se g, relaz d unsu applicat	PO7 sing: I nation, g and o ng - Fou their p nent-Co ening, storation n blur r ssion -Hu ssion tu ntour co egment: cation, i pervise tions.	PO ₈ trong mage stereo quantiz urier, W propert freque n-Cons remove uffman wo ton pding. ation line and d classi	mes PO ₉ 1 formati imagin ation s alsh-Ha ies, filt mod strained r, geom and of e Imag Techni d edge ificatior	PO ₁₀ ion, im g elen erial & admard ters, c ification omain l and hetric a ther co g comj ques-th detecti h techn	age genents parall discre orrelat a, H enhan uncoind rac odes t presh on app iques,	geometry of visua el Image te cosine cors and istogram neement istogram neement istogram netrained liometric ransform on, block holding proaches remotely
Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1 Unit: 2 Unit: 3	<b>PO</b> ₁ 2	PO2 2 2 2 Introo persp perce proce Signal and I convo specif pseud Image restor corre comp codin Segm appro edge sense Shape	PO ₃ 2 2 1 - Reas duction ective ption.D essing. I Proces Hotellin lovers. ication, o-colou e Rest ration V ction In oression g, run le entatio baches, linking, ed image e Analys	PO ₄ sonable; a to In and ot igital In ssing: Si g tran Image smoot ir oration Wiener mage C , predident ength c n Tec region superve e analys sis: Sha	PO₅ 2 - Sig 2 - Sig 2 - Sig mage = her tra mage-s ignal Pr sforms e enh othing, : Imag filter , data co ctive cc oding, a chnique growin ised an is and a ape Ana	PO ₆ nifican Process ansform amplin rocessir and nancem sharp ge Res motion ompress ompress and cor es: Se g, relax d unsu applicat ilysis –	PO7 sing: Ination, g and of their pent-Coening, storation their pent-Coening, storation their pent-Coening, storation the sion the sis the sion the sion the sion the sion the sion the sion the	PO ₈ trong mage stereo quantiz urier, W propert ntrast freque n-Cons remove uffman wo ton oding. ation line and d classi t princi	mes PO ₉ 1 formati imagin ation s alsh-Ha ies, filt mod: trained r, geom and ot e Imag Techni d edge fication ples, sh	PO ₁₀ ion, im ag elen erial & admard ters, c ification omain l and hetric a ther co re comj ques-th detecti n techn hape nu	age genents parall discree orrelation, H enhai uncound raco odes t pression presshon app iques, umber,	geometry of visua el Image te cosine cors and istogram neement istogram neement istogram neement istogram neement istogram non, block holding proaches remotely momen
Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1 Unit: 2	<b>PO</b> ₁ 2	PO ₂ 2 2 2 Intro persp perce proce Signal and I convo specif pseud Image restor corre comp codin Segm appro edge sense Shape Fourio	PO ₃ 2 2 1 - Reas duction ective ption.D essing. I Proces Hotellin livers. ication, o-colou e Rest ration V ction In oression g, run la entatio baches, linking, ed image e Analys er and	PO ₄ conable; a to In and ot igital In ssing: Si g tran Image smoot ir oration Wiener mage co , predident ength c region superv e analys sis: Sha other is	PO₅ 2 - Sig 2 - Sig mage ignal Pr sforms e enh othing, : Imag filter , lata co ctive cc oding, a chnique growin ised an is and a ape Ana shape o	PO ₆ nifican Process ansform amplin rocessin and nancem sharp ge Res motion ompress ompress and cor es: Se g, relax d unsu applicat ilysis – descrip	PO7 PO7 sing: I nation, g and o ng - Fou their I eent-Co ening, storation h blur I sion-Hu sion-Hu sion-Hu sion two not our co egmentation, I pervise tions. Gestalions, S	PO ₈ rrong mage stereo quantiz urier, W propert ntrast freque n-Cons remove uffman wo ton pding. ation line and d classi t princi kelton	mes PO ₉ 1 formati imagir ation s alsh-Ha ies, filt mod strained r, geom and of e Imag Techni d edge ficatior ples, sr detecti	PO ₁₀ ion, im ag elen erial & admard ters, c ification omain l and hetric a ther co e comp ques-th detecti n techn nape nu on, Ho	age genents parall discre orrelation, H enhai uncound raco odes t pression presshon app iques, mber, ugh tr	geometry of visua el Image te cosine cors and istogram neement istogram neement istogram netrained liometric ransform on, block holding proaches remotely

	Finger print classification, signature verification, text recognition, map
	understanding, bio-logical cell classification.
Exar	mination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester examination.
Text	t Books:
1	Gonzalez and Wood, "Digital Image Processing", Addison Wesley, 1993.
2	Anil K.Jain, "Fundamental of Image Processing", Prentice Hall of India.
Refe	erence Books:
1	Rosenfeld and Kak, "Digital Picture Processing" vol.I&vol.II, Academic,1982
2	Ballard and Brown, "Computer Vision", Prentice Hall, 1982

Course Co	de									ture	Semester:	
BTCS832PI	ET			Dat	ta Analy	tics			L	Т Р	Г Р VIII	
Version: 1.2			Date of	Approv	7 <b>al:</b> 16th	BoS 17-	-11-2022	2	3	1 0		111
S	Scheme of			••					of Exar	ninatior	n i	
No. of	Periods	: 60	Hrs.					М	aximun	n Score	: 1	.00
	/ Week	: 4						Inter	nal Eva	luation	: 3	30
	Credits	: 4				End Semester : 70						70
Instructio	on Mode	: Leo	eture					Ι	Exam D	uration	: 3	3 Hrs.
Prerequisite(s):	Engineer	ring Ma	themati	cs and	Data Mi	ining & I	Data wa	re Hou	sing			
<b>Course Objectiv</b>	ves:											
1. To learn the	e fundame	ental co	oncepts	of data	analyti	cs.						
2. To provide t	the princi	iples an	d meth	ods of s	statistic	al analy	sis.					
3. To discover			erns, ar	alyze s	upervis	ed and ι	unsuper	vised m	nodels a	nd estin	nate th	e
accuracy of												
4. To understa		arious s	earch n	nethods	s and vis	sualizati	on tech	niques.				
Course Outcom	es (CO):											
COs No.				S	tateme	nt					ped Pr	
										Out	comes	<u> </u>
CO ₁	Explain						ysis				PO ₁ , PO	02
CO ₂	Interpre	et the p	robabili	stic mo	dels for	· data					PO ₂	
CO ₃	Illustrat					inciple					PO ₃	
CO ₄	Demons										<b>PO</b> ₃ , <b>PO</b>	
PO1- Engineering	g Knowled	lge, PO	2- Probl	em ana	lysis, P	<b>0</b> 3- Des	ign/dev	elopmen	t of so	lutions,	<b>PO</b> ₄ - C	onduct
investigations of o sustainability, <b>PO</b> ₈ <b>PO</b> ₁₂ - Life-long Le	- Ethics, <b>P</b>											
8	0	Mappi	ng of co	urse ou	itcomes	s with p	rogram	outcon	nes			
Course			Ŭ			-						PO ₁
Outcomes	PO ₁	$PO_2$	PO ₃	$PO_4$	PO ₅	$PO_6$	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	<b>PO</b> ₁₁	2
CO ₁	2	2										
CO ₂		2										
CO ₃			2									
CO ₄			2		2							
			1 – Reas	onable;	2 - Sig	nificant	; 3 – Stı	rong				
Detailed Conter	nts:											
Detailed Conter	nts:	Intro								roductio		
Detailed Conter	nts:	<b>Intro</b> of the	e Book,	The M	ethods,	The So	oftware	, Model	ing and	1 Model	s, Graț	ohical
Detailed Conter	nts:	<b>Intro</b> of the Mode	e Book, ls, Algeb	The M oraic Mo	ethods, odels, Sj	The So preadsh	oftware eet Mo	, Model dels, Sev	ing and ven-Ste	1 Model p Model	s, Graj ling Pro	ohical ocess.
Detailed Conter	nts:	Introd of the Mode Descr	e Book, ls, Alget <b>ibing t</b>	The M oraic Mo t <b>he Di</b> s	ethods, odels, Sj <b>stributi</b>	The So preadsh <b>on of</b>	oftware eet Moo <b>a Sing</b>	, Model dels, Sev <b>(le Var</b>	ing and ven-Ste <b>iable</b> :	l Model p Model Introduc	s, Graµ ling Pro ction,	ohical ocess. Basic
Detailed Conter	nts:	Introd of the Mode Descr Conce	e Book, ls, Alget <b>ibing t</b> epts, Po	The M oraic Mo <b>he Di</b> s pulation	ethods, odels, Sj <b>stributi</b> ns and	The So preadsh <b>on of</b> Sample	oftware eet Moo <b>a Sing</b> s, Data	, Model dels, Sev <b>(le Var</b> Sets, V	ing and ven-Ste <b>iable</b> : ariables	1 Model p Model Introduc s, and O	s, Graț ling Pro ction, bserva	ohical ocess. Basic tions,
Detailed Conter	nts:	Introd of the Mode Descr Conce Types	e Book, ls, Algeb <b>ibing t</b> epts, Po of Dat	The M praic Mo the Dis pulation a, Desc	ethods, odels, Sj <b>stributi</b> ns and criptive	The So preadsh <b>on of</b> Sample Measu	oftware eet Moo <b>a Sing</b> s, Data res for	, Model dels, Sev <b>(le Var</b> Sets, V Catego	ing and ven-Ste <b>iable</b> : ariables rical Va	d Model p Model Introduc s, and O ariables,	s, Graj ling Pro ction, bserva Descr	ohical ocess. Basic tions,
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	nts:	Introd of the Mode Descr Conce Types Measu Nume	e Book, ls, Alget <b>ibing t</b> epts, Po of Dat ures for rical Su	The M praic Mo the Dis pulation a, Deso Numer mmary	ethods, odels, Sj <b>stributi</b> ns and criptive ical Var Measur	The So preadsh on of Sample Measur iables, N	oftware eet Moo <b>a Sing</b> s, Data res for Numerio Stat To	, Model dels, Sev <b>fle Var</b> Sets, V Catego cal Sum ols, Cha	ing and ven-Ste <b>iable</b> : ariables rical Va mary M urts for 1	d Model p Model Introduc s, and O ariables, leasures Numeric	s, Graj ling Pro ction, bserva Descr , cal Varia	bhical bcess. Basic tions, iptive ables,
	nts:	Introd of the Mode Descr Conce Types Measu Nume Time	e Book, ls, Alget <b>ibing 1</b> epts, Po of Dat ures for rical Su Series I	The M praic Mo the Dis pulation a, Desc Numer mmary Data, Ou	ethods, odels, Sj <b>stributi</b> ns and criptive ical Var Measur utliers a	The So preadsh on of Sample Measur iables, N res with nd Miss	oftware eet Moo <b>a Sing</b> s, Data res for Numerio Stat To sing Valu	, Model dels, Sev <b>gle Var</b> Sets, V Catego cal Sum ols, Cha ues, Ou	ing and ven-Ste <b>iable:</b> ariables rical Va mary M urts for I tliers, N	d Model p Model Introduc s, and O ariables, leasures Numeric <i>I</i> issing V	s, Graț ling Pro etion, bserva Descr , cal Vari Values,	bhical Decess. Basic tions, iptive ables, Excel
	ats:	Introo of the Mode Descr Conce Types Measu Nume Time Tables	e Book, ls, Alget <b>ibing 1</b> epts, Po of Dat ures for rical Su Series I s for Fil	The M oraic Mo <b>he Di</b> s pulatio a, Desc Numer mmary Data, Ou tering, S	ethods, odels, Sj <b>stributi</b> ns and criptive ical Var Measur utliers a Sorting	The So preadsh on of Sample Measur iables, M res with nd Miss , and Su	oftware eet Moo <b>a Sing</b> s, Data res for Numerio Stat To Stat To sing Valu	, Model dels, Sev <b>fle Var</b> Sets, V Catego cal Sum ols, Cha ues, Ou zing. <b>Fi</b> r	ing and ven-Ste <b>iable</b> : ariables rical Va mary M arts for 1 tliers, N <b>ading R</b>	d Model p Model Introduc s, and O ariables, leasures Numeric Aissing V elations	s, Graț ling Pro etion, bserva Descr , eal Vari Values, <b>hips a</b>	bhical bcess. Basic tions, iptive ables, Excel <b>mong</b>
	ats:	Introd of the Mode Descr Conce Types Measu Nume Time Tables Varial	e Book, ls, Algeb <b>ibing 1</b> epts, Po of Dat ures for rical Su Series E s for Fil- <b>bles</b> : I	The M praic Mo che Dis pulationa, Desc Numer mmary Data, Ou tering, S ntrodue	ethods, odels, Sj <b>stributi</b> ns and criptive ical Var Measur utliers a Sorting ction,	The So preadsh on of Sample: Measur iables, N res with nd Miss , and Su Relatio	oftware eet Moo <b>a Sing</b> s, Data res for Numerio Stat To Stat To sing Valu ummariz nships	, Model dels, Sev gle Var Sets, V Catego cal Sum ols, Cha ues, Ou zing. Fir amon	ing and ven-Ste iable: ariables rical Va mary M urts for I tliers, M hding R g Cat	d Model p Model Introduc s, and O ariables, leasures Numeric Aissing V celations egorical	s, Grap ling Pro ction, bserva Descr , cal Vari Values, hips a Vari	bhical bcess. Basic tions, iptive ables, Excel <b>mong</b>
	nts:	Introd of the Mode Descr Conce Types Measu Nume Time Tables Varial Relatio	e Book, ls, Algeb <b>ibing 1</b> epts, Po of Dat ures for rical Su Series E s for Fil- <b>bles</b> : I onships	The M oraic Mo che Dis pulatio a, Deso Numer mmary Data, Ou tering, 1 ntroduc among	ethods, odels, Sj <b>stributi</b> ns and criptive ical Var Measur utliers a Sorting ction, ctatego	The So preadsh on of Sample Measur iables, N res with nd Miss , and Su Relatio orical Va	oftware eet Moo a Sing s, Data res for Numeric Stat To ing Valu mmariz nships riables	, Model dels, See <b>gle Var</b> Sets, V Catego cal Sum ols, Cha ues, Ou cing. <b>Fir</b> amon and a N	ing and ven-Ste iable: ariables rical Va mary M arts for I tliers, M nding R g Cat	d Model p Model Introduc s, and O ariables, leasures Numeric Aissing V celations egorical al Variat	s, Grap ling Pro etion, bserva Descri, al Vari Values, <b>hips a</b> Vari ble.	ohical ocess. Basic tions, iptive ables, Excel <b>mong</b> ables,
	nts:	Introd of the Mode Descr Conce Types Measu Nume Time Tables Varial Relati Proba	e Book, ls, Algeb <b>ibing 1</b> epts, Po of Dat ures for rical Su Series E s for Fili <b>bles</b> : I <u>onships</u> <b>bility</b>	The M oraic Mo che Dis pulatio a, Desc Numer mmary Data, Ou tering, 1 ntroduc among and	ethods, odels, Sj stributi ns and criptive ical Var Measur utliers a Sorting ction, <u>catego</u> <b>Probabi</b>	The So preadsh on of Sample Measur iables, N res with nd Miss , and Su Relatio <u>prical Va</u> <b>lity D</b>	oftware eet Moo a Sing s, Data res for Numerio Stat To ing Valu ummariz nships riables <b>vistribu</b>	, Model dels, Sev gle Var Sets, V Catego cal Sum ols, Cha ues, Ou zing. Fir amon <u>and a N</u> tions:	ing and ven-Ste <b>iable</b> : ariables rical Va mary M arts for I tliers, M <b>nding R</b> g Cat <u>(umeric</u> Introd	d Model p Model Introduc s, and O ariables, leasures Numeric Aissing V elations egorical <u>al Variat</u> uction,	s, Grap ction, bserva Descri, cal Vari. Values, <b>hips a</b> Vari. <u>ble.</u> Proba	bhical bocess. Basic tions, iptive ables, Excel <b>mong</b> ables, bility
	nts:	Introo of the Mode Descr Conce Types Measu Nume Time Tables Varial Relati Proba Essen	e Book, ls, Algeb <b>ibing 1</b> epts, Po of Dat ures for rical Su Series I s for Fili <b>bles</b> : I <u>onships</u> <b>bility</b> tials, Ru	The M oraic Mo che Dis pulatio a, Desc Numer mmary Data, Ou tering, S antroduc among and D lle of C	ethods, odels, Sj stributi ns and criptive ical Var Measur itliers a Sorting ction, <u>catego</u> <b>Probabi</b> Compler	The Sopreadsh on of Sample Measuriables, N res with nd Miss , and Su Relatio prical Va <b>lity D</b> nents, A	oftware eet Moo a Sing s, Data res for Numeric Stat To sing Valu ummariz nships vistribu Addition	, Model dels, Sev gle Var Sets, V Catego cal Sum ols, Cha ues, Ou zing. Fir amon and a N tions: t Rule, (	ing and ven-Ste <b>iable</b> : ariables rical Va mary M urts for I tliers, M <b>nding R</b> g Cat <u>umeric</u> Introd Conditio	d Model p Model Introduc s, and O ariables, leasures Numeric Aissing V celations egorical al Variat	s, Grap ction, bserva Descri, cal Vari Values, <b>hips a</b> Vari <u>ble.</u> Proba bability	bhical bocess. Basic tions, iptive ables, Excel <b>mong</b> ables, bility y and
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		utility Functions, Exponential Utility, Certainty Equivalents, Is Expected
		Utility Maximization Used?
	Unit: 4	<b>Hypothesis Testing using R programming</b> : Introduction, Concepts in Hypothesis Testing, Null and Alternative Hypothesis, One-Tailed Versus Two- Tailed Tests, Types of Errors, Significance Level and Rejection Region, Significance from p-values, Type II Errors and Power, Hypothesis Tests and Confidence Intervals, Practical versus Statistical Significance, Hypothesis Tests for a Population Mean.
	Unit: 5	<b>Regression Analysis</b> : Estimating Relationships: Introduction, Scatterplots : Graphing Relationships, Linear versus Nonlinear Relationships, Outliers, Unequal Variance, No Relationship, Correlations: Indications of Linear Relationships, Simple Linear Regression, Least Squares Estimation, Standard Error of Estimate, The Percentage of Variation Explained: R-Square, Multiple Regression, Interpretation of Regression Coefficients, Interpretation of Standard Error of Estimate and R-Square, Modeling Possibilities, Dummy Variables, Interaction Variables, Nonlinear Transformations, Validation of the Fit., Statistical Inference: Introduction, Assumptions, Nonconstant Error Variance, Nonnormality of Residuals, Autocorrelated Residuals, Prediction.
Exa	mination and Evalua	tion Pattern: It include both internal evaluation (30 marks) comprising two class
		nents/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
	ainly end semester e	xamination.
	t Books:	
1		David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2		p: The Definitive Guide" Third Edition, O'reilly Media, 2012
Refe	erence Books:	
1		tics in a Big Data World: The Essential Guide to Data Science and its/
		Y Big Data Series)", John Wiley & Sons,2014
2	Paul Zikopoulos, Di	rkde Roos, Krishnan Parasuraman, Thomas Deutsch, James Giles , David Corrigan,
	"Harness the Power	r of Big Data The IBM Big Data Platform", Tata McGraw Hill Publications, 2012

