Progressive Education Society's

Modern College Of Engineering, Pune-05.

1186A, Shivaji Nagar, Pune- 411 005.

DEPARTMENT OF INFORMATION TECHNOLOGY

E- Curriculum Booklet

YEAR: 2018-2019 **SEMESTER: I**

CLASS: TE **DIV: A & B**

VISION AND MISSION OF THE INSTITUTE

Vision Statement:

To create a collaborative academic environment to foster professional excellence and ethical values

Mission Statement:

1. To develop outstanding professionals with high ethical standards capable of creating and managing global enterprises
2. To foster innovation and research by providing a stimulating learning environment
3. To ensure equitable development of students of all ability levels and backgrounds
4. To be responsive to changes in technology, socio-economic and environmental conditions
5. To foster and maintain mutually beneficial partnerships with alumni and industry

VISION AND MISSION OF THE DEPARTMENT

Vision Statement:

To develop proficient IT engineers for the Industry and Society.

Mission Statement:

1. To achieve academic excellence.
2. To develop students for being competent in dynamic IT environment.
3. To encourage research and innovation.
4. To inculcate moral and professional ethics.

PEO's OF THE DEPARTMENT

1. Demonstrate sustained learning by building the profound foundation of math's, science and engineering principles and make the students erudite self-reliant and adaptable to diverse culture of multidisciplinary environment.
2. Prepare graduate with strong knowledge and skills in the field of Information Technology to develop solutions of complex engineering problems.
3. To bring leadership skill with teamwork in continuous learning environment to bear with professional challenges.
4. To inculcate ethics towards issues of professional and social relevance.

PSO's OF THE DEPARTMENT

1. Graduate exhibits skills to analyze, design and develop software.
2. Graduate demonstrate technical competency and leadership qualities to work in multidisciplinary environment.

PROGRAM OUTCOMES

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6.The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: 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 presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: 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.

LONG TERM GOALS

1. To Improve Industry Collaboration.
2. Promote Faculty for Research.
3. To Introduce Post Graduates Programme and Research Center.
4. To Enhance Infrastructure and lab development.

SHORT TERM GOALS

1. To enhance teaching learning process with effective utilization of e-resources
   - Moodle
   - Activity Based Teaching.
   - Online Courses. (NPTEL/Spoken Tutorials)
2. To organize national level conference / workshop.
3. Focused Interaction with Alumni.
   - Forum for Career Guidance
   - Guidelines for Training and Placements
   - Expert /Webinar/Seminar
   - Suggestions on Programme Improvisation.

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STUDENT ACADEMIC CALENDAR

Sr. No.	Day & Date	Activity
1.	15/06/18 Friday	• Term commencement • Student registration. • HOD's address.
2.	02 - 07/07/2018 Monday-Saturday	• Mentor Mentee Meeting with GFM (I^{st})
3.	14/07/18 Saturday	• Review of first month attendance • Counseling by GFM & HOD.
4.	16 – 21/07/2018 Monday-Saturday	• MCQ Test 1 (based on Unit I and II for 25 Marks)-SE • Unit Test (based on completed syllabus I, II, III)-TE & BE
5.	23 – 27/07/2018 Monday-Saturday	• Display of Results for Unit Test and MCQ Test with its analysis
6.	23-28/07/18 Monday-Saturday	• Part Submission – I.
7.	31/07/2018 - 04/08/2017	• Mentor Mentee Meeting with GFM (II^{nd})
8.	04/08/18 Saturday	• Parents Meet.
9.	15/08/18 Wednesday	• Independence Day Celebration.
10.	16/08/18 Thursday	• Review of second month attendance. • Counseling by GFM & HOD.
11.	20-25/08/18	• Part Submission – II.
12.	27 – 31/08/2018 Monday-Saturday	• MCQ Test 2 (based on Unit III and IV for 25 Marks)
13.	03 – 08/09/2018 Monday-Saturday	• Display of Results of MCQ test 2 with its analysis • Mentor Mentee Meeting with GFM (III^{rd})
14.	15/09/18 Saturday	• Review of third month attendance • Counseling by GFM & HOD.
15.	17-22/09/18 Monday-Saturday	• Part Submission – III.

16.	18/09/18 Tuesday	• Display of submission schedule (SE-BE).
17.	01 - 06/10/2018	• End Term Test
18.	08 – 11/10/2018 Monday - Thursday	• Mock Oral Practical Exam • Final submission
19.	10/10/18 Wednesday	• Review of final attendance • Counseling by GFM & HOD.
20.	17/10/18 Wednesday	• Term End
21.	20/10/18 - 03/11/18 Saturday - Saturday	• University Practical / Oral Exam.
22.	14/11/18 - 08/12/18 Wednesday - Saturday	• University Theory Exam
23.	17/12/18 Monday	• Term –II Commencement (FE-BE)

* These are tentative dates, subject to change.

** Exam form submission, SE Online Examination, TE, BE In-Semester Examination, Theory Examination will be scheduled as per Savitribai Phule Pune University notification.

HOD

Department of Information Technology

STUDENT CO CURRICULER ACTIVITY CALENDAR

Sr. No.	Planned Date/Week	Class	Academic Activity
1.	21/6/18	SE, TE, BE	International Yoga Day
2.	07/07/18	SE, TE, BE	Spotlight (Light : Camera: Click)
3.	14/07/2018	TE, BE	Workshop on 3D printing
4.	15/7/18	SE, TE, BE	Play store Uploading of App
5.	15/7/18	SE, TE, BE	Designing Tools
6.	21/07/18	TE	Workshop on “Agile Development Process”
7.	23/7/18 to 28/7/18	TE	Python
8.	04/08/2017	SE, TE, BE	Nail Art Competition
9.	11/8/18	SE, TE	Workshop on Maya 3D
10.	25/08/18	TE	How to manage Project
11.	01/09/18	TE	Session on "Big data analytics"
12.	05/09/18	Staff and Students	Teacher’s Day Celebration
13.	15/09/18	SE, TE, BE	Engineer’s Day Celebration
14.	15/09/18	SE, TE, BE	Seminar on Drupal

Mrs. S. D. Deshpande

HOD (IT)

TIME TABLE TE A

Class: T.E.(A) **Lecture Hall: 324** **WEF: 15/06/2018**

Day/ Time	08.45 TO 09.45	09.45 TO 10.45	10.45 to	11.00 TO 12.00	12.00 TO 1.00	1.00 TO	1.45 TO 2.45	2.45 TO 3.45	3.45 to 4.45
MON	SE &PM (KM) 324	DBMS (SSB) 324		TOC (RS) 324	OS (DP) 324		HCI (SB) 324	OS (DP) 324	
TUE	OS (DP) 324	HCI (SB) 324		DBMS (SSB) 324	SE &PM (KM) 324		Tutorial (DBMS/ TOC)324	Technical Activity/ Core Java Session(324)	
WED	OSL 'A' PL1 (DP) OSL 'B' PL2 (SB) DBMSL 'C' SL1 (SSB) DBMSL 'D' SL2(KM)		RECESS	OSL 'A' PL1 (DP) OSL 'B' PL2 (SB) DBMSL 'C' SL1 (SSB) DBMSL 'D' SL2(KM)		RECESS	SE &PM (KM) 324	TOC (RS) 324	
THU	DBMSL 'A' SL1 (SSB) DBMSL 'B' SL2 (KM) OSL 'C' PL1 (DP) OSL 'D' PL2 (SB)			DBMSL 'A' SL1 (SSB) DBMSL 'B' SL2 (KM) OSL 'C' PL1 (DP) OSL 'D' PL2 (SB)			TOC (RS) 324	DBMS (SSB) 324	
FRI	DBMS (SSB) 324	HCI (SB) 324		Japanese Language(324)			SL-III 'C' PL1(DP) SL-III 'D' PL2(VK)		Remedial Contact Hours(419)

Day /Time	9.00 TO 10.00	10.00 TO 11.0	11.00 TO 11.15	11.15 TO 12.15	12.15 TO 1.15
SAT	OS (DP) 324	TOC (RS) 324	RECESS	SL-III 'A' PL1 (DP) SL-III 'B' PL2 (VK)	

GFM :- Mrs. Swapna Bhavsar Co-GFM :- Mrs.KopalMaheshwari

Name of the Subject	Teaching Staff & Seating Arrangement	Practical Lab
TOC:Theory of Computation	RS - Ms.Rajashri Sadafule-415(A)	414(A)- PL1:Programming
DBMS:Database Management Systems	SSB -Mrs.Swapna Bhavsar-418 KM:Mrs.KopalMaheshwari(416A)	414(B)- PL2 :Programming Lab 2
SE & PM:Software Engineering & Project	KM:Mrs.KopalMaheshwari(416A)	417(A)- SL1 : Software Lab1
OS:Operating System	DP:Mr.Digvijay Patil-415(A) SB: Ms.Suhasini Bhat-416(A)	417(B)- SL2 : Software Lab2
HCI:Human-Computer Interaction	SB: Ms.Suhasini Bhat-416(A)	413(C)- HL: Hardware lab
SL-III(WET)	DP:Mr.Digvijay Patil-415(A) VSK:MR. Vishnu Kamble-418(C)	416(B)- OSL:Operating System Lab

TIME TABLE TE B

Class: T.E.(B) **Lecture Hall: 317,318 & 324,419** **WEF: 15/06/2018**

Day/ Time	12 to 1	1.45 TO 2.45	2.45 TO 3.45	3.45 TO 4	4.00 TO 5.00	5.00 TO 6.00	6.00 TO 7.00	7.00 TO 8.00
MON	Remedial Action Slot(317)	TOC (PR) 317	DBMS (KMG) 317		OS (AB) 318	SE &PM (KS) 318	Technical Activity(317)	
TUE		OS (AB) 317	TOC (PR) 317		DBMS (KMG) 318	HCI (SSP) 318	SL-III 'C' NL(SSP) SL-III 'D' OSL (DT)	
							Tut DBMS 'A' & 'B' 318	Tut TOC 'A' & 'B' 318
WED		DBMS (KMG) 324	TOC (PR) 324	R E C E S S	DBMSL 'A' SL1 (KG) DBMSL 'B' SL2 (AD) OSL 'C' PL1 (AB) OSL 'D' PL2 (KS)		DBMSL 'A' SL1 (KG) DBMSL 'B' SL2 (AD) OSL 'C' PL1 (AB) OSL 'D' PL2 (KS)	
THU		SE &PM (KS) 324	HCI (SSP) 324		OSL 'A' PL1 (AB) OSL 'B' PL2 (KS) DBMSL 'C' SL1 (KG) DBMSL 'D' SL2(AP)		OSL 'A' PL1 (AB) OSL 'B' PL2 (KS) DBMSL 'C' SL1 (KG) DBMSL 'D' SL2(AP)	
FRI		Japanese Language(324)			DBMS (KMG) 324	OS (AB) 324	SL-III 'A' PL1(SSP) SL-III 'B' PL2 (DT)	
							Tut TOC 'C' & 'D' 324	Tut DBMS 'C' & 'D' 324
Day /Time		**9.00 TO 10.00**	**10.00 TO 11.0**	**11.00 TO**	**11.15 TO 12.15**	**12.15 TO 1.15**		
SAT		TOC (PR) 419	HCI (SSP) 419	RECESS	OS (AB) 419	SE &PM (KS) 419		

GFM :-MS Ashwini Bhamre **Co-GFM :- Mrs.Ketki Gawali**

Name of the Subject	Teaching Staff & Seating	Practical Lab
TOC:Theory of Computation	PR:MS. Poonam Rakibe-418(B)	414(A)- PL1:Programming Lab
DBMS:Database Management Systems	KMG:Mrs.Ketki Gawali(416A) AD: Mrs. Anita Deokar-416(A) AP: MS. Asmita Pawar - 415(A)	414(B)- PL2 :Programming Lab 2
SE & PM:Software Engineering & Project	KS:Mrs.Khushboo Satpute-(413A)	417(A)- SL1 : Software Lab1
OS:Operating System	AB:MS Ashwini Bhamre-416(A) KS:Mrs.Khushboo Satpute-(413A)	417(B)- SL2 : Software Lab2
HCI:Human-Computer Interaction	SSP - Ms.Sreyasi Paul-412(B)	413(C)- HL: Hardware lab
SL-III-WET	DT:MR. Deepak Tamhane-418(C) SSP - Ms.Sreyasi Paul-412(B)	416(B)- OSL:Operating System Lab

COURSE STRUCTURE

SEMESTER – I

Subject Code	Subject	Teaching Scheme			Examination Scheme					Total Marks	Credits
		Lecture	Tutorial	Practical	In-Sem. Paper	End-Sem. Paper	TW	PR	OR		
314441	Theory of Computation	4	--	--	30	70	--	--	--	100	4
314442	Database Management Systems	4	--	--	30	70				100	4
314443	Software Engineering & Project Management	3	--	--	30	70	--	--	--	100	3
314444	Operating System	4	--	--	30	70	--	--	--	100	4
314445	Human-Computer Interaction	3	--	--	30	70	--	--	--	100	3
314446	Software Laboratory-I		--	4	--	--	25	50	50	125	2
314447	Software Laboratory-II	--	--	4	--	--	25	50	--	75	2
314448	Software Laboratory-III	--	--	2	--	--	50	--	--	50	1
314449	Audit Course 3	--	--		--	--	--	--	--	Grade	
	Total	**18**	**--**	**10**	**150**	**350**	**100**	**100**	**50**	**750**	**23**
	Total of Part-I	**28 Hours**				**750**					

IMPORTANT INSTRUCTIONS

1. It is essential that the student attends all classes in time from the first day to the last day of each term.
2. Minimum of 75% attendance for lectures and practical sessions is mandatory for all students.
3. In case the attendance falls below 75% , term will not be granted and the student will not be allowed to appear for the University examination
4. Student should complete term work such as Journals, Files as per schedule. If the student fails to complete the term work to the entire satisfaction of the Head of the Department his/her term will not be granted and he/she will not be allowed to appear for the University examination.
5. Attendance to all class tests or internals exams is compulsory.
6. Students are always required to carry Identity card (duly signed by Authority) everyday to college and shall show the same on demand by any faculty/official of the Institute in the campus.
7. Students are advised to maintain good rapport with classmates and staff.
8. Institute uniform is compulsory on specified days, during University examinations, for internal tests and special functions decently dressed on the other days of the week.

TERM WORK EVALUATION CRITERIA

Final term work will be given based on throughout performance of the student. 100 marks are distributed in (60 for continuous assessment + 15 for internal test result + 5 for general behavior + 20 for attendance of student)

- 60 marks shall be awarded to the students, based on their journal work, which includes experiment's write up, program print out. Each assignment should be evaluated for 10 marks.
    - Distribution of 10 marks for each assignment is as follows:

Sr. No.	Head	Marks
i.	Coding standards, proper indentation, Comments, Documentation	2 Marks
ii.	Timely submission	3 Marks
iii.	Test cases / originality / Understanding of Assignment	5 Marks

- 15 marks shall be allotted based on the marks of Class test/ Assessment test per unit/ mock exam.
- 5 marks for General Behavior.
- 20 Marks as per the college policy for Term Work, marks are to be awarded for attendance as per the below, based on the percentage of attendance per subject, combining lectures and practical's together, wherever applicable.

Sr .No.	%of attendee=total(Lectures + Practical's attended)	Marks
1	90 to 100	20
2	85to<90	16
3	80to<85	12
4	75 to <80	10

EXAM EVALUATION CRITERIA

University Examination

Phase I Online examination of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ) and fill in blanks; based on unit I and unit II of the subject

Phase II Online examination of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ)) and fill in blanks; based on unit III and unit IV of the subject

University Practical Examination of 50 marks oral/ practical duration 3 hr, contain problem statement based on assignment submitted as term work during lab hours Each chit will have 3 problem statements

- Every student will pick up one chit randomly and will perform one assignment/experiment out of three written on his/her chit.
- Practical examination will be based on the term work.
- Oral examination (if applicable i.e. in case of Oral as a separate passing head) will be based on journal and theory syllabus
- Questions will be asked during the practical examination to judge the understanding of the practical performed in the examination

Note: student will be allowed for university practical examination only when, all types of assignments given by respective staff and Satisfying attendance criteria

Phase III Written examination of 50 marks, 2 hours duration; based on all the six units, shall be conducted at the end of semester, as per the schedule of the university.

Internal Examination

MCQ Test 1

Test of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ) and fill in blanks; based on unit I and unit II of the subject.

MCQ Test 1

Test of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ) and fill in blanks; based on unit I and unit II of the subject

314441

Theory of Computation

SYLLABUS

C314441: THEORY OF COMPUTATION

Teaching Scheme:	Credits	Examination Scheme:
Lectures: 4 Hours/Week	04	In-Semester : 30 Marks End-Semester: 70 Marks

Prerequisites:

1. Discrete Structures.
2. Data structures and problem solving.

Course Objectives :

1. To understand problem classification and problem solving by machines.
2. To understand the basics of automata theory and its operations.
3. To study computing machines by describing, classifying and comparing different types of computational models.
4. Encourage students to study theory of computability and complexity.
5. To understand the P and NP class problems and its classification.
6. To understand the fundamentals of problem decidability and reducibility.

UNIT – I FINITE STATE MACHINES **08 Hours**

Basic Concepts: Symbols, Strings, Language, Formal Language, Natural Language. Basic Machine and Finite State Machine. FSM without output: Definition and Construction-DFA, NFA, NFA with epsilon-Moves, Minimization Of FA, Equivalence of NFA and DFA, Conversion of NFA with epsilon moves to NFA, Conversion of NFA With epsilon moves to DFA. FSM with output: Definition and Construction of Moore and Mealy Machines, Inter-conversion between Moore and Mealy Machines.

UNIT – II REGULAR EXPRESSIONS **08 Hours**

Definition and Identities of Regular Expressions, Construction of Regular Expression of the given L, Construction of Language from the RE, Construction of FA from the given RE using direct method, Conversion of FA to RE using Arden's Theorem, Pumping Lemma for RL, Closure properties of RLs, Applications of Regular Expressions.

UNIT – III CONTEXT FREE GRAMMAR AND LANGUAGES **08 Hours**

Introduction, Formal Definition of Grammar, Notations, Derivation Process: Leftmost Derivation, Rightmost Derivation, derivation trees, Context Free Languages, Ambiguous CFG, Removal of ambiguity, Simplification of CFG, Normal Forms, Chomsky Hierarchy, Regular grammar, equivalence of RG(LRG and RLG) and FA.

UNIT IV PUSHDOWN AUTOMATA AND POST MACHINES 08 Hours

Push Down Automata: Introduction and Definition of PDA, Construction (Pictorial/ Transition diagram) of PDA, Instantaneous Description and ACCEPTANCE of CFL by empty stack and final state, Deterministic PDA Vs Nondeterministic PDA, Closure properties of CFLs, pumping lemma for CFL. Post Machine- Definition and construction.

UNIT – V TURING MACHINES 08 Hours

Formal definition of a Turing machine, Recursive Languages and Recursively Enumerable Languages, Design of Turing machines, Variants of Turing Machines: Multi-tape Turing machines, Universal Turing Machine, Nondeterministic Turing machines. Comparisons of all automata.

UNIT – VI COMPUTATIONAL COMPLEXITY 08 Hours

Decidability: Decidable problems concerning regular languages, Decidable problems concerning context-free languages, Un-decidability, Halting Problem of TM, A Turing-unrecognizable language. Reducibility: Un-decidable Problems from Language Theory, A Simple Un-decidable Problem PCP, Mapping Reducibility. Time Complexity: Measuring Complexity, The Class P, Examples of problems in P, The Class NP, Examples of problems in NP, NP-completeness.

Text Books

1. Michael Sipser, Introduction to the Theory of Computation, CENGAGE Learning, 3rdEdition ISBBN- 13:978-81-315-2529-6.

2. Vivek Kulkarni, Theory of Computation, Oxford University Press, ISBN-13: 978-0-19-808458-7.

Reference Books

1. Hopcroft Ulman, Introduction to Automata Theory, Languages and Computations, Pearson Education Asia, 2nd Edition, ISBN: 9788131720479.

2. DanielI. A. Cohen, Introduction to Computer Theory, Wiley-India, ISBN: 978-81-265-1334-5.

3. K.L.P Mishra, N. Chandrasekaran, Theory of Computer Science (Automata, Languages and

Computation), Prentice Hall India, 2nd Edition.

