SJPN Trust's

Hirasugar Institute of Technology, Nidasoshi.

Inculcating Values, Promoting Prosperity

Approved by AICTE, New Delhi, Permanently Affiliated to VTU, Belagavi
Recognized under 2(f) &12B of UGC Act, 1956
Accredited at 'A' Grade by NAAC & Programmes Accredited by NBA:CSE & ECE

Dept. of CSE

Academic

Course Plan

2022-23 (ODD)

INSTITUTE VISION

"To be a preferred institution in Engineering Education by achieving excellence in teaching and research and to remain as a source of pride for its commitment to holistic development of individual and society"

INSTITUTE MISSION

"To continuously strive for the overall development of students by educating them in a state-of-the-art-infrastructure, by retaining the best practices, faculties and inspire them to imbibe real time problem solving skills, leadership qualities, human values and societal commitments, so that they emerge as competent professionals".

DEPARTMENT VISION

"To be a center of excellence in providing education in the field of Computer Science and Engineering to produce technically competent and socially responsible IT professionals"

DEPARTMENT MISSION

"To provide a theoretical foundation in computing with the exposure of latest tools and technologies, IT infrastructure and encourage students for continuous learning to make them competent professionals"

PROGRAM EDUCATIONAL OBJECTIVES (PEO's) :

1. *Pursue a successful career in the field of Computer Science & Engineering utilizing his/her knowledge and contribute to the profession as an excellent employee, or as an entrepreneur.*

2. *Apply the knowledge of mathematics & computer science fundamentals to analyze & formulate the solution to solve real time problems.*

3. *Exhibit the professional and ethical values, communication & teamwork skills, lifelong learning, multidisciplinary approach to address computer engineering and societal issues.*

PROGRAM OUTCOMES (PO's) :

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, review research literature, and analyze 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 modeling 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.*

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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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.*

PROGRAM SPECIFIC OUTCOMES (PSO's) :

PSO1: *Uunderstand, design and analyze computer programs in the areas related to Algorithms, System Software, Web design, Big data Analytics, Machine Learning and Networking.*

PSO2: *Make use of modern computer tools for creating innovative career paths to be an entrepreneur and desire for higher studies.*

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1.0   Student Help Desk

Sl. No.	Purpose	Contact Person	
		Faculty	**Instructor**
1	Research Center Coordinator ,Dept. NBA Coordinator Conference / FDP / Workshop, IIIC/Internship Coordinator, NBA Criteria1 Coordinator Module Coordinator	Dr. K. B. Manwade	Mr. A. K. Talawar
2	Website Coordinator, Feedback Coordinator, Final year seminar Coordinator, NBA Criteria 4 Coordinator NACC Criteria 3 Co-Coordinator, Module Coordinator	Dr. Mahesh. G. Huddar	Mr. A. K. Badakar
3	Dept. ED Cell Coordinator ,NBA Criteria 6 Coordinator, NAAC Criteria 1 Co-coordinator Module Coordinator, Class Teacher for VII Sem Microprocessor Lab Incharge	Prof. N. K. Honnagoudar	Mr. V. V. Manashi
4	Head of Department, Innovation Club Coordinator AICTE activity point Coordinator, NBA Criteria 7 and 10 Coordinator, Module Coordinator, Project Lab Incharge	Prof. S. V. Manjaragi	Mr. A. R. Bhiste
5	GATE/Pre-placement Coaching Coordinator, Dept. T&P coordinator, NBA Criterion 9 Coordinator NACC Criterion-5 Co-Coordinator, Class Teacher for V Sem	Prof. N. M. Patel	Mr. A. K. Badakar
6	EMS/IA Coordinator, Alumni Coordinator, NBA Criteria 3 Coordinator, NACC Criterian-7 Co-Coordinator, Dept. Time table Coordinator / Meeting Coordinator, Module coordinator	Prof. A. A. Daptardar	Mr. V. V. Manashi
7	Department Association Coordinator (STAC), Technical magazine / Newsletter, Professional body Coordinator (IEEE/ISTE), NBA Criteria 5 Coordinator Web Programming Lab Incharge	Prof. P. G. Patil	Mr. A. K. Talawar
10	Project/KSCST Coordinator, NBA Criteria 2 Coordinator, Class Teacher for III Sem, Computer Center Lab Incharge	Prof. S. I. Mane	Mr. A. R. Bhiste
11	Dept. Library	Mr. A. R. Bhiste	
Institute Level			
12.	Dean Student Welfare Convener	Dr. Mahesh G. Huddar (7411043272)	
13.	Dean Placements and III Cell	Prof. N. M. Patel (9739619661)	
14.	Internal Complaint Committee Convener	Prof. S. S. Kamate (9008696825)	
15.	Grievance Redressal Convener	Prof. S. S. Tabhaj (9901398134)	
16.	Sports & Cultural/Extra-Curricular Activities Convener	Sri. S.B. Sarawadi (9739109383)	