Course C						urse Ti					ecture		Sen	nester
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		Virtualization
		Basics of Virtualization - Types of Virtualization - Implementation Levels of
		Virtualization Virtualization Structures - Tools and Mechanisms -
		Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource
	Unit: 4	management – Virtualization for Data-center Automation.
		Hardware and Infrastructure
		Clients, Security, Networks, Services. Accessing the Cloud - Platforms, Web
		Applications, Web APIs, Web Browsers. Cloud Storage - Overview, Cloud
		Storage Providers, Standards – Application, Client, Infrastructure, Service.
		Security in the Cloud
		Security Overview - Cloud Security Challenges and Risks - Software-as-a-
	··· ·	Service Security – Security Governance – Risk Management – Security
	Unit: 5	Monitoring - Security Architecture Design - Data Security - Application
		Security – Virtual Machine Security – Identity Management and Access
		Control – Autonomic Security.
Exa	mination and Evalua	tion Pattern: It include both internal evaluation (30 marks) comprising two class
		nents/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
	ainly end semester ex	
	t Books:	
1		ny Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH,
-		abh, "Cloud Computing – insights into New -Era Infrastructure", Wiley
	India,2011.	an, croud comparing mognes mee new 2nd minustration of they
2	1	A Practical Approach" Anthony T. Velte, Toby J. Velte, Robert Elsenpeter.
	McGraw-Hill.	
Refe	erence Books:	
1	Kai Hwang, Geoffre	ey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel
		iternet of Things", Morgan Kaufmann Publishers, 2012.
2		e and James F.Ransome, "Cloud Computing: Implementation, Management, and
	Security", CRC Pres	
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Unit: 1 Unit: 2 Unit: 3		FOUN The H comp – fran DESH Intera Iterat usabil – prin Desig MOD Cogni –Com WWW MOBI MOBI Mobil Applio	I – Reas	NS OF H I/O cha evices – s – Ergo DFTWA esign ba prototy neering standar D THEC dels –S tion an stem: P Widget	HCI mnels – Memo onomics RE PRO asics – J yping. H g – Prot ds, guic ORIES ocio-On d collab	Memo y – pro- s – style CESS process ICI in s otyping lelines, rganiza oration s, Appl cations	ory – Re ocessin es – ele s – scer oftware g in pra rules. I ntional i n mode ication s, Game	asonin g and n ments e proce ctice – Evaluat ssues a ls-Hype framev s- Mot	g and pu etworks - intera - navigat ss – sof design ion Tec ion Tec nd stak ertext, N	s; Inters ctivity- cion – s tware li rationa nniques e holde Aultime	action: 1 Paradig creen d ife cycle le. Desig s – Univ r requir edia and	Models gms. esign – gn rules ersal ements
Unit: 1 Unit: 2 Unit: 3		FOUN The H comp – fran DESH Interat usabil – prin Desig MOD Cogni –Com WWW MOBI Mobil Applic Mobil	I – Reas	NS OF H I/O cha evices – S – Ergo DFTWA esign ba prototy neering standar D THEC dels –S tion an stem: P Widget lobile D	HCI mnels – Memoro momics RE PRO asics – J yping. H g – Prot ds, guic ORIES ocio-Or d collab d collab	Memo y – pro- s – style CESS process ICI in s otyping lelines, rganiza oration s, Appl cations	ory – Re ocessin es – ele s – scer oftware g in pra rules. I ntional i n mode ication s, Game	asonin g and n ments e proce ctice – Evaluat ssues a ls-Hype framev s- Mot	g and pro- networks - intera - navigat ss – sof design ion Tec nd stak ertext, N	s; Inters ctivity- cion – s tware li rationa nniques e holde Aultime	action: I Paradig creen d ife cycle le. Desig s – Univ r requir edia and	Models gms. esign – gn rules ersal ements
Unit: 1 Unit: 2 Unit: 3 Unit: 4		FOUN The H comp – fran DESH Interat usabil – prin Desig MOD Cogni –Com WWW MOBI Mobil Applic Mobil WEB	I – Reas	NS OF H I/O cha evices – s – Ergo DFTWA esign ba prototy neering standar D THEC dels –S tion an stem: P Widget <u>tobile D</u> ACE DE	HCI mnels – Memoionomics RE PRO asics – j yping. H g – Prot ds, guić ORIES ocio-Or d collab Hatform (s, Appli esign: H SIGN	Memo y – pro- s – style CESS process ICI in s otyping lelines, rganiza oration s, Appl cations clemen	ory – Re ocessin es – ele s – scer oftware g in pra rules. I ntional i n mode ication s, Game ts of Me	asonin g and n ments aarios – e proce ctice – Evaluat ssues a ls-Hypo framev es- Mob obile Do	g and pu etworks - intera - navigat ss - sof design ion Tec nd stake ertext, N vorks- 7 pile Info esign, T	s; Inters ctivity- cion – s tware li rationa nniques hniques e holde Multime Types o rmation ools.	action: 1 Paradig creen d ife cycle le. Desig s – Univ r requir edia and f Mobile n Archit	Models gms. esign – gn rules ersal ements ecture,
Unit: 1 Unit: 2 Unit: 3		FOUN The H comp – fran DESI Interat usabil – prin Desig MOD Cogni – Com WWW MOBI Mobil Applic Mobil WEB Desig	I – Reas	NS OF H I/O cha evices – S – Ergo DFTWA esign ba prototy neering standar D THEC dels –S tion an stem: P Widget tobile D ACE DE eb Inter	HCI mnels – Memoi nomics RE PRO asics – J yping. H g – Prot ds, guid PRIES ocio-Or d collab latform s, Appli esign: E SIGN faces –	Memo y – pro- s – style CESS process (CI in s otypinş lelines, rganiza oration s, Appl cations clemen Drag &	ory – Re ocessin es – ele s – scer oftware g in pra rules. I utional i n mode ication s, Game ts of Mo	asonin g and n ments proce ctice – Evaluat ssues a ls-Hypo framev es- Mob obile Do	g and pu etworks - intera - navigat ss - sof design ion Tec nd stake ertext, N vorks- 7 pile Info esign, T	s; Inters ctivity- tion – s tware li rationa nniques e holde Multime Cypes o rmation ools.	action: I Paradig creen d ife cycle le. Desig s – Univ r requir edia and	Models gms. esign – gn rules ersal ements ecture,

Exa	mination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester examination.
Text	t Books:
1	Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition,
	Pearson Education, 2004
Refe	erence Books:
1	Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O"Reilly, 2009.

2 Brian Fling, "Mobile Design and Development", First Edition, O"Reilly Media Inc., 2009

Course Co	de			Co	urse Ti	itle			Leo	cture	Som	ester:
BTCS836P	ET					Techno	0,		L	T P		III
Version: 1.2				Approv	7 <b>al:</b> 16th	BoS 17			3	1 0		111
	Scheme o	1 1					5			minatio	1	
	Periods		Hrs.							n Score		100
Periods	/ Week	: 4						Inte		aluation		30
Instructio	Credits	: 4	cture							emester	-	70 3 Hrs.
Prerequisite(s):									Exam D	uration	•	S HIS.
Course Objectiv			01 K5									
1. To provide		concep	tual and	l techno	ological	develor	ments	in the f	ield of I	nternet	and we	b
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2. To underst												
3. To impart											501.01	•
4. To acquire		-		0		-		-		ъ.		
Course Outcom		neuge	51 Busie	commu	ind with	11111 50	eripeing	langua	50.			
COs No.	().			S	tateme	nt				Mar	ped Pr	ogram
											tcomes	
CO ₁	Demon	strate t	he abilit	ty to cre	eate we	b pages	using I	ITML, I	OHTML	,	PO ₁ , PC	2
	Java Sci	ripts, ar	nd XML.									
$CO_2$	Review	the cur	rent top	pics in V	Veb & I	nternet	techno	logies			$PO_2$	
CO ₃	Apply s	erver-s	ide scri	pting wi	ith PHP	langua	ge			I	PO3, PO5, 1	PO ₉
00			-				0	4			PO ₃ , PO ₄ , 1	DO.
CO ₄ PO ₁ - Engineering	Implem				0	·	-					
PO ₁₂ - Life-long Le						s with p				во	DO	PO ₁
Outcomes	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	PO ₉	<b>PO</b> ₁₀	<b>PO</b> ₁₁	2
CO ₁	2	2										
<b>CO</b> ₂		2										
<u>CO3</u>			2		2				1			
CO ₄			2	2	2	· · · · · · · · · · · · · · · · · · ·						
Detailed Conter			1 – Reas	sonable;	2 – Sig	nificant	;; 3 – Sti	rong				
Detailed Conter	its.	Intro	duction	to Inte	rnet. Ir	tornot	Interne	t histo	ry of th	e World	Wide W	Joh
			RPANE'		<b>HICC.</b> 11	nernet,	man		i y Oi tili	c world	while v	
					s – Com	merce	on the l	nterne	t Gove	rnance o	on the	
Unit: 1										igh the l		-
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										etwork a		
			ork secu					-	2			
		Netw	ork Cor	nponen	ts:Clier	nt, Serve	er, Com	munica	tion Me	edia, Typ	oes of	
		netwo	ork: Pee	r-Peer,	Clients	-Server	•					
			-							ganizati		
Unit: 2				-					work to	pologie	s: Bus, s	tar
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										WWW,		
										iges, In	ernet l	hone
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Unit: 3		mana	gement	, Web P	age Des	sigii C01	usiuerai	uon ano	l plinci	pies.		
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						s: HTMI	_ page s	tructur	e, HTM	L Text, I ultimed		nks,