4. John C. Martin, Introduction to Language and Theory of Computation, TMH, 3rd Edition, ISBN: 978-0-07-066048-9.

5. Kavi Mahesh, Theory of Computation: A Problem Solving Approach, Wiley-India, ISBN: 978-81-265-3311-4.

6. Kavi Mahesh, Theory of Computation: A Problem Solving Approach, Wiley India, ISBN: 9788126533114.

7. Daniel Cohen, Introduction to Computer Theory, Wiley India, ISBN: 9788126513345.

8. Basavaraj S. Anami, Karibasappa K.G, Formal Languages and Automata Theory, Wiley India, ISBN: 9788126520107

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit	Assessment Technique	Blooms Taxonomy Category
C314441.1	Student should able to build finite automata with output to solve computing problems.	Unit-I	Unit test	Creating
C314441.2	Student should able to construct regular expression for the given language and vice versa.	Unit-II	Unit test	Applying
C314441.3	Student should able to classify different types of grammar for syntax verification.	Unit-III	Unit test	Analyzing
C314441.4	Student should able to demonstrate the concept of Push down automata, Turing Machine for formal language.	Unit IV, V	Unit test	Understanding
C314441.5	Student should able to understand the Computational Time Complexity of problems.	Unit VI	Open book test	Understanding

PREREQUISITES

SR. No.	Number	Prerequisite subject name
1.	I	Basic Mathematics
2.	II	Understanding of FA,Basic Mathematics
3.	III	Basic Mathematics
4.	IV	Basic Mathematics,CFL's
5.	V	FA ,PDA
6.	VI	Regular and non regular languages

TEACHING PLAN

Academic Year:-2018-19 Semester :-I w. e. f. :- 18.06.2018

Class : - TE Division: A,B

Subject :- THEORY OF COMPUTATION Subject Code :- C314441

Faculty In charge :- Ms. Rajashri Sadafule, Ms.Poonam Rakibe

No. of Lectures/ weeks: 4

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Start Date	End Date
1.	I	Finite State Machines	June week 4	July week 1
2.	II	Regular Expressions	July week 2	July week 4
3.	III	Context free grammar and Languages	July week 4	August week 1
4.	IV	Pushdown automata and Post Machines	August week 3	August week 5
5.	V	Turing Machines	September week 2	September week 3
6.	VI	Computational complexity	September week 4	September week 5

Detail Teaching Plan:

Lect. No	Unit No.	Main Topic to be Covered	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to attain CO
1	I	Basic Concepts	Symbols, Strings, Language, Formal Language, Natural Language.	T1 & R1	C3144411	Unit test
2		Basic Machine and Finite State Machine.	FSM Examples			
3		FSM without output	Definition and Construction-DFA, NFA, NFA with epsilon-Moves			
4		FSM without output	Minimization Of FA			
5		FSM without output	Equivalence of NFA and DFA			
6		FSM without output	, Conversion of NFA with epsilon moves to NFA,			
7		FSM with output: .	Definition Moore and Mealy Machines			
8		FSM with output: .	Definition Moore and Mealy Machines			
9			Examples For Practice			
10	II	REGULAR EXPRESSION	Definition and Identities of Regular Expressions	T2 & R4	C3144412	
11	II		Construction of Regular Expression of the given L			Unit test
12	II		Construction of Language from the RE			
13	II		Construction of FA from the given RE using direct method			
14	II		Conversion of FA to RE using Arden's Theorem			
15	II		Conversion of FA to RE using Arden's Theorem			
16	II		Pumping Lemma for RL			
17	II		Closure properties of RLs,			

			Applications of Regular Expressions			
18	II		Examples For Practice			
19	III	CONTEXT FREE GRAMMAR AND LANGUAGES	Introduction, Formal Definition of Grammar,	T2 & R3	CO3	Unit test
20	III		Notations, Derivation Process: Leftmost Derivation, Rightmost Derivation,			
21	III		derivation trees,			
22	III		Context Free Languages, Ambiguous CFG,			
23	III		Removal of ambiguity, Simplification of CFG,			
24	III		Normal Forms, Chomsky Hierarchy,			
25	III		Regular grammar, equivalence of RG(LRG and RLG) and FA.			
26	III		Examples For Practice			
27	IV	Push Down Automata	Introduction and Definition of PDA,	T2 & R3	CO4	Unit Test
28	IV		Construction (Pictorial/ Transition diagram) ofPDA			
29	IV		Instantaneous Construction (Pictorial/ Transition diagram) of PDA,			
30	IV		Instantaneous Construction (Pictorial/ Transition diagram) of PDA,			
31	IV		ACCEPTANCE of CFL by empty stack and final state			
32	IV		Deterministic PDA Vs Nondeterministic PDA,			
33	IV		Closure properties of CFLs,			

34	IV		pumping lemma for CFL.			
35	IV	Post Machine	Definition and construction.			
36	V	TURING MACHINES	Formal definition of a Turing machine, Recursive Languages and Recursively Enumerable Languages,	T2	CO 4	Unit Test
37	V		Design of Turing machines			
38	V		Design of Turing machines			
39	V		Design of Turing machine			
40	V		Variants of Turing Machines: Multi-tape Turing machines,			Unit test
41	V		Universal Turing Machine, Nondeterministic Turing			
42	V		Comparisons of all automata.			
43	V		Variants of Turing Machines: Multi-tape Turing machines,			
44	VI	COMPUTATIONAL COMPLEXITY Decidability	Decidable problems concerning regular languages, Decidable problems concerning context-free languages,		CO 5	Open Book Test
45	VI		Un-decidability, Halting Problem of TM,			
46	VI		A Turing-unrecognizable language			
47	VI	Reducibility	Un-decidable Problems from Language Theory,			
48	VI		A Simple Un-decidable Problem PCP, Mapping Reducibility			
49	VI	Time Complexity	Measuring Complexity, The Class P, Examples of problems in P,	T2 & R3 &R1		
50	VI		The Class NP, Examples of problems in NP, NP-completeness			
51	VI		Practice			

TUTORIAL QUESTIONS

UNIT I

Q1.Construct a FSM that reads strings made up of letters in word "CHARIOT" and recognize those string that contain "CAT" as a substring.

Q2.Consider the following NFA with ε – moves :

	ε	a	B	c
p	Φ	{p}	{q}	{r}
q	{p}	{q}	{r}	Φ
r	{q}	{r}	Φ	{p}

i. Compute the ε – closure of each state.

ii. Give all the strings of length three or less accepted by the automaton.

iii. Convert the automaton to its equivalent DFA.

Q3. Design a DFA for following language:

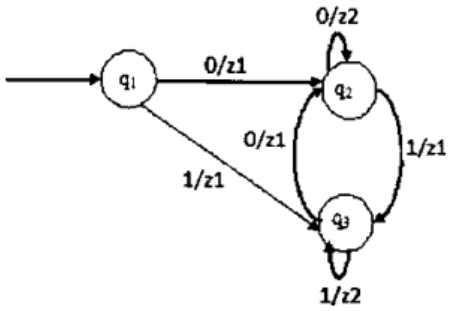
L = { w | w is Binary word of length 4i (where I >= 1) such that each consecutive block of 4 bits contains atleast 2 0's }.

= {0000, 0110, 01101100,……..}

Q4.Design a Moore machine for checking divisibility by 3 of a given binary number(residue of 3).

Q5.Design Mealy machine which accepts strings containing 'cat' and 'rat'.

Q6. Consider the following Mealy machine , construct a Moore machine equivalent to It.



UNIT II

1. Write the regular expressions for :

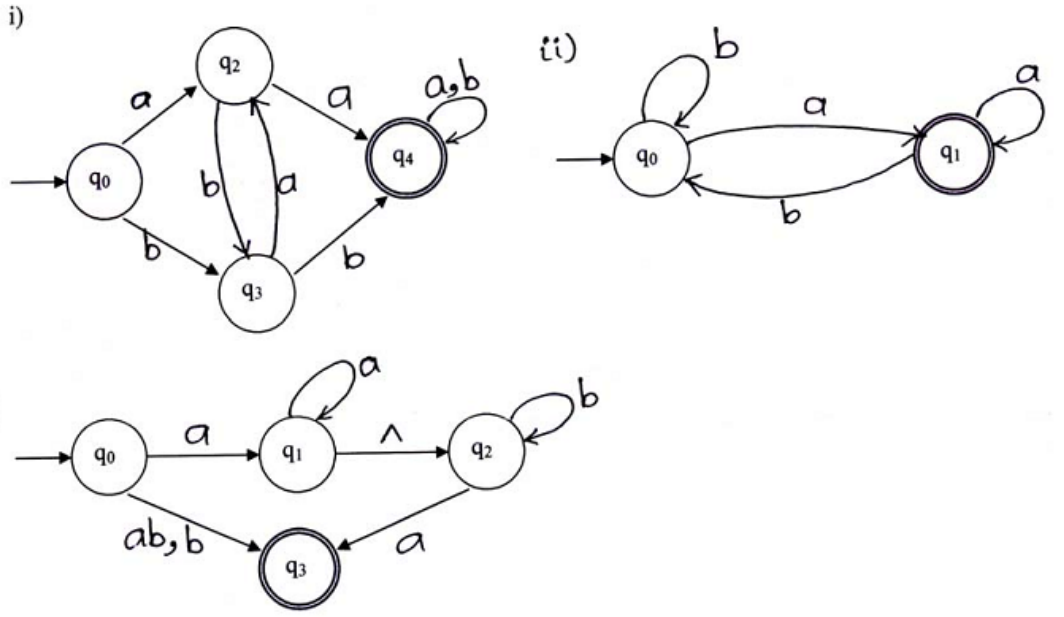
- 1.Language defined over Σ = {a, b } has to have the strings beginning with 'a' and not to have two consecutive's a's.
- 2. Σ = {a, b} , such that each of string do not have aa or bb as a substring in it.
- 3. Σ = {0, 1} the language such that it contains strings with even number of 0's.
- 4. Σ = {a, b} , such that ab is not a substring of any strings.
- 5. Σ = {0, 1} , Set of strings of 0's and 1's whose tenth symbol from the right end is 1.
- 6. Σ = {0, 1} , Set of strings of 0's and 1's not containing 101 as substring.
- 7 Set of strings of a's and b's with even number of a's followed by odd number of b's that is for the language L= {a2n b2m+1 |n >= 0 , m >= 0 }.
-

2. Define in simple english the language defined by following regular expressions:

- a. (a + b)* aa (a + b)*
- b. (b + ba)*
- c. a(a + b)*b
- d. a+ b* c+
- e. (a +ab)*

- f. (a+ b)* a (a + b)*
- g. (a* ab* ab*) + b*
- h. (a+b)*a(epsilon+bbbb)
- i. (a(a+bb)*)*
- j. (a(aa)*b(bb)*)*
- k. ((a+b)a)*
-

3. Construct regular expression for the following FA using Arden's Theorem.



UNIT III

1. Construct the parse trees the strings using specified derivation for the given grammar G.

   G={{S,A,B},{a,b},P,{S}}

   P={S→aB,S→bA

   A→a,A→aS,A→bAA

   B→b,B→bS,B→aBB}

   Strings:

i.aaabbb(rightmost derivation)

ii.aababb(rightmost deviation)

2. Remove Unit-Productions from the given grammar.

   P={S→ABA|BA|AA|AB|A|B

   A→aA|a

   B→bB|b}

3. Define ambiguous grammar.

   i.S→0S|S|1SOS|ε

   ii.S→AA

   A→aAb|bAa|ε

   Consider above grammars. Test whether these grammar are ambiguous.

4. Consider the CFG with productions and convert into CNF

   S→PQP

   P→0P|€

   Q→1Q|€

Construct CFG for language with ∑={a,b}

   i.L={w|w is in ∑* and has atleast 2 a's}

   ii.L={w|w is in ∑* and palindrome strings of odd length}

6. Consider the CFG with Productions.

   A1-> A2A3

   A2->A3A1| b

   A3 -> A1A2 | a

   Convert above grammar to GNF.

7. Smplify grammar:

   S→Aa|bS|ε

A→aA|bB|ε

B→aA|bc|ε

C→aC|bc

8. Convert to left linear grammar.

   S→0A|1B

   A→0C|1A|0

   B→1B|1A|1

   C→0|0A

9. Construct a CFG for the language of binary strings of the form 0n12n

UNIT IV

Q1. Design a post machine that accepts even and odd palindrome.

Q2. Prove the following language is not CFL

L ={anbmcp|0<=n<=m<=p}

Q3. Design PDA for detection of all kind of palindrome.

Q4. Show that Post Machines are more powerful than PDA.

Q5.Construct a PDA for the language of strings of the form 0^n12^n.

UNIT V

Q1. Design a TM to compute multiplication of two unary numbers.

Q2. Design Turing Machine to concatenate given unary number.

Q3. Design a TM that computes the function

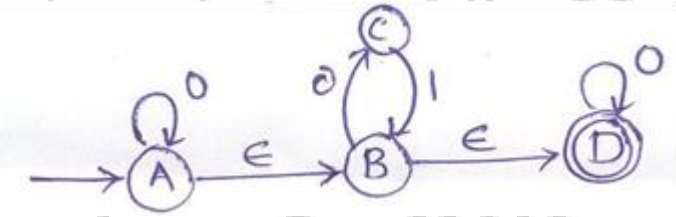
$f(x,y) = x + y$ if $x >= y$

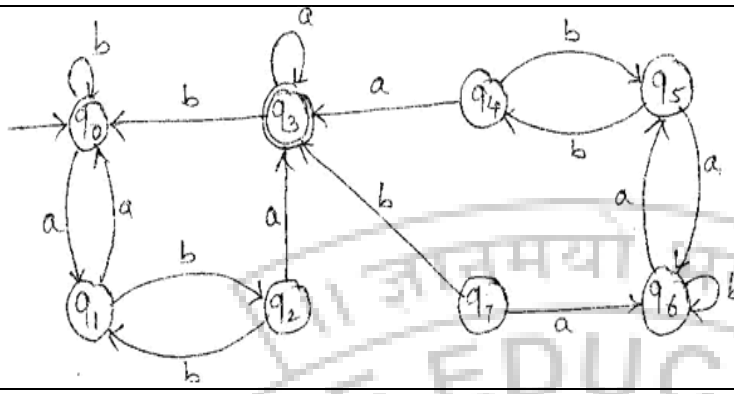
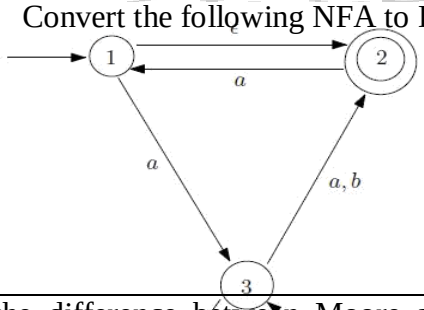
$= 0$ if $x < y$ where x & y are unary.

Simulate the working of the TM for x=2, y=2;

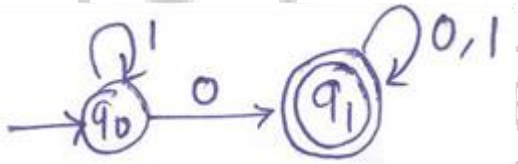
UNIT WISE QUESTION BANK

Unit I

Sr. No	Question	CO No.	Marks	University Year
1	Design an FA for the languages that contain strings with next-to-last symbol O.	C314441.1	5	Dec2012
2	Write formal definition of NFA - L. Also define L - closure	C314441.1	5	Dec2012
3	Write the formal definition of the following Finite Automata E-closure	C314441.1	4	Dec2014
4	Using pumping lemma for the regular sets prove the language $L = \{ a^{i^2} \mid i \geq \}$ is not regular.	C314441.1	6	Dec2014
5	Give formal definitions for the following NFA with € trasitions € closure	C314441.1	5	Oct.2016
6	Design an FA over S = {0,1} for the following Strings which end in either "00" or "11" Strings which contain either "01" or "110"	C314441.1	5	Oct.2016
7	Compare Moore and Mealy machines with suitable example	C314441.1	5	Oct.2016
8	Convert the following NFA-€ to equivalent NFA 	C314441.1	5	Oct.2016
9	Construct the minimum state automation equivalent to the transition diagram given as below	C314441.1	6	Dec2014

				
10	Convert the following NFA to DFA. 	C314441.1	5	
11	Explain the difference between Moore and Mealy Machine by giving a suitable example of each.	C314441.1	5	
13	Discuss FSM Equivalence in detail with example.	C314441.1	5	
14	Construct the FSM with the binary adder. Also draw the transition matrix and transition graph.	C314441.1	5	

Unit II

Sr. No.	Question	CO No.	Marks	University Year
1	Construct a Regular Expression corresponding to the followingtransition diagram using Arden's theorem 	C314441.2	5	Dec2012
2	Write a short note on the applications of regular expressions.	C314441.2	5	Dec2012
3	Construct a DFA that accepts the language represented by 0*1*2*. Make use of NFA	C314441.2	8	Dec2014
4	Define pumping lemma for regular languages	C314441.2	2	Dec2014
5	Draw an FA recognizing the regular language corresponding to give regular expression 1(01 + 10)* + 0 (11 + 10)*	C314441.2	5	Oct.2016
6	Write a short note on the applications of Regular Expressions	C314441.2	5	Oct.2016
7	Construct a r.e for the language which accepts all strings with	C314441.2	5	

	atleast two c's over the set Σ={c,b}			
8	What are the applications of Regular expressions and Finite automata	C314441.2	5	
9	write Regexp for the language that accepts all strings in which 'a' appears tripled overthe set Σ ={a}	C314441.2	6	Dec2014
10	Construct a r.e for the language over the set _={a,b} in which total number of a's are divisible by 3	C314441.2	5	
11	What is language for:: (i) (0+1)* (ii)(01)* (iii)(0+1) (iv)(0+1)+	C314441.2	4	
12	Regexp for: (i) All strings over {0,1} with the substring '0101' (ii) All strings beginning with '11 ' and ending with 'ab' (iii) Set of all strings over {a,b}with 3 consecutive b's. (iv) Set of all strings that end with '1'and has no substring '00' (i)(0+1)* 0101(0+1)* (ii)11(1+a+b)* ab (iii)(a+b)* bbb (a+b)* (iv)(1+01)* (10+11)	C314441.2	6	
13	Regexp denoting a language over _ ={1} having (i) even length of string (ii) odd length of a string (i) Even length of string R=(11)* (ii) Odd length of the string R=1(11)*	C314441.2	6	

Unit III

Sr. No.	Question	CO No.	Marks	University Year
1	What are the applications of Context free languages? What are the uses of Context free grammars? Define a context free grammar	C314441.3	5	Dec-2015
2	What is the language generated by CFG or G?What is : (a) CFL (b) Sentential form	C314441.3	5	May-2016
3	What is a ambiguous grammar?.Consider the grammarP={S>aS | aSbS | Є} is ambiguous by constructing:(a) two parse trees (b) two leftmost derivation (c) rightmost derivation	C314441.3	8	Dec-2015
4	Find CFG with no useless symbols equivalent to : S→ AB | CA , B→BC | AB,A→ a , C →aB | b	C314441.3	2	May-2016
5	What are the three ways to simplify a context free grammar?What are the properties of the CFL generated by a CFG?	C314441.3	5	Dec-2015
6	Find the language generated by :S>0S1 | 0A | 0 |1B | 1A>0A | 0 , B->1B | 1Construct the grammar for the language L={ an b an | n>=1}.	C314441.3	5	Dec2012

7	Test whether the following grammars is ambiguous or not, if it is ambiguous then remove ambiguity S →Ab, A → a, B →C|b, C → D, D → E, E → a.	C314441.3	5	Dec2012
8	Find CNF for the given grammar: S → ABAB A→aA|∈B →bA |∈	C314441.3	5	Dec2012
9	For following grammar give rightmost and leftmost derivations for the string aaabbb S→aSb/ab	C314441.3	6	Dec2012
10	Write the CFG for the language: L={$0^m1^n0^{m+n}$ where m,n>=0}	C314441.3	5	Dec2013
11	Write CFG for the following languages i) L = {a^nb^n | n>=1} ii) ii) (baa + abb)*	C314441.3	4	Oct.2016
12	Simplify the given grammar S ® aC | SB A ® bSCa B ® aSB | bBC C ® aBC | ad	C314441.3	6	Dec-2015
13	Define the following with suitable example Ambiguous Grammar Regular Grammar	C314441.3	6	May-2016
14	Convert the following grammar to CNF S ® Aba | aab A ® aS	C314441.3	6	Oct.2016

Unit IV

Sr. No	Question	CO No.	Marks	University Year
1	Design a PDA which accepts only odd number of a's over Σ = {a, b}. Simulate PDA for the string "aabab". **[9]**	C314441.4	9	Dec-2015
2	Give formal Definition of Push Down automata & applications of PDA.	C314441.4	4	May-2016
3	Construct a PDA accepting $L=\{w \subset w^R \mid w \text{ is in } (a/b)^* \text{ and } w^R \text{ is reverse of } w\}$	C314441.4	8	May-2016
4	Write short note on post machine with example.	C314441.4	6	May-2016
5	Construct a PDA equivalent to following grammar S → aAA A → *aS / bS / a*	C314441.4	4	May-2016
6	Construct a post m/c to accept the language {a^nb^{n+1}/where n > = 1}.	C314441.	8	May-2015

		4		
7	Prove that the Language $L=\{ww \mid w \text{ is in } (0+1)^*\}$ is not a CFL.	C314441.4	6	May-2016
8	Define PDA and Post machine with suitable example. Compare DPDA NPDA and CFG. [9	C314441.4	9	Dec-2015
9	Compare PDA and post machine. Design a post machine to accept the language $L = \{a^n b^{n+1} \mid n \geq 0\}$ [9]	C314441.4	9	Dec-2015

UNIT V

1	Construct a TM for obtaining two's complement of a given binary number. Simulate TM for any string.	C314441:4	8	Dec-2015
2	Write a short note on : i) Multi - tape TM ii) Universal TM	C314441:4	8	Dec-2015
3	Construct a Turing machine to perform mod2 operation on given binary number retain original number as well as store result after number separated by blank.	C314441:4	8	May-2016
4	Design a TM that computes the function $f(x, y) = x + y$ if $x >= y$ $= 0$ if $x < y$ where x & y are unary. Simulate the working of the TM for x = 2, y = 2.	C314441:4	15	May-2015
5	Differentiate between FA, PDA, and TM.	C314441:4	4	May-2015,2016
6	Write short note on multitape turing machine.	C314441:4	4	May-2016
7	Explain the halting problem of turing machines.	C314441:4	4	May-2015
8	Construct a Turing machine to perform the two's complement of given binary number.	C314441:4	8	May-2016
9	Write short note on universal Turing machine.	C314441:4	8	May-2016
10	Compare FM, PDA, PM and TM with respect to language, grammar, powerfulness and example.	C314441:4	8	Dec-2015
11	Design a turing machine that accepts the language of all strings which contain 'aba' as a substring.	C314441:4	4	Dec-2015

UNIT VI

Sr. No.	Question	CO No.	Marks	University Year
1	Discuss categories of problems based on solvability with suitable example.	C314441.4	4	Dec-2015
2	Define decidability of problem with suitable example. Describe undecidable problems for context-free Grammar.	C314441.5	8	Dec-2015
3	Show that following decision problems are recursive. i) NFA accepts a word or not ii) CEG G generates the string w or not.	C314441.5	10	May-2015,May 2016
4	Write short note on recursive language & recursively enumerable language with suitable example.	C314441.5	6	May-2016
5	P.T. the following decision problems are recursive i) DFA accepts a word or not ii) CFG G generates the string w or not.	C314441.5	10	May-2015
6	Explain with example Turing Reducibility.	C314441.5	6	May-2015
7	Write short note on post corrospondance problem	C314441.5	4	May-2016
8	Prove that "Whether directed graph contains Hamiltonian Path or not." is a NP-class problem.	C314441.5	6	
9	Prove that following are decidable languages i) $A_{CFG}=\left\{\langle G,w\rangle \middle\vert \begin{array}{l}\text{where G is a CFG that}\\ \text{generates string w}\end{array}\right\}$ ii) $E_{CFG}=\left\{\langle G,w\rangle \middle\vert \begin{array}{l}\text{where G is a CFG and}\\ L(G)=\phi\end{array}\right\}$	C314441.5	10	Nov-2017
10	Explain the role of Polynomial Time Verifiers in the context of NP-Class.	C314441.5	6	
11	Prove That $HALT_M=\left\{\langle M,w\rangle \middle\vert \begin{array}{l}\text{M is TM \& M halts}\\ \text{on input w}\end{array}\right\}$ is undecidable.	C314441.5	8	Nov 2016
12	Explain Turing reducibility with example	C314441.5	8	May2018

314442 Database Management Systems

SYLLABUS

Teaching Scheme:	Credits	Examination Scheme:
Lectures: 4 Hours/Week	04	In-Semester : 30 Marks End-Semester: 70 Marks

Prerequisites:

1. Data structures.
2. Discrete structures.

Course Objectives:

1. To understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
2. To provide a strong formal foundation in database concepts, technology and practice.
3. To give systematic database design approaches covering conceptual design, logical design and an Overview of physical design.
4. To be familiar with the basic issues of transaction processing and concurrency control.
5. To learn and understand various Database Architectures and Applications.
6. To understand how analytics and big data affect various functions now and in the future.