2.0   Departmental Resources

Department of Computer Science and Engineering was established in the year 1996 and is housed in a total area of ***1206 Sq. Mtrs.***

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2.1 Faculty Position

Sl.No.	Category	No. in Position	Average experience (in years)
1.	Teaching Faculty	08	14.5
2.	Technical Supporting Staff	05	12.6
3.	Helper Staff	03	21

2.2 Major Laboratories

Sl.No.	Name of the laboratory	Area in Sq. Mtrs	Amount Invested (Rs. in Lakhs)
1.	System Programming Lab.	70	12.65
2.	C Programming Lab/ Algorithms/ Network Lab.	70	19.34
3.	Project Laboratory	70	20.06
4.	Microprocessors Lab.	70	22.14
5.	Web Programming/DBA Lab.	70	09.56
6.	Computer Center	220	234.79

Total Investment in the Department   **Rs. 318.54 Lakhs**

3.0 Teaching Faculty Details

Sl. No.	Name	Designation	Qualification	Specializ-ation	Professional Membership	Teaching Exp (in yrs)	Phone No.
1	Dr. K. B. Manwade	Assoc. Prof	M. Tech, Ph.D	CSE	LMISTE,CSI	17.06	8412968254
2	Dr. Mahesh. G. Huddar	Assoc. Prof	M. Tech, Ph.D	CSE	LMISTE	13.00	7411043272
3	Prof. N. K. Honnagoudar	Asst. Prof.	M.E	ECE	LMISTE	19.06	9449495302
4	Prof. S. V. Manjaragi	Asst. Prof.	M.Tech.(Ph.D)	CSE	LMISTE	18.06	9986658309
5	Prof. N. M. Patel	Asst. Prof	M. Tech	CSE	LMISTE	17.01	9739619661
6	Prof. A.A. Daptardar	Asst. Prof	M. Tech.	CSE	LMISTE	15.06	9620851002
7	Prof. P. G. Patil	Asst. Prof	M. Tech	CSE	LMISTE,CSI,IE	09.1	9743202717
8	Prof. Sujata Mane	Asst. Prof	M. Tech	CNE	--	8.00	9743202717

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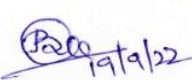
4.0   Institute Academic Calendar

CALENDAR OF EVENTS FOR THE ACADEMIC YEAR 2022-23 (Odd)