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		Style Sheets: Need for CSS, introduction to CSS, basic syntax and structure,
		using CSS, background images, colors and properties, manipulating texts, using
		fonts, borders and boxes, margins, padding lists, positioning using CSS.
		Interactivity Tools: ASP, VB Script, JAVA Script, JAVA and Front Page, Flash
	Unit: 4	Javascript: Client side scripting, What is Javascript, How to develop Javascript,
		Simple Javascript, Variables, Functions, Control Statements, Arrays.
		<b>PHP:</b> Starting to script on server side, Arrays, function and forms, advance PHP
		Databases : Basic command with PHP examples, Connection to server, creating
	Unit: 5	database, selecting a database, listing database, listing table names creating a
		table, inserting data, altering tables, queries, deleting database, deleting data
		and tables, PHP myadmin and database bugs.
Exa	mination and Evalua	tion Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignr	nents/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester e	xamination.
Text	t Books:	
1	Jeffrey C.Jackson,	"Web TechnologiesA Computer Science Perspective", 2006, Pearson
	Education.	
2	Robert. W. Sebest	a, "Programming the World Wide Web", Fourth Edition, 2007, Pearson
	Education.	
Refe	erence Books:	
1	Deitel, Deitel, Gol	dberg, "Internet & World Wide Web How To Program", Third Edition,
	2006, Pearson Edu	ucation.
2	Marty Hall and La	rry Brown,"Core Web Programming" Second Edition, Volume I and II,
	2001, Pearson Edu	

Course Co	de			Co	ourse T	itle			Lee	cture	<b>C</b> - 1	
BTCS837PI			Crypto				Security		L	T P		ester:
Version: 1.2			~ 1				-11-2022		3	1 0	- `	/III
	cheme o	f Instr		11 -						minatio	n	
	Periods		Hrs.							n Score	:	100
	/ Week	: 4								luation		30
	Credits	: 4								mester	:	70
Instructio			cture							uration		3 Hrs
Prerequisite(s):										aration	. · .	0 1110
Course Objectiv		11000	on									
1. To learn the		entals	of comp	uter Ne	tworks	securit	v concer	ts and s	securit	v challe	ndes	
2. To understa												ncents
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3. To provide t			symmet	ric and	asymme	etric ke	v crypto	graphy.	factor	rs affect	ing coi	npute
Networks se				i o unu			j erjpte	8. ap.i.j.,	140001	5 arreet		
4. To acquire t				ving tec	hnology	v in the	net-cen	tric sec	urity a	areas an	d asses	s thei
current cap								tirie bee	unity t	ii cus uii	a assec	55 01101
Course Outcom		inneae	ons and	potene	iui uppi	loution	•					
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0001101											omes	•
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001							and				_,	
	algorith		veenn	ques,	, ai io ao	Puolit	, una j	prinate	ney			
CO ₂			Netwo	rk sec	uritv i	ssues	like co	nfidenti	ality.		PO ₂ , PO	3
							horizatio					
CO ₃							ocol, Vi				PO ₆	
03							m, Fire				100	
	virtual 1			131011 U	ciccuo	li syste	iii, 1110	wan, Ti	Ivate			
CO ₄				of emer	ging te	chnolog	gy in the	net-ce	ontric		PO ₁₀	
004							pabilities				1 0 10	
	and pot				ch cun	cine ca	pabilities	, iiiiica	10115			
PO ₁ - Engineering					lvsis. P	03- Des	ign/deve	lopment	of so	lutions	PO4- (	Conduc
investigations of c												
sustainability, PO8												
PO12- Life-long Lea	arning											
							rogram	outcom				
Course	PO ₁	$PO_2$	PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	РО	<b>PO</b> ₁₀	<b>PO</b> ₁₁	PO
Outcomes			- 0		- 0	- 0		- 0	9	- 10		2
CO ₁	2	2										
CO ₂		2	2									
CO ₃						2						
CO ₄										2		
			1 – Reas	onable;	2 – Sigi	nificant	; 3 – Str	ong				
Detailed Conten	nts:											
		Intro	duction	to the	Conce	pts of	Security	r: The r	need f	or secu	rity, S	ecurit
						-	rity, T				-	-
			niques:		-		Cipher					
Unit: 1			inques.				-					-

Offic. I	Transposition Techniques, Encryption and Decryption, Symmetric and
	Asymmetric Key Cryptography, Steganography, Key Range and Key Size,
	Possible Types of Attacks.
	Modular arithmetic, prime numbers, relative prime numbers, Euler's function,
	GCD. Computer-based Symmetric Key Cryptographic Algorithms: Algorithm
Unit: 2	Types and Modes, An overview of Symmetric Key Cryptography, DES,
	International Data Encryption Algorithm (IDEA), RC5, Blowfish, AES, Differential
	and Linear Cryptanalysis.
	Computer-based Asymmetric Key Cryptography: Brief History of Asymmetric
Unit: 3	Key Cryptography, An overview of Asymmetric Key Cryptography, The RSA
	Algorithm, Symmetric and Asymmetric Key Cryptography, Digital Signatures.

		Public Key Infrastructure: Digital Certificates, Private Key Management, The
		PKI Model, Public Key Cryptography Standards, PKI and Security. Internet
	Unit: 4	Security Protocols: Basic Concepts, Secure Socket Layer, SHTTP, Time
		Stamping Protocol, Secure Electronic Transaction, SSL versus SET, 3-D Secure
		Protocol, Electronic Money, E-mail Security.
		Understanding Session Hijacking, Spoofing vs Hijacking, Steps in Session
		Hijacking, Types of Session Hijacking, and TCP Concepts Sequence numbers.
	Unit: 5	ARP Spoofing and Redirection, DNS and IP Sniffing, HTTPS Sniffing. Wireless
		802.11 Networks security standards, Sniffing Traffic, Wireless DOS attacks,
		DDoS, WLAN Scanners, WLAN Sniffers, Securing Wireless Networks.
		tion Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignr	nents/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester e	xamination.
Tex	t Books:	
1	Cryptography and N	Networks Security by Behrouz A. Forouzan, 2 nd Edition TMH.
2	Cryptography and N	Networks Security, W. Stallings, Prentice Hall, 5 th Edition, 20102.
Refe	erence Books:	
1	Networks Security	Essentials, William Stallings, Prentice Hall, 5 th Edition, 2013.
2	Firewalls and Inter	rnet Security, William R. Cheswick and Steven M. Bellovin, Addison-Wesley
	Professional, 2ndEd	

Course	Code				ourse T				Lec	ture	Sem	ester:
BTCS83	38PET				t Comp				L	T P		III
Version: 1.2				f Appro	<b>val:</b> 16tł	n BoS 17-			3	1 0		111
	Scheme		iction				Se	cheme o	of Exan	ninatio	n	
No	o. of Periods	: 6	0 Hrs.					Ma	ximum	Score		100
Per	iods/ Week	: 4						Interr	nal Eval	uation	:	30
	Credits								End Sei	mester	:	70
	iction Mode		ecture						xam Dı	iration	:	3 Hrs.
Prerequisite	(s): Data Mi	ning & E	ata Wai	re Hous	ing and	Machin	e Learn	ing				
Course Obje	ctives:											
<ol> <li>To prov intelligen of it usin</li> <li>To under experient</li> </ol>		ic conc such as stems. idea of	epts of fuzzy r Neural	differe nodels, Networ	ent met neural rks s, fi	hods an Network 1zzy logi	d tools as s, pro ic and u	for pr babilist use of l	ic mod neurist	lels, and ics base	l found	ations
	rt the know	eage of	Diologic	cal neur	ons and	i their si	mulatio	n to pro	blem s	solving.		
Course Outc	omes (CO):			~		. 4				3.5-	J D	-
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$CO_2$	-				plying a	soft con	nputing	metho	lology		PO ₂	
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	solve e	engineei	ing pro	hlems		-1~	me to	combin	atorial			
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investigations	optimi Apply regres ring Knowle of complex p	Artificia sion pro dge, <b>PO</b> roblems	roblems Neural blems. 2- Proble <b>PO</b> 5- Mo	s. Networ em anal odern to	rks to so lysis, <b>PC</b> ool usage	olve vario D ₃ - Desig e, <b>PO</b> 6- Th	ous clas gn/devel de engine	sification opment eer and s	on and of sol society,	utions, <b>PO</b> 7- En	vironme	onduct ent and
CO ₄ PO ₁ - Enginee investigations sustainability, PO ₁₂ - Life-long	ring Knowle of complex p PO ₈ - Ethics, 1	Artificia sion pro dge, <b>PO</b> roblems <b>PO</b> 9- Indi	roblems l Neural blems. 2- Proble PO5- Me vidual or	s. Networ em anal odern to team wo	rks to so lysis, <b>PC</b> pol usage prk, <b>PO</b> 10-	olve varie D ₃ - Desig , <b>PO</b> 6- Th - Commu	ous clas gn/devel ne engine nication,	sificatio opment eer and s <b>PO₁₁-</b> Pr	on and of sol society, oject ma	utions, <b>PO</b> 7- En	<b>PO₄</b> − C vironme	onduct ent and
<b>PO</b> ₁ - Enginee investigations sustainability,	optimi Apply regres ring Knowle of complex p <b>PO</b> 8- Ethics, I g Learning	Artificia sion pro dge, <b>PO</b> roblems <b>PO</b> 9- Indi <u>Mappi</u>	roblems Neural blems. 2- Proble vidual or	s. Networ em ana odern to team wo ourse ou	rks to so lysis, PC ool usage ork, PO ₁₀ -	Dive varie $D_3$ - Designer, <b>PO</b> _6- Theorem Communication of the pro- with pro-	ous clas gn/devel ne engine nication, ogram c	sification opment eer and s <b>PO</b> 11- Pr outcome	on and of sol society, oject ma es	utions, <b>PO</b> 7- En anageme	<b>PO₄</b> - C vironme nt and f	onduct ent and
<b>PO</b> 1- Enginee investigations sustainability, <b>PO</b> 12- Life-lonş	optimi Apply regress ring Knowle of complex p PO ₈ - Ethics, I g Learning	Artificia sion pro dge, <b>PO</b> roblems <b>PO</b> 9- Indi	roblems l Neural blems. 2- Proble PO5- Me vidual or	s. Networ em anal odern to team wo	rks to so lysis, <b>PC</b> pol usage prk, <b>PO</b> 10-	olve varie D ₃ - Desig , <b>PO</b> 6- Th - Commu	ous clas gn/devel ne engine nication,	sificatio opment eer and s <b>PO₁₁-</b> Pr	on and of sol society, oject ma	utions, <b>PO</b> 7- En	<b>PO₄</b> − C vironme	onduct ent and inance, <b>PO</b> 1
PO ₁ - Enginee investigations sustainability, PO ₁₂ - Life-long Course	optimi Apply regress ring Knowle of complex p PO ₈ - Ethics, I g Learning	Artificia sion pro dge, <b>PO</b> roblems <b>PO</b> 9- Indi <u>Mappi</u>	roblems Neural blems. 2- Proble vidual or	s. Networ em ana odern to team wo ourse ou	rks to so lysis, PC ool usage ork, PO ₁₀ -	Dive varie $D_3$ - Designer, <b>PO</b> _6- Theorem Communication of the pro- with pro-	ous clas gn/devel ne engine nication, ogram c	sification opment eer and s <b>PO</b> 11- Pr outcome	on and of sol society, oject ma es	utions, <b>PO</b> 7- En anageme	<b>PO₄</b> - C vironme nt and f	onduct ent and inance,
PO ₁ - Enginee investigations sustainability, PO ₁₂ - Life-long Course Outcome	optimi Apply regres ring Knowle of complex p PO ₈ - Ethics, l g Learning s PO ₁	Artificia sion pro dge, <b>PO</b> roblems <b>PO</b> 9- Indi Mappi <b>PO</b> 2	roblems Neural blems. 2- Proble vidual or	s. Networ em ana odern to team wo ourse ou	rks to so lysis, PC ool usage ork, PO ₁₀ -	Dive varie $D_3$ - Designer, <b>PO</b> _6- Theorem Communication of the pro- with pro-	ous clas gn/devel ne engine nication, ogram c	sification opment eer and s <b>PO</b> 11- Pr outcome	on and of sol society, oject ma es	utions, <b>PO</b> 7- En anageme	<b>PO₄</b> - C vironme nt and f	onduct ent and inance, <b>PO</b> 1
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	Trainging techniques for ANNs., Applications of ANNs to solve some real life problems.
Exar	nination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester examination.
Text	Books:
1	Fuzzy Logic: A Pratical approach, F. Martin, , Mc neill, and Ellen Thro, AP Professional, 2000.
2	Foundations of Neural Networks, Fuzzy Systems, and Knowldge Engineering, Nikola K. Kasabov, MIT
	Press, 1998.
3	An Introduction to Genetic Algorithms, Melanie Mitchell, MIT Press, 2000.
Refe	rence Books:
1	Fuzzy Logic with Engineering Applications (3rd Edn.), Timothy J. Ross, Willey, 2010.
2	Genetic Algorithms In Search, Optimization And Machine Learning, David E. Goldberg, Pearson
	Education, 2002.