Unit-I: Introduction To DBMS **08 Hours**

Introduction: Database Concepts, Database System Architecture, Data Modeling: Data Models, Basic Concepts, entity, attributes, relationships, constraints, keys.

E-R and EER diagrams: Components of E-R Model, conventions, converting E-R diagram into tables, EER Model components, converting EER diagram into tables, legacy system model.

Relational Model: Basic concepts, Attributes and Domains, Codd's Rules.

Relational Integrity: Domain, Entity, Referential Integrities, Enterprise Constraints, Schema Diagram.

Relational Algebra: Basic Operations, Selection, projection, joining, outer join, union, difference, intersection, Cartesian product, division operations (examples of queries in relational algebraic using symbols).

UNIT – II DATABASE DESIGN AND SQL **08 Hours**

Database Design: Functional Dependency, Purpose of Normalization, Data Redundancy and Update Anomalies, Single Valued Normalization: 1NF, 2NF, 3NF, BCNF. Decomposition: lossless join decomposition and dependency preservation, Multi valued Normalization (4NF), Join Dependencies and the Fifth Normal Form.

Introduction to SQL: Characteristics and advantages, SQL Data Types and Literals, DDL, DML, DCL, SQL Operators, Tables: Creating, Modifying, Deleting, Views: Creating, Dropping, Updating using Views, Indexes, Nulls SQL DML **Queries:** SELECT Query and clauses, Set Operations, Predicates and Joins, Set membership,Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, Nested Queries, Database Modification using SQL Insert, Update and Delete Queries.

UNIT – III QUERY PROCESSING AND DATABASE TRANSACTIONS 08 Hours

Query Processing: Overview, Measures of query cost, Evaluation of expression, Materialization and Pipelining algorithm. **Transaction:** Basic concept of a Transaction, Transaction Management, Properties of Transactions, Concept of Schedule, Serial Schedule, Serializability: Conflict and View, Cascaded Aborts, Recoverable and No recoverable Schedules. Concept of Stored Procedures, Cursors, Triggers, assertions, roles and privileges Programmatic SQL: Embedded SQL, Dynamic SQL, Advanced SQL-Programming in MYSQL.

UNIT – IV CONCURRENCY CONTROL AND ADVANCED DATABASES 08 Hours

Concurrency Control: Need, Locking Methods, Deadlocks, Time-stamping Methods, and Optimistic Techniques. **Recovery Methods:** Shadow-Paging and Log-Based Recovery, Checkpoints, Performance Tuning, Query Optimization with respect to SQL Database. **Database Architectures:** Centralized and Client-Server Architectures, 2 Tier and 3 Tier Architecture, Introduction to Parallel Databases, Key elements of Parallel Database Processing, Architecture of Parallel Databases, Introduction to Distributed Databases, Architecture of Distributed Databases, Distributed Database Design.

UNIT – V LARGE SCALE DATA MANAGEMENT 08 Hours

Emerging Database Technologies: Introduction to No SQL Databases- Internet Databases, Cloud Databases,Mobile Databases, SQLite Database, XML Databases, MongoDB.

Introduction to Big Data and XML: DTD, XML Schemas, XQuery, XPath.

JSON: Overview, Data Types, Objects, Schema, JSON with Java/PHP/Ruby/Python.

Hadoop: HDFS, Dealing with Massive Datasets-Map Reduce and Hadoop.

Introduction to HBase: Overview, HBase Data Model, HBase Region, Hive.

UNIT – VI DATA WAREHOUSING AND DATA MINING **08 Hours**

Data Warehousing: Introduction, Evolution of Data Warehouse, Characteristics, Benefits, Limitation of Data Warehousing, Architecture and Components of Data Warehouse, Conceptual Models, Data Mart, OLAP.

Data Mining: Process, Knowledge Discovery, Goals of Data Mining, Data Mining Tasks, Association, Classification, Clustering, Big Data (Terminology and examples) Introduction to Machine learning for Big Data and Business Intelligence.

Text Books

1. Silberschatz A., Korth H., Sudarshan S, Database System Concepts, McGraw Hill Publication, ISBN-0-07-120413-X, Sixth Edition.

2. S. K. Singh, Database Systems: Concepts, Design and Application, Pearson Publication, ISBN-978-81-317-6092-5.

Reference Books

1. Thomas H Cormen and Charles E.L Leiserson, Introduction to Algorithm, PHI Publication, ISBN: 81-203-2141-3.

2. R. C. T. Lee, S S Tseng, R C Chang, Y T Tsai, Introduction to Design and Analysis of Algorithms, A Strategic approach, Tata McGraw Hill., ISBN-13: 978-1-25-902582-2. ISBN-10: 1-25-902582-9.

3. Anany Levitin, Introduction to the Design & Analysis of Algorithm, Pearson Publication, ISBN 81-7758-835-4.

4. Steven S Skiena, The Algorithm Design Manual, Springer, ISBN 978-81-8489-865-1, Second Edition

5. George T. Heineman, Gary Pollice, Stanley Selkow, Algorithms in a Nutshell, A Desktop Quick Reference, O'Reilly, ISBN: 9789352133611.

6. Gilles Brassard, Paul Bratle, Fundamentals of Algorithms, Pearson Publication, ISBN 978-81-317- 1244-3.

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit	Assessment Technique	Blooms Taxonomy Category
C314442.1	Define the basic functions of DBMS & RDBMS and analyze ER model & relational model and	I	1. Mock In Sem Test 2. ERD and its conversion and 3. Execution of Queries	Understand
C314442.2	Design database in appropriate normal form for given problem	II		Apply
C314442.3	Formulate queries using relational algebra & SQL	I & II		Design
C314442.4	Illustrate the basic concepts of transaction processing & concurrency control	III & IV	Mock End Sem Test	Understand
C314442.5	Write program using PL/SQL	III		Design
C314442.6	Classify different database architecture	IV & VI		Analyze
C314442.7	Understand how analytics & big data affect various functions	V & VI		Understand

PREREQUISITES

Sr. No.	Unit Number	Prerequisite subject name
1.	I	Data Structure
2.	II	Discrete Structure
3.	III	Data Structure
4.	IV,V & VI	NA

TEACHING PLAN

Teaching Plan Short

Academic Year:- 2018-19 Semester :-I w. e. f. :- 15.6.18

Class : - TE IT A & TE IT B Division: A & B

Subject :- DBMS Subject Code :- 314442

Faculty In charge :- Mrs.Swapna Bhavsar & Mrs.Ketki M Gawali No. of Lectures/ weeks: 4

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Start Date	End Date
1.	I	Introduction to DBMS	June Week 4	July Week 1
2.	II	Database Design And SQL	July Week 2	July Week 4
3.	III	Query Processing And Database Transactions	July Week 4	August Week 1
4.	IV	Concurrency Control And Advanced Databases	August Week 3	August Week 5
5.	V	Large Scale Data Management	Sep Week 2	Sep Week 3
6.	VI	Data Warehousing And Data Mining	Sep Week 4	Sep Week 5

Detail Teaching Plan(Both Shifts)

LecNo	Unit	Main Topic to be Covered	Sub Topics to be Covered	Chap no. & Reference Books	CO to Attain	Measurable to attain CO	Mode of Delivery
1	I	**Introduction to DBMS**	Database Concepts, Database System Architecture, Data Modeling : Data Models	Ch 1, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S	1,3	Unit Test, Conversion of ERD into Tables Queries executions	Chalk and talk
2			Entity, attributes, relationships, constraints,keys, E-R and EER diagrams: Components of E-R Model	Ch 7 , Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			Chalk and talk
3			converting E-R diagram into tables, EER Model components, converting EER diagram into tables,	Ch 7, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			PPT's And Chalk and talk
4			legacy system model, Relational Model: Basic concepts, Attributes and Domains,	Ch 1 & 2 , Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			PPT's And Chalk and talk
5			Codd's Rules,Relational Integrity: Domain, Entity, Referential Integrities,	Ch 1, 1.PL/SQL by Ivan Bayross Ch 1 2.Database System Concepts 6thEdition Silberschatz A., Korth			Chalk and talk

				H., Sudarshan S			
6	**I**		Enterprise Constraints, Schema Diagram. **Relational Algebra:** Basic Operations: Selection, projection	Ch 6, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S	3		PPT's And Chalk and talk
7			joining, outer join, union, difference, intersection	Ch 6, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			PPT's And Chalk and talk
8			Cartesian product, division operations (examples of queries in relational algebraic using symbols).	Ch 6, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			PPT's And Chalk and talk
9	**II**	**Database Design And SQL**	**Database Design**: Functional Dependency, Purpose of Normalization, Data Redundancy and Update Anomalies	Ch 8, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S	2	Unit Test Queries execution	Chalk and talk
10			Single Valued Normalization: 1NF, 2NF, 3NF, BCNF. Decomposition: lossless join decomposition and dependency preservation	Ch 8, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			Chalk and talk

11			Multi valued Normalization (4NF), Join Dependencies and the Fifth Normal Form.	Ch 8, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			Chalk and talk
12		**Introduction to SQL**	Characteristics and advantages, SQL Data Types and Literals, DDL	Ch 3, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			Chalk and talk
13			DML, DCL, SQL Operators	Ch 3, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			PPT's
14	**II**		Tables: Creating, Modifying, Deleting, Views: Creating, Dropping, Updating using Views, Indexes, Nulls SQL DML	Ch 7,11 Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S Database Systems : Concepts, Design and Application 2nd Edition S.K.Singh	3		Chalk and talk
15			**Queries:** SELECT Query and clauses, Set Operations, Predicates and Joins, Set membership,Tuple Variables, Set comparison, Ordering of Tuples, .	Ch 4, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S Database Systems : Concepts, Design and Application 2nd			Chalk and talk

				Edition S.K.Singh			
16			Aggregate Functions, Nested Queries, Database Modification using SQL Insert, Update and Delete Queries.	Ch 5, Database Systems : Concepts, Design and Application 2nd Edition S.K.Singh			Chalk and talk
17	**III**	**Query Processing And Database Transactions**	**Query Processing:** Overview, Measures of query cost, Evaluation of expression	Ch 12, Database System Concepts 6thEdition Silberschatz A.			Chalk and talk
18			Materialization and Pipelining algorithm	Ch 12, Database System Concepts 6thEdition Silberschatz A.		Unit Test Mock Exam	Chalk and talk
19			**Transaction:** Basic concept of a Transaction, Transaction Management, Properties of Transactions	Ch 14, Database System Concepts 6thEdition Silberschatz A.	4,5		Chalk and talk Video Lectures
20			Concept of Schedule, Serial Schedule,	Ch 14, Database System Concepts 6thEdition Silberschatz A.			Chalk and talk
21			Serializability: Conflict and View, Cascaded Aborts	Ch 14, Database System Concepts 6thEdition Silberschatz A			Chalk and talk
22			Recoverable and No recoverable Schedules. Concept of Stored	Ch 14, Database System Concepts 6thEdition			Chalk and talk

			Procedures	Silberschatz A.			
23			Cursors, Triggers, assertions, roles and privileges Programmatic SQL	Ch 5, Database System Concepts 6thEdition Silberschatz A.			Chalk and talk
24			Embedded SQL, Dynamic SQL, Advanced SQL-Programming in MYSQL.	Ch 5, Database System Concepts 6thEdition Silberschatz A.			PPT's and Chalk And Talk
25	**IV**	**Concurrency Control And Advanced Databases**	**Concurrency Control:** Need, Locking Methods, Deadlocks,	Ch 15, Database System Concepts 6thEdition Silberschatz A.Database System Concepts 6thEdition Silberschatz A., Korth H.,	4	Unit Test	PPT's and Chalk And Talk
26			Time-stamping Methods, and Optimistic Techniques	Ch 15, Database System Concepts 6thEdition Silberschatz A., Korth H., Sudarshan S			PPT's and Chalk And Talk
27			**Recovery Methods:** Shadow-Paging and Log-Based Recovery, Checkpoints	Ch 16, Database System Concepts 6thEdition Silberschatz A.	4,6		PPT's and Chalk And Talk
28			Performance Tuning, Query Optimization with respect to SQL Database	Ch 13, Database System Concepts 6thEdition Silberschatz A.			PPT's and Chalk And Talk
29			**Database Architectures:** Centralized and Client-	Ch 17, Database System Concepts			PPT's and Chalk And Talk

			Server Architectures	6thEdition Silberschatz A.			
30			2 Tier and 3 Tier Architecture, Introduction to Parallel Databases	Ch 17,18 Database System Concepts 6thEdition Silberschatz A.			PPT's
31			Key elements of Parallel Database Processing, Architecture of Parallel Databases	Ch 18, Database System Concepts 6thEdition Silberschatz A.			PPT's
32			Introduction to Distributed Databases, Architecture of Distributed Databases, Distributed Database Design.	Ch 19, Database System Concepts 6thEdition Silberschatz A.	6		PPT's Chalk and Talk
33	**V**	**Large Scale Data Management**	**Emerging Database Technologies:** Introduction to No SQL Databases- Internet Databases	O'Really Pubilcation Online Materials, http://nosql.database.org	6,7	Unit Test	PPT's and Chalk And Talk
34			Cloud Databases,Mobile Databases, SQLite Database	W3Schools.com/cloud Databases W3Schools.com/Mobile Databases			PPT's and Chalk And Talk
35			XML Databases, MongoDB	Ch 23, Database System Concepts 6thEdition Silberschatz A Kristina Chodorow, Michael Dirolf,			PPT's and Chalk And Talk

				MongoDB: The Definitive Guide, O'Reilly Publications			
36			**Introduction to Big Data and XML:** DTD, XML Schemas, XQuery, XPath.	W3Schools.com/ XML			PPT's and Chalk And Talk
37			**JSON:** Overview, Data Types, Objects, Schema,	W3Schools.com/ JSON			PPT's and Chalk And Talk
38			JSON with Java/PHP/Ruby/Python	W3Schools.com/ HSON			PPT's and Chalk And Talk
39			**Hadoop**: HDFS, Dealing with Massive Datasets- Map Reduce and Hadoop				PPT's and Chalk And Talk
40			**Introduction to HBase:** Overview, HBase Data Model, HBase Region, Hive.				PPT's and Chalk And Talk
41	**VI**	**Data Warehousing And Data Mining**	**Data Warehousing:** Introduction, Evolution of Data Warehouse,	Ch 20, Database System Concepts 6thEdition Silberschatz A.			PPT's and Chalk And Talk
42			Characteristics, Benefits, Limitation of Data Warehousing	Ch 20, Database System Concepts 6thEdition Silberschatz A.	6,7	Unit Test	Chalk And Talk
43			Architecture and Components of Data Warehouse, Conceptual Models	Ch 20, Database System Concepts 6thEdition Silberschatz A.			PPT's and Chalk And Talk

44			Data Mart, OLAP	J. Han, M. Kamber Data mining: concepts and techniques. Morgan Kaufmann.			PPT's and Chalk And Talk
45		**Data Mining:**	Process, Knowledge Discovery, Goals of Data Mining, Data Mining Tasks	J. Han, M. Kamber Data mining: concepts and techniques. Morgan Kaufmann.			PPT's and Chalk And Talk
46			Association, Classification, Clustering,	J. Han, M. Kamber Data mining: concepts and techniques. Morgan Kaufmann.			PPT's and Chalk And Talk
47			Big Data (Terminology and examples)	J. Han, M. Kamber Data mining: concepts and techniques. Morgan Kaufmann			PPT's and Chalk And Talk
48			Business Intelligence.	Online Material			PPT's and Chalk And Talk

TUTORIAL QUESTIONS

Class: TE IT A

1. Draw an ER diagram for any database and Write schema definitions for same database.
2. Write create table syntax for all university tables and Insert records into tables that are created in tut 3 and execute queries.
3. Write set membership operations, set comparison on tables that are created in tut 2.
4. Write relational algebra queries on the DB created
5. What is Normalization? Explain 1 NF,2 NF and 3 NF with examples.
6. Write Procedure, Function trigger and Cursor for all operations.
7. Create database using mongoDB and write CRUD operations.
8. Write some queries on the database which has been created in tut 6.
9. Give the DTD for XML representation for your mini project statement and write Xpath expressions and Xqueries.

Class: TE B

Tutorial-1

Question 1 : Construct an ER Diagram for Company having following details :

1. Company organized into DEPARTMENT. Each department has unique name and a Particular employee who manages the department. Start date for the manager is recorded. Department may have several locations.

2. A department controls a number of PROJECT. Projects have a unique name, number and a single location.

3. Company's EMPLOYEE name, ssno, address, salary, sex and birth date are recorded. An Employee is assigned to one department, but may work for several projects (not Necessarily controlled by her dept).

4. Number of hours/week an employee works on each project is recorded; The immediate supervisor for the employee.

5. Employee's DEPENDENT are tracked for health insurance purposes (dependent name, birthdate, relationship to employee).

Question 2.

Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.

Tutorial- 2

1. Write relational algebra queries on the DB created in Question 2?

Tutorial- 3

1. What are the different Anomalies (Problems) in database?
    a. Insert
    b. Delete
    c. Update

2. What is the use of Normalization? Explain 1NF & 2NF?

Tutorial- 4

Q.1.create School database using mongo db & insert documents using single insert statements and batch insert separately.

Consider Fields as follows:

S_id,sname:{fname,middlename,lname},address,pincode,email_id,class,teacher_allocated

Formulate following queries:

1. Update all students name whose name is similar
2. Add new student using upsert

Tutorial- 5

1. Procedure, Function trigger and Cursor for all operations

Tutorial- 6

1.Give the DTD for XML representation for your mini project statement and write Xpath expressions and Xqueries?

UNIT WISE QUESTION BANK

Unit-I

Sr. No	Question	CO No.	Marks	University Year
1	Consider a database used to record the marks that students get in different exams of different course offerings. Construct an E-R diagram that models exams as entities, and uses a ternary relationship, for the above database.	C314442.1	5	October 2017 end sem
2	Discuss the fundamental operations in relational algebra with example.	C314442.1	3	October 2017 end sem
3	Explain different types of attributes of an entity with example	C314442.1	3	October 2017 end sem
4	Draw and list different components of database system structure.	C314442.1	4	October 2017 end sem
5	List E-R diagram symbols. & draw an E-R diagram for a hospital management system with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examination conducted.	C314442.1	6	October 2017 end sem
6	Define data independance and explain the concept of data independency with level of abstraction in DBMS	C314442.1	5	2015 In Sem
7	Explain the following extended entity relationship features of E-R model. **5** i) specialization ii) generalization iii) aggregation iv) attribute inheritance v) Weak Entity Set	C314442.1	5	Nov/Dec 2014 End Sem 2015 In sem
8	How Following Problems are handled with DBMS. i. Data Isolation. ii. Data Redundancy and Inconsistency.	C314442.1	6	April 2013

	iii. Data Integrity			
9	Explain with Example how E-R diagrams are converted into tables	C314442.1	6	April 2013
10	Explain various database Languages	C314442.1	8	April 2013
11	Explain various Data Models used in DBMS	C314442.1	10	April 2013, Apri 2012
12	Given relation schema: R(A,B,C), S(D,E,F). Let relation r(R) and s(S) be given. Convert following SQL Statements in relational algebra form. 1. Select * from r where B = 17 2. Select A,F from r,s where r.C = s.D 3. Update r, set B = B*15 where A='aaa' 4. Select * from s where E < 20	C314442.3	8	April 2013
13	Explain various operators in relational Algebra?	C314442.3	8	April 2013
14	What are the unary operations in Relational Algebra?	C314442.3	4	IMP
15	List the design goal of DBMS and Explain why each are desirable?	C314442.1	5	2015 In Sem
16	Construct an E-R diagram for a car insurance company that has a set of customers each of whom owns one or more cars. Each car has associated with it zero to any number of recorded accidents. **[6]**	C314442.1	6	2015 End Sem
17	What is a relation ? What are the properties of relation ? Explain with example.	C314442.3	5	Dec 2014 End Sem
18	Specify Codd's norms to be specified by RDBMS	C314442.1	6	April 2012 End Sem
19	What are the enhancements that distinguish the EER model from ER Model? Explain with example.	C314442.1	6	April 2012 End Sem
20	Explain components and overall structure of a DBMS.	C314442.1	8	Dec 2013 End Sem

21	Consider the following relations: [3] BRANCH(bno, street, area, city, pcode, telno) STAFF(Sno, Fname, Lname, address, position, salary, bno) Express the following queries in SQL: 1) List the staff who work in the branch at 'Main Street' 2) Find staff whose salary is larger than the salary of every member of staff at branch 'S1'	C314442.1	3	Dec 2016 Endsem

Unit-II

Sr. No	Question	CO No.	Marks	University Year
1	Explain different anamolies with examples.	C314442.2	6	May 2015 End Sem
2	Explain good database design properties. With suitable example explain the consequences of bad designing.	C314442.2	5	Dec 2014 End Sem
3	Define the following: 1. Full functional dependency. 2. Partial dependency.	C314442.2	6	Dec 2014 In Sem
4	Define Armstrong's axioms for functional Dependency.	C314442.2	5	Oct 2016 In Sem 2017 In Sem
5	What is transitive dependency? Explain the normal form based on the concept of transitive dependency.	C314442.2		2015 In sem (2008 Pattern)
6	What is multi-valued dependency? What is the difference between functional dependency and multi-valued dependency?	C314442.2	4	Oct 2016 In Sem
7	Define dependency preserving & lossless join decomposition.	C314442.2	5	May 2015 End Sem