Date	Events
19-09-2022	Commencement of Classes for VII Semester
24-09-2022	NSS Foundation Day
02-10-2022	Gandhi Jayanthi
10-10-2022	Commencement of Classes for V Semester
24-10-2022 to 30-10-2022	Traffic Week
27-10-2022 to 29-10-2022	First Internal Assessment for VII Semester
31-10-2022	Feedback -I on Teaching-Learning for VII Semester
31-10-2022	National Integration Day
31-10-2022	Commencement of Classes for III Semester
01-11-2022	Kannad Rajyothsava
03-11-2022	Display of 1st Internal Assessment Marks and submission of Feedback-I of VII Semester to office
09-11-2022 to 18-11-2022	Environment Awareness Month
22-11-2022	World's Aids Day
26-11-2022	First Assignment Submission of III Semester (PCC + IPCC)
28-11-2022 to 30-11-2022	Second Internal Assessment for VII Semester & First Internal Assessment for III (PCC + IPCC) /V Semester
01-12-2022	Feedback –II on Teaching-Learning for VII Semester & Feedback – I on Teaching-Learning for III/V Semester
06-12-2022	Display of 2nd Internal Assessment Marks and submission of Feedback-II of VII Semester & Display of 1st Internal Assessment Marks and submission of Feedback-I of III/V Semester to office
10-12-2022	Human Rights Day
10-12-2022	Sports Day
23-12-2022 & 24-12-2022	First Lab Internal Assessment for III Semester (PCC+AEC)
26-12-2022 & 27-12-2022	Lab Internal Assessment for VII Semester
29-12-2022 to 31-12-2022	Third Internal Assessment for VII Semester & Second Internal Assessment for III (PCC + IPCC) /V Semester
31-12-2022	Last working day for VII Semester
02-01-2023	Feedback –II on Teaching-Learning for III/V Semester
05-01-2023	Display of Final IA Marks of VII Semester
05-01-2023	Display of 2nd Internal Assessment Marks and submission of Feedback-II of III/V Semester to office
07-01-2023	Second Assignment Submission of III Semester (PCC + IPCC)
12-01-2023	National Youth Day
15-01-2023	NSS Day
20-01-2023 & 21-01-2023	Lab Internal Assessment for V Semester
23-01-2023 to 25-01-2023	Third Internal Assessment for V Semester
26-01-2023	Republic Day
27-01-2023	Last working day for V Semester
30-01-2023 to 01-02-2023	Second Lab Internal Assessment for III Semester (PCC+IPCC+AEC)
31-01-2023	Display of Final IA Marks of V Semester
06-02-2023 to 08-02-2023	Third Internal Assessment for III Semester (PCC)
11-02-2023	Last working day for III Semester
14-02-2023	Display of Final IA Marks of III Semester

September-2022

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October-2022

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30	31					

04- Mahanavami, Ayudhapooja 05- Vijayadashami
24- Naraka Chaturdashi, 26- Balipadyami Deepavalli

Novemner-2022

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01- Kannada Rajyothsava, 11- Kanakadasa Jayanti

December-2022

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January-2023

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29	30	31				

14-Makara Sankranti, 26- Republic Day

February-2023

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26	27	28				

18- Mahashivaratri

Dr. B. V. Madiggond
Dean (Academics)

Dr. S. C. Kamate
Principal

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5.0   Department Academic Calendar

DEPARTMENT OF COMPUTER SCIENCE & ENGG.
CALENDAR OF EVENTS FOR THE ACADEMIC YEAR 2022-23 (Odd)

Date	Events
19-09-2022	Commencement of Classes for VII Semester
10-10-2022	Commencement of Classes for V Semester
14-10-2022	*Tech Talk by Industry Expert on Latest Technology*
27-10-2022 to 29-10-2022	First Internal Assessment for VII Semester
31-10-2022	Feedback -I on Teaching-Learning for VII Semester
31-10-2022	Commencement of Classes for III Semester
01-11-2022	Kannad Rajyothsava
03-11-2022	Display of 1st Internal Assessment Marks and submission of Feedback-I of VII Semester to office
04-11-2022	*Cooking Without Fire Competition*
05-11-2022 - 07-11-2022	*32 Hours Workshop on "IoT" - Vth Sem Students*
12-11-2022	*Industrial Visit - III & V Sem students*
18-11-2022	*Webinar on Latest Technology*
19-11-2022	*Inauguration of STAC Activities for the AY 2022-23 & Welcome function to 3rd Sem Students*
25-11-2022	*Technical Essay Writing Competition*
26-11-2022	First Assignment Submission of III Semester (PCC + IPCC)
28-11-2022 to 30-11-2022	Second Internal Assessment for VII Semester & First Internal Assessment for III (PCC + IPCC) /V Semester
01-12-2022	Feedback –II on Teaching-Learning for VII Semester & Feedback – I on Teaching-Learning for III/V Semester
02-12-2022	*Box Cricket*
06-12-2022	Display of 2nd Internal Assessment Marks and submission of Feedback-II of VII Semester & Display of 1st Internal Assessment Marks and submission of Feedback-I of III/V Semester to office
09-12-2022	*Coding Competition- "Codeathon-2022"*
10-12-2022	Sports Day
16-12-2022	*Git & GitHub Workshop*
23-12-2022 & 24-12-2022	First Lab Internal Assessment for III Semester (PCC+AEC)
26-12-2022 & 27-12-2022	Lab Internal Assessment for VII Semester
29-12-2022 to 31-12-2022	Third Internal Assessment for VII Semester & Second Internal Assessment for III (PCC + IPCC) /V Semester
31-12-2022	Last working day for VII Semester
02-01-2023	Feedback –II on Teaching-Learning for III/V Semester
05-01-2023	Display of Final IA Marks of VII Semester
05-01-2023	Display of 2nd Internal Assessment Marks and submission of Feedback-II of III/V Semester to office
06-01-2023	*One Day Short-Term training on Web Designing using WordPress*
07-01-2023	Second Assignment Submission of III Semester (PCC + IPCC)
12-01-2023	National Youth Day
15-01-2023	NSS Day
19-01-2023	*Mini Project Exhibition and Competition*
20-01-2023 & 21-01-2023	Lab Internal Assessment for V Semester
23-01-2023 to 25-01-2023	Third Internal Assessment for V Semester
26-01-2023	Republic Day
27-01-2023	Last working day for V Semester
30-01-2023 to 01-02-2023	Second Lab Internal Assessment for III Semester (PCC+IPCC+AEC)
31-01-2023	Display of Final IA Marks of V Semester
06-02-2023 to 08-02-2023	Third Internal Assessment for III Semester (PCC)
11-02-2023	Last working day for III Semester
14-02-2023	Display of Final IA Marks of III Semester