Course Co			Course Title Le										Semester:	
BTCS8391	PET			Speech and Natural Language Processing L								Р	VIII	
Version: 1.2					Approv	<b>al:</b> 16th	BoS 17-			3	1	0	,	
		eme of							Scheme			ion		
		eriods		) Hrs.						imum		:	100	
Perioc			: 4						Interna			:	30	
		redits	: 4								nester	:	70	
Instruct				ecture					Exa	am Du	ration	:	3 Hrs	
Prerequisite(s)			Learnin	g										
Course Objecti														
<ol> <li>To underst</li> <li>To learn base</li> <li>To underst statistics.</li> <li>To acquire</li> </ol>	asic tano the	progra d some	mming e of the	tools fo proble	or NLP. ems an	d soluti	ions of	NLP a	nd thei	r relat	tion to	lingu	istics and	
Course Outcom	ies	(CO):												
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					analysis				nmars			PC		
<u> </u>					y for ev			-				PO _{3.}		
<u> </u>					LP syste				oblem		PC	- ,	PO5, PO9	
PO ₁ - Engineerin		-		-	•			-						
sustainability, <b>PO</b> <b>PO</b> ₁₂ - Life-long Lo		ing			team wo					nes		menta	and finance	
Course Outcomes		PO ₁	PO ₂	PO ₃	PO ₄	<b>PO</b> ₅	PO ₆	<b>PO</b> ₇	PO ₈	РО 9	PO ₁	PO	1 PO ₁₂	
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D / 11 1 0 /			1	– Reas	onable;	2 – Sigi	iificant	; 3 – Sti	rong					
Detailed Conte	nts:						0.011							
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Unit: 2	2		N-gra Smoo Tagse	ms Moo thing- 1 ts for E	nglish I	Syntax - Deleteo Part of S	- Count dInterp Speech	ing Wor olation Tagging	rds - Ur – Entro g-Rule I	opy – I Based i	English Part of	Word Speed	l Classes ch Taggin	
Unit: 3	3		<ul> <li>Stochastic Part of Speech Tagging - Transformation-Based Tagging</li> <li>CONTEXT FREE GRAMMARS</li> <li>Context Free Grammars for English Syntax- ContextFree Rules and Trees.</li> <li>Sentence- Level Constructions- Agreement - Sub Categorization. Parsing -</li> <li>Top-down - Earley Parsing - feature Structures - ProbabilisticContext-Free</li> <li>Grammars</li> </ul>											
Unit: 4	ļ		SEMA Repre Calcul Seman Analys Sense	NTIC A senting lus. Re ntic An sis - I Disamb	epresen alysis - Lexeme biguation	ng - Me ting L Semar s and n -Infor	inguist ntic Att Their mation	ically 1 achmer Senses Retriev	Relevan nts -Syn s - In ⁻ zal	t Con ntaxDi ternal	ncepts riven A Struc	-Syr nalyz	[•] Predicat ntaxDrive er. Robus - Wor	
Unit: 5	5		Disco	urse -F		ce Resc	olution	- Text	Cohere	nce -	Discou		tructure ret ation	

		Conversational Agents. Language Generation - Architecture - Surface
		Realizations - Discourse Planning
		Machine Translation - Transfer Metaphor - Interlingua - Statistical Approaches
Exa	nination and Evaluat	ion Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/ assignm	ents/ quiz/ seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester ex	amination.
Text	t Books:	
1	Daniel Jurafsky and	James H Martin, "Speech and Language Processing: An introduction to Natural
	Language Processing	g, Computational Linguistics and Speech Recognition", Prentice Hall, 2nd Edition,
	2008	
Refe	erence Books:	
1	C. Manning and H. S	chutze, "Foundations of Statistical Natural Language Processing", MIT Press.
	Cambridge, MA:,1999	)
2	C. Manning and H. S	chutze, "Foundations of Statistical Natural Language Processing", MIT Press.
	Cambridge, MA:,1999	)

Course Co	ode			Co	urse Tit	le			I	Lecture		~	
UGCS611G	ΈT	Soft Skill and Interpersonal Communication								T P		Semester	
Version: 1.2		<b>Date of Approval:</b> 16th BoS 17-11-2022 3								0	0 :VI		
5	Scheme of	f Instru	ction					Schem	e of E	xamina	tion		
No. o	f Periods		Hrs.					Ma	ximum	Score	:	100	)
Period	s/ Week	: 3						Intern	al Eval	luation	:	30	
	Credits	: 3						E	Ind Sei	mester	:	70	
Instructi			cture					Ex	am Du	ıration	:	3 F	Irs.
Prerequisite(s):		ic pre-ı	requisit	es.									
Course Objectiv													
1. To learn the								_					
2. To apply th										ctice.			
3. To understa							scussi	ons skil	ls.				
4. To develop		agemen	it and s	tress m	anagem	ient.							
Course Outcom	les(CO):			C4-						Mar		Davis of a	
COs No.				Sta	tement						pped l tcom		
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	4 Establish time management and stress management. ineering Knowledge, <b>PO</b> ₂ - Problem analysis, <b>PO</b> ₃ - Design/development of							ent of	solution			nduct	
investigations of o sustainability, <b>PO</b>													
			lividuai	or team	n work,	<b>PO</b> ₁₀ - C	ommu		, 11	roject	,	-	
finance, <b>PO</b> ₁₂ - Life	e-long Lear	ning								Toject			
	e-long Lear	^{ning} Mappin	g of co	urse ou	tcomes	with p		n outco					DO
finance, <b>PO</b> 12- Life	e-long Lear	ning					rograr		mes	PO ₁₀	PC	<b>D</b> ₁₁	<b>PO</b> ₁₂
finance, PO ₁₂ - Life Course	e-long Lear	^{ning} Mappin	g of co	urse ou	tcomes	with p	rograr PO	n outco	PO			<b>D</b> ₁₁	PO ₁₂
finance, PO ₁₂ - Life Course Outcomes CO ₁ CO ₂	e-long Lear	^{ning} Mappin	g of co	urse ou	tcomes	with p PO ₆	rograr PO	n outco	PO 9	PO ₁₀		<b>D</b> ₁₁	PO ₁₂
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finance, PO ₁₂ - Life Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter	PO ₁	ning Mappin PO2 1 Funda Basic	g of con PO ₃ – Reaso mental Forms	PO4 PO4 pnable; ;	PO5 PO5 2 - Sign	with p PO ₆ 2 2 ificant ication tion; T	rograr <b>PO</b> 7 ; <b>3 – S</b> : The the Pro	PO ₈ PO ₈ trong	PO 9 2 ance of f Com	PO ₁₀ 3 3 3 of Comr	PC	ation	; The
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finance, PO ₁₂ - Life Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1 Unit: 2 Unit: 3	PO1	Mappin Mappin PO2 PO2 I Suppose Comp Lister Appro to Ens Intery with C Negot Prepa Interv Interv With Negot Prepa	g of cor PO ₃ – PO ₃ – Reaso – Reaso	PO4 PO4 PO4 PO4 PO4 PO4 PO4 PO4 PO4 PO4	tcomes PO5 2 - Sign 2 - Sign munica Deali nication verbal C ce of ning; Ho tening. s: Buildi aging Co aches to iew an ng an In s: Buildi Criticism aches to uation.	with p PO ₆ 2 2 iificant ication tion; T ng t: Chara Commu Listen ow to b ng Pos onflict. o Nego d Typ terview ng Pos on, o Nego	rograr PO 7 ; 3 – S ; 3 – S ; 3 – S ; 3 – S ; 1 – S ; 3 – S ; 1 – S ; 2 – S ; 3 – S ; 3 – S ; 3 – S ; 3 – S ; 1 – S ; 1 – S ; 2 – S ; 3 – S ; 3 – S ; 3 – S ; 3 – S ; 1 – S ; 3 – S ; 3 – S ; 3 – S ; 1 – S ; 1 – S ; 1 – S ; 1 – S ; 2 – S ; 3 – S ; 1 – S ; 3 – S ; 3 – S ; 1 – S ; 1 – S ; 1 – S ; 1 – S ; 2 – S ; 1 – S ; 2 – S ; 3 – S ; 1 – S ; 1 – S ; 1 – S ; 1 – S ; 2 – S ; 3 – S ; 1 – S ; 2 – S ; 1 – S ; 2 – S ; 1 – S ; 1 – S ; 2 – S ; 3 – S ; 1 –	n outco PO ₈ Import ocess o Cotics of on. Barrie Etter Lis Relation a; The M Busine Ethics Relation Mar s; The M	ance of Communications to a stener; a ships; a s	PO ₁₀ 3 3 3 3 of Comr municatio verbal ( Effec ; What S Giving Element terviewin Giving	PC nunic tion; I Comm tive Speak Prais s of N s; Pla g Prais s of N	ation: Barrie Barrie Bar Liste ers ca e; De legoti Situa annin ee; De Cor legoti	; The ers to riers. ation; ening; an do ealing ation ation. g an ealing nflict. ation
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finance, PO ₁₂ - Life Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1 Unit: 2 Unit: 3	PO ₁	Mappin Mappin PO2 PO2 I Funda Basic Comp Lister Approto to Ens Intery with C Negot Prepa Intery with Negot Prepa Intery With Negot Prepa	g of con PO ₃ PO ₃ - Reaso mental Forms nunicati erbal C onents ing: Im aches t sure Bet persona Criticism iations ration; riewing iew; Co persona iations	PO4 PO4 PO4 onable; : onable; : onable; : onable; : ls of Com ion; commun of Nom iportan co Liste: tter Liste al Skills m; Mana : Appro f: Interv onductin al Skills ( c) : Appro The Sitt ; Interv onductin	tcomes PO ₅ 2 - Sign 2 - Sign munica Deali nication verbal C ce of ning; Ho tening. s: Buildi aging Cc aches to iew an ng an In s: Buildi Criticism aches to uation. iew an ing an 1	with p PO ₆ 2 2 ifficant ication ition; T ng n: Chara Commu Lister ow to b ng Pos onflict. o Nego d Typ terviev ng Pos onflict. o Nego d Typ terviev ng Pos	rograr PO 7 ; 3 - S ; 1 - S ; 3 - S ; 5 - S ; 6 - S ; 7 -	n outco PO ₈ PO ₈ Import ocess o Cotics of on. Barrie Etter Lis Relation cotter Lis Relation Relation a; The M Busine Busine Busine	mes PO 9 2 2 ance c f Com Commu F Nonv rs to stener; aships; Aajor E ess In of Inte iships; haging Aajor F ess In cs of	PO ₁₀ 3 3 3 3 of Comr municatio verbal ( Effec ; What S Giving Element terviewin Giving	PC munic tion; I n Comm tive Speak Prais s of N s; Pla s of N s; Pla s of N	ation Barrie Barrie Bar Liste ers ca legoti Situa annin legoti annin Ethi	; The ers to riers. ation; ening; an do ealing ation. g an ealing nflict. ation g an cs in

	<b>mination and Evaluation Pattern:</b> It include both internal evaluation (30 marks) comprising two class sional exams/assignments/quiz/seminar presentation etc. and external evaluation (70 marks) which
is m	nainly end semester examination.
Tex	t Books:
1	Sanjay Kumar and Pushpa Lata, "Communication Skills", Oxford University Press.
2	Krishna Mohan, Meera Banerji, "Developing Communication Skill", McMillan India Ltd.
Ref	erence Books:

1 Simon Sweeney, "English for Business Communication", Cambridge University Press.

2 Caroline & Whitbeck, "Ethics in Engineering Practice and Research", Cambridge University Press.

Course Co	de				ourse Ti				L	ecture		Som	ester
UGCS612G	ET	Human	Resource	e Develop	ment and	Organiza	ational Be	haviour	L	Т	Р		VI
Version: 1.2		]	Date of	Approv	7 <b>al:</b> 16th	BoS 17			3	0	0	•	VI
	Scheme of	f Instru	ction				5	Scheme	of Exa	minati	on		
No. of	Periods		Hrs.							Score	:	100	
Periods	s/Week	: 3						Interna	al Eval	uation	:	30	
	Credits	: 3						Eı	nd Ser	nester	:	70	
Instructio	on Mode	: Le	ecture					Exa	am Du	ration	:	3 Hr	s.
Prerequisite(s):	<u>.</u>	ic pre-	requisit	es.									
Course Objectiv													
<ol> <li>To learn bes</li> <li>To familiaria</li> <li>To acquire t</li> <li>To impart i projects, rol</li> </ol>	ze with th the use of nto the c	e theor case di	ies, cor scussio	ncepts, 1 ns, exer	rcises, g	games, j					erc	ises, j	group
Course Outcom													
COs No.				Sta	tement							Prog nes (P	
CO ₁	Underst	tand Or	ganizat	ional Be	ehaviou	r						<b>'O</b> 6	,
			0								DO	DO	
CO ₂	Improve	e Perso	lanty								PU	5, <b>PO</b> 10	
CO ₃	Build m	otivatio	n as an	individ	ual as w	vell as a	team			PC	D _{6,} P	0 _{9,} PO	10
CO ₄	Able to	analyze	variou	s select	ion tecł	nniques	in recr	uitmen	t		PO	6, <b>PO</b> 10	
sustainability, <b>PO</b> finance, <b>PO</b> ₁₂ - Life	-long Lear	ning			tcomes				nes		Idilic	igemen	
Course	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₆	<b>PO</b> ₇	PO ₈	РО	<b>PO</b> ₁₀	F	<b>PO</b> 11	<b>PO</b> ₁₂
Outcomes						2			9				
CO1 CO2					-	2 2				2			
CO ₂						2			2	2			
<u> </u>						2			2	2			
004		1	- Dease	nahle [,]	1 2 – Sign		· 3 - Sta	ona		2			
Detailed Conter	nte'	1	- Keusi	Jnubie, I	2 – Siyn	ij icuni.	, 5 - 50	ong					
Unit: 1		Resou develo HRM:	rce M opment contrib	lanager organiz oution a	course V nent ( zations) nd linka lopment	(HRM) OB and ges wit	Differ HRM a h susta	ence nd Sust	betwe ainabl	en con e develo	rpo pm	rates Ient O	and B and
Unit: 2		indivie Perso attrib labout Orgar Perce	dual be nality: utes in r; Emot nization ptual en	haviour Big fiv fluencii ional In al Com Tors; Se	aging Y Values e mode ng OB telligen mitmen elf-fulfil	: Value el; MB Emotio ce Attit t Perce ling pro	es acros FI; Use ons: Ur udes: A eption: ophecy;	s cultu of pe aderstan ttitudes Factors <u>Know</u>	res (H rsonal nding s v/s v influe yourse	ofstede ity test emotio alues; Jo ncing p elf: Johan	's f ns; ob S oerc ri w	ramev Perso Emo atisfa eptio indov	work): nality tional ction: n; 3 3 v
Unit: 3		Conte motiv Team	mporai ation of effecti	ry theor f social veness:	orkplace ries of n workers Conte riduals i	notivati s. Work xt, Cor	ion; Des Teams npositi	signing v/s gro on, Wo	motiva oups; V	ating job Vhy tea	os: J ms;	ICM n A mo	nodel del of
Unit: 4		Comn Forma effect	nunicat al netw ive c	ion Wł orks a ommun	nat is o nd Gra ication; unicatio	commu pevine; non	nicatio Electr - ver	n; Orga onic co bal co	ommu ommu	nication nicatior	ıs;	Barrie	
Unit: 5		Job A	nalysis	Job o	descript tion, Or	ion; Jo	ob Spe	cificatio	on; Jo	b Eval			