8	Given relation R(A,B,C,D,E) with dependencies AB-> C, CD->E, DE-> B. Is AB a candidate key? Or Is ABD is candidate key?	C314442.2	5	Oct 2016 In Sem
9	For given functional dependency F find primary key A-> BCD, AE->F, E->G,D->H,FE->I	C314442.2	4	2014 End Sem
10	Consider a relation schema R(ABCD) with FDs AB->C, AB->D, C->A Show that schema is in 3NF but not in BCNF.	C314442.2	4	2015 In sem
11	What is 2Nf and 3 NF with an example?	C314442.2	5	Oct 2016 In Sem
12	What is need of Normalization? Explain 1NF,2NF & 3NF	C314442.2	5	2017 InSem
13	What is Normalization? Define 2NF and 3NF with example,	C314442.2	5	2014 Insem
14	What is view? What are its advantages? Write and explain create view syntax.	C314442.3	5	Dec 2014 End Sem
15	Explain with suitable example SQL aggregate functions	C314442.3	6	Dec 2014 End Sem
16	Write the syntax for following SQL commands : i) create table ii) alter table iii) drop table iv) insert v) delete vi) update	C314442.3		Dec 2014 End Sem
17	Consider a relational database Supplier (Sid, Sname, address) Parts (Pid, Pname, color) Catalog (Sid, Pid, cost) Write SQL queries for the following:- i) Find the names of suppliers who supply some red parts. ii) Find the names of all parts whose cost is more than Rs. 250. iii) Find name of all parts whose color is green. iv) Find number of parts supplied by each supplier.	C314442.3	8	May 2015 End Sem
18	Consider the following relations: BRANCH(bno,street,area,city,pcode,telno) STAFF(sno,fname,lname,address,position,salary,bno)	C314442.3	3	2014 End Sem

	Express the following queries in SQL: 1.List the staff who work in the branch at 'Main Street' 2.Find staff whose salary is larger than the salary of every member of staff at branch 'S1'			
19	Discuss with respect to SQL: 1.How nulls are treated in comparison operators? 2.The check clause/constraints 3.The difference between drop table R and delete table R.	C314442.3	6	Oct 2016 In Sem
20	What are different types of Joins? Explain with proper examples.	C314442.3	5	2017 End Sem2014 Insem
21	What do you mean by sub queries? Explain proper DMLstatements.	C314442.3	6	2014 Insem
22	What do you mean by correlated sub queries? How it is different from uncorrelated sub query?	C314442.3	4	2015 End Sem
23	Explain Join in SQL. Give proper example for recursive Join.	C314442.3	6	2015 End Sem
24	Write down difference between TRUNCATE and DELETE with example. What is advantage of TRUNCATE over delete and vice versa	C314442.3	4	2015 End Sem
25	Consider the following database [2] Student (RollNo, Name, Address) Subject (Sub_code, Sub_name) Marks (Roll_no, Sub_code, Marks) Write following queries in SQL. 1. Find average marks of each student, along with the name of student	C314442.3	2	2017 End Sem
26	Consider the following relations. [5] **PLAYER (PID#, Name)** **MATCH (MID#, PID#, Match_date, opponent)** i) Write a simple inner join query using SQL to display information about the player and match played by the player. ii) Show intermediate steps of inner join with proper example (assume suitable data)	C314442.3	5	2016 Endsem

Unit: III

Sr. No	Question	CO No.	Marks	University Year
1	Explain the concept of 'transaction'. Describe ACID properties for transaction.	C314442.4	5	October 2017 end sem, 2016 In sem,Aug 2014
2	Write short note on : i) Query optimization ii) Query processing.	C314442.4	6	Dec 2013 End Sem
3	Explain ACID properties.	C314442.4	4	2015 End Sem
4	Define serializable schedule. Explain two forms of serializability.	C314442.4	5	Nov/Dec 2014 End Sem
5	Explain Equivalence rules for Query Optimization?	C314442.4	8	Oct 2012
6	What do you mean by Transaction?	C314442.4	8	Oct 2012
7	Explain Transaction Control Commands in SQL with example.	C314442.4,3	4	May 2017 Endsem
8	Explain Stored Procedures and Function with exapmles	C314442.5	5	2016 In sem
9	What is cursor? Explain various types of Cursor?	C314442.5	8	April 2013
10	Explain Stored Procedures and Triggers	C314442.5	8	April 2013
11	Explain embedded and dynamic SQL?	C314442.5	8	April 2013
12	What is cursor? Explain cursor in PL/SQL with suitable example.	C314442.5	4	2015 End Sem
13	Write a short note on Embedded SQL.	C314442.5	2	2015 End Sem

Unit IV

Sr. No	Question	CO No.	Marks	University Year
1	Explain Timestamp Protocol with an example	C314442.4	5	2015 InSem, 2012 Pattern
2	List down all possible crash recovery methods. Explain shadow paging with proper examples.	C314442.4	8	2017 End Sem

3	Explain rigorous two phase locking protocol.	C314442.4	5	2014 End Sem
4	Show that two phase locking protocol ensures conflict serializability.	C314442.4	8	2012 Pattern End Sem
5	Explain Shadow paging recovery and log based recovery scheme.	C314442.4	8	2012 Pattern End Sem
6	Explain architecture of parallel and distributed databases.	C314442.5	6	2017 End Sem
7	Explain different database architecture	C314442.5	6	2017 End Sem
8	What is deadlock? Explain how deadlock detection and prevention is done?	C314442.5	6	2017 End Sem
9	What is a deadlock? Explain deadlock recovery techniques.	C314442.5	4	2014 End Sem
10	Explain characteristics and advantages of distributed systems.	C314442.5	8	2014 End Sem
11	Explain the speed-up and scale up issues with respect to parallelism.	C314442.5	8	2014 End Sem
12	Explain need of partitioning techniques used in I/O parallelism. Explain techniques in detail. **[8]**	C314442.5	8	2015 End Sem
13	What is distributed database. Discuss different approaches used for data storage in distributed database. **[8]**	C314442.5	8	2015 End Sem
14	Explain the need of data fragmentation and types of fragmentation.	C314442.5	8	2016 End Sem
15	Explain the following terms related to distributed database system. i) Homogeneous and heterogeneous distributed database ii) Data replication iii) Data fragmentation iv) Transparency.	C314442.5	8	2013 End Sem
16	What is fragment of relation? What is main types of fragments? Why a fragmentation is useful concept in distributed database design?	C314442.5	8	2013 End Sem

Unit-V

Sr. No	Question	CO No.	Marks	University Year
1	Explain the CRUD operations in MongoDB with suitable example	C314442.6	4	October 2017 end sem
2	Explain the following terms in XML with examples i) Documents ii) Elements iii) Nested/sub elements iv) Attributes v) Namespace vi) DTD vii) Schema	C314442.6	6	October 2017 end sem
3	What are the different data types in JSON? Discuss about JSON object and ARRAY in details	C314442.6	5	October 2017 end sem
4	What is HDFS? Explain HBase data model and HBase region	C314442.6	5	October 2017 end sem
5	What is XML Schema? Give XML Schema for the following banking system: account (account_number, branch_name, balance) Customer(customer_number, customer_street, customer_city), Depositor(customer_number, account_number)	C314442.6	6	October 2017 end sem
6	Detail the procedure for connectivity of MongoDB with Java.	C314442.6	8	Nov/Dec 2014 End Sem
7	Draw and explain basic building blocks of Hadoop.	C314442.6	8	Nov/Dec 2014 End Sem
8	Describe XML data model. List the advantages of XML	C314442.6	8	Nov/Dec 2014 End Sem
9	Explain various components of Hadoop.	C314442.6	8	Nov/Dec 2014 End Sem
10	Write a short note on : i) XQuery ii) JSON	C314442.6	8	Nov/Dec 2014 End Sem
11	What are the characteristics of NoSQL cloud databases ?	C314442.5	9	Dec 2014 End Sem

12	What are the requirements of mobile databases ? List existing mobile dbs.	C314442.5	9	Nov/Dec 2014 End Sem

Unit VI

Sr. No	Question	CO No.	Marks	University Year
1	Draw and explain main components of data warehouse and its characteristics.	C314442.5	9	2014 End Sem
2	What is a decision support system ? Explain storage and data retrieval issues related to it.	C314442.4	9	2014 End Sem
3	What is data preprocessing? Explain data preprocessing techniques.	C314442.4	8	2015 End Sem
4	Explain architecture of data mining technique.	C314442.4	8	2015 End Sem
5	Write a short note on 1. Machine learning for big data 2.Data Mart 3. KDD 4.Mobile Databases	C314442.4 C314442.5	16	2013 End Sem
6	Write a short note on data warehouse manager	C314442.4	4	2013 End Sem
7	Write a short note on : i) Data warehouse ii) Data mining	C314442.4	8	2012 End Sem
8	Write a short note on : i) Data warehouse ii) Association Rules in Data mining	C314442.4	8	2012 End Sem
9	Write A short note on (any 2) 1.SQLite Databases 2.Machine Learning for Big Data 3.Machine Learning for BI	C314442.4 C314442.5	8	2017 End Sem
10	What is KDD? Explain KDD in details.	C314442.4	8	2017 End Sem
11	What is data warehouse? Explain schemas in data warehouse.	C314442.4	8	2017 End Sem
12	What is OLTP & OLAP? Explain different OLAP Operations.	C314442.5		2017 End Sem

ADDITIONAL RESOURCES

Online Resource:

1. https://www.tutorialspoint.com/dbms/index.htm
2. https://www.w3schools.com/sql/

314443 Software Engineering & Project Management

SYLLABUS

Teaching Scheme: Lectures: 3 Hours/Week

Credits 03

Examination Scheme: In-Semester : 30 Marks End-Semester: 70 Marks

Prerequisites:

1. Problem solving and object oriented programming.
2. Fundamental of data structures.

Course Objectives :

1. To understand the nature of software complexity in various application domains, disciplined way of software development and software lifecycle process models.
2. To introduce principles of agile software development, the SCRUM process and agile practices.
3. To know methods of capturing, specifying, visualizing and analyzing software requirements.
4. To understand project management through life cycle of the project.
5. To understand current and future trends and practices in the IT industry.
6. To learn about project planning, execution, tracking, audit and closure of project.

UNIT – I INTRODUCTION TO SOFTWARE ENGINEERING 06 HOURS

Nature of Software, Software Process, Software Engineering Practice, Software Myths, Generic Process model, Analysis and comparison of Process Models: Waterfall Model, Incremental Models, Evolutionary Models, Concurrent, Specialized Process Models, Personal and Team Process Models, Introduction to Cleanroom Software Engineering.

Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, CMM Models.

UNIT – II REQUIREMENT ANALYSIS 06 HOURS

Requirements Capturing: requirements engineering (elicitation, specification, validation, negotiation, prioritizing requirements (Kano diagram) - real life application case study.

Requirements Analysis: basics, scenario based modeling, UML models: use case diagram and class diagram, data modeling, data and control flow model, behavioral modeling using state diagrams - real life application case study, software Requirement Specification.

UNIT – III PROJECT PLANNING 06 HOURS

Project initiation, Planning Scope Management, Creating the Work Breakdown Structure, Effort estimation and scheduling: Importance of Project Schedules, Estimating Activity Resources, Estimating Activity Durations, Developing the Schedule using Gantt Charts, Adding Milestones to Gantt Charts, Using Tracking Gantt Charts to Compare Planned and Actual Dates, Critical Path Method, Program Evaluation and Review Technique (PERT) with examples. Planning Cost Management, Estimating Costs, Types of Cost Estimates, Cost Estimation Tools and Techniques, Typical Problems with IT Cost Estimates.

UNIT – IV AGILE DEVELOPMENT PROCESS 06 HOURS

Agile Development: Agile manifesto, agility and cost of change, agility principles, myth of planned development, toolset for the agile process.

Extreme Programming: XP values, process, industrial XP, SCRUM - process flow, scrum roles, scrum cycle description, product backlog, sprint planning meeting, sprint backlog, sprint execution, daily scrum meeting, maintaining sprint backlog and burndown chart, sprint review and retrospective.

Agile Practices: test driven development, refactoring, pair programming, continuous integration, exploratory testing versus scripted testing

UNIT – V PROJECT MANAGEMENT 06 Hours

Project monitoring and control: tools for project management, Software tools like Microsoft project management or any other open source tools.

The Importance of Project Quality Management: Planning Quality Management, Performing Quality Assurance, Controlling Quality, Tools and Techniques for Quality Control (statistical

control, six sigma) The Importance of Project Risk Management, Planning Risk Management, Common Sources of Risk in IT Projects.

UNIT – VI RECENT TRENDS IN SOFTWARE ENGINEERING AND PROJECT MANAGEMENT 06 Hours

Software configuration management: SCM basics, SCM repository, SCM process, SCM tools such as GitHub, CASE – taxonomy, tool-kits, workbenches, environments, components of CASE, categories (upper, lower and integrated CASE tools).

Emerging software engineering trends: technology evolution, process trends, collaborative development, test-driven development, global software development challenges

Project Management trends: CRM, ERP: Basic concepts, Advantages and limitations, SAP, Business process reengineering, International Project Management, Case studies.

Text Books

1. Roger S Pressman, Software Engineering: A Practitioner's Approach, Mcgraw-Hill, ISBN: 0073375977, Seventh or Eighth Edition.

2. Joseph Phillips, IT Project Management –On Track From Start to Finish, Tata Mc Graw-Hill, ISBN13: 978-0-07106727-0, ISBN-10: 0-07-106727-2.

Reference Books

1. Pankaj Jalote, Software Engineering: A Precise Approach, Wiley India, ISBN: 9788126523115.

2. Marchewka, Information Technology Project Management, Wiley India, ISBN: 9788126543946.

3. Chris Dawson with Ben Straub, Building Tools with GitHub, O'Relly, Shroff publishers, ISBN: 978-93-5213-333-8.

4. C. Michael Pilato, Ben Collins-Sussman and Brian Fitzpatrick, Version Control with subversion, O'Relly, Shroff publishers, ISBN: 978-81-8404-728-8.

5. P.C. Tripathi, P.N. Reddy, Principles of Management, Tata McGrew Hill Education Private Limited, ISBN: 9780071333337, ISBN: 0071333339.

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit	Assessment Technique	Blooms Taxonomy Category
C 314443 .1	To identify unique features of various software application domains and classify software applications.	I	Unit Test I	Applying
C 314443. 2	To choose and apply appropriate lifecycle model of software development.	I	Unit Test I	Remembering , Applying
C 314443 .3	To describe principles of agile development, discuss the SCRUM process and distinguish agile process model from other process models.	IV	Unit Test I	Analyzing, Creating
C 314443. 4	To analyse software requirements by applying various modelling techniques.	II	Unit Test II	Analyzing, Applying
C 314443.5	To list and classify CASE tools and discuss recent trends and research in software engineering.	V & VI	Unit Test II	Remembering , Understanding, creating
C 314443.6	To understand IT project planning and project management through life cycle of the project and future trends in IT Project Management.	III and VI	Unit Test II	Understanding

PREREQUISITES

Sr. No.	Unit Number	Prerequisite subject name
1.	I	Conceptual knowledge to understand the course contents
2.	II	Problem solving and object oriented programming.
3.	III	Fundamental of data structures.
4.	IV	Conceptual knowledge to understand the course contents
5.	V	Conceptual knowledge to understand the course contents
6.	VI	Conceptual knowledge to understand the course contents

TEACHING PLAN

Teaching Plan Short

Academic Year:-2018-19 Semester :- V w. e. f. :- 3/4/2017

Class : - TE IT Division: A/B

Subject :- SE & PM Subject Code :- 314443

Faculty In charge :- Ms. Khushboo Satpute & Ms. Kopal Maheshwari No. of Lectures/ weeks: 3 Hr/weeks

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Start Date	End Date
1.	I	**INTRODUCTION TO SOFTWARE ENGINEERING**	2nd week June 2018	4th week June 2018
2.	II	**REQUIREMENT ANALYSIS**	1st week July 2018	3rd week July 2018
3.	III	**PROJECT PLANNING**	3rd week July 2018	4th week July 2018
4.	IV	**AGILE DEVELOPMENT PROCESS**	1st week August 2018	4th week August 2018
5.	V	**PROJECT MANAGEMENT**	1st week Sept 2018	2th week Sept 2018
6.	VI	**RECENT TRENDS IN SOFTWARE ENGINEERING AND PROJECT MANAGEMENT**	3rd week Sept 2018	4th week Sept 2018

Detail Teaching Plan(Both Shifts)

Lect. No	Unit No.	Unit	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to attain CO	Mode of Delivery
1	I	Introduction To Software Engineering	Introduction to Software Engineering ,Nature of Software, , Software Engineering Practice	Chapter1.(Pressman,R.2010).Software Engineering)	C314443 .1	Unit Test	Chalk and Talk
2			Software Process Software Myths, Generic Process model	Chapter1.(Pressman,R.2010).Software Engineering)			Chalk and Talk
3			Analysis and comparison of Process Models: Waterfall Model, Incremental Models,	Chapter 2. (Pressman, R. (2010). Software Engineering)	C314443 .2		Chalk and Talk
4			Evolutionary Models, Concurrent, Specialized Process Models, Personal and Team Process Models,	Chapter 2. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
5			Introduction to Clean Room Software Engineering. **Software Quality Assurance (SQA):** Verification and Validation	Chapter 16. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
6			SQA Plans, Software Quality Frameworks, ISO 9000 Models, CMM Models.	Chapter 16. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
7	Assessment		Assessment & Assignments				
8	II	Requireme	**Requirements Capturing:** requirements	Chapter 5.	C314443 .4	Unit Test	Chalk and

		nt Analysis	engineering (elicitation, specification, validation,	(Pressman,R.2010).Software Engineering)			Talk
9			Negotiation, prioritizing requirements (Kano diagram) - real life application case study.	Chapter 5. (Pressman,R.2010).Software Engineering)			Chalk and Talk
10			**Requirements Analysis:** basics, scenario based modeling,	Chapter 6. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
11			UML models: use case diagram and class diagram, data modeling,	Chapter 6. (Pressman, R. (2010). Software Engineering)			Chalk and Talk, PPT's
12			Data and control flow model, behavioral modeling using state diagrams.	Chapter 6. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
13			Real life application case study, software Requirement Specification.				Dicussion
14		**Assessment** Assessment & Assignments					
15	**III**	**Project Planning**	**Project Initiation:** Introduction to Project Planning, Defining Software Scope, Feasibility Study, Project Charter, Project Team, Project Office, Phase Review, Planning Scope Management		C314443 .5 & C314443 .6	Oral	Chalk and Talk
16			**Work Breakdown Structure:** Creating WBS, Software Measurement, Size-oriented Metrics, Function-Oriented Metrics, Reconciling LOC				Chalk and Talk

			and FP Metrics, Object-Oriented Metrics				
17			**Effort Estimation and Scheduling:** Software sizing, Problem-Based Estimation, An Example of LOC-based Estimation, An example of FP-based Estimation, Estimation with Use-Cases, Empirical Estimation Model				Chalk and Talk
18			**Project Scheduling:** Project Scheduling, The structure of Project Schedule, Estimating Activity Resources, Estimating Activity Durations, COCOMO-II Model, Software Equation, Developing the schedule using Gantt Charts, Schedule tracking, Earned Value Analysis (EVA)				Chalk and Talk
19			**Project Scheduling Tools and Techniques:** CPM (Critical Path Method), PERT (Program Evaluation and Review Technique), Planning Cost Management, Estimating Costs, Types of cost estimates, cost estimation tools and techniques, typical problems with IT cost estimates				Chalk and Talk
20			Real life application case study, Example solving related to PERT, CPM, EVA				Discussion
21		**Assessment**	Assessment & Assignments				
22	**IV**	**Agile Development Process**	Agile Development – Agile manifesto, agility and cost of change, agility principles,	Chapter 3. (Pressman, R. (2010). Software Engineering)	C314443 .3	Unit Test	Chalk and Talk
23			myth of planned development, toolset for the agile process	Chapter 3. (Pressman, R. (2010). Software			Chalk and Talk

				Engineering)			
24			**Extreme Programming** – XP values, process, industrial XP	Chapter 3. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
25			**SCRUM** – process flow, scrum roles, scrum cycle description, product backlog, sprint planning meeting, sprint backlog, sprint execution	Chapter 3. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
26			daily scrum meeting, maintaining sprint backlog and burn-down chart, sprint review and retrospective	Chapter 3. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
27			**Agile Practices** - test driven development, refactoring, pair programming, continuous integration, exploratory testing versus scripted testing	Chapter 3. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
28		**Assessment**	Assessment &Assignments				
29	**V**	**Project Management**	**Project Monitoring and Control:** The management Spectrum, The people, Stake holders, Team leaders, Software team, Agile teams	Chapter 24. (Pressman, R. (2010). Software Engineering)	C 314443 .5 & C 314443 .6	Unit Test	Chalk and Talk
30			Co-ordination and Communication Issues, The product, The process, The project, Microsoft project tool, DART	Chapter 24. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
31			**Project Quality Management:** Importance of Project Quality Management, Planning Quality Management, Performing Quality Assurance, types of standards, software quality assurance	Chapter 24. (Pressman, R. (2010). Software Engineering)			Chalk and Talk

			activities,				
32			SQA relationships to other assurance activities, controlling quality, SQA vs SQC, Tools and Techniques for Quality Control, Statistical Control, Six Sigma	Chapter 24. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
33			**Project Risk Management:** Risk Management, Risk Strategies, Reactive versus Proactive risk strategies, risk identification, assessing overall project risk, risk components and drivers,	Chapter 28. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
34			Risk projection, developing risk table, assessing risk, project plan, RMMM, planning risk management, RMMM Plan	Chapter 28. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
35		**Assessment**	Assessment & Assignments				
36	**VI**	**Trends In Software Engineering**	**Software Configuration Management:** SCM Basics, Baselines, Software Configuration Items, SCM repository, The role of the repository,	Chapter 22. (Pressman, R. (2010). Software Engineering)	C 314443 .6		Chalk and Talk
37			General Features and Content, SCM Features, SCM Process, Identification of objects, Version Control, Change Control, Configuration Audit, Status Reporting,	Chapter 22. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
38			SCM Tools : GitHub, Computer-Aided Software Engineering, Emerging Software Engineering Trends	Chapter 22. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
39			Project Management Trends: Customer Relationship Manager, Advantages of CRM, Disadvantages of CRM,	Chapter 31. (Pressman, R. (2010). Software Engineering)			Chalk and Talk