September-2022

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October-2022

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04- Mahanavami, Ayudhapooja 05- Vijayadashami
24- Naraka Chaturdashi, 26- Balipadyami Deepavalli

Novemner-2022

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14-Makara Sankranti, 26- Republic Day

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5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

18- Mahashivaratri

Prof. Prasanna Patil
STAC Coordinator

Prof. S. V. Manjaragi
HOD

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6.0 Scheme of Teaching & Examination

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
Scheme of Teaching and Examination 2018 – 19
Choice Based Credit System (CBCS) AND Outcome Based Education (OBE)
(Effective from the academic year 2018 – 19)

V SEMESTER

Sl. No.	Course and Course code		Course Title	Teaching Department	Teaching Hours /Week			Duration in hours	Examination			Credits
					L	T	P		CIE Marks	SEE Marks	Total Marks	
1	HSMC	18CS51	Management, Entrepreneurship for IT industry	HSMC	2	2	--	03	40	60	100	3
2	PCC	18CS52	Computer Networks and Security	CS / IS	3	2	--	03	40	60	100	4
3	PCC	18CS53	Database Management System	CS / IS	3	2	--	03	40	60	100	4
4	PCC	18CS54	Automata theory and Computability	CS / IS	3	--	--	03	40	60	100	3
5	PCC	18CS55	Application Development using Python	CS / IS	3	--	--	03	40	60	100	3
6	PCC	18CS56	Unix Programming	CS / IS	3	--	--	03	40	60	100	3
7	PCC	18CSL57	Computer Network Laboratory	CS / IS	--	2	2	03	40	60	100	2
8	PCC	18CSL58	DBMS Laboratory with mini project	CS / IS	--	2	2	03	40	60	100	2
9	HSMC	18CIV59	Environmental Studies	Civil/ Environmental [Paper setting: Civil Engineering Board]	1	--	--	02	40	60	100	1
	TOTAL				18	10	04	26	360	540	900	25

Note: PCC: Professional Core, HSMC: Humanity and Social Science.

AICTE activity Points: In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of degree only after the release of the Eighth semester Grade Card.

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Subject Title	MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY		
Subject Code	18CS51	IA Marks	40
Number of Lecture Hrs / Week	04	Exam Marks	60
Total Number of Lecture Hrs	40	Exam Hours	03
CREDITS – 03			

FACULTY DETAILS:

Name: Prof. N. M. Patel	Designation: Asst. Professor	Experience:17.2
No. of times course taught:07 including present	Specialization: Computer Science & Engineering	

1.0   Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Common to all	I/II	Constitution Of India, Professional Ethics & Human Rights

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2.0   Course Objectives

This course will enable students to learn

- Principles of management, organization and entrepreneur.
- Discuss on planning, staffing, ERP and their importance.
- Infer the importance of intellectual property rights and relate the institutional support.