	external; Steps in selection process; Socialization and Induction; NGO recruitment
Exar	nination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class
sess	ional exams/assignments/quiz/seminar presentation etc. and external evaluation (70 marks) which
is m	ainly end semester examination.
Text	Books:
1	McShane, S.L. and Von Glinow, M.A., Organizational Behaviour, New Delhi, Tata McGrawHill
	Publishing company ltd.
2	P. Jyothi, P. and Venkatesh, D.N., Human Resource Management, New Delhi, Oxford University
	Press
Refe	rence Books:
1	Denhardt, R.B., Denhardt, J.V., and Aristigueta, M.P. (2009), Managing Human Behaviour in Public
	and Non-Profit Organizations, Second edition. California, Sage Publications.
2	Pynes, J.E. (2004). Human Resources Management for Public and Nonprofit Organizations, Second
	Edition. San Francisco, CA: Jossey- Bass Publishers.

Course Coo	de			~ ~ ~		ourse Ti		•.			ture	Sem	ester:
UGCS613GET							ber Secu				T P		VI
Version: 1.2					Approv	v <b>al:</b> 16th	BoS 17-			-	0 0		
			f Instru					S	cheme of			n I I	40.0
No. of				Hrs.						iximum		:	100
Periods	1		: 3							nal Eval		:	30
In ature at a	Credi		: 3	4						End Ser		:	70
Instructio				cture					E.	xam Du	iration	:	3 Hrs
Prerequisite(s): 1 Course Objective		ecii	ic pre-i	requisit	es.								
1. To create th			arity ar	d unde	rstandi	or of cy	herlaws	and cyl	her seci	urity la	we to th	ie.	
professional			2			0 2		and cy	JCI SCC	unity la	ws to ti		
2. To emphasiz								ndividu	al or org	vanizati	ional pr	ivacy.	
3. To provide t								i ai i i a a		Sampar	ionai pi	i acji	
4. To understa								eventi	on.				
Course Outcome	es (CO	ı):											
COs No.					St	atemen	ıt				Map	ped Pro	ogram
												comes	
CO ₁							ecurity l	aws				PO ₁ , PO	
$CO_2$				-	tion of c	-						D6, PO8, I	
CO ₃				eyber s	ecurity	vulner	abilities	and c	yber se	curity		PO ₅ , PO	8
	safe												
					plication					C 1		PO ₈ , PO	
<b>PO</b> ₁ - Engineering investigations of co													
sustainability, PO ₈ -													
PO ₁₂ - Life-long Lea		,	, indiv	iuuui oi	count it o		commu			ojeetiin	unugeine	, iii uiiu	
			Mappir	ng of co	urse ou	tcomes	with pro	ogram o	outcom	es			
Course	D										PO	PO.	PO
Outcomes	Р		PO ₂	ng of com PO ₃	urse ou PO4	tcomes PO₅	with pro PO ₆	ogram o PO ₇	PO ₈	es PO ₉	PO ₁₀	PO ₁₁	<b>PO</b> ₁
Outcomes CO ₁	<b>P</b> (	01					PO ₆	PO ₇			PO ₁₀	PO ₁₁	2
Outcomes           CO1           CO2		01	PO ₂			PO ₅			PO ₈		PO ₁₀	PO ₁₁	
OutcomesCO1CO2CO3		01	PO ₂				PO ₆	PO ₇	<b>PO</b> ₈	PO ₉	PO ₁₀	PO ₁₁	2
Outcomes           CO1           CO2		01	<b>PO</b> ₂ 2	PO ₃	PO ₄	<b>PO</b> ₅	<b>PO</b> ₆	<b>PO</b> ₇	<b>PO</b> ₈		PO ₁₀	PO ₁₁	2
Outcomes           CO1           CO2           CO3           CO4	2	01	<b>PO</b> ₂ 2	PO ₃	PO ₄	<b>PO</b> ₅	PO ₆	<b>PO</b> ₇	<b>PO</b> ₈	PO ₉	PO ₁₀	PO ₁₁	2
OutcomesCO1CO2CO3	2	01	PO ₂ 2 1	PO ₃	PO ₄	<b>PO</b> 5 2 <b>2 - Sign</b>	PO ₆ 2 ificant; :	<b>PO</b> ₇ 3 <b>3 - Stro</b>	PO ₈ 2 2 mg	<b>PO</b> ₉			2 2 2
Outcomes           CO1           CO2           CO3           CO4	2	01	PO2 2 1 1 Introd	PO3 - Reaso	PO ₄	<b>PO</b> ₅ 2 <b>2 - Sign</b> r law,	PO ₆	<b>PO</b> ₇ 3 <b>3 - Stro</b> or Cyb	PO ₈ 2 2 mg er Law	<b>PO</b> ₉ 2 7, Cybe	er Juris	sprude	2 2 nce at
Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conten	2	01	PO ₂ 2 1 Introd	PO ₃ – Reaso	PO ₄	PO ₅ 2 2 - Sign r law, dian Le	PO ₆ 2 ificant; Need for	PO ₇ 3 3 - Stro or Cyb es of ju	PO ₈ 2 2 mg er Law risdicti	PO ₉ 2 7, Cybe on in c	er Juris	sprude ace, Ty	2 2 nce ar
Outcomes           CO1           CO2           CO3           CO4	2	01	PO ₂ 2 1 Introd Intern jurisdi	PO ₃ – Reasonal duction national iction, '	PO ₄	PO ₅ 2 2 - Sign r law, dian Le st evolv	PO ₆ 2 ificant; : Need fo vel, Issu- ved - Mi	PO ₇ 3 3 - Stro or Cyb es of ju inimum	PO ₈ 2 2 mg er Law risdicti Conta	PO ₉ 2 7, Cybe on in c ccts Th	er Juris eyberspa	sprudet ace, Ty Sliding	2 2 2 mce an 7pes of g Scale
Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conten	2	01	PO ₂ 2 1 Introd Intern jurisdi	PO ₃ – Rease luction hational iction, ' y – Effe	PO ₄	PO ₅ 2 2 - Sign r law, dian Le st evolv	PO ₆ 2 ificant; Need for	PO ₇ 3 3 - Stro or Cyb es of ju inimum	PO ₈ 2 2 mg er Law risdicti Conta	PO ₉ 2 7, Cybe on in c ccts Th	er Juris eyberspa	sprudet ace, Ty Sliding	2 2 2 mce an 7pes of g Scale
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Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conten	2	01	PO ₂ 2 1 Introd Intern jurisdi Theor 2000. <b>Cyber</b>	PO ₃ – Rease duction hational iction, ' y – Effe Crime:	PO ₄	PO ₅ 2 2 - Sign r law, dian Le st evolv st and l 1 Frame	PO ₆ 2 ifficant; : Need fo vel, Issu- vel - Mi internati	PO ₇ 3 3 - Stro or Cyb es of ju inimum onal ta	PO ₈ 2 2 mg er Law risdicti Conta rgeting	PO ₉ 2 7, Cybe on in c cts Th , Jurisd	er Juris yberspa eory - liction	sprude: ace, Ty Sliding under	2 2 2 mce at 7pes o g Scale IT Act
Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conten	2	01	PO ₂ 2 1 Introc Intern jurisdi Theor 2000. Cyber Cyber Forge	PO ₃ – Reason - Reason	PO ₄ pnable; : crybe: and In The Te: ects Te: s& Lega es agair er Stall	PO ₅ 2 2 - Sign r law, dian Le st evolv st and l I Frame ast Indi king/Ha	PO ₆ 2 ificant; : Need fo vel, Issu- ved - Mi internati work viduals, arassmen	PO ₇ 3 3 - Stro or Cyb es of ju inimum onal ta Institu nt, Cyb	PO ₈ 2 2 mg er Law risdicti a Conta rgeting tion an er Porn	PO ₉ 2 7, Cybe on in c cts Th , Jurisd d State	er Juris yberspæ eory – liction u	spruder ace, Ty Sliding under king ,	2 2 2 nce at pes or g Scale IT Act Digita heft 8
Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conten	2	01	PO ₂ 2 1 Introd Intern jurisdi Theor 2000. Cyber Cyber Forge Fraud	PO ₃ - Reason - Reason	PO ₄ pnable; : conable; : and In The Teresects Teresects Teresects again er Stall er Terr	PO ₅ 2 2 - Sign 2 - Sign 2 - Sign 1 aw, dian Le st evolv st and I st evolv st and I 1 Frame inst Indi king/Ha orism	PO ₆ 2 <b>ificant;</b> Need forvel, Issue ved - Miternati internati work viduals, arassmen .,Cyber	PO ₇ 3 3 - Stro or Cyb es of ju inimum onal ta Institu nt, Cyb Defama	PO ₈ 2 2 mg er Law risdicti a Conta rgeting tion an er Porn ation ,F	PO ₉ 2 7, Cybe on in c cts Th , Jurisd d State	er Juris yberspæ eory – liction u	spruder ace, Ty Sliding under king ,	2 2 2 nce at pes or g Scale IT Act Digita heft 8
Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1	2	01	PO ₂ 2 1 Introd Intern jurisdi Theor 2000. Cyber Cyber Forge Fraud Proteo	PO ₃ - Reason - Reason	PO ₄ pnable; : conable; : and In The Teresects Teresects again er Stall er Terresectaller intern	PO ₅ 2 2 - Sign 2 - Sign 2 - Sign 1 aw, dian Le st evolv st and I ast evolv st and I 1 Frame ist Indi king/Ha orism et - Con	PO ₆ 2 <i>ificant;</i> Need for vel, Issu- ved - Mi internati internati work viduals, arassmer .,Cyber ncept of	PO ₇ 3 3 - Stro or Cyb es of ju inimum onal ta Institu nt, Cyb Defama privacy	PO ₈ 2 2 mg er Law risdicti a Conta rgeting tion an er Porn ation ,F 7.	PO ₉ 2 7, Cybe on in c cts Th , Jurisd d State nograpl Right to	er Juris yberspa eory - liction v e, Hac ny, Iden o Priva	spruder ace, Ty Sliding under king , ntity T cy and	2 2 2 7 2 7 2 7 2 7 2 7 2 7 2 7 2 7 2 7
Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conten	2	01	PO ₂ 2 1 Introd Interri jurisdi Theor 2000. Cyber Forge Fraud Proteo Threa	PO ₃ - Rease duction national iction, ' ry - Effe Crime: ry ,Cybe , Cybe ction or t to p	PO ₄ pnable; : onable; : and In: The Te: ects Te: s& Lega es agair er Stall er Terr i Intern rivacy	PO ₅ 2 2 - Sign r law, dian Le st evolv st and l st evolv st and l I Frame nst Indi king/Ha orism et - Con on inte	PO ₆ 2 <i>ifficant;</i> Need for vel, Issu- ved - Mi internati ework viduals, arassmen "Cyber ncept of ernet -	PO ₇ 3 3 - Stro or Cyb es of ju inimum onal ta Institu nt, Cyb Defama privacy Self-re	PO ₈ 2 2 mg er Law risdicti a Conta rgeting tion an er Porn ation ,F '. egulatio	PO ₉ 2 7, Cybe on in c cts Th , Jurisd d State nograpl Right to on app	er Juris yberspa eory - liction of hy, Ider o Priva roach	sprudes ace, Ty Sliding under king , ntity T cy and to priv	2 2 2 7 2 7 2 7 2 7 2 7 2 7 2 7 2 7 2 7
Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1	2	01	PO ₂ 2 1 Introd Intern jurisdi Theor 2000. Cyber Forge Fraud Protec Threa Ingred	PO ₃ - Rease - Rease - Rease - Rease - Rease - Crime - Crime	PO ₄ pnable; : onable; : conable; : onable; : and In: The Te: ects Te: s& Lega es agair er Stall er Terr h Intern rivacy to decid	PO ₅ 2 - Sign 2 - Sign r law, dian Le st evolv st and l l Frame st Indi king/Ha orism et - Cor on inte de conf	PO ₆ 2 <i>ifficant;</i> Need for vel, Issu- zed - Mi internati ework viduals, arassmer "Cyber ncept of ernet - fidentiali	PO ₇ 3 3 – Stro or Cyb es of ju inimum onal ta Institu nt, Cyb Defama privacy Self-ro ty of i	PO ₈ 2 2 mg er Law risdicti a Conta rgeting tion an er Porn ation ,F , egulatio nforma	PO ₉ 2 7, Cybe on in c cts Th , Jurisd d State nograpl Right to on appr tion -	er Juris yberspa eory - liction n e , Hac hy, Iden o Priva roach Breach	sprude ace, Ty Sliding under king , ntity T cy and to priv	2 2 2 mce a 7pes o g Scale IT Act Digita heft & d Data vacy nsitive
Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1	2	01	PO ₂ 2 1 Introd Intern jurisdi Theor 2000. Cyber Cyber Forge Fraud Protec Threa Ingrec person	PO ₃ - Rease - Rease - Rease - Rease - Crime r Crime r Crime r Crime ry ,Cybe ction or t to p dients t nal info	PO ₄ onable; i conable; i conable; i and In- The Te: ects Te: s& Lega es agair er Stall er Terr h Intern rivacy co decidor mation	PO ₅ 2 - Sign 2 - Sign c law, dian Le st evolv st and I l Frame ast Indi king/Ha orism et - Con on inte de conf n and c	PO ₆ 2 <i>ificant;</i> Need for vel, Issu- ved - Mi internati ework viduals, arassmen .,Cyber ncept of ernet - fidentiali onfident	PO ₇ 3 3 - Stro or Cyb es of ju inimum onal ta Institu nt, Cyb Defama privacy Self-re ty of i ciality u	PO ₈ 2 2 mg er Law risdicti a Conta rgeting tion an er Porn ation ,F 7. egulatio nforma nder IT	PO ₉ 2 7, Cybe on in c cts Th , Jurisd d State nograph Right to on app tion - Γ Act a	er Juris yberspa eory - liction t e , Hac hy, Ider p Priva roach Breach nd pen	sprude ace, Ty Sliding under king , ntity T cy and to priv- of se alties f	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1	2	01	PO ₂ 2 1 Intern jurisdi Theor 2000. Cyber Cyber Forge Fraud Proteo Threa Ingreo perso same.	PO ₃ - Rease - Rease - Rease - Autional iction, ' y - Effe - Crimer r Crimer r Crimer r Crimer r Cybe ction or t to p dients t nal info - Right	PO ₄ onable; i conable; i conable; i and In- The Te: ects Te: s& Lega es agair er Stall er Terr h Intern rivacy co decidor mation	PO ₅ 2 - Sign 2 - Sign c law, dian Le st evolv st and I l Frame ast Indi king/Ha orism et - Con on inte de conf n and c	PO ₆ 2 <i>ifficant;</i> Need for vel, Issu- zed - Mi internati ework viduals, arassmer "Cyber ncept of ernet - fidentiali	PO ₇ 3 3 - Stro or Cyb es of ju inimum onal ta Institu nt, Cyb Defama privacy Self-re ty of i ciality u	PO ₈ 2 2 mg er Law risdicti a Conta rgeting tion an er Porn ation ,F 7. egulatio nforma nder IT	PO ₉ 2 7, Cybe on in c cts Th , Jurisd d State nograph Right to on app tion - Γ Act a	er Juris yberspa eory - liction t e , Hac hy, Ider p Priva roach Breach nd pen	sprude ace, Ty Sliding under king , ntity T cy and to priv- of se alties f	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1	2	01	PO ₂ 2 1 Intern jurisdi Theor 2000. Cyber Cyber Forge Fraud Proteo Threa Ingreo perso same. 2000.	PO ₃ - Rease - Rease - Rease - Autional iction, ' y - Effe - Crimer r Crimer r Crimer ry ,Cybe , Cybe ction or t to p dients t nal info - Right	PO ₄ pnable; : conable; : and In The Te: ects Tes s& Lega es agair er Stall er Terr h Intern rivacy to decidor mation t of Intern	PO₅ 2 2 - Sign 2 - Sign c law, dian Le st evolv st and I 1 Frame ast Indi king/Ha orism et - Con on inte de confin and c erceptio	PO ₆ 2 <i>ifficant;</i> Need forvel, Issue wed - Mi Internati internati ework viduals, arassmen .,Cyber ncept of ernet - fidentiali onfident on under	PO ₇ 3 3 - Stro or Cybes of ju inimum onal ta Institu nt, Cyb Defama privacy Self-ro ty of i ciality u	PO ₈ 2 2 mg er Law risdicti a Conta rgeting tion an er Porn tion ,F c egulatio nforma inder IT . , Diffe	PO ₉ 2 7, Cybe on in c cts Th c, Jurisd d State nograph Right to on app tion - Γ Act a rent of	er Juris yberspi eory - liction t e , Hac hy, Iden p Priva roach Breach nd pen fences	spruder ace, Ty Sliding under htity T cy and to priv of se alties f under	2 2 2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
Outcomes CO1 CO2 CO3 CO4 Detailed Conten Unit: 1	2	01	PO ₂ 2 1 Introd Intern jurisdi Theor 2000. Cyber Cyber Forge Fraud Proteo Threa Ingreo perso same. 2000. <b>Over</b>	PO ₃ - Rease - Rease - Rease - Rease - Crimer r C	PO ₄ pnable; : and In The Te: ects Te: s& Lega es agair er Stall er Terr h Intern rivacy to decide ormation t of Intern f Cybe:	PO₅ 2 2 - Sign r law, dian Le st evolv st and l 1 Frame ist Indi isting/Ha orism et - Con on inte de confin and c erceptio r Secu	PO ₆ 2 <i>ificant;</i> Need fo vel, Issue vel, Issue ved - Mi internati internati work viduals, arassmen .,Cyber ncept of ernet - fidentiali onfident on under rity, In	PO7 3 3-Stra or Cybes of ju inimum onal ta Institu nt, Cyb Defama privacy Self-ra ty of i ciality u 'IT Act ternet	PO ₈ 2 2 mg er Law risdicti a Conta rgeting tion an er Porn ation ,F 7. egulatio nforma under IT . , Diffe Gover	PO ₉ 2 7, Cybe on in c cts Th c, Jurisd d State nograph Right to on appr tion - F Act a rent of <b>'nance</b>	er Juris evyberspa eory - liction t e , Hac hy, Iden o Priva roach Breach nd pen fences - Cha	pruder spruder ace, Ty Sliding under king , ntity T cy and to prive of se alties f under	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
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		Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.
	Unit: 5	Securing Web Application, Services and Servers: Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges. Intrusion Detection and Prevention, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems
		<b>ion Pattern:</b> It include both internal evaluation (30 marks) comprising two class nents/quiz/ seminar presentation etc. and external evaluation (70 marks) which
	ainly end semester ex	
	t Books:	
1		uters, Internet and New Technology Laws, Lexis NexisButterworthsWadhwa
1	Nagpur.	acto, mernet and new recimology laws, lexis nexis actor worth swadniwa
2	01	ngel, Computer Law, OUP, New York, (2007).
	erence Books:	
1		yber Law, Springer, New York, (1997).
2		jet in Technologie (1997) Allen dheele OUD New York (2011)