40			ERP (Enterprise Resource Planning), Advantages of ERP, Disadvantages of ERP, SAP, SAP ERP Advantages	Chapter 31. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
41			SAP ERP Disadvanatages, Business Process Reengineering, International Project Management and its challenges	Chapter 31. (Pressman, R. (2010). Software Engineering)			Chalk and Talk
42		**Assessment**	**Assessment & Assignments**				

UNITWISE QUESTION BANK

Unit I

Question	CO No.	Marks	University Year
1. Explain different aspects of software process model.	C 314443 .2 C 314443 .1	5 9	2016 2014
2. Elaborate how software engineering is a layered technology.	C 314443 .1	9	2014
3. What characteristics make software different from hardware? Identify and discuss the unique features of web applications software.	C 314443 .2	5	2012,13,14
4. Explain the generic process model for software development.	C 314443 .2	5	2012,13
5. Discuss 5 software myths and realities.	C 314443 .1	5	2012,14,16
6. Provide 3 examples of software project that would be amenable to the incremental model. Be specific.	C 314443 .1 C 314443 .1	4 6	2013,15 2012,13,16
7. Define Software engineering.			
8. List and explain the characteristics that describe the nature of software.	C 314443 .2	3	2014
9. Software Engineering is considered as layered technology. Comment.	C 314443 .2	3	
10. What are the characteristics of software?	C 314443 .2	5	2012,13
11. Explain in detail all the process phases of waterfall process model and state merits/demerits of the same.	C 314443 .2 C 314443 .2	5 8 10	2012 2012,16 2014
12. Explain in detail the model: Increment Model.	C 314443 .1	8	2012,13,16
13. Explain RAD Model			
14. Explain Spiral Model. Give an example of	C 314443 .1	6	

application using Spiral model. 15. Explain the cleanroom process model. 16. Discuss in brief the statistical use testing. How do we certify a software component in clean room testing? 17. Write a short note on Software quality assurance (SQA).			2014,16 2016 2012,14,16

Unit II

Question	CO No.	Marks	University Year
1. What is Requirement Engineering?	C 314443 .4	5	2015
2. Explain in detail Requirement Engineering task.	C 314443 .4	5	2012,15
3. Explain Requirement Elicitation tasks in brief.	C 314443 .4	4	2013
4. Explain Requirement Elaboration task in brief.	C 314443 .4	5	2015
5. Explain activities and the steps used for negotiating software requirement.	C 314443 .4	6	2012
6. Explain various stakeholders involved in the project along with their viewpoints.	C 314443 .4	3	2012,14
7. What is meant by normal requirements?	C 314443 .4	3	2012,14
8. What is meant by exciting requirements?	C 314443 .4	3	2012,14
9. How requirements are validated?	C 314443 .4	5	2015,16
10. How to prioritize software requirements based on KANO Analysis?	C 314443 .4	3	2012,13
11. What are the rules of thumb?	C 314443 .4	3	2012-14
12. Explain Domain Analysis.	C 314443 .4	4	2015
13. Describe the steps of scenario based modeling with a suitable example.	C 314443 .4	3	2012-13
14. Explain in detail UML diagram stating purpose and applicability of Use-Case diagram.	C 314443 .4	3	2012

15. Explain in detail UML diagram stating purpose and applicability of Activity diagram.	C 314443 .4	3	2012,14, 15
16. Explain in detail UML diagram stating purpose and applicability of Sequence diagram.	C 314443 .4	3	2012,13, 15
17. Explain in detail UML diagram stating purpose and applicability of State diagram.	C 314443 .4	3	2012,13, 15
18. Explain swimlane with diagram.	C 314443 .4	3	2012,13, 15
19. What is modeling?	C 314443 .4	3	2012,13, 14
20. Explain data objects in data modeling.	C 314443 .4	3	2012,14
21. Explain attributes and relationships in data modeling.	C 314443 .4	3	2012,14
22. Discuss about cardinality and modality in data models.			
23. Explain different characteristics of SRS document.			

Unit III

Question	CO No.	Marks	University Year
1. Explain Project Initiation in detail.	All questions	5	2015
2. Explain Work breakdown structure.	map with	5	2014
3. Explain in detail Effort Estimation and Scheduling	C 314443 .6	4	2015
		4	2015
4. Write a note on Cocomo-II Model.		5	2016
5. Write a note on EVA.		5	2015
6. Explain PERT and CPM with example.		5	2015
7. What are different problems related with IT cost Estimates.		4	2014
		4	2015

8. Define Project Planning. 9. Write a note on planning scope management. 10. Explain the two types of software measurements. 11. Explain Project Scheduling. Explain its importance		4 4	2015

Unit IV

Question	CO No.	Marks	University Year
1. What is Agile Manifesto?	All questions	5	2014,15
2. Discuss agility principles used in agile development.	map with C 314443 .3	5 3	2014-15 -
3. Write short note on JIRA.		3	-
4. Write a short note on Kanban.		5	2013-15
5. Explain in detail extreme programming.			
6. Discuss XP Values.		5	2016
7. Discuss XP process		4	2016
8. Explain Scrum in detail		4	-
9. What is Sprint.		4	-
10. Discuss XP concept of pair programming.		5	2015
11. Describe XP concepts of refactoring.		5	2015,16
12. Compare scripted testing verses exploratory testing.		5	2015-16

Unit V

Question	CO No.	Marks	University Year
1. Explain the term people of management spectrum. 2. What are the 4 Ps involved in software project	All questions map with C 314443 .5	3 5 3	2012 2012,14,15 2012

management?		3	2012
3. Explain the term process of management		3	-
spectrum.		3	-
4. Explain importance of SQA.		3	-
5. Compare SQA and SQC.		3	-
6. Explain different quality standards.		6	2012
7. Describe Formal Test Monitoring.		5	2012,14
8. Explain software risk management.		3	-
9. What are various reasons for delay in project?			-
10. Compare Proactive and Reactive risk strategies.		3	--
11. How to assess risk?			-
12. Give the difference between known risks and predictable risks.		3	-
13. What is RMMM? Explain in detail.			

Unit VI

Question	CO No.	Marks	University Year
1. Write a short note on Software Configuration	C 314443 .5	5	2015
Management.	C 314443 .6	5	2015
2. Write a short note on elements of a configuration		5	2015
management system.	C 314443 .6	5	2015
3. What is software configuration management	C 314443 .6	5	2015
repository?	C 314443 .6	5	2015
4. Discuss the role of SCM repository.	C 314443 .6	4	2015
5. Discuss features of SCM repository.	C 314443 .6	5	2015
6. What is the objective of SCM?	C 314443 .6	5	2015
7. Explain SCM process in detail.	C 314443 .5	5	2016
8. Write a note on change control process			
9. Write a note on CRM, ERM and SAP.			

ADDITIONAL RESOURCES

1.http://www.umsl.edu/~sauter/analysis/F08papers/View.html#Introduction_8121203202754259

2.http://nptel.ac.in/courses/Webcourse-contents/IISc-BANG/System%20Analysis%20and%20Design /pdf/Lecture_Notes/LNm14.pdf

3.http://www.rspa.com/spi/index.html#webe

4.http://www-itec.uni-klu.ac.at/~harald/proseminar/web11.pdf

5.http://58.59.135.118:8081/BOOKS%5C026%5C21%5CHXYWPJH144310.pdf

6. www.scrum.org

7. http://www.slideshare.net/abhirajoria/web-analytics-and-metrics

8. http://www.slideshare.net/awahid/web-engineering-2337102

9.http://cs.queensu.ca/home/cordy/Papers/ACD_STVR_Survey.pdfhttp://www.digitalanalyticsassociation.org/Files/PDF_standards/WebAnalyticsDefinitionsVol1.pdf

314444 Operating System

SYLLABUS

Teaching Scheme:	Credits	Examination Scheme:
Lectures: 4 Hours/Week	04	In-Semester : 30 Marks End-Semester: 70 Marks

Prerequisites:

1. Computer Organization and Architecture.
2. Fundamentals of Data Structures.

Couse Objectives:

1. To introduce basic concepts and functions of modern operating systems.
2. To understand the concept of process and thread management.
3. To understand the scheduling of processes and threads.
4. To understand the concept of concurrency control.
5. To understand the concept of I/O and File management.
6. To understand various Memory Management techniques.

UNIT-I OPERATING SYSTEMOVERVIEW **8Hours**

Operating System Objectives and Functions, The Evolution of Operating Systems, Developments Leading to Modern Operating Systems, Virtual Machines. BASH Shell scripting: Basic shell commands, shell as a scripting language.

UNIT-II PROCESS DESCRIPTION AND CONTROL **8 Hours**

Process: Concept of a Process, Process States, Process Description, Process Control (Process creation, Waiting for the process/processes, Loading programs in to processes and Process Termination) ,Execution of the Operating System.

Threads: Processes and Threads, Concept of Multithreading, Types of Threads, Thread programming Using pitheads.

Scheduling: Types of Scheduling, Scheduling Algorithms, and Thread Scheduling.

UNIT-III CONCURRENCY: MUTUAL EXCLUSION AND SYNCHRONIZATION

8Hours

Process/thread Synchronization and Mutual Exclusion: Principles of Concurrency, Requirements for MutualExclusion, Mutual Exclusion: Hardware Support, Operating System Support (Semaphores and Mutex),Programming Language Support (Monitors).

Classical synchronization problems: Readers/Writers Problem, Producer and Consumer problem, Interprocesscommunication (Pipes, shared memory: system V).

Deadlock: Principles of Deadlock, Deadlock Modeling, Strategies to deal with deadlock: The OstrichAlgorithm, Deadlock Prevention, Deadlock Avoidance, Deadlock detection and recovery, An IntegratedDeadlock Strategy, Example: Dining Philosophers Problem.

UNIT-IV MEMORY MANAGEMENT 8Hours

Memory Management: Memory Management Requirements, Memory Partitioning: Fixed Partitioning, Dynamic Partitioning, Buddy System, Relocation, Paging, Segmentation.

Virtual Memory: Hardware and Control Structures, Operating System Software.

UNIT – V INPUT/OUTPUT AND FILES 8Hours

I/O Management and Disk Scheduling: I/O Devices, Organization of the I/O Function, Operating System Design Issues, I/O Buffering, Disk Scheduling, Disk Cache.

File Management: Overview, File Organization and Access, File Directories, File Sharing, Record Blocking, Secondary Storage Management.

UNIT- VI The LINUX Operating System 8Hours

Linux Kernel Module Programming, Embedded Operating Systems: Characteristics of Embedded Systems, Embedded Linux, and Application specific OS. Basic services of NACH Operating System. Introduction to Service Oriented Operating System(SOOS),Introduction to Ubuntu EDGE OS, etc.

THEORY :

A) TEXT BOOKS

1. William Stallings, Operating System: Internals and Design Principles, Prentice Hall, ISBN-10: 0-13380591-3, ISBN-13: 978-0-13-380591-8, 8th Edition

2. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, WILEY, ISBN 978-1-118-06333-0 , 9th Edition

3. Andrew S. Tanenbaum & Herbert Bos, Modern Operating System, Pearson, ISBN-13: 9780133592221, 4th Edition

B) REFERENCE BOOKS

1. Tom Adelstein and Bill Lubanovic, Linux System Administration, O'Reilly Media, ISBN-10: 0596009526, ISBN-13: 978-0596009526

2. Harvey M. Deitel, Operating Systems, Prentice Hall, ISBN-10: 0131828274, ISBN-13: 978-0131828278

3. Thomas W. Doeppner, Operating System in depth: Design and Programming, WILEY, ISBN: 978-0471-68723-8 4. Mendel Cooper, Advanced Shell Scripting, Linux Documentation Project.

COURSE OUTCOMES

Upon successful completion of the course, the students should be able to:

CO No.	Course Outcome	Mapping With Unit	Assessment Technique	Blooms Taxonomy Category
C314444.1	Fundamental understanding of the role of Operating Systems.	I	Test	Understanding
C314444.2	To understand the concept of a process and thread.	I	Test	Understanding
C314444.3	To apply the cons of process/ thread scheduling.	II	Test	Understanding, Applying
C314444.4	To apply the concept of process synchronization, mutual exclusion and the deadlock.	III	Test	Applying
C314444.5	To realize the concept of I/O management and File system.	IV	Test	Understanding
C314444.6	To understand the various memory management techniques.	V	Test	Understanding

PREREQUISITES

Sr. No.	Unit Number	Prerequisite subject name
1.	I	Computer Organization
2.	II	Computer Organization, Data structure
3.	III	Computer Organization, Data structure
4.	IV	Computer Organization, Data structure
5.	V	Computer Organization, Data structure
6.	VI	Computer Organization, Data structure

TEACHING PLAN

Teaching Plan Short

Academic Year:-2017-18 Semester : I w. e. f. :-18th June 2018

Class : - TE Division:A & B

Subject :- Operating System Subject Code :- 314444

Faculty In charge :-Mr. Digvijay Patil &Mrs. Ashwini Bhamre No. of Lectures/ weeks: 04

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Start Date	End Date
1.	I	Overview Of Operating System	3rd week June	4th Week June
2.	II	Process Description And Control	1st week July	2nd week July
3.	III	Concurrency Control	3rd week July	4th week July
4.	IV	Memory Management	1st week August	3rd week August
5.	V	Input / Output And File Management	4th week August	2nd week Sept
6.	VI	The Linux Operating System	3rd week Sept	4th week Sept

Detail Teaching Plan

Lect .No	Unit No.	Main Topic to be Covered	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to attain CO	Mode of Delivery
1	I	OVERVIEW OF OPERATING SYSTEM	Operating System Objectives and Functions	OS by William Stallings	C314444.1	Class Test-1, University Exam,	Chalk & Talk
2			The Evolution of Operating Systems				
3			Developments Leading to Modern Operating Systems				
4			Virtual Machines				
5			BASH Shell scripting: Basic shell commands	https://spoken-tutorial.org/tutorial-search/?search_foss=BASH&search_language=English-USA			
6			shell as a scripting language				
7							
8			Test on Unit-I				
9	II	Process	Process: Concept of a Process, Process states, process description	OS by William Stallings	C314444.2	Class Test-1, University Exam,	Chalk & Talk
10			PCB				
11			Process creation, waiting for process/processes				
12			Loading programs in to processes and Process Termination, Execution of the Operating System				
13		Thread	Processes and Threads, Types of Threads.	OS by Peter Galvin			
14			Thread programming Using Pthreads				
15							

16		Scheduling	Types of Scheduling, Scheduling Algorithms				
17			Thread Scheduling				
18			Practise problems on Scheduling				
19	III	Concurrency Control	**Process/thread Synchronization and Mutual Exclusion:** Principles of Concurrency, Requirements for Mutual Exclusion,	OS by William Stallings Chapter 6 from OSC By Peter Galvin	C314444.3	University Exam, Class Test	Chalk & Talk
20			**Mutual Exclusion**: Hardware Support				
21			Operating System Support (Semaphores and Mutex)				
22			Programming Language Support (Monitors).				
23			**Classical synchronization problems:** Readers/Writers Problem				
24			Producer and Consumer problem				
25			Interprocess communication (Pipes, shared memory: system V)				
26			**Deadlock:** Principles of Deadlock, Deadlock Modeling,				
27			**Strategies to deal with deadlock**: The Ostrich Algorithm				
28			Deadlock Prevention, Deadlock Avoidance, Deadlock detection and recovery				
29	IV	Memory	**Memory Management:** Memory Management Requirements, Memory	OS by William			

		Management:	Partitioning: Fixed Partitioning, Dynamic Partitioning	Stallings and Peter Galvin			
30			Buddy System, Relocation				
31			Paging, Segmentation				
32		Virtual Memory	**Virtual Memory:** Hardware and Control Structures	OS by William Stallings	C314444.4	Class Test-2,University Exam	Chalk & Talk
33			Operating System Software.				
34	**V**	Input / Output And File Management	**I/O Management and Disk Scheduling:** I/O Devices, Organization of the I/O Function	OS by William Stallings and By Peter Galvin	C314444.5	,Class Test-2,University Exam	Chalk & Talk
35			Operating System Design Issues				
36			I/O Buffering				
37			Disk Scheduling(FIFO, SSTF, SCAN, C-SCAN,				
38			LOOK, C-LOOK), Disk Cache.				
39			**File Management:** Overview, File Organization and Access,				
40			File Directories,File Sharing				
41			Record Blocking, Secondary Storage Management.				
42	**VI**	The LINUX Operating System	Linux Design Principles, Linux Booting Process,	By Peter Galvin	C314444.6		

43			Kernel Modules,Process Management			Class Test-2,University Exam	Chalk & Talk
44			Scheduling,				
45			Memory Management				
46			File Systems				
47			Input and Output,				
48			Inter-process Communication				

UNITWISE QUESTION BANK

UNIT I : OVERVIEW OF OPERATING SYSTEM

Sr No.	Question	CO	Marks	University
1	What are the OS Design Consideration for multiprocessor and multicore architecture ?	C314444.1	05	Dec 2015
2	Describe the evolution of Operating System.	C314444.1	05	May 2015
3	Discuss batch and real time operating system with respect to process scheduling , memory management?	C314444.1	04	May 2017
4	Explain the concept of virtual machine with its implementation and benefits .also explain example of VM.	C314444.1	06	May 2017
5	Explain Micro kernel approach ?how will you decide that your requirement meets the criteria for the micro kernel design?	C314444.1	05	Dec 2016
6	What is the purpose of command interpreter ?why it is usually separated from kernel.	C314444.1	05	Dec 2016
7	What is virtual machine ? Explain the concept of virtualization.	C314444.1	05	Dec 2017
8	Write a shell program to check if a given string is palindrome or not?	C314444.1	05	Dec 2017
9	Explain in significance of following shell commands a) In b) wc c) umask d) cut e) grep	C314444.1	05	May 2018
10	Explain the following shell commands with explame: a) chmod b) Grep c) Cat d) Sort	C314444.1	4	Aug 2017
11	State and explain different services provided by an operating system.	C314444.1	6	Aug 2017
12	Explain the concept of virtual machine with benefits.	C314444.1	4	Aug 2017

13	Write a shell script for sorting a given list of numbers using any sorting strategy.	C314444.1	6	Aug 2017

UNIT II : PROCESS DESCRIPTION AND CONTROL

Sr No.	Question	Co	Marks	University
1	Explain different types of schedulers in an operating system.	C314444.2	05	Dec 2015
2	Explain thread & Process management in android Opearting system.	C314444.2	05	Dec 2015
3	Explain fork and execve system calls,Also state their relationships.	C314444.2	05	May 2015
4	Differenciate between kernal-level and user-level threads.	C314444.2	05	May 2015
5	Consider the following CPU set of processes with length of CPU brust time given in milliseconds Process / Arrival time / Burst time / Priority P1 / 0 / 8 / 3 P2 / 1 / 1 / 1 P3 / 2 / 3 / 2 P4 / 3 / 2 / 3 P5 / 4 / 6 / 4 Draw the Gantt chart illustrating the execution these processes using FCFS, SJF (Preemptive and Non Preemptive) , smaller number indicates higher priority. Calculate avg waiting time and avgturn around time.	C314444.2	10	May 2017
6	Explain the concept of context switching with the help of diagram?	C314444.2	05	Dec 2016
7	What the resources are used when thread is created ?how do they differ from those used when a process is created?	C314444.2	05	Dec 2016
8	Provide two programming examples in which multi threading provides better performances than a single threading?	C314444.2	05	Dec 2016
9	Explain multi level feedback queue scheduling in UNIX	C314444.2	05	Dec 2016
10	State and Explain multiprocessor thread scheduling	C314444.2	05	Dec 2017

	approaches.			
11	How PCB helps in process state management ? Explain the structure of PCB.	C314444.2	05	Dec 2017
12	Draw and explain process state diagram?	C314444.2	05	May 2018
13	Explain the following functions with references to 'C' a) pthread_create() b) pthread_join()	C314444.2	05	May 2018

UNIT III:CONCURRENCY: MUTUAL EXCLUSION AND SYNCHRONIZATION

Sr No.	Question	Co	Marks	University
1	Explain any classical synchronization problem.	C314444.3	05	Dec 2015
2	What is Dead Lock ? State and Explain necessary conditions for deadlock?	C314444.3	05	Dec 2015
3	What is busy waiting with respective to process synchronization ? Explain how semaphore reduces the severity of this problem.	C314444.3	05	Dec 2015
4	What are the differnet requriment for mutual Exclusion.	C314444.3	05	Dec 2015
5	Write and explain the deadlock – free solution for a dining philosophers problems.	C314444.3	05	May 2015
6	Explain any two ways of creating unnamed pipes in linux with example.	C314444.3	05	May 2015
7	Consider the following snap-shot of the system. Answer the following questions using banker's algo. 1. What ate the value of Need Matrix?	C314444.3	10	May 2017

	Allocation	Max	Available
	R1R2R3	R1R2R3	R1R2R3
P1	0 1 0	7 5 3	3 3 2
P2	2 0 0	3 2 2	
P3	3 0 2	9 0 2	
P4	2 1 1	2 2 2	
P5	0 0 2	4 3 3	

	2. Is the system in safe mode? What is the safe sequences.? 3. If a request from Process I arrives for (1,0,2) can the request be grant immediately ?			
8	Explain produces consumer problem & discuss how critical section requirements are fulfill and writer its pseudo code?	C314444.3	5	Dec 2016
9	Explain message passing system for IPC and synchronization.	C314444.3	05	Dec 2016
10	Explain with definition, the concept of general and binary semaphore.	C314444.3	05	Dec 2017
11	Write a semaphore for dinning philosopher's problem.	C314444.3	05	Dec 2017
12	Explain the following functions (along with parameter) with the references to semaphore programming in C a) Sem_post() b) Sem_wait()	C314444.3	05	Dec 2017
13	Enlist and explain different IPC mechanisms.	C314444.3	05	May 2018
14	Explain Monitor in brief.	C314444.3	05	May 2018
15	Write a semaphore for reader-writer problem.	C314444.3	05	May 2018
16	Explain with an appropriate example , how recourse allocation graph determines a deadlock.	C314444.3	05	May 2018