3.0   Course Outcomes

After studying this course, students will be able to

COs	Course Outcome	Cognitive Level	POs
C301.1	Explain the basic concepts of management, planning, Organizing and Staffing.	L2	1,2,7,8
C301.2	Summarize the appropriate leadership styles, motivation theories, communications, Coordination and controlling, methods	L2	6,7,8,10
C301.3	Interpret the meaning of entrepreneur, entrepreneurship and role in economic development on India. Along with Identification of business opportunities and feasibility study	L2	1,2,6,9,12
C301.4	Inferring the new ideas, Prepare project report based on guidelines of planning commission by utilizing the resources available effectively through ERP	L2	1,2,10,11
C301.5	Explain the IPRs and institutional support in Micro and Small Enterprises as per the Indian Industrial Policy 2007.	L2	1,2,6,7,11,12
Total Hours of instruction		**40**	

4.0   Course Content

Module1:   **08 Hours**

Introduction - Meaning, nature and characteristics of management, scope and Functional areas of management, goals of management, levels of management, brief overview of evolution of management theories,. Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of Organization, Staffing- meaning process of recruitment and selection. **RBT: L1, L2**

Module2:   **08 Hour**

Directing and controlling- meaning and nature of directing, leadership styles, motivation theories, Communication- Meaning and importance, Coordination- meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control. **RBT: L1, L2**

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Module 3:   **08 Hours**

Entrepreneur – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs, various stages in entrepreneurial process, role of entrepreneurs in economic development, entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study, technical feasibility study, financial feasibility study and social feasibility study. **RBT: L1, L2**.

Module 4:   **08 Hours**

Preparation of project and ERP - meaning of project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report, **Enterprise Resource Planning: Meaning and Importance- ERP** and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation. **RBT: L1, L2**

Module 5:   **08 Hours**

Micro and Small Enterprises: Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India indusial policy 2007 on micro and small enterprises, case study (Microsoft), Case study(Captain G R Gopinath),case study (N R Narayana Murthy & Infosys), **Institutional support:** MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency, **Introduction to IPR RBT: L1, L2**.

5.0   Relevance to future subjects

Sl. No	Semester	Subject	Topics
01	VIII	Project work	Project identification, project selection, project report, need and significance of project report, contents and formulation

6.0   Relevance to Real World

Sl. No	Real World Mapping
01	Outline importance of management, planning, staffing, Enterprise Resource Planning (ERP) in Entrepreneurship.
02	Utilize the resources available effectively through ERP
03	Institutional support in entrepreneurship

7.0   Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	Tutorial	Seminar on Micro and Small Enterprises
02	NPTEL	Study on entrepreneurship

8.0   Books Used and Recommended to Students

Text Books
1. Principles of Management -P. C. Tripathi, P. N. Reddy; Tata McGraw Hill, 4th / 6th Edition, 2010.
2. Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
3. Entrepreneurship Development -Small Business Enterprises -Poornima M Charantimath Pearson Education – 2006.
4. Management and Entrepreneurship – Kanishka Bedi- Oxford University Press-2017

Reference Books
1. Management Fundamentals -Concepts, Application, Skill Development Robert Lusier– Thomson.
2. Entrepreneurship Development -S S Khanka -S Chand & Co.
3. Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003

Additional Study material & e-Books
1. Iyer, P.P., Engineering Project Management with Case Studies, Vikas Publishing, New Delhi, 2009.
2. Zikmund, W.G., Business Research Methods, 5th Edition, New York, The Dryden Press, Harcount Publishers, 1997.
3. M Govindarajan and S. Natarajan, Principles of Management, Eastern Economy Edition, 2005.

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Academic

Course Plan

2022-23 ODD

9.0	**Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended**

Website and Internet Contents References
1) https://www.managementstudyguide.com/entrepreneurship-articles.htm
2) https://www.scribd.com/document/305671935/Business-Management-Study-Guide

10.0	**Magazines/Journals Used and Recommended to Students**

Sl.No	Magazines/Journals	Website
1	International Entrepreneurship and Management Journal	https://link.springer.com/journal/11365
2	International Journal of Entrepreneurship and Innovation Management	www.inderscience.com/ijeim
3	International Entrepreneurship and Management Journal (IntEnterprenManag J)	www.inderscience.com/jhome.php?jcode=IJMED

11.0	**Examination Note**

Internal Assessment: 30+10=40 Marks
    30 marks –from internal assessment test
    10 marks- from the assignments
Scheme of Evaluation for Internal Assessment (50 Marks)
    a) Internal Assessment test is conducted for 50 marks in the same pattern as that of the main examination. Average of all three Test marks will be taken and finally scale down to 30 marks.
    b) Assignment marks for each module is 25. Average of 5 assignment marks will be taken and finally scale down to 10 marks.