- 2 SudhirNaib, The Information Technology Act, 2005: A Handbook, OUP, New York, (2011)
- 3 S. R. Bhansali, Information Technology Act, 2000, University Book House Pvt. Ltd., Jaipur (2003).

Course Coo	de			Co	ourse Ti	itle			Leo	ture	<u> </u>		
UGCS614GET		Comr	parative				ian Lang	nages	L	Т	P		ester:
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PO ₁ - Engineering investigations of co sustainability, PO ₈ - PO ₁₂ - Life-long Lea	omplex pr - Ethics, <b>P</b>	roblems, O ₉ - Indiv	<b>PO</b> ₅- Mo idual or	odern to	ol usage	, <b>РО</b> 6- Т	The eng	ineer and on, <b>PO</b> 11- I	l society Project m	, <b>PO</b> 7- En	vironme	nt and
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Course Outcomes	PO ₁	PO ₂	ng of cor PO ₃	urse ou PO4	tcomes PO ₅	with p PO ₆	rogran PO ₇	n outcon PO ₈	nes PO ₉	<b>PO</b> ₁₀	<b>PO</b> ₁₁	
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$\begin{array}{c} \hline Outcomes \\ \hline CO_1 \\ \hline CO_2 \\ \hline CO_3 \\ \hline CO_4 \\ \hline \end{array}$		PO2 1 Basics	PO3 - Reaso	PO4	PO5	PO ₆	<b>PO</b> ₇ 2 2 2 ; <b>3 - S</b>	PO ₈	PO ₉			2 2 2 2
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Instruct	ion Mode	: Le	ecture					E	xam Dı	iration	:	3 Hrs.
Prerequisite(s):	No spec	fic pre-	requisit	es/ awa	areness	of Cyb	er Law a	and Cyl	ber Sec	urity is	desira	able.
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investigations of sustainability, PO PO ₁₂ - Life-long Le Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1	g Knowle complex p s- Ethics, I earning PO1 nts:	Ige, PO2 roblems, O9- Indiv Mappir PO2 Indiv PO2 Indiv PO2 Indiv Indiv OVER intelle abroa PATE Utility , Righ of pat COPY How I are re cover TRAD can b perfo long prote name	- Proble PO ₅ - Mc idual or 1 g of con PO ₃ PO ₃ - Rease VIEW C ectual p d Some NTS: M y Non p ts of pat cent Inf RIGHT: ong doe elated r ed by co EMARK e used rm How is a reg ction? V and ho	em anal odern to team wo urse ou PO4 PO4 OF INT roperty import teaning, patental tentee. ringem What i es copyrigh S: Wha' as trad y is a trad y is a trad y is a trad	ysis, PC ol usage rk, PO ₁₀ - tcomes PO ₅ PO ₅ 2 - Sign ELLECT 7 right (I cant exa ,Criteria ble inver Basic cc ent of p s copyr right las Distinct t? t is a tra lemarks ademari tradem e well-k it relate	<b>Da-</b> Designation <b>PO6-</b> T         Communication         with prime <b>PO6</b> 2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2 <t< td=""><td>ign/deve he engir inicatior rogram PO7 PO7 PO7 PO7 PO7 PO7 PO7 PO7</td><td>POn- F outcon POn- F Outcon POn- F POn- F PO</td><td>society Project n nes PO₉ oducti- tesis an coducti- tesis an license n case that is o ght? RI rights a ademar trader How ez are tho</td><td>PO₁₀ PO₁₀ PO₁₀ on and d Deve ovelty I ation , ' e and G of infri coverec ELATEL and cop k? What on doe nark re- ktensive ey prot</td><td>PO PO PO PO PO PO PO PO PO PO PO PO PO P</td><td>ment and d finance, PO12 PO12 PO12 meed for nt IPR in ive step. of patent ment use ent pyright? TS What i? Rights I of signs ademark ed? How ademark</td></t<>	ign/deve he engir inicatior rogram PO7 PO7 PO7 PO7 PO7 PO7 PO7 PO7	POn- F outcon POn- F Outcon POn- F POn- F PO	society Project n nes PO ₉ oducti- tesis an coducti- tesis an license n case that is o ght? RI rights a ademar trader How ez are tho	PO ₁₀ PO ₁₀ PO ₁₀ on and d Deve ovelty I ation , ' e and G of infri coverec ELATEL and cop k? What on doe nark re- ktensive ey prot	PO PO PO PO PO PO PO PO PO PO PO PO PO P	ment and d finance, PO12 PO12 PO12 meed for nt IPR in ive step. of patent ment use ent pyright? TS What i? Rights I of signs ademark ed? How ademark

		INDUSTRIAL DESIGNS:What is an industrial design? How can industrial
		designs be protected? What kind of protection is provided by industrial
		designs? How long does the protection last? Why protect industrial designs?
		ENFORCEMENT OF INTELLECTUAL PROPERTY RIGHTS Infringement of
	Unit: 4	intellectual property rights Enforcement Measures EMERGING ISSUES
		INTELLECTUAL PROPERTY Overview of Biotechnology and Intellectual
	Unit: 5	Property, Biotechnology Research and Intellectual Property Rights
		Management Licensing and Enforcing Intellectual Property
Exa	mination and Evaluat	ion Pattern: It include both internal evaluation (30 marks) comprising two class
		ents/quiz/seminar presentation etc. and external evaluation (70 marks) which
	ainly end semester ex	
Text	t Books:	
1	T. M Murray and M.J	. Mehlman, Encyclopedia of Ethical, Legal and Policy issues in Biotechnology,
	John Wiley & Sons 2	000
2	Lionel Bently & Brad	Sherman, Intellectual Property Law, Oxford. P. Narayanan, Intellectual
	Property Law, Easter	rn Law House
Refe	erence Books:	
1	Intellectual property	right, Deborah. E. Bouchoux, Cengage learning.
2	Intellectual property	right – Unleashing the knowledge economy, prabuddha ganguli, Tate McGraw
	Hill Publishing comp	any ltd.