UNIT IV : MEMORY MANAGEMENT

Sr No.	Question	Co	Marks	University
1	Write a short note paging .	C314444.4	06	Dec 2015
2	Free memory holes sizes 15K,10K,5K,25K,30K are available. The process size 12K , 2K , 25 K, 20K are to be allocated . how process are placed in first fit, best fit and worst fit partitioning algo.calculate external and		10	May 2018

	internal fragmentation.			
3	What is page fault ? How the OS handles when a page fault occurs and what are the actions taken by OS explain it with neat diagram .	C314444.4	08	Dec 2015
4	Wirte a short note of buddy system.	C314444.4	06	May 2015
5	Explain two-level page table organizationfor implementing virtual memory.	C314444.4	06	May 2015
6	What are the steps in handling page faults? Explain with suitable example.	C314444.4	10	May 2017
7	Explain the concept of demand paging with neat diagram.	C314444.4	6	May 2017
8	Explain memory management in Linux ?	C314444.4	10	Dec 2015
10	What are the common techniques for structuring the page table? Explain at least three of the techniques.	C314444.4	10	Dec 2017
11	Write a short note on: a) Buddy System. b) Compaction	C314444.4	08	May 2018
12	Explain different ways to remove external fragmentation.	C314444.4	06	May 2018
13	Explain the address transalation mechanism in paging and segmentation with proper example.	C314444.4	08	May 2018

UNIT V : INPUT/OUTPUT AND FILES

Sr No.	Question	Co	Marks	University
1	For the following page references string with 3 frames : A,B,C,D,E,C,D,A,F,G,H,I,G,H,I,E,D,E,D,B Calculate no. of Page Fault for the following page replacement algorithms.	C314444.5	12	Dec 2015

	a)FIFO b) LRU c) Optimal			
2	Explain different file organizationtechniques.	C314444.5	08	Dec 2015
3	Explain different file system performance issuses	C314444.5	08	Dec 2015
4	Assume a disk with 200 tracks and the disk request queue has random requests in it as follows : 55, 58, 39, 18 , 90, 160, 150 ,38 , 184 Find no. of tracks traversed and average seek length if i. SSTF ii. SCAN iii. C-SCAN Disk sheduling algorithm is used &intially head is at track no. 100	C314444.5	08	Dec 2015
5	1. Define following terms a. Seek Time b. Rotational Latency c. Transfer Time	C314444.5	06	May 2015
6	Explain different I/O Buffering Techniques.	C314444.5	04	May 2015
7	Assume the disk head is initially positioned over track 100. For the disk track request 27 , 129 , 110 , 186 ,147, 41 , 10 ,64 , 120 how disk scheduling is done for FIFO Scan Algorithms, Calculate the average SEEK Time and show the tracing of request.	C314444.5	06	May 2015
8	List and briefly define any two file allocation methods.	C314444.5	06	May 2015
9	What are the functions of file management system?	C314444.5	06	May 2015
10	What are the typical operations that may be performed on a Directory	C314444.5	06	May 2015
11	Write a short note on I/O functions	C314444.5	4	May 2017
12	Explain the concepts of file sharing	C314444.5	8	May 2017

13	Explain the concepts of disk free space management techniques	C314444.5	8	May 2017
14	Explain with the help of a neat diagram TLB can be used to improve access time?		10	Dec 2017
15	A process references pages in the following order 5 4 2 4 6 5 3 6 2 3 2 4 5 2 6 Determine the number of page fault for FIFO ,Optimal and LRU page replacement algo. For 3 page frames.	C314444.5	10	May 2017
16	For the given sequences of disk request, determine the total distances travel by disk head in satisfying the entire request for FCFS,C-SCAN and SSTF algo. The initial head position is 120 and total number of cylinders in the disk is 200. 120 , 130 , 180, 150, 25, 10 , 105, 90	C314444.5	12	May 2017
17	For the following page referenes strings 5,6,7,8,5,6,9,5,6,7,8,9 show and count the number of page faults that occurs with three frames using FIFO , LRU, and optimal replacement methods	C314444.5	12	May 2015

UNIT VI : The LINUX Operating System

Sr No.	Question	CO	Marks	University
1	Write a short note on the following (any three) d. Serive oriented Operating System. e. Ubuntu EDGE f. Android OS g. Embedded Linux	C314444.6	16	Dec 2015
2	Explain procedure of inserting new module in existing kernal with all necessary steps.	C314444.6	08	Dec 2015
3	Explain NACH OS Components if brief.	C314444.6	08	Dec 2015
4	Write the steps for kernel compilation with necessary commands	C314444.6	08	May 2017

5	Write a pseudo code for simple kernel module and Explain procedure of inserting new module in existing kernal with all necessary steps	C314444.6	8	May 2017
6	List and explain different inter-process communication mechanisms in Linux Operating System.	C314444.6	08	Dec 2017
7	Write a short note on following : a) Memory management in Linux b) Linux File system c) Linux IPC d) Process management in Linux	C314444.6	16	Dec 2017
8	Explain the detail Linux Booting Process.	C314444.6	08	May 2018

ADDITIONAL RESOURCES

1. www.tutorialspoint.com
2. https://spoken-tutorial.org/tutorial-search/?search_foss=BASH&search_language =English -USA
3. www.byte-code.com

314445

Human-Computer Interaction

SYLLABUS

Teaching Scheme:	Credits	Examination Scheme:
Lectures: 4 Hours/Week	03	In-Semester : 30 Marks End-Semester: 70 Marks

Prerequisites :

1. Problem Solving and Object Oriented Technologies.

Course Objectives :

1. To introduce to the field of human-computer-interaction study.
2. To gain an understanding of the human part of human-computer-interactions.
3. To learn to do design and evaluate effective human-computer-interactions.
4. To study HCI models and theories.
5. To understand HCI design processes.
6. To apply HCI to real life use cases.

UNIT – I INTRODUCTION (06 Hours)

What is HCI? Disciplines involved in HCI, Why HCI study is important? The psychology of everyday things, Principles of HCI, User-centred Design.

UNIT – II UNDERSTANDING THE HUMAN (06 Hours)

Input-output channels, Human memory, Thinking: Reasoning and Problem Solving, Human emotions, Individual differences, Psychology and Design.

UNIT – III UNDERSTANDING THE INTERACTION (06 Hours)

Models of interaction, Ergonomics, Interaction styles, WIMP Interface, Interactivity, Context of interaction, User experience, Paradigms of Interactions.

UNIT – IV HCI - DESIGN PROCESS (06 Hours)

What is interaction design?, The software design process, User focus, Scenarios, Navigation Design, Screen Design, Prototyping techniques, Wire-Framing, Understanding the UI Layer and Its Execution Framework, Model-View-Controller(MVC) Framework.

UNIT – V HCI - DESIGN RULES, GUIDELINES AND EVALUATION TECHNIQUES (06 Hours)

Principles that support usability, Design standards, Design Guidelines, Golden rules and heuristics, Using toolkits, User interface management system (UIMS), Goals of evaluation, Evaluation Criteria, Evaluation through expert analysis, Evaluation through user participation, Choosing an Evaluation Method.

UNIT – VI HCI MODELS AND THEORIES (06 Hours)

Goal and task hierarchy model, Linguistic model, Physical and device models, Cognitive architectures, Hierarchical task analysis (HTA), Uses of task analysis, Diagrammatic dialog design notations, Computer mediated communication, Ubiquitous Computing, Finding things on web Future of HCI.

Text Books:

1. Alan Dix (2008). Human Computer Interaction. Pearson Education. ISBN 978-81-317-1703-5.
2. Gerard Jounghyun Kim (20 March 2015). Human–Computer Interaction: Fundamentals and Practice. CRC Press. ISBN 978-1-4822-3390-2.

Reference Books:

1. Ben Shneiderman; Catherine Plaisant; Maxine Cohen; Steven Jacobs (29 August 2013). Designing the User Interface: Strategies for Effective Human-Computer Interaction. Pearson Education Limited.ISBN 978-1-292-03701-1.
2. Donald A. Norman (2013). The Design of Everyday Things Basic Books. ISBN 978-0-465-07299-6.
3. Jeff Johnson (17 December 2013). Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Guidelines. Elsevier. ISBN 978-0-12-411556-9.
4. Alan Cooper; Robert Reimann; David Cronin; Christopher Noessel (13 August 2014). About Face: The Essentials of Interaction Design. Wiley. ISBN 978-1-118-76658-3.
5. Alan Cooper (1 January 1999). The Inmates are running the Asylum, Sam's. ISBN 978-0-672-31649-4.

6. John M. Carroll (21 May 2003). HCI Models, Theories, and Frameworks: Toward a Multidisciplinary Science. Morgan Kaufmann. ISBN 978-0-08-049141-7.

7. Alan Cooper, Robert Reimann, David Cronin, Christopher Noessel, About Face: The Essentials of Interface Design,Wiley India, ISBN : 9788126559718,4th Ed

8. Rogers, Sharp, Preece, Interaction Design: Beyond Human Computer Interaction, Wiley India, ISBN:9788126544912,3ed

9. Wilbert O.Galitz, The Essential Guide to user Interface Design, Wiley India, ISBN: 9788126502806

Web-links:

1. http://hcibib.org/

2.Andriod Design Guidelines - https://developer.android.com/guide/ practices/ui_guidelines /index.html

3. iOS Human Interface Guidelines - https://developer.apple.com/ios/human-interfaceguidelines/overview/design-principles/

4. MacOS Human Interface Guidelines - https://developer.apple.com/library/content/documentation UserExperience/Conceptual /OSXHIGuidelines/

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit	Assessment Technique	Blooms Taxonomy Category
C314445 .1	To analyze various benefits of HCI and Human centered Design	Unit I	Home Assignment/ Test	Analyzing
C314445.2	To understand the involvement of different circumstances in design of HCI	Unit II	Home Assignment/ Test	Understanding
C314445.3	To summarize and apply an appropriate models and principles to design HCI	Unit III	Home Assignment/ Test	Applying
C314445.4	To design GUI with various UCD process and interaction principles	Unit IV	Home Assignment/ Test	Creating
C314445 .5	To evaluate various usage of GUI with real-world	Unit V	Home Assignment/ Test	Evaluating
C314445 .6	To make use of intellectual models to forecast human computer interaction	Unit VI	Home Assignment/ Test	Applying

PREREQUISITES

Sr. No.	Unit Number	Prerequisite subject name
1.	I	Problem Solving and Object Oriented Technologies. Human psychology.
2.	II	Human psychology.
3.	III	Software Engineering.
4.	IV	Problem Solving and Object Oriented Technologies. Software Engineering. Human psychology.
5.	V	Problem Solving and Object Oriented Technologies. Software Engineering. Human psychology.
6.	VI	Problem Solving and Object Oriented Technologies. Software Engineering. Human psychology.

TEACHING PLAN

Teaching Plan Short

Academic Year: - 2018-2019 Semester: - V w. e. f.:-03/04/2017

Class: - TE Division: A, B

Subject: - HCI Subject Code: - 314445

Faculty In charge: - Mrs. Shreyasi Paul, Mrs. Suhasini L Bhat No. of Lectures/ weeks: 3

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Month	Week
1.	I	UNIT I: INTRODUCTION	June 3rd week	June last week
2.	II	UNIT II: UNDERSTANDING THE HUMAN	July 1st week	July 2nd week
3.	III	UNIT III: UNDERSTANDING THE INTERACTION	July 3rd week	July 4th week
4.	IV	UNIT IV: HCI - DESIGN PROCESS	July Last week	August 2nd week
5.	V	UNIT V: HCI - DESIGN RULES , GUIDELINES AND EVALUATION TECHNIQUES	August 3rd week	August 4th week
6.	VI	UNIT VI: HCI MODELS AND THEORIES	August last week	September 2nd week

Detail Teaching Plan

Lect. No	Unit No.	Main Topic to be Covered	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to Attain CO
1	I	INTRODUCTION	What is HCI?	Introduction. Alan Dix (2008). Human-Computer-Interaction. 3rd Edition Pearson Education,	I	Home Assignments/ Test
2			Disciplines involved in HCI			
3			Why HCI study is important?			
4			The psychology of everyday things	Donald A. Norman (2013). The Design of Everyday Things Basic Books. ISBN 978-0-465-07299-6.		
5			Principles of HCI	Chapter no. 1. Gerard Jounghyun Kim (20 March 2015). Human–Computer Interaction: Fundamentals and Practice. CRC Press. ISBN 978-1-4822-3390-2.		
6			User-centered Design	Chapter no. 1. Donald A. Norman (2013). The Design of Everyday Things Basic Books. ISBN 978-0-465-07299-6.		

7	II	UNDERSTANDING THE HUMAN	Input	Chapter 1. Alan Dix (2008). Human-Computer-Interaction. 3rd Edition Pearson Education,	II	Home Assignments/ Class Test
8			Human memory			
9			output channels			
10			Thinking: Reasoning and Problem Solving			
11			Human emotions			
12			Individual differences, Psychology and Design			
13	III	UNDERSTANDING THE INTERACTIO	Models of interaction	Chapter 3. Alan Dix (2008). Human-Computer-Interaction. 3rd Edition Pearson Education,	III	Class test
14			Ergonomics, Interaction styles			
15			WIMP Interface			
16			Interactivity			
17			Context of interaction			
18			User experience, Paradigms of Interactions			
19	IV	HCI -DESIGN PROCESS	What is interaction design?	Chapter 5. Alan Dix (2008). Human-Computer-Interaction. 3rd Edition Pearson Education,	IV	Assignment/Report generation
20			The software design process, User focus, Scenarios			
21			Navigation Design, Screen Design, Prototyping techniques			
22			Wire -Framing			

23			Understanding the UI Layer and Its Execution Framework			
24			Model-View n Controller(MVC) Framework			
25	V	HCI DESIGN RULES , GUIDELINES AND EVALUATION TECHNIQUES	Principles that support usability, Design standards, Using Goals of evaluation, Evaluation	Chapter 7. Alan Dix (2008). Human-Computer-Interaction. 3rd Edition Pearson Education,	V	Class Test
26			Design Guidelines, Golden rules and heuristics			
27			toolkits, User interface management system (UIMS)			
28			Criteria, Evaluation through expert analysis			
29			Evaluation through user participation,			
30			Choosing an Evaluation Method.			
31	VI	HCI MODELS AND THEORIES	Goal and task hierarchy model	Chapter12. Alan Dix (2008). Human-Computer-Interaction. 3rd Edition Pearson Education,	VI	Class Test
32			Linguistic model, Physical and device models			
33			Cognitive architectures, Hierarchical task analysis (HTA)			

34			Uses of task analysis, Diagrammatic dialog design notations			
35			Computer mediated communication, Ubiquitous Computing			
36			Finding things on web Future of HCI			

UNIT WISE QUESTION BANK

Unit-1 INTRODUCTION				
No.	**Question**	**CO. No.**	**Marks**	**University Year**
Q1	What is HCI?	1	5	
Q2	Why HCI Study is Important?	1	5	
Q3	What are disciplines involved in HCI?	1	5	
Q4	Explain various principle of HCI.	1	5	
Q5	Explain the concept of User-Centered Design.	1	7	
Q7	List and Explain the Various Application area of HCI.	1	7	
Q8	Express your opinion - "A design should be User-Centric".	1	5	
Q9	Explain different UCD principles.	1	5	
Q10	Explain UCD process steps.	1	7	
Q11	Explain Psychology of everyday things.	1	5	
Q12	Software for handling meeting (diary or calendar) electronically needs to be developed. Indentify any frequent task that will be performed on this system and specify its usability specifications assuming the new system will be a replacement of the oid paper-based system. What assumptions you need to make about its use?	1	5	2017
Q13	Explain any 2 of the following HCI principles in brief. i. Know the user ii. Understand the task iii. Reduce Memory load iv. Strive for consistency v. Prevent Errors/Reversal of Action	1	5	2017
Q14	Explain with example how HCI help to reduce human memory load?	1	5	2017
Q15	Explain with example how HCI relate national security?	1	5	2017
Q16	How you design a smart classroom for preprimary students	1	5	2017
Q17	Consider two different ATM machines. One giving away the cash and then ejecting the bank card and other one ejecting the bank card first and then dispensing the cash. Which is a better interface from intercation point of view? Justify.	1	5	2017

Unit-2 UNDERSTANDING THE HUMAN				
No.	**Question**	**CO. No.**	**Marks**	**University Year**
Q1	What is reasoning? Discuss with example Inductive versus Deductive Reasoning.	2	7	
Q2	Compare STM and LTM of human with respect to capacity, access time and forgetting.	2	7	
Q3	Differentiate between human short-term memory and long-term memory.	2	5	
Q4	Write short note on: i) Human Input Output Channels ii) Human Memory	2	8	
Q5	What are mental models, and why are they important in interface design?	2	5	
Q6	What can a system designer do to minimize the memory load of the user?	2	5	
Q7	How you will correlate the concept of human input output channels with GUI Design.	2	5	
Q8	How Human emotions play a important role in designing an GUI for any application.	2	5	
Q9	Human memory plays an important role in how well people deal with an interface. Describe two differences between STM and LTM.	2	5	
Q10	What is the difference between recognition and recall in relation to human memory? Explain with Example.	2	5	
Q11	Explain a Model of Structure of Human Memory. What are the types of Long Term Memory? Explain with example.	2	5	
Q12	The human eye has number of limitations. Give three examples. For one of the limitations identified, describe how this should be taken into a account in the design of indivisible interface.	2	5	
Q13	Explain significance of sensory memory in interface design	2	7	
Q14	List and explain five human senses and identify those that are most important to HCI	2	5	
Q15	Suggest ideas for an interface which uses the properties of sound effectively.	2	5	
Q16	Explain following terms related to the human short term memory. i) Digits span ii) Chunking	2	8	

	iii) Recency Effect iv) Closure			
Q17	Explain Skill acquisition in detail.	2	5	
Q18	Design and explain an experiment to investigate the decay aspect of human short-term memory.	2	5	2017
Q19	A semantic network is used in modeling the organization of knowledge in memory. Produce a semantic network to train memory for gaining knowledge about all living things.	2	5	2017
Q20	List and explain five human senses and identify those that are most important to HCI.	2	8	2013
Q21	Explain significance of sensory memory in interface design.	2	8	2013

Unit-3 UNDERSTANDING THE INTERACTION

No.	Question	CO No.	Marks	University Year
Q1	Discuss general principles and goals of user interface design.	3	5	
Q2	Define Ergonomics. Explain with example.	3	5	
Q3	Describe briefly four different interactions styles used to accommodate the dialog between user and computer. Specify advantages and disadvantages of each interaction style.	3	7	
Q4	List different interaction styles. Explain command line interface and menus interface with advantages and disadvantages.	3	5	
Q5	Explain following WIMP interface elements with respect to any text editor. – Icons – Menus – Toolbars –Dialog boxes.	3	7	
Q6	Explain interaction design process.	3	7	
Q7	What is interaction design? What are goals of interaction design?	3	5	
Q8	Why is context important in selecting and applying guidelines and principles for interface design? Illustrate your answer with examples.	3	5	
Q9	What is WIMP interface? Discuss its advantage and disadvantage.	3	7	
Q10	Explain paradigms of Interaction design.	3	5	
Q11	Write short note on process of Interaction design with respect to following points:	3	5	

	i) Basic activities ii) Characteristics.			
Q12	What is WIMP interface? Explain how to use its elements to design user interface.	3	5	
Q13	How menus and pointers are helpful as interaction styles? Explain advantages and disadvantages of these interaction style	3	5	
Q14	Discuss how social environment influences the interaction with the computer. What effect does the organization (Commercial or Academic) to which you belong have on interaction?	3	5	
Q15	How does making a call differ when using: i) Public Phone Box ii) Cell Phone How have these devices being designed to take into account a) The kind of users b) Types of activity being supported c) Context of use.	3	8	
Q16	Explain paradigms of interaction design.	3	5	
Q17	Classify the different models of interaction. Explain any one in detail.	3	5	
Q18	Explain the difference between slips and mistakes with the help of suitable example.	3	8	
Q19	How does making a call differ when using: i) Smart Phone ii) Cell Phone Consider the kinds of user,type of activity and context of use.	3	5	2017
Q20	Navigate affect can make it harder to do even easy tasks; positive affect can make it easier to do difficult tasks. What are implications of this for interaction design?	3	5	2017
Q21	Describe how HCI affects use of Fully Automatic Washing Machine with respect to:	3	10	2013
	i) the aim of the program (what is used for)			
	ii) describe its interface (picture of the screen			
	iii) describe its interaction (how it is used)			
Q22	Describe the interaction framework introduced in Human-Computer Interaction. Explain how it can be used to explain problems in the dialogue between a user and a computer.	3	10	2013
Q23	Discuss how social environment influences the interactions with the computer? What effect does the organization (commercial or academic) to which you belong have on the interaction?	3	10	2013

Q24	Describe briefly four different interaction styles used to accommodate the dialog between user and computer. Specify advantages and disadvantages of each interaction style	3	10	2013

UNIT – IV HCI - DESIGN PROCESS				
No	**Question**	**CO No.**	**Marks**	**University Year**
1	What do you mean by interaction design?	4	2	
2	Explain software design process with example.	4	6	
3	Write a short note on Model-View-Controller(MVC) Framework.	4	6	
4	What is design?	4	2	2017
5	What are the Golden-rule of design?	4	4	2017
6	Illustrate the process of interaction design.	4	4	2017
7	Give any two diagrammatic or textual notations used to design dialogs in effective user interface. Justify your notations with respective examples.	4	8	2003
8	Describe briefly four different interaction styles used to accommodate the dialog between user and computer. Specify advantages and disadvantages of each interaction style.	4	8	2003
9	Describe the interaction framework introduced in Human-Computer Interaction. Explain how it can be used to explain problems in the dialogue between a user and a computer.	4	8	2003
10	Explain Navigation design with example	4	8	2003

UNIT – V HCI - DESIGN RULES , GUIDELINES AND EVALUATION TECHNIQUES				
No.	**Question**	**CO No.**	**Marks**	**University Year**
1	Explain UIMS in detail		6	
2	List out principles of Usability		6	
3	Explain steps to Improve Usability, Utility, and Desirability by Implementing Nielsen and Molich's User Interface Design Guidelines		6	
4	What are learnability, flexibility and robustness in context of usability?	5	3	2017

5	It has suggested that consistency could be considered a major category of interactive principals, on the same level as learnability, flexibility and robustness. If had been the case, discuss the principals that would appear in support of consistency?	5	5	2017
6	Explain Nielsen's heuristics	5	8	2017
7	Discuss Shneiderman's eight golden rules of interface design with suitable examples	5	8	2017
8	Design an experiment to test whether adding color coding to an interface will improve accuracy. Identify your hypothesis, Participant group, dependent and independent variables, experimental design, task and analysis approach.	5	8	2017
9	How do "golden rules" and heuristics help interface designers take account of cognitive psychology? Illustrate your answer with examples.	5	8	2003
10	Why is context important in selecting and applying guidelines and principles for interface design? Illustrate your answer with examples.	5	8	2003
11	A practical usability engineering process that can be incorporated into the software product development process to ensure the usability of interactive computer product is presented. Explain your view regarding usability engineering life cycle for online hotel booking management system.	5	8	2003

UNIT – VI HCI MODELS AND THEORIES

No.	Question	CO No.	Marks	University Year
1	Goals are accomplished by methods consisting of operators which are identified by selection rules. Illustrate this for following goals.	6	9	Dec-17
	a. To delete a sentence in a graphical text editor.			
	b. To close window in a graphical text editor.			

2	Discuss applications meant for computer mediated communication.	6	9	Dec-17
3	Draw a state chart diagram of a machine that dispenses bottles on inserting coins.	6	9	Dec-17
4	A Hierarchical Task Analysis (HTA) provides an understanding of the tasks user need to perform to achieve certain goal. Perform HTA of the task to cook food (rice). Illustrate using diagram.	6	9	Dec-17
5	Explain GOMS in detail.	6	7	
6	What is Linguistic Models? Explain with example.	6	9	
7	Write a short note on Key Stroke Model.	6	5	
8	With the help of diagram, explain three state models.	6	7	
9	What is Ubiquitous Computing? Explain with example.	6	5	
10	Write a short note on Computer Mediated Communication.	6	5	

ADDITIONAL RESOURCES

Site References:

1. http://www.usabilityfirst.com/intro/index.txl.
2. http://www.scribd.com/doc/6633611/HCI-Chap5-Interaction-Design-Basics.
3. http://www.dgp.toronto.edu/~hunt/telechi/hcitools.html.
4. http://www.cs.cmu.edu/~bam/uicourse/special/.
5. http://www.wtec.org/loyola/hci/c1_s1.htm.
6. https://cs3240turbulence.wordpress.com/2012/01/21/why-is-hci-important/.
7. https://www.cs.bham.ac.uk/~rxb/Teaching/HCI%20II/intro.html
8. https://cs3240turbulence.wordpress.com/2012/01/21/why-is-hci-important/.
9. https://www.cs.bham.ac.uk/~rxb/Teaching/HCI%20II/intro.html
10. http://www.inf.ed.ac.uk/teaching/courses/hci/0809/lecs/1_principles-6up.pdf.
11. http://hcidesignprinciples.blogspot.com/

314446 Software Laboratory-I

SYLLABUS

Teaching Scheme:	Credits	Examination Scheme:
Practical : 4 Hours/Week	02	Term Work : 25 Marks Practical: 50 Marks Oral : 50 Marks

Prerequisites:

1. Data structures and files.
2. Discrete Structure.
3. Software engineering principles and practices.

Course Objectives :

1. Understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
2. To provide a strong formal foundation in database concepts, recent technologies and best industry practices.
3. To give systematic database design approaches covering conceptual design, logical design and an overview of physical design.
4. To learn the SQL and NoSQL database system.
5. To learn and understand various Database Architectures and its use for application development.
6. To programme PL/SQL including stored procedures, stored functions, cursors and packages.

Group A: Introduction to Databases (Study assignment – Any 2)

1. Study and design a database with suitable example using following database systems:

- Relational: SQL / PostgreSQL / MySQL
- Key-value: Riak / Redis
- Columnar: Hbase
- Document: MongoDB / CouchDB

- Graph: Neo4J

Compare the different database systems based on points like efficiency, scalability, characteristics and performance.

2. Install and configure client and server for MySQL and MongoDB (Show all commands and necessary steps for installation and configuration).

3. Study the SQLite database and its uses. Also elaborate on building and installing of SQLite.

Group B: SQL and PL/SQL

1. Design any database with at least 3 entities and relationships between them. Apply DCL and DDL commands. Draw suitable ER/EER diagram for the system.

2. Design and implement a database and apply at least 10 different DML queries for the following task. For a given input string display only those records which match the given pattern or a phrase in the search string. Make use of wild characters and LIKE operator for the same. Make use of Boolean and arithmetic operators wherever necessary.

3. Execute the aggregate functions like count, sum, avg etc. on the suitable database. Make use of built in functions according to the need of the database chosen. Retrieve the data from the database based on time and date functions like now (), date (), day (), time () etc. Use group by and having clauses.

4. Implement nested sub queries. Perform a test for set membership (in, not in), set comparison (<some, >=some, <all etc.) and set cardinality (unique, not unique).

5. Write and execute suitable database triggers .Consider row level and statement level triggers.

6. Write and execute PL/SQL stored procedure and function to perform a suitable task on the database. Demonstrate its use.

7. Write a PL/SQL block to implement all types of cursor.

8. Execute DDL statements which demonstrate the use of views. Try to update the base table using its corresponding view. Also consider restrictions on updatable views and perform view creation from multiple tables.

Group C: MongoDB

1. Create a database with suitable example using MongoDB and implement Inserting and saving document (batch insert, insert validation) Removing document Updating document (document replacement, using modifiers, upserts, updating multiple documents, returning updated documents)

2. Execute at least 10 queries on any suitable MongoDB database that demonstrates following querying techniques:

 find and findOne (specific values)

 Query criteria (Query conditionals, OR queries, $not, Conditional semantics)

 Type-specific queries (Null, Regular expression, Querying arrays)

3. Execute at least 10 queries on any suitable MongoDB database that demonstrates following: $ where queries

 Cursors (Limits, skips, sorts, advanced query options)

 Database commands

4. Implement Map reduce example with suitable example.

5. Implement the aggregation and indexing with suitable example in MongoDB. Demonstrate the following:

 Aggregation framework

 Create and drop different types of indexes and explain () to show the advantage of the indexes.

Group D: Mini Project / Database Application Development

Student group of size 3 to 4 students should decide the statement and scope of the project which will be refined and validated by the faculty considering number of students in the group. Draw and normalize the design up to at ER Diagram least 3NF in case of back end as RDBMS.

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Assignment	Assessment Technique	Blooms Taxonomy Category
C314446.1	To install and configure database systems	Group A & D	Continuous Assessment and Mock Practical Exam	Understand
C314446 .2	To analyze database models & entity relationship models	Group B 1 & Group D		Apply
C314446.3	To design and implement a database schema for a given problem-domain	Group B 2 & Group D		Design
C314446.4	To understand the relational and document type database systems	Group A		Understand
C314446.5	To populate and query a database using SQL DML/DDL commands.	Group B 3 to 8 & Group D		Design
C314446.6	To populate and query a database using MongoDB commands.	Group C 1 to 5		Design

TEACHING PLAN

Teaching Plan Short

Academic Year:- 2018-19 Semester :-I w. e. f. :- 15.6.18

Class : - TE IT A & TE IT B Division: A & B

Subject :- DBMS Subject Code :- 314442

Faculty In charge :- Mrs.Swapna Bhavsar & Mrs.Ketki M Gawali No. of Lectures/ weeks: 4

- **Practical Plan**

Sr. No.	Assignment No.	Assignment Title	Start Date	End Date
Group A				
1.	1	Study and design a database with suitable example.	June Week 4	June Week 4
2.	2	Install and configure client and server for MySQL and MongoDB.	June Week 5	June Week 5
3	3	Study the SQLite database and its uses. Also elaborate on building and installing of SQLite.	August Week 5	August Week 5
Group B				
4	1	Design any database with at least 3 entities and relationships between them	June Week 5	July Week 2
5	2	Design and implement a database and apply at least 10 different DML queries	July Week 2	July Week 2
6	3	Execute the aggregate functions like count, sum, avg etc. on the suitable database	July Week 3	July Week 3
7	4	Implement nested sub queries.	July Week 4	August Week 1
8	5	Write and execute suitable database triggers.	August Week 3	August Week 3

9	6	Write and execute PL/SQL stored procedure and function to perform a suitable task on the database.	August Week 4	August Week 4
10	7	Write a PL/SQL block to implement all types of cursor	August Week 5	August Week 5
11	8	Execute DDL statements which demonstrate the use of views.	July Week 4	July Week 4
Group C				
12	1	Create a database with suitable example using MongoDB and implement.	Sep Week 2	Sep Week 2
13	2	Execute at least 10 queries on any suitable MongoDB database.	Sep Week 3	Sep Week 3
14	3	Execute at least 10 queries on any suitable MongoDB database.	Sep Week 4	Sep Week 4
15	4	Implement Map reduce example with suitable example	Sep Week 5	Sep Week 5
16	5	Implement the aggregation and indexing with suitable example in MongoDB.	Sep Week 5	Sep Week 5
Group D				
17	1	Mini Project	August Week 5	October Week 1

PRACTICAL PRACTICE QUESTIONS

MYSQL & PL/SQL

Sr. No	Problem Statement	CO No.
1	Design any database with at least 3 entities and relationships between them. Apply DCL and DDL commands. Draw suitable ER/EER diagram for the system.	C314446 .2
2	Design and implement a database and apply at least 10 different DML queries for the following task. For a given input string display only those records which match the given pattern or a phrase in the search string. Make use of wild characters and LIKE operator for the same. Make use of Boolean and arithmetic operators wherever necessary	C314446.3
3	Execute the aggregate functions like count, sum, avg etc. on the suitable database. Make use of built in functions according to the need of the database chosen. Retrieve the data from the database based on time and date functions like now (), date (), day (), time () etc. Use group by and having clauses.	C314446.5
4	Implement nested sub queries. Perform a test for set membership (in, not in), set comparison (<some, >=some, <all etc.) and set cardinality (unique, not unique).	C314446.5
5	Write and execute suitable database triggers .Consider row level and statement level triggers.	C314446.5
6	Write and execute PL/SQL stored procedure and function to perform a suitable task on the database. Demonstrate its use.	C314446.5
7	Write a PL/SQL block to implement all types of cursor.	C314446.5
8	Execute DDL statements which demonstrate the use of views. Try to update the base table using its corresponding view. Also consider restrictions on	C314446 .2

	updatable views and perform view creation from multiple tables.	
9	Write a procedure a. To add new employee into emp table b. Which will return number of employees working in the department? Pass the dept no.	C314446.5
10	Write a function c. That accepts employee number and returns the salary status as low, high, based on his salary.Which will show the level of the customer whether platinum, gold or silver	C314446.5
11	Write a procedure to find d. length of the string e. reverse of the string	C314446.5
12	Write a procedure to find f. length of the string g. reverse of the string	C314446.5
13	Write a procedure to find a. Sum of digit of the number b. Reverse of the given number	C314446.5
14	Write a function to find h. Sum of digit of the number i. Reverse of the given number.	C314446.5
15	Write a function which j. Will accept input as a number and print whether it is even or odd k. Will find the largest number among three numbers.	C314446.5
16	"Managing customer orders system"	C314446.5

	Scenario: 1. Customer information (unique id, contact number) 2. Customer can place many orders but given purchase order is placed by one customer. 3. Purchase order has many to many relationship with stock item. Write a database trigger to update a "stock" table when a record is inserted in the "orders" table	
17	For University database execute following queries: Department (dept_name, building, budget) Instructor (inst_id, name, salary, dept_name) Course (course_id, title, credits, dept_name) Teaches (course_id, inst_id) • Find the names of all instructors in Computer dept who have salary greater than 70000. • Find the names of instructors who are working in physics dept. • Find the names of instructors whose names are exactly five chracaters. • Create a view to find out only instructors who have taught some course. • Find the names of all instructors whose salary is greater than at least one instructor in biology dept. • Find the names of all departments whose name includes substring " i "	C314446.2, C314446.5
18	For University database execute following queries: Department (dept_name, building, budget) Instructor (inst_id, name, salary, dept_name) Course (course_id, title, credits, dept_name) Teaches (course_id, inst_id)	C314446.2, C314446.5

	• Create a view to find instructor name and course for instructors in IT department. • Find the names of all departments whose name includes substring " i ". • List the entire instructor relation in descending order. • Find the names of all instructors whose salary is greater than at least one instructor in biology dept. • Find titles along with department where department must end with " y ". • Find the titles along with department name of biology department.	
19	For University database execute following queries: Department (dept_name, building, budget) Instructor (inst_id, name, salary, dept_name) Course (course_id, title, credits, dept_name) Teaches (course_id, inst_id) • Find the average salary of the instructors who are in music dept. • Find the average salary in each dept. • Find out department name with average salary in each department where average salary is greater than 40000. • Find the names of all instructors whose salary is greater than at least one instructor in biology dept. • Display joining date of all instructors.	C314446.2, C314446.5
20	Consider a relational database Supplier (Sid, Sname, address) Parts(Pid, Pname, color) Catalog(Sid, Pid, cost) Write SQL queries for the following:	C314446.2, C314446.5

	i) Find the names of suppliers who supply some red parts. ii) Find the names of all parts whose cost is more than Rs.250. iii) Find name of all parts whose color is green. iv) Find number of parts supplied by each supplier	

MONGODB

Sr. No	Problem Statement	CO No.
1	Create a database with suitable example using MongoDB and implement □ inserting and saving document (batch insert, insert validation) □ Removing document □ Updating document (document replacement, using modifiers, upserts, updating multiple documents, returning updated documents)	C314446.6
2	Execute at least 10 queries on any suitable MongoDB database that demonstrates following querying techniques: □ find and findOne (specific values) □ Query criteria (Query conditionals, OR queries, $not, Conditional semantics) □ Type-specific queries (Null, Regular expression, Querying arrays)	C314446.6
3	Execute at least 10 queries on any suitable MongoDB database that demonstrates following: □ $ where queries □ Cursors (Limits, skips, sorts, advanced query options) □ Database commands	C314446.6
4	Implement Map reduce example with suitable example.	C314446.6
5	Implement the aggregation and indexing with suitable example in MongoDB. Demonstrate the following: □ Aggregation framework □ Create and drop different types of indexes and explain () to show the advantage of the indexes.	C314446.6
6	Place an order of any five products from computer Shoppe like – keyboard, monitor mouse, printer, processor, switch, modem etc. and prepare a bill for the same	C314446.6

7	Place an order of any five products from computer Shoppe like – keyboard, monitor mouse, printer, processor, switch, modem etc. and prepare a bill for the same.	C314446.6
8	For student database execute following queries: a. Find the record of the students who has got the highest marks in DBMS subject. b. Find the average result of TOC subject. c. Find the record of the students who has got the lowest marks in CNT subject. d. Find the total number of students who scored first class.	C314446.6
9	Implement map reduce operation for super market.	C314446.6
10	Implement map reduce operation for stationary shop.	C314446.6
11	Create university database (using MongoDB) a. Find the list of teachers in IT dept. b. Find the list of teachers who have salary greater than 50000. c. Find the teacher's list in descending order. d. Remove the teacher whose status is not approved. e. Give the increment of rs.20000 that has salary less than 30000.	C314446.6
12	Create library database (using MongoDB) a. List the books of management subjects. b. List the books whose publication is "Pearson" c. List the number of journals. d. List the number of books which price is less than rs.500. e. Find the total investment for IT dept (IT books).	C314446.6
13	Create Hotel management database using MongoDB & database should perform following operations. • Add • Delete • Update	C314446.6

	• Search • Display	
14	Create Student registration details database using MongoDB & database should perform following operations. • Add • Delete • Update • Search • Display	C314446.6
15	Create teacher database which contains the information of teacher_id, name of teacher, department of teacher,salary and status of teacher. (Status : Approved/Not Approved)Design and implement any five queries using mongoDB.	C314446.6

ORAL QUESTION BANK

MYSQL Assignments

1. What is open source database? Compare all databases.
2. What is the difference between DBMS and RDBMS?
3. What is SQL?
4. What is Non SQL?
5. What is structured and unstructured database?
6. What is difference between MySQL and MongoDB?
7. Explain all the constraints that can be applied on the table.
8. Explain the codd's rules for relational database design.
9. What is an E-R Model?
10. What is an Entity, Attribute?
11. What is a Relation Schema and a Relation?
12. Give example of following relationships :
    a. Many-to-One
    b. One-to-One
    c. One-to-Many
    d. Many-to-Many
13. What is the difference between Primary key and Super key?
14. What is Primary key?
15. What is foreign key and what is its importance?
16. What do you understand by Referential integrity?
17. Explain MYSQL data types.
18. What is the purpose of Index?
19. What difference is between delete and drop statement?
20. What is the difference between truncate command, drop command and delete command?
21. What are the differences between DDL and DML statements?
22. Explain DCL and DDL commands.
23. What is the use of aggregate functions?

24. What does join operation do?
25. What are different types of Join operations?
26. Explain all date functions, string functions.
27. What is the purpose of group by clause in the SELECT statement?
28. What are the nested queries? Explain Set membership operators, set comparison operators and set cardinality operators.
29. How PL/SQL is more advantageous than SQL?
30. What is difference between stored procedure and function?
31. How is stored procedure or function invoked in the main PL/SQL code?
32. How check constraints are applied in MYSQL?
33. What is row level trigger and statement level trigger?
34. What is implicit and explicit cursor? Explain it with an example.
35. What is the purpose to create view? What is an updatable view?

MONGODB Assignments

1. Which type of databases is mongoDB? And Why?
2. What is JSON? How do we use JSON in mongoDB?
3. Explain MongoDB data types.
4. What is the difference between insert and batchinsert?
5. What is upsert?
6. What is difference between find and findOne?
7. Explain CRUD operations in MongoDB with an example.
8. Explain different conditional operators in mongoDB.
9. How to display particular string using regular expression?
10. How to represent null values?
11. What is the difference between where clause in Mysql and in MongoDB?
12. Explain the difference between limit and skip. Can we use both commands in single query?
13. How to remove database?
14. Explain cursor with example.
15. What do you mean by map reduce function, why is it used?

16. What is the difference between map reduce function and aggregate function?
17. What is indexing? And types of indexing?
18. Explain aggregation framework with all operators.
19. Explain explain () function.

ADDITIONAL RESOURCES

1. https://www.w3schools.com/sql/
2. https://www.tutorialspoint.com/mongodb/index.htm
3. MongoDB: The Definitive Guide, 3rd Edition

314447 Software Laboratory-II

SYLLABUS

Teaching Scheme:	Credits	Examination Scheme:
Practical : 4 Hours/Week	02	Term Work : 25 Marks Practical: 50 Marks

Prerequisites:

1. C programming.
2. Fundamental of Data Structures.

Course Objectives :

1. To introduce and learn Linux commands required for administration.
2. To learn shell programming concepts and applications.
3. To demonstrate the functioning of OS basic building blocks like processes, threads under the LINUX.
4. To demonstrate the functioning of OS concepts in user space like concurrency control (process synchronization, mutual exclusion & deadlock) and file handling in LINUX.
5. To aware Linux kernel source code details.
6. To demonstrate the functioning of OS concepts in kernel space like embedding the system call in any LINUX kernel.

Guidelines for Instructor's Manual

1. The faculty member should prepare the laboratory manual for all the experiments and it should be made available to students and laboratory instructor/Assistant.

Guidelines for Student's Lab Journal

1. Student should submit term work in the form of handwritten journal based on specified list of assignments.
2. Practical Examination will be based on the term work.
3. Candidate is expected to know the theory involved in the experiment.
4. The practical examination should be conducted if and only if the journal of the candidate is complete in all respects.

Guidelines for Lab /TW Assessment

1. Examiners will assess the term work based on performance of students considering the parameters such as timely conduction of practical assignment, methodology adopted for

implementation of practical assignment, timely submission of assignment in the form of handwritten write-up along with results of implemented assignment, attendance etc.

2. Examiners will judge the understanding of the practical performed in the examination by asking some questions related to theory & implementation of experiments he/she has carried out.

3. Appropriate knowledge of usage of software and hardware related to respective laboratory should be checked by the concerned faculty member.

As a conscious effort and little contribution towards Green IT and environment awareness, attaching printed papers of the program in journal may be avoided. There must be hand-written write-ups for every assignment in the journal. The DVD/CD containing students programs should be attached to the journal by every student and same to be maintained by department/lab In-charge is highly encouraged. For reference one or two journals may be maintained with program prints at Laboratory.

Suggested List of Laboratory Assignments

Assignment No. 1:

Shell programming :Write a program to implement an address book with options given below:

a) Create address book. b) View address book. c) Insert a record. d) Delete a record.

e) Modify a record.f) Exit.

Assignment No. 2 :

Process control system calls: The demonstration of FORK, EXECVE and WAIT system calls along with zombie and orphan states.

a. Implement the C program in which main program accepts the integers to be sorted. Main program uses the FORK system call to create a new process called a child process. Parent process sorts the integers using sorting algorithm and waits for child process using WAIT system call to

sort the integers using any sorting algorithm. Also demonstrate zombie and orphan states.

b. Implement the C program in which main program accepts an integer array. Main program uses

the FORK system call to create a new process called a child process. Parent process sorts an integer array and passes the sorted array to child process through the command line arguments of

EXECVE system call. The child process uses EXECVE system call to load new program that uses this sorted array for performing the binary search to search the particular item in the array.

Assignment No. 3:

Implement multithreading for Matrix Multiplication using pthreads.

Assignment No. 4:

Thread synchronization using counting semaphores. Application to demonstrate: producer-consumer problem with counting semaphores and mutex.

Assignment No. 5:

Thread synchronization and mutual exclusion using mutex. Application to demonstrate: Reader-Writer problem with reader priority.

Assignment No. 6:

Deadlock Avoidance Using Semaphores: Implement the deadlock-free solution to Dining Philosophers problem to illustrate the problem of deadlock and/or starvation that can occur when many synchronized threads are competing for limited resources.

Assignment No. 7:

Inter process communication in Linux using following.

a.Pipes: Full duplex communication between parent and child processes. Parent process writes a pathname of a file (the contents of the file are desired) on one pipe to be read by child process and child process writes the contents of the file on second pipe to be read by parent process and displays on standard output.

b.FIFOs: Full duplex communication between two independent processes. First process accepts sentences and writes on one pipe to be read by second process and second process counts number of characters, number of words and number of lines in accepted sentences, writes this output in a text file and writes the contents of the file on second pipe to be read by first process and displays on standard output.