Course Coo	le			Cou	rse Tit	le			Le	ecture		~	
UGCS712GET				Histor	y of Sci	ence			L	Т	Р	Ser	nester:
Version: 1.2		D	ate of A	pprova	<b>l:</b> 16th I	BoS 17-	11-2022	2	3	0	0		VII
S	cheme of	f Instru	ction					Scher	ne of E	kamina	tion		
No. of	Periods	: 45 1	Hrs.					Ma	iximum	Score		:	100
Periods	/ Week	: 3						Interr	nal Eval	uation		:	30
	Credits	: 3						]	End Ser	nester		:	70
Instructio	n Mode	: Lec	ture					E	xam Du	iration		:	3 Hrs.
Prerequisite(s): 1		ic pre-r	equisit	es.									
Course Objective	es:												
Course Outcome	es (CO):												
COs No.				St	atemer	nt				М	app	ed Pi	rogram
													s (POs)
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	Ethics, <b>P</b> rning	<b>D</b> 9- Indiv	idual or	team wo	ork, <b>PO</b> 10-	- Comm	unicatio	on, <b>PO</b> 11	- Projec				
sustainability, PO8-	Ethics, <b>P</b> rning		idual or	team wo	ork, <b>PO</b> 10-	- Comm	unicatio	on, <b>PO</b> 11	- Projec		emer		
sustainability, <b>PO</b> 8- <b>PO</b> 12- Life-long Lea <b>Course</b>	Ethics, PC	<b>D</b> 9- Indiv Mappin	idual or	team wo urse ou	tcomes	- Comm with p	unicatio	n, PO ₁₁ n outco PO	- Project	t manage	emer	nt and	finance,
sustainability, PO ₈ - PO ₁₂ - Life-long Lea Course Outcomes	Ethics, PC	<b>D</b> 9- Indiv Mappin	idual or	team wo urse ou	tcomes	- Comm with p	unicatio	n, PO ₁₁ n outco PO	- Project	t manage	emer	nt and	finance,
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sustainability, PO ₈ - PO ₁₂ - Life-long Lea Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conten Unit: 1	PO ₁	D₀- Indiv Mappin PO₂	idual or ¹ g of co PO ₃	team wo urse ou PO4	rk, PO ₁₀ - tcomes PO ₅	PO ₆	PO7	on, PO ₁₁	- Project	t manage	emer	nt and	finance
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sustainability, PO ₈ - PO ₁₂ - Life-long Lea Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conten Unit: 1 Unit: 2 Unit: 3 Unit: 4	PO ₁	D₀- Indiv Mappin PO₂	idual or ¹ g of co PO ₃	team wo urse ou PO4	rk, PO ₁₀ - tcomes PO ₅	PO ₆	PO7	on, PO ₁₁	- Project	t manage	emer	nt and	finance
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sustainability, PO ₈ - PO ₁₂ - Life-long Lea Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conten Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5 Examination and sessional exams/ is mainly end ser Text Books:	Ethics, PO ming PO1 ts:	D ₉ - Indiv Mappin PO ₂ 1 1 ion Patteents / c	idual or g of cor PO ₃ - Rease tern: It juiz/ se	include	rk, PO ₁₀ - tcomes PO ₅ 2 - Sigr	- Comm with p PO ₆ nificant	evalua	n outco PO 8 crong	- Project	PO ₁₀	P	O ₁₁	PO ₁₂
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sustainability, PO₄- PO₁₂- Life-long Lea Outcomes CO₁ CO₂ CO₃ CO₄ Detailed Conten Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5 Examination and sessional exams/ is mainly end ser Text Books: 1 2	Ethics, PO rning PO1 ts: I Evaluat ' assignm nester ex	D ₉ - Indiv Mappin PO ₂ 1 1 ion Patteents / c	idual or g of cor PO ₃ - Rease tern: It juiz/ se	team wo urse ou PO₄ onable; :	rk, PO ₁₀ - tcomes PO ₅ 2 - Sigr	- Comm with p PO ₆ nificant	evalua	n outco PO 8 crong	- Project	PO ₁₀	P	O ₁₁	PO ₁₂

Course Co	de			Co	urse Ti	tle			Lec	ture	Som	nester:
UGCS713GET				Valu	ıes & Et	hics			L	Т Р		VII
Version: 1.2		I	Date of	Approv	<b>al:</b> 16th	BoS 17	-11-202	2	3	0 0		V 11
	Scheme of	Instru	ction				5	Scheme	of Exa	minatio	ı	
No. of	f Periods	: 45	Hrs.					М	aximun	n Score	:	100
Period	s/ Week	: 3						Inter	nal Eva	luation	:	30
	Credits	: 3							End Se	mester	:	70
Instructi	on Mode	: Leo	ture					I	Exam D	uration	:	3 Hrs.
Prerequisite(s):		ic pre-r	equisite	es.							1 1	
Course Objectiv	<b>1</b>	1	1									
1. To help stud		ndersta	nd valu	es.								
2. To introduc					5.							
3. To understa		-										
4. To facilitate							ladan M	ohan M	alviya a	and Maha	atma (	Gandhi
Course Outcom									5			
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CO ₂	Demons										<b>PO</b> ₇ ,	
CO3	Analyze			-						1	PO ₂ , PO	ີ່
CO4	Explore						Aalviva	and M	ahatma		PO ₆ , PO	
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PO ₁₂ - Life-long Le								outcom	nes	-	PO ₁₁	PO
Course Outcomes		Mappin <b>PO</b> 2	g of cou PO₃	urse ou PO4	tcomes PO₅	PO ₆	rogram PO ₇			PO ₁₀	<b>PO</b> ₁₁	<b>PO</b> 2
Course Outcomes CO ₁							PO ₇	outcom	nes	-	PO ₁₁	
Course Outcomes CO ₁ CO ₂		PO ₂				PO ₆		outcom PO ₈	nes	-	PO ₁₁	
Course Outcomes CO ₁ CO ₂ CO ₃						<b>PO</b> ₆	PO ₇	outcom PO ₈	nes	-	PO ₁₁	
Course Outcomes CO ₁ CO ₂		<b>PO</b> ₂	PO ₃	PO ₄	PO ₅	<b>PO</b> ₆ 2 2 2	<b>PO</b> ₇	outcom PO ₈	nes	-	PO ₁₁	
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁	<b>PO</b> ₂	PO ₃	PO ₄		<b>PO</b> ₆ 2 2 2	<b>PO</b> ₇	outcom PO ₈	nes	-	PO ₁₁	
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁	PO ₂ 2 1	PO ₃	PO ₄	PO5 2 - Sign	PO ₆ 2 2 ificant	<b>PO</b> ₇ 2 ; <b>3 - St</b> ₁	outcom PO ₈ 3 3 cong	PO ₉	PO ₁₀		2
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁ PO ₁ Definit values,	PO ₂ 2 1 ion and Physic	PO ₃ – Reaso d classical, Env	PO ₄	<b>PO</b> ₅ 2 - Sign	PO ₆ 2 2 ificant	<b>PO</b> ₇ 2 ; <b>3 - Str</b>	outcom PO ₈ 3 3 rong e values	PO ₉	-	d Situ	ationa
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter	PO1 PO1 nts: Definit values, Religio Concej Good	PO2 2 1 ion and Physic us value pts rela	PO ₃ – Reaso d classical, Enves. ted to v	PO ₄	PO ₅ 2 – Sign n of va ental, Se Purusar	PO ₆ 2 2 <i>ificant</i> lues: E ensuous tha, Vin	PO ₇ 2 ; 3 – Str xtrinsic s, Econ rtue, Riş	outcom PO ₈ 3 3 ong e values omic, S ght, dut	PO9 PO9 s, Unive Social, A	PO ₁₀ ersal and Aesthetic	d Situ c, Mor ity, Lc	ationa cal and
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1	PO ₁ PO ₁ Ints: Definit Values, Religio Conceg Good Egoisn Kutum	PO2 2 1 ion and Physic us value pts rela n, Altru bakam	PO ₃ – Reaso d classical, Env es. ted to v aism a	PO ₄	PO ₅	PO ₆ 2 2 <i>ificant</i> lues: E ensuous tha, Vin sm. Th	PO ₇ 2 ; 3 – Str xtrinsic s, Econ rtue, Rig ne Idea	outcom PO ₈ 3 3 cong e values omic, S ght, dut al of S	PO9 PO9 S, Unive Social, A y, justic	PO ₁₀ ersal and Aesthetic ce, Equal	d Situ c, Mor ity, Lc Vasu	ationa cal and ove and
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1 Unit: 2	PO ₁ PO ₁ Definit values, Religio Concej Good Egoisn Kutum The Pr change	PO2 2 1 ion and Physic us value pts rela n, Altru bakam oblem c es.	PO ₃ – Reaso d classical, Enves. ted to ves. ted to ves. ted to ves.	PO ₄	PO ₅ 2 - Sign a of va ntal, Se Purusar iversalis	PO ₆ 2 2 ificant lues: E ensuous tha, Vir sm. Th in the p	PO7 2 ; 3 - Str xtrinsic s, Econ rtue, Rig ne Idea	outcom       PO ₈ 3       3       3       cong       conic, S       ght, dut       al of S       of Social	PO9 PO9 s, Unive Social, A y, justic Sarvoda I, Politic	PO ₁₀ ersal and Aesthetic ce, Equal and cal and T	d Situ c, Mor ity, Lo Vasu	ationa cal and ove and udhaiva
Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 2 Unit: 3 Unit: 4 Unit: 5	PO1 PO1 nts: Definit values, Religio Concej Good Egoisn Kutum The Pr change The Pr Malviy	PO2 2 1 ion and Physic us value pts rela n, Altru bakam oblem c es. oblem a a and M	PO ₃ – Reaso d classical, Enves. ted to v uism a of Suster of hiera lahatma	PO ₄ mable; 2 ification ironme values: 1 nd un nance c archy of a Gandh	PO ₅ 2 – Sign n of va ental, Se Purusar iversalis if value f values ni.	PO ₆ 2 2 ificant lues: E ensuous tha, Vin sm. Th in the p and th	PO ₇ 2 ; 3 – Str ; s, Econ rtue, Rig ne Idea process neir cho	outcom PO ₈ 3 3 ong e values omic, S ght, dut al of S of Socia ice, The	PO9 PO9 s, Unive Social, 2 y, justic Sarvoda I, Politic	PO ₁₀ ersal and Aesthetic ce, Equal tya and cal and T of Pt. M	d Situ c, Mor ity, Lc Vasu 'echno ladan	ationa cal and ove and udhaiva
Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3 Unit: 3 Unit: 4 Unit: 5 Examination an	PO1 PO1 nts: Definit values, Religio Concej Good Egoisn Kutum The Pr change The Pr Malviy d Evaluati	PO2 2 1 ion and Physic us value pts rela n, Altru bakam oblem c es. oblem o a and M ion Pati	PO ₃ – Reaso d classical, Enves. ted to v uism a of Suster of hiera lahatma tern: It	PO ₄ mable; : ification irironme values: 1 nd un nance c archy of a Gandh include	PO ₅ 2 – Sign n of va ental, Se Purusar iversalis of value f values ni. both ir	PO ₆ 2 2 <i>ifficant</i> lues: E ensuous tha, Vin sm. Th in the p and th	PO7 2 ; 3 – Str xtrinsic s, Econ rtue, Riş ne Idea process neir cho evaluat	outcom PO ₈ 3 3 ong e values omic, S ght, dut al of S of Socia ice, The ion (30	PO9 PO9 s, Unive Social, A y, justic Sarvoda I, Politic e views marks)	PO ₁₀ ersal and Aesthetic e, Equal aya and cal and T of Pt. M compris	d Situ c, Mor ity, Lc Vasu Pechno ladan ing tw	ationa ationa cal and ove and udhaiva ologica Mohar
Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3 Unit: 3 Unit: 4 Unit: 5 Examination an sessional exams	PO1 PO1 nts: Definit values, Religio Concej Good Egoism Kutum The Pr change The Pr Malviy. d Evaluati / assignm	PO ₂ 2 1 ion and Physic us value pts rela n, Altru bakam oblem c es. roblem c es. roblem d a and M ion Patt ents/ q	PO ₃ – Reaso d classical, Enves. ted to v uism a of Suster of hiera lahatma tern: It uiz/ se	PO ₄ mable; : ification irironme values: 1 nd un nance c archy of a Gandh include	PO ₅ 2 – Sign n of va ental, Se Purusar iversalis of value f values ni. both ir	PO ₆ 2 2 <i>ifficant</i> lues: E ensuous tha, Vin sm. Th in the p and th	PO7 2 ; 3 – Str xtrinsic s, Econ rtue, Riş ne Idea process neir cho evaluat	outcom PO ₈ 3 3 ong e values omic, S ght, dut al of S of Socia ice, The ion (30	PO9 PO9 s, Unive Social, A y, justic Sarvoda I, Politic e views marks)	PO ₁₀ ersal and Aesthetic e, Equal aya and cal and T of Pt. M compris	d Situ c, Mor ity, Lc Vasu Pechno ladan ing tw	ationa ationa cal and ove and udhaiva blogica Mohai
Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5 Examination an sessional exams is mainly end se	PO1 PO1 nts: Definit values, Religio Concej Good Egoism Kutum The Pr change The Pr Malviy. d Evaluati / assignm	PO ₂ 2 1 ion and Physic us value pts rela n, Altru bakam oblem c es. roblem c es. roblem d a and M ion Patt ents/ q	PO ₃ – Reaso d classical, Enves. ted to v uism a of Suster of hiera lahatma tern: It uiz/ se	PO ₄ mable; : ification irironme values: 1 nd un nance c archy of a Gandh include	PO ₅ 2 – Sign n of va ental, Se Purusar iversalis of value f values ni. both ir	PO ₆ 2 2 <i>ifficant</i> lues: E ensuous tha, Vin sm. Th in the p and th	PO7 2 ; 3 – Str xtrinsic s, Econ rtue, Riş ne Idea process neir cho evaluat	outcom PO ₈ 3 3 ong e values omic, S ght, dut al of S of Socia ice, The ion (30	PO9 PO9 s, Unive Social, A y, justic Sarvoda I, Politic e views marks)	PO ₁₀ ersal and Aesthetic e, Equal aya and cal and T of Pt. M compris	d Situ c, Mor ity, Lc Vasu Pechno ladan ing tw	ationa ationa cal and ove and udhaiva blogica Mohai
Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5 Examination an sessional exams is mainly end se	PO1 PO1 nts: Definit values, Religio Concej Good Egoism Kutum The Pr change The Pr Malviy. d Evaluati / assignm	PO ₂ 2 1 ion and Physic us value pts rela n, Altru bakam oblem c es. roblem c es. roblem d a and M ion Patt ents/ q	PO ₃ – Reaso d classical, Enves. ted to v uism a of Suster of hiera lahatma tern: It uiz/ se	PO ₄ mable; : ification irironme values: 1 nd un nance c archy of a Gandh include	PO ₅ 2 – Sign n of va ental, Se Purusar iversalis of value f values ni. both ir	PO ₆ 2 2 <i>ifficant</i> lues: E ensuous tha, Vin sm. Th in the p and th	PO7 2 ; 3 – Str xtrinsic s, Econ rtue, Riş ne Idea process neir cho evaluat	outcom PO ₈ 3 3 ong e values omic, S ght, dut al of S of Socia ice, The ion (30	PO9 PO9 s, Unive Social, A y, justic Sarvoda I, Politic e views marks)	PO ₁₀ ersal and Aesthetic e, Equal aya and cal and T of Pt. M compris	d Situ c, Mor ity, Lc Vasu Pechno ladan ing tw	ationa ationa cal and ove and udhaiva ologica Mohar
Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5 Examination an sessional exams is mainly end se	PO1 PO1 nts: Definit values, Religio Concej Good Egoisn Kutum The Pr change The Pr change The Pr Malviy d Evaluati / assignm mester ex	PO2 2 1 ion and Physic us value pts rela bakam oblem o es. roblem o es. roblem o es.	PO ₃ – Reaso d classical, Envest es. ted to ves. ted to ves. tern: It uiz/ see on.	PO ₄ mable; 2 ification ironme values: 1 nd un nance c archy of a Gandh include eminar p	PO ₅ 2 - Sign a of va ntal, Se Purusar iversalis of value f values hi. b both ir present.	PO ₆ 2 2 <i>ificant</i> lues: E ensuous tha, Vir sm. Th in the p and th nternal ation et	PO7 2 ; 3 - Str ; 3 - Str ; 3 - Str ; 5 - Str ; 5 - Str ; 6 - Str ; 7 - Str	outcom PO ₈ 3 3 3 cong c values omic, S ght, dut al of S of Socia ice, The ion (30 external	PO9 PO9 s, Unive Social, A y, justic Sarvoda I, Politic e views marks) e evalua	PO ₁₀ ersal and Aesthetic e, Equal aya and cal and T of Pt. M compris	d Situ c, Mor ity, Lc Vasu Pechno ladan ing tw	ationa ationa cal and ove and udhaiva ologica Mohar
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1 Unit: 2 Unit: 2 Unit: 3 Unit: 4 Unit: 5 Examination an sessional exams is mainly end se Text Books:	PO1 PO1 Definit values, Religio Conce Good Egoism Kutum The Pr change The Pr Malviy. d Evaluati / assignm mester exa	PO2 2 1 ion and Physic us value pts rela n, Altru bakam oblem c es. oblem c es. oblem d a and N ion Patt ents/ q aminati	PO ₃ – Reaso d classical, Envesting ted to vesting ted to vesting of Suster of hiera lahatma tern: It uiz/ se on. ion of E	PO ₄ mable; 2 ification ironme values: 1 nd un nance c a Gandh include minar p	PO ₅ 2 – Sign n of va ntal, Se Purusar iversalis of value f values ni. both ir present: allied P	PO ₆ 2 2 <i>ifficant</i> lues: E ensuous tha, Vin sm. Th in the p and th nternal ation et	PO7 2 ; 3 - Str ; 3 - Str ; s, Econ rtue, Rig ne Idea process neir cho evaluat tc. and e	outcom PO ₈ 3 3 3 cong c values omic, S ght, dut al of S of Socia ice, The ion (30 external	PO9 PO9 s, Unive Social, A y, justic Sarvoda I, Politic e views marks) e evalua	PO ₁₀ ersal and Aesthetic e, Equal aya and cal and T of Pt. M compris	d Situ c, Mor ity, Lc Vasu Pechno ladan ing tw	ationa cal and ove and udhaiva ologica Mohar
Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1 Unit: 2 Unit: 2 Unit: 3 Unit: 4 Unit: 5 Examination an sessional exams is mainly end se Text Books: 1 Little, Willi	PO1 PO1 nts: Definit values, Religio Concej Good Egoisn Kutum The Pr change The Pr Malviy d Evaluati / assignm mester exa	PO2 2 1 ion and Physic us value pts rela n, Altru bakam oblem c es. oblem c es. oblem d a and N ion Patt ents/ q aminati	PO ₃ – Reaso d classical, Envesting ted to vesting ted to vesting of Suster of hiera lahatma tern: It uiz/ se on. ion of E	PO ₄ mable; 2 ification ironme values: 1 nd un nance c a Gandh include minar p	PO ₅ 2 – Sign n of va ntal, Se Purusar iversalis of value f values ni. both ir present: allied P	PO ₆ 2 2 <i>ifficant</i> lues: E ensuous tha, Vin sm. Th in the p and th nternal ation et	PO7 2 ; 3 - Str ; 3 - Str ; s, Econ rtue, Rig ne Idea process neir cho evaluat tc. and e	outcom PO ₈ 3 3 3 cong c values omic, S ght, dut al of S of Socia ice, The ion (30 external	PO9 PO9 s, Unive Social, A y, justic Sarvoda I, Politic e views marks) e evalua	PO ₁₀ ersal and Aesthetic e, Equal aya and cal and T of Pt. M compris	d Situ c, Mor ity, Lc Vasu Pechno ladan ing tw	ationa ationa cal and ove and udhaiva ologica Mohar