Assignment No. 8:

Inter-process Communication using Shared Memory using System V.Application to demonstrate: Client and Server Programs in which server process creates a shared memory segment and writes the message to the shared memory segment. Client process reads the message from the shared memory segment and displays it to the screen.

Assignment No. 9:

Implement an assignment using File Handling System Calls (Low level system calls like open, read, write, etc).

Assignment No. 10:

Implement a new system call in the kernel space, add this new system call in the Linux kernel by the compilation of this kernel (any kernel source, any architecture and any Linux kernel distribution) and demonstrate the use of this embedded system call using C program in user space.

References :

1.Das, Sumitabha, UNIX Concepts and Applications, TMH, ISBN-10: 0070635463, ISBN-13: 978-0070635463, 4th Edition.

2. Kay Robbins and Steve Robbins, UNIX Systems Programming, Prentice Hall, ISBN-13: 978-0134424071, ISBN-10: 0134424077, 2nd Edition.

3. Mendel Cooper, Advanced Shell Scripting Guide, Linux Documentation Project, Public domain.

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Assignment	Assessment Technique	Blooms Taxonomy Category
C314447.1	To understand the basics of Linux commands and program the shell of Linux.	1	CONTINOUS ASSESSMENT &MOCK TEST	Understanding
C314447.2	To develop various system programs for the functioning of operating system.	2		Applying
C314447.3	To implement basic building blocks like processes, threads under the Linux.	3, 4, 5,6		Creating
C314447.4	To develop various system programs for the functioning of OS concepts in user space like concurrency control and file handling in linux.	7, 8, 9		Applying
C314447.5	To design and implement Linux Kernel Source Code.	10		Creating
C314447.6	To develop the system program for the functioning of OS concepts in kernel space like embedding the system call in any linux kernel.	10		Applying

TEACHING PLAN

Teaching Plan Short

- Academic Year:-2017-18 Semester :- I w. e. f. :-18th June 2018
- Class : - TE Division: A & B
- Subject :- Operating System Subject Code :- 314444
- Faculty In charge :-Mrs. Ashwini Bhamre , MR. Digvijay A. Patil
- No. of Lectures/ weeks: 04

- **Practical Plan**

Sr. No.	Assignment No.	Assignment Title	Start Date	End Date
1.	1	Shell programming Write a program to implement an address book with options given below: a) Create address book. b) View address book. c) Insert a record. d) Delete a record. e) Modify a record. f) Exit.	3rd week June	1st Week July
2.	2a.	Process control system calls: The demonstration of FORK, EXECVE and WAIT system calls along with zombie and orphan states. a. Implement the C program in which main program accepts the integers to be sorted. Main program uses the FORK system call to create a new process called a child process. Parent process sorts the integers using sorting algorithm and waits for child process using WAIT system call to sort the integers using any sorting algorithm. Also demonstrate zombie and orphan states.	2nd week July	2nd week july
3	2b	Implement the C program in which main program accepts an integer array. Main program uses the FORK system call to create a new process called a child process. Parent process sorts an integer array and	3rd week july	3rd week July

		passes the sorted array to child process through the command line arguments of EXECVE system call. The child process uses EXECVE system call to load new program that uses this sorted array for performing the binary search to search the particular item in the array.		
4	3	Implement multithreading for Matrix Multiplication using pthreads.	4th week July	4th week July
5	4	Thread synchronization using counting semaphores. Application to demonstrate: producer-consumer problem with counting semaphores and mutex.	1st week August	1st week August
6	5	Thread synchronization and mutual exclusion using mutex. Application to demonstrate: Reader-Writer problem with reader priority.	3rd week August	3rd week August
7	6	Deadlock Avoidance Using Semaphores: Implement the deadlock-free solution to Dining Philosophers problem to illustrate the problem of deadlock and/or starvation that can occur when many synchronized threads are competing for limited resources.	4th week August	4th week August
8	7	Inter process communication in Linux using following. a. Pipes: Full duplex communication between parent and child processes. Parent process writes a pathname of a file (the contents of the file are desired) on one pipe to be read by child process and child process writes the contents of the file on second pipe to be read by parent process and displays on standard output. b. FIFOs: Full duplex communication between two independent processes. First process accepts sentences and writes on one pipe to be read by second process and second process counts	1st week Sept.	1st week Sept.

		number of characters, number of words and number of lines in accepted sentences, writes this output in a text file and writes the contents of the file on second pipe to be read by first process and displays on standard output.		
10	8	Inter-process Communication using Shared Memory using System V. Application to demonstrate: Client and Server Programs in which server process creates a shared memory segment and writes the message to the shared memory segment. Client process reads the message from the shared memory segment and displays it to the screen.	2nd week Sept.	2nd week Sept
11	9	Implement an assignment using File Handling System Calls (Low level system calls like open, read, write, etc).	3rd week Sept.	3rd week Sept.
12	10	Implement a new system call in the kernel space, add this new system call in the Linux kernel by the compilation of this kernel (any kernel source, any architecture and any Linux kernel distribution) and demonstrate the use of this embedded system call using C program in user space.	4th week Sept.	4th week Sept.

PRACTICAL PRACTICE QUESTIONS

1. Shell programming Write a program to implement an address book with options given below: a) Create address book. b) View address book. c) Insert a record. d) Delete a record. e) Modify a record. f) Exit.
2. Process control system calls:

   Implement the C program in which main program accepts the integers to be sorted. Main program uses the fork system call to create a new process called a child process. Parent process sorts the integers using **merge sort** and waits for child process using wait system call to sort the integers using **quick sort**. Also demonstrate zombie state.
3. Process control system calls:

   Implement the C program in which main program accepts the integers to be sorted. Main program uses the fork system call to create a new process called a child process. Parent process sorts the integers using **insertion sort** and waits for child process using wait system call to sort the integers using **selection sort**. Also demonstrate orphan state.
4. Process control system calls: The demonstration of fork, execve

   Implement the C program in which main program accepts an integer array. Main program uses the fork system call to create a new process called a child process. Child process sorts an integer array and usesexecve system call to load new program that uses this sorted array to find largest element in the array.
5. Process control system calls: The demonstration of fork, execve

   Implement the C program in which main program accepts an integer array. Main program uses the fork system call to create a new process called a child process. Child process sorts an integer array and usesexecve system call to load new program that uses this sorted array to search element using binary search
6. Thread management using pthread library: Implement matrix multiplication using multithreading. Application should have pthread_create, pthread_join, pthread_exit. In the program, every thread must return the value and must be collected in pthread_join in the main function. Final sum of row-column multiplication must be done by main thread (main function).

7. Thread synchronization using counting semaphores and mutual exclusion using mutex. Application to demonstrate: producer consumer problem with counting semaphores and mutex.
8. Deadlock Avoidance using Semaphores: Implement the deadlock free solution to Dining Philosophers problem to illustrate the problem of deadlock and/or starvation that can occur when many synchronized threads are competing for limited resources.
9. Inter process communication in Linux using Pipes : Full duplex communication between parent and child processes. Parent process accepts the pathname (the contents of the file are desired) from user and writes it on one pipe to be read by child process and child process writes total number of characters of the file on second pipe to be read by parent process and displays on standard output.
10. Inter process communication in Linux using Pipes : Full duplex communication between parent and child processes. Parent process writes a pathname of a file (the contents of the file are desired) on one pipe to be read by child process and child process writes the contents of the file on second pipe to be read by parent process and displays on standard output.
11. Inter process communication in Linux using FIFOs: Full duplex communication between two independent processes. First process accepts a sentence from user and writes on one pipe to be read by second process and second process counts number of upper case letters, lower case letters and number of special symbols in accepted sentence, writes this output in a text file named “gtk.txt” and writes the contents of the file on second pipe to be read by first process and displays on standard output.
12. FIFOs: Full duplex communication between two independent processes. First process accepts sentences and writes on one pipe to be read by second process and second process counts number of characters, number of words and number of lines in accepted sentences, writes this output in a text file and writes the contents of the file on second pipe to be read by first process and displays on standard output.
13. Inter-process Communication using Shared Memory using System V. Application to demonstrate: Client and Server Programs in which server process creates a shared memory segment and writes the message to the shared memory segment. Client process reads the message from the shared memory segment and displays it to the screen.

14. Implement an assignment using File Handling System Calls (Low level system calls like open, read, write, etc).
15. Implement a new system call in the kernel space, add this new system call in the Linux kernel by the compilation of this kernel (any kernel source, any architecture and any Linux kernel distribution) and demonstrate the use of this embedded system call using C program in user space.

ORAL QUESTION BANK

Assignment 1

1. What is a UNIX shell?
2. What are the different types of commonly used shells on a typical Linux system?
3. What needs to be done before you can run a shell script from the command line prompt?
4. How do you terminate a shell script if statement?
5. What UNIX operating system command would you use to display the shell's environment variables?
6. How do you access command line arguments from within a shell script?
7. Within a UNIX shell scripting loop construct, what is the difference between the break and continue?
8. What is the significance of $#?
9. What is the difference between $* and $@?
10. Given a file, write a command sequence to find the count of each word.
11. What is the difference between $$ and $!?
12. What is the significance of $?
13. Explain use of sed.

Assignment 2

1. Write and implement any five options of ps command from command manual.
2. Write and implement the top command.
3. Explain with example, how to make the process to run at background?
4. Write and implement any five options of kill command from command manual.
5. What is nice value? Write and implement nice command.
6. Explain with example, how to show processes created by system?
7. What is zombie and orphan states.
8. What is the use of wait() and waitpid() function
9. Explain execve() function .
10. Explain fork() function

Assignment 3

1. Explain thread.
2. Difference between thread and process.
3. What is multithreading? Advantages of multithreading.
4. Explain use of pthread_create()
5. Explain pthread_join(),pthread_exit()
6. What is use of –lpthread
7. Types of thread

Assignment 4

1. What is critical section.
2. Three conditions for critical section
3. Explain semaphore and types
4. Explain sem_init(),sem_wait(),sem_post(),sem_destroy() functions.
5. Explain mutex.
6. Explain producer consumer problem.
7. What is the difference between pthread and lpthread?
8. How binary and counting semaphores are differentiated in Linux functions?

Assignment 5 & 6

1. What is the difference between mutex and binary semaphore?
2. How many number of maximum philosophers will this problem have?
3. What is deadlock?
4. Explain deadlock 4 necessary conditions for deadlock to occur
5. Alternative solutions to deadlock problem.
6. Write the use of -pthread flag with gcc.
7. What is difference between -pthread and -lpthreadgcc flags?
8. What is difference between mutex and semaphores in Linux multithreading?

Assignment 7

1. List out different IPC mechanisms

2. Explain PIPE
3. How to create pipe.
4. Difference between PIPE and FIFO
5. How to create FIFO
6. Use of signal
7. Types of signal
8. What is SIGCHLD.
9. Enlist the system calls related to Signals.
10. What are the advantages of FIFO over pipe?
11. Explain the situation where FIFO is appropriate structure used over pipe.
12. State the difference between named and unnamed pipes.
13. Explain the use of | operator with the example of multiple commands. (At least three examples with practical demonstration is expected).
15. What is difference between pipe and shared memory implementation in Linux IPC?

Assignment 8

1. What is IPC?
2. Which are different methods used foe IPC?
3. Explain shared memory for IPC.
4. List different shared memory system calls.
5. What is use of shmget() ?
6. How to access shared memory?
7. Explain controlling of shared memory segment.

Assignment 9

1. Explain virtual file system
2. Explain proc file system
3. Explain cat /proc/hello_proc
4. Explain functions

proc_create

remove_proc_entry

hello_proc_show()

seq_printf

hello_proc_open()

single_open()

5. What are limitations of proc file system

Assignment 10

1. Explain system call
2. Difference between system call and library function.
3. Explain ltrace and strace
4. How to add system call in linux kernel.
5. Explain syscall().

ADDITIONAL RESOURCES

1. www.tutorialspoint.com
2. https://spoken-Tutorial.org/tutorialsearch/?search_foss=BASH&search_language=English-USA
3. www.byte-code.com

314448
Software Laboratory-III

SYLLABUS

314448 : SOFTWARE LABORATORY – III

Teaching Scheme	Credits	Examination Scheme
Practical : 2 Hours/Week	01	Term Work : 50 Marks

Preamble:

A major component of the course is a Graphical User Interface development. The objective is to develop a GUI by using concepts learned from Software Engineering and Project management. At the beginning of the course, Course Teacher will form project teams with maximum 3 members. During the semester, the project team will work together through all the phases of development cycle up to design, from an initial feasibility study to designing, after designing phase students will deploy the designed system and will make a series of presentations and reports of the work.

Prerequisites:

1. Programming fundamentals.
2. Problem solving skills.

Course Objectives :

1. To understand the nature of software complexity in various application domains, disciplined way of software development and software life cycle process models.
2. To introduce principles of agile software development, the SCRUM process and agile practices.
3. To know methods of capturing, specifying, visualizing and analyzing software requirements.
4. To understand concepts and principles of software design and architecture.
5. To understand user-centric design approach.
6. To apply principles of designing for effective user interfaces.

Course Outcomes :

1. To identify the needs of users through requirement gathering.
2. To apply the concepts of Software Engineering process models for project development.
3. To apply the concepts of HCI for user-friendly project development.
4. To deploy website on live web server and access through URL.

5. To understand, explore and apply various web technologies.

6. To develop team building for efficient project development.

Guidelines for Instructor's Manual

1. The faculty member should prepare the laboratory manual for all the experiments and it should be made available to students and laboratory instructor/Assistant.

Guidelines for Student's Lab Journal

1. Student should submit term work in the form of handwritten journal based on specified list of assignments.

2. Practical Examination will be based on the term work.

3. Candidate is expected to know the theory involved in the experiment.

4. The practical examination should be conducted if and only if the journal of the candidate is complete in all respects.

Guidelines for Lab /TW Assessment

1. Examiners will assess the term work based on performance of students considering the parameters such as timely conduction of practical assignment, methodology adopted for implementation of practical assignment, timely submission of assignment in the form of handwritten write-up along with results of implemented assignment, attendance etc.

2. Examiners will judge the understanding of the practical performed in the examination by asking some questions related to theory & implementation of experiments he/she has carried out.

3. Appropriate knowledge of usage of software and hardware related to respective laboratory should be checked by the concerned faculty member.

As a conscious effort and little contribution towards Green IT and environment awareness, attaching printed papers of the program in journal may be avoided. There must be hand-written write-ups for every assignment in the journal. The DVD/CD containing students programs should be attached to the journal by every student and same to be maintained by department/lab In-charge is highly encouraged. For reference one or two journals may be maintained with program prints at Laboratory.

SUGGESTED LIST OF LABORATORY ASSIGNMENTS

Group A :Website Design (HTML5, CSS, Bootstrap)

Assignment No. 1: Using HTML5 layout tags develop informative page with sections which include various images, links to other pages for navigation, make use of all possible formatting (for example font, color etc.).

Assignment No. 2: Apply CSS properties Border, margins, Padding, Navigation, dropdown list to page created in first assignment.

Group B : Website GUI Validation (JavaScript, PHP)

Assignment No. 3: Create form in HTML with all form elements apply form validations (e.g. Email, mobile, Pin code, Password).

Assignment No. 4: Validate URL, Email, Required using functions empty, preg_match, filter_var in PHP.

Group C : Website Working (Java Servlet)

Assignment No. 5: Understand servlet life cycle, create login page and apply proper validations with appropriate messages using doGet()/ doPost() methods.

Group D : Website Development (Mini-Project)

Assignment No. 6: Develop website using any CMS tool which falls into one of the categories blog, social networking, News updates, Wikipedia, E-commerce store. Website must include home page, and at least 3 forms (with Validation), use at list HTML5, PHP, CSS/Bootstrap, JavaScript web technologies. No database support is needed. Deploy website on live webserver and access through URL.

Write a complete report of web development stages for the chosen topic and attach printout of the same with screen shots of web pages. Proper use of every technique used for web designing should be followed like for designing wireframe is used. Human computer interaction and user experience concepts learned from HCI should be applied while web development process.

Guidelines for Mini project

1. Project group of maximum 3 students should be formed.
2. Every group member should participate in every stage of the web development.
3. Proper compilation of the report should be attached in the file in printed format.

4. Use of CMS should be done for only Assignment no 6 (Mini Project).

5. At the end of the semester, group should give a presentation of the Mini Project.

References:

1. HTML, XHTML and CSS, Fourth Edition by Steven M. Schafer, Wiley India Edition. ISBN: 978- 81-265- 1635-3.

2. Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP, 4thEdition by Ivan Bayross, BPB Publications. ISBN: 9788183330084.

3. Professional Word Press: Design and Development by Brad Williams, David Damstra, Hal Stern, Wrox publications Web Technologies Black Book: HTML, JavaScript, PHP, Java, JSP, XML and AJAX by Kogent Learning Solutions Inc. ISBN: 9788126554560, 8126554568.

4. Wordpress for Web developers: An introduction to web professionals by Stephanie Leary, Apress Publications. ISBN: 9781430258667, 1430258667.

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit	Assessment Technique	Blooms Taxonomy Category
C314445 .1	To identify the needs of users through requirement gathering.	Assignment No. 1-6	Practical Assignment	III. Applying
C314445.2	To apply the concepts of Software Engineering process models for project development.	Assignment No. 6	Practical Assignment	III. Applying
C314445.3	To apply the concepts of HCI for user-friendly project development.	Assignment No. 1-6	Practical Assignment	III. Applying
C314445.4	To deploy website on live web server and access through URL.	Assignment No. 6	Practical Assignment	III. Applying
C314445 .5	To understand, explore and apply various web technologies.	Assignment No.1-5	Practical Assignment	II.Understanding, III. Applying, IV. Analyzing
C314445 .6	To develop team building for efficient project development.	Assignment No. 6	Practical Assignment	VI. Creating

PREREQUISITES

Sr. No.	Assignment Number	Prerequisite subject name
1.	I	1. Programming fundamentals. 2. Problem solving skills.
2.	II	1. Programming fundamentals. 2. Problem solving skills.
3.	III	1. Programming fundamentals. 2. Problem solving skills.
4.	IV	1. Programming fundamentals. 2. Problem solving skills.
5.	V	1. Programming fundamentals. 2. Problem solving skills.
6.	VI	1. Programming fundamentals. 2. Problem solving skills. 3.Software Engineering

TEACHING PLAN

Teaching Plan Short

Academic Year:-2018-2019	Semester:-I	w. e. f. :- 15.6.2018
Class : - TEIT-B		Division: B
Subject :- SOFTWARE LABORATORY – III		Subject Code :- 314448
Faculty In charge :- Prof.Shreyasi S.Paul		No. of Practical/ weeks: 2

- **Practical Plan**

Sr. No.	Assignment No.	Assignment Title	Start Date	End Date
1.	1	Using HTML5 layout tags develop informative page with sections which include various images, links to other pages for navigation, make use of all possible formatting (for example font, color etc.).	June Mid week	June Last week
2.	2	Apply CSS properties Border, margins, Padding, Navigation, dropdown list to page created in first assignment.	July first week	July second week
3.	3	Create form in HTML with all form elements apply form validations (e.g. Email, mobile, Pin code, Password).	July second week	July last week
4.	4	Validate URL, Email, Required using functions empty, preg_match, filter_var in PHP.	August 2nd week	August 3rd week
5.	5	Understand servlet life cycle, create login page and apply proper validations with appropriate messages using doGet()/ doPost() methods.	August last week	September 1st week
6.	6	**Website Development (Mini-Project)** Develop website using any CMS tool which falls into one of the categories blog, social networking, News updates, Wikipedia, E-commerce store. Website must include home page, and at least 3 forms (with Validation), use at list HTML5, PHP, CSS/Bootstrap, JavaScript web technologies. No database support is needed. Deploy website on live webserver and access through URL.	September 2nd week	September 3rd week

		Write a complete report of web development stages for the chosen topic and attach printout of the same with screen shots of web pages. Proper use of every technique used for web designing should be followed like for designing wireframe is used. Human computer interaction and user experience concepts learned from HCI should be applied while web development process.		

ORAL QUESTION BANK

Sr. No.	Question	CO No.
1	1) What is HTML? 2) What are Tags? 3) Do all HTML tags have? 4) What are some common lists that are used when designing a page? 5) What is the difference between HTML elements and tags? 8) How to insert a copyright symbol on a browser page? 9) How do you keep list elements straight in an HTML file? 10) Does a hyperlink only apply to text? 14) What is a marquee? 16) How to make a picture a background image of a web page?	C314448:1. C314448:3. C314448:5
2	1) What is CSS? 2) What is the origin of CSS? 3) What are the different variations of CSS? 4) How can you integrate CSS on a web page? 5) What are the advantages of CSS? 6) What are the limitations of CSS? 7) What are the CSS frameworks? 8) Why background and color are the separate properties if they should always be set together? 9) What is the difference between CSS2 and CSS3?	C314448:1. C314448:3. C314448:5
3	1) What is validation? 2) What is verification? 3) What is the difference between verification and validation? 4) How you implement validation in password field?	C314448:1. C314448:3. C314448:5
4	1) What is PHP? 2) What is PEAR in PHP? 3) Who is known as the father of PHP? 4) Explain the difference b/w static and dynamic websites? 5) Explain the difference between PHP4 and PHP5. 6) What are the popular frameworks in PHP? 7) What is "echo" in PHP?	C314448:1. C314448:3. C314448:5

5	1. What is different between web server and application server? 2. Which HTTP method is non-idempotent? 3. What is the difference between GET and POST method? 4. What is MIME Type? 5. What is a web application and what is it's directory structure? 6. What is a servlet? 7. What are the advantages of Servlet over CGI? 8. What are common tasks performed by Servlet Container? 9. What is ServletConfig object? 10. What is ServletContext object? 11. What is difference between ServletConfig and ServletContext? 12. What is Request Dispatcher? 13. What is difference between PrintWriter and ServletOutputStream? 14. Can we get PrintWriter and ServletOutputStream both in a servlet? 15. How can we create deadlock situation in servlet? 16. What is the use of servlet wrapper classes? 17. What is SingleThreadModel interface? 18. Do we need to override service() method? 19. What is servlet life cycle? Explain with proper diagram. 20. Write the syntax.	C314448:1. C314448:3. C314448:5
6	1) Explain project. 2) How you use HCI concept here? 3) How you use Software Engineering concept here? 4) What is team building planning of your project?	C314448:1. C314448:3. C314448:5 C314448:4 C314448:6