Course Co	de				ourse Ti				Lee	ctur	e	Sen	nester:
UGCS714GET			E	conomi	c Polici	es in Ind	ia		L	Т	Р		VII
Version: 1.2			Date of	Approv	val: 16th	n BoS 17-	11-2022		3	0	0		VII
1	Scheme of	f Instru	ction				Sc	heme	of Exar	nina	tion		
No. o	f Periods	: 45	Hrs.					Μ	laximui	n Sc	ore	:	100
Period	s/ Week	: 3						Inter	rnal Eva	aluat	ion	:	30
	Credits	: 3							End Se	emes	ster	:	70
Instructi			cture					]	Exam D	ourat	tion	:	3 Hrs
Prerequisite(s):	No specif	fic pre-r	equisit	es.									
Course Objectiv													
1. To understa													
2. To acquire			Econor	nic refo	orms sin	nce 1991.							
3. To learn gro													
4. To analyze		onomy v	with oth	ner coui	ntries.								
Course Outcom	es (CO):												
COs No.				St	atemen	ıt							ogram
										C	Jutco		(POs)
CO ₁						ies in Inc						PO ₆	
CO ₂	Gain th	e knowl	edge of	Econo	mic refo	orms sine	ce 1991					PO ₆	
CO ₃	Demon	strate g	rowth p	olicies							Р	O ₆ , PC	)9
$CO_4$	Analyze	e Indian	Econor	ny with	other o	countries	5					$PO_6$	
						· Commur	nication, 1	PO11- Pr	-				finance
PO12- Life-long Le						· Commur with pro	nication, 1	PO ₁₁ - Pr	oject m			t and	
PO ₁₂ - Life-long Le Course Outcomes						with pro	nication, 1	PO11- Pr	oject m	anag			
PO ₁₂ - Life-long Le Course Outcomes CO ₁	arning	Mappin	g of co	urse ou	tcomes	with pro PO ₆	ogram o	PO ₁₁ - Pr utcome PO	es	anag	emen	t and	PO
PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂	arning	Mappin	g of co	urse ou	tcomes	with pro PO ₆ 2 2	ogram o	PO ₁₁ - Pr utcome PO	PO9	anag	emen	t and	PO
PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂ CO ₃	arning	Mappin	g of co	urse ou	tcomes	with pro <b>PO</b> ₆ 2 2 2	ogram o	PO ₁₁ - Pr utcome PO	es	anag	emen	t and	PO
PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂	arning	Mappin PO2	PO ₃	PO4	PO5	with pro <b>PO</b> ₆ 2 2 2 2 2 2	pgram or PO7	PO ₁₁ - Pr utcome PO 8	PO9	anag	emen	t and	PO
PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁	Mappin PO2	PO ₃	PO4	PO5	with pro <b>PO</b> ₆ 2 2 2	pgram or PO7	PO ₁₁ - Pr utcome PO 8	PO9	anag	emen	t and	PO
PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂ CO ₃	PO ₁	Mappin PO2	PO3 PO3	PO4 PO4 pnable; :	tcomes PO₅ 2 – Sign	with pro <b>PO</b> ₆ 2 2 2 2 iificant;	PO7 PO7 3 – Strop	PO ₁₁ - Pr utcome PO 8	PO9	P P	010	t and POr 1	PO 2
PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄	PO ₁	Mappin PO2 1 Develo	g of con PO ₃ - Rease	PO4 PO4 pnable; :	tcomes PO₅ 2 – Sign	with pro <b>PO</b> ₆ 2 2 2 2 2 2	PO7 PO7 3 – Strop	PO ₁₁ - Pr utcome PO 8	PO9	P P	010	t and POr 1	PO 2
PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1	PO ₁	Mappin PO2 1 Develo Evalua	g of con PO ₃ - Reaso opment ation.	PO4 PO4 pnable; :	PO5 PO5 2 - Sign gies in 1	with pro PO ₆ 2 2 2 ificant; 3 India: Pla	PO7 3 - Strop	POn-Pr utcome PO 8 ng	PO9	P P	010	t and POr 1	2 2
PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1 Unit: 2	PO ₁	Mappin PO2 Develo Evalua Econo	g of com PO ₃ - Reason opment ation.	PO4 PO4 pnable; ; Strate	tcomes PO5 2 – Sign gies in 1 ince 199	with pro PO ₆ 2 2 2 ificant; 3 India: Pla	PO7 3 – Strog impact.	POn-Pr utcome PO 8 ng ng	PO9	P P	010	t and POr 1	2 2
PO12- Life-long Le Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3	PO ₁	Mappin PO2 Develo Evalua Econo Econo	rg of com PO ₃ - Reason opmentation. omic reformic De	PO4 PO4 mable; : Strates	tcomes PO5 2 - Sign gies in 1 ince 199 eent and	with pro PO ₆ 2 2 2 2 <b>ificant;</b> India: Pla 1 and its 1 Growth	PO7 3 - Strop impact. Policies	POn-Pr utcome PO 8 ng n India	PO9 PO9	P tive	010	t and POr 1	PO 2
PO ₁₂ - Life-long Le Course Outcomes CO ₁ CO ₂ CO ₃ CO ₄ Detailed Conter Unit: 1 Unit: 2	PO ₁	Mappin PO2 Develo Evalua Econo Econo	g of con PO ₃ - Reaso opment ation. omic ref omic De ilture a	PO4 PO4 mable; 2 Corms si velopm nd Indu	tcomes PO5 2 - Sign gies in 1 ince 199 eent and istrial So	with pro PO ₆ 2 2 2 ificant; 3 India: Pla India: Pla I and its I Growth ectors of	PO7 PO7 3 - Strom anning in impact. A Policies f the Ind	POn-Pr utcome PO 8 ng ng S. ian eco	PO9 PO9 1	P tive	O10	PO1 1 rateg	PO 2 ies and
PO12- Life-long Le Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3	PO ₁	Mappin PO2 Develor Evalua Econo Agricu Curre	reg of con PO ₃ - Reason - Re	PO4 PO4 omable; : Strates forms si velopm nd Indu enges f	tcomes PO5 2 - Sign gies in 1 ince 199 ient and istrial Strial Striad Striad Strial Strial Striad Striad St	with pro PO ₆ 2 2 2 2 ificant; 3 India: Pla I and its I Growth ectors of ndian Eco	PO7 PO7 3 - Strom anning in impact. A Policies f the Ind	POn-Pr utcome PO 8 ng ng S. ian eco	PO9 PO9 1	P tive	O10	PO1 1 rateg	ies and
PO12- Life-long Le Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5	PO1 PO1	Mappin PO2 Develor Evalua Econo Agricu Curre a com	g of cor PO ₃ – Reaso opment ation. omic ref omic De alture a nt chall parison	PO4 PO4 omable; 2 Strates Corms si velopm nd Indu enges f	tcomes PO5 2 - Sign gies in 1 ince 199 ient and istrial Si acting Ir ther con	with pro PO ₆ 2 2 2 <b>ificant</b> ; 3 India: Pla I and its I Growth ectors of ndian Eco untries.	PO7 PO7 3 - Strop anning in impact. Policies f the Ind onomy,	POn-Pr utcom PO 8 ng ng s. ian eco Develo	PO9 PO9 1 1 , Objec	exp	emen O ₁₀	PO1 1 rateg	PO 2 ies and
PO12- Life-long Le Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5 Examination an	PO1 PO1 nts:	Mappin PO2 Develo Evalua Econo Agricu Curre a com	g of con PO ₃ – Reaso opment ation. omic ref omic De ilture a nt chall parison tern: It	PO4 PO4 mable; : Strates Corms si velopm nd Indu enges f with o include	tcomes PO5 2 - Sign gies in 1 ince 199 ent and istrial Sc acing Ir ther con both in	with pro PO ₆ 2 2 2 vificant; 3 India: Pla I and its Growth ectors of ndian Eco untries. nternal e	PO7 PO7 3 - Stron impact. Policies f the Ind onomy, valuatio	POn-Pr utcom PO 8 ng ng n India 5. ian eco Develo	PO9 PO9 1 1 , Object onomy. pment narks)	P tive exp	emen O10 s, Str erien prisii	PO1 1 rategi	PO 2 ies and ies and
PO12- Life-long Le Course Outcomes CO1 CO2 CO3 CO4 Detailed Conter Unit: 1 Unit: 2 Unit: 3 Unit: 4 Unit: 5 Examination an sessional exams	PO1 PO1 nts: d Evaluat / assignm	Mappin PO2 Develo Evalua Econo Econo Agricu Curre a com ion Pat	g of com PO ₃ - Reason opmentation. omic reformic De ilture an nt chall parison tern: It puiz/ se	PO4 PO4 mable; : Strates Corms si velopm nd Indu enges f with o include	tcomes PO5 2 - Sign gies in 1 ince 199 ent and istrial Sc acing Ir ther con both in	with pro PO ₆ 2 2 2 vificant; 3 India: Pla I and its Growth ectors of ndian Eco untries. nternal e	PO7 PO7 3 - Stron impact. Policies f the Ind onomy, valuatio	POn-Pr utcom PO 8 ng ng n India 5. ian eco Develo	PO9 PO9 1 1 , Object onomy. pment narks)	P tive exp	emen O10 s, Str erien prisii	PO1 1 rategi	PO 2 ies and ies and
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