Question Paper Pattern (IA):
1. Two main questions to be set from syllabus covered up to IA tests.
2. Student has to answer two full main questions and each question carries 25.
    a. Q.No I or Q.No II   =25 Marks
    b. Q.No III or Q.No IV   =25 Marks
    c. Total   **=50 Marks**

Question Paper Pattern and instructions (Main Exam):
1. The question paper will have TEN questions.
2. There will be TWO questions from each module.
3. Each question will have questions covering all the topics under a module.
4. The students will have to answer FIVE full questions, selecting ONE full question from each module.
    Max. Marks: 100 and each question carries 20 marks. Exam Duration: 3 Hrs.

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12.0   Course Delivery Plan

Module	Lecture No.	Content of Lecture	% of Portion
1	1	**Introduction** - Meaning, nature and characteristics of management.	20
	2	Goals of management, levels of management.	
	3	Brief overview of evolution of management theories.	
	4	Planning-Nature, importance, types of plans.	
	5	Steps in planning.	
	6	Organizing- nature and purpose.	
	7	Types of Organization.	
	8	Staffing- meaning process of recruitment and selection.	
2	9	**Directing and controlling-** meaning and nature of directing.	20
	10	Leadership styles.	
	11	Motivation theories.	
	12	Communication- Meaning and importance.	
	13	Coordination- meaning and importance.	
	14	Controlling- meaning.	
	15	Steps in controlling,	
	16	Methods of establishing control.	
3	17	**Entrepreneur**–meaning of entrepreneur, characteristics of entrepreneurs and classification.	20
	18	Types of entrepreneurs	
	19	Various stages in entrepreneurial process.	
	20	Role of entrepreneurs in economic development.	
	21	Entrepreneurship in India and barriers to entrepreneurship.	
	22	Identification of business opportunities and market feasibility study.	
	23	Technical feasibility study.	
	24	Financial feasibility study and social feasibility study.	
4	25	**Preparation of project and ERP -** meaning of project, project identification, project selection.	20
	26	Project report, need and significance of project report.	
	27	Contents, formulation, guidelines by planning commission for project report.	
	28	**Enterprise Resource Planning:** Meaning and Importance.	
	29	**ERP** and Functional areas of Management.	
	30	Marketing / Sales- Supply Chain Management.	
	31	Finance and Accounting – Human Resources.	
	32	Types of reports and methods of report generation.	
5	33	**Micro and Small Enterprises:** Definition of micro and small enterprises.	20
	34	Characteristics and advantages of micro and small enterprises.	
	35	Steps in establishing micro and small enterprises.	
	36	Government of India indusial policy 2007 on micro and small enterprises.	
	37	Case study (Microsoft), Case study (Captain G R Gopinath), case study (N R Narayana Murthy & Infosys).	
	38	**Institutional support:** MSME-DI, NSIC, SIDBI.	
	39	KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency	
	40	**Introduction to IPR.**	

13.0   Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment1: Some important University Questions on Module one.	Students study the Topics and write the Answers. Get practice to solve questions	Module one of the syllabus	3	Individual Activity. Witten solutions expected.	Text book

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2	Assignment 2: Some important University Questions on Module two	Students study the Topics and write the Answers. Get practice to solve questions	Module two of the syllabus	6	Individual Activity. Witten solutions expected.	Text book
3	Assignment 3: Some important University Questions on module three.	Students study the Topics and write the Answers. Get practice to solve questions	Module three of the syllabus	9	Individual Activity. Witten solutions expected.	Text book
4	Assignment 4: Some important University Questions on and comprehensive Questions module four.	Students study the Topics and write the Answers. Get practice to solve questions	Module four of the syllabus	11	Group Activity power point presentation	Text book and reference books
5	Assignment 5: Some important University Questions on and comprehensive questions module five.	Students study the Topics and write the Answers. Get practice to solve questions	Module five of the syllabus	13	Group Activity power point presentation	Text book and reference books

14.0   QUESTION BANK

Module 1:

1. Explain management –A science, art or profession? (June 2010, Dec 2017/Jan 2018)
2. What is the scope of management? (Jan 2010, Jan 2012)
3. Bring out the differences between management and administration. (Jan 2010, Dec 2011)
4. Define management and describe the functions of the management. (June 2015 June 2010, Dec 2011)
5. What are the roles of manager? Explain. (June 2015)
6. Explain various functions of management. (Dec 2017/Jan 2018)
7. Explain the different levels of management. (Dec 2012)
8. Explain various roles of management.
9. Explain modern management approaches. (Jan 2010, June 2010)
10. What are different levels of management? Explain. (Jan 2014)
11. Explain scientific management. (Dec 2012)
12. Explain different skills and their importance at different levels of management.
13. Is management is science or an art? Explain.
14. Why management can be considered as a profession?
15. Explain various functional areas of management. (Dec 2012)
16. What is scientific management? Explain Taylor's scientific principles of management.
17. Explain different milestones in development of management thought.
18. What are contributions of Henry Fayol? Explain. (Dec 2017/Jan 2018)
19. Explain the principles of management.
20. Explain early management approaches. (June 2015)
21. Explain behavior approach to management.
22. Explain the contributions of Hawthorne experiments.
23. Explain quantitative approach to management.
24. Compare various approaches to management.
25. What are the steps involved in planning? Explain. (Dec 2017/Jan 2018)
26. Explain committee organization with its advantages and disadvantages. (Dec 2017/Jan 2018)
27. What is management? List the functional areas of management and explain any two in detail.(Jan 2021)
28. Write a note on need and importance of staffing. (Jan 2021)
29. Explain importance of planning. Briefly explain general steps involved in planning. (Jan 2021)
30. Define recruitment. List sources of recruitment. (Jan 2021)

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Module 2:

1. What are the sources of recruitment? (Dec 2017/Jan 2018)
2. What is directing? Explain the importance of directing.
3. Explain the methods of establishing sound controlling. (June 2010)
4. Explain different styles and importance of leadership in organization. (June 2014, Dec 2017/Jan 2018)
5. Explain Lickert's four system management.
6. Briefly explain comparison of Maslow's and Herzberg theories of human motivation. (Dec 2012, Jan 2010)
7. What do you mean by charismatic leadership? (July 2012)
8. Differentiate between transactional and transformational leadership.
9. Differentiate between autocratic and democratic styles of leadership.
10. What are the various techniques of coordination? (Jan 2010)
11. Explain various theories of leadership. (Jan 2021)
12. Are leaders made born? Justify. (Jan 2010)
13. Give principles of directing. Differentiate between autocratic, participative and free-rein styles of leadership.
    (June 2010, , Dec 2017/Jan 2018)
14. What is trait theory of leadership? Explain.
15. What is managerial grid? Explain.
16. What is contingency theory of leadership? Explain Fielder's model.
17. Define the term motivation and explain its importance.
18. What is two factor theory? Explain.
19. Discuss McGregor's theory X and theory Y. (June 2010)
20. Compare different theories of motivation.
21. What is communication? Explain its importance. (Dec 2011)
22. Explain different types of communication also explain importance of communication. (Dec 2017/Jan 2018) (Jan 2021)
23. What are barriers to communication? Explain.
24. What is coordination? Explain the need of coordination. (Dec 2017/Jan 2018)
25. State and explain steps in controlling. (Dec 2011)
26. What is controlling? Explain its importance.
27. What are the different types of steps involved in controlling process? (Dec 2012) (Jan 2021)
28. Explain how controlling is related to planning.
29. Explain principles of controlling.
30. Discuss the process of controlling. (Dec 2017/Jan 2018)
31. Explain the different techniques used in controlling.
32. Differentiate between co-ordination and co-operation. (Jan 2021)

Module 3:

1. Define entrepreneurship. Explain the functions of entrepreneur. (Jan 2010)
2. Write and explain types of entrepreneur. (July 2015,Dec 2017/Jan 2018/Jan 2021)
3. Who is an entrepreneur and how is he different from a businessman?
4. Differentiate entrepreneur and entrepreneurship. (July 2014)
5. Explain stages in entrepreneurial process. (Dec 2011, Dec 2015, Dec 2017/Jan 2018)
6. Tabulate the changing definition of entrepreneur and entrepreneurship.
7. Discuss the characteristics of entrepreneurs. (Dec 2011)
8. Discuss in detail how entrepreneurs view risk.
9. Describe the entrepreneurial process.
10. Describe role of entrepreneurs in economic development.
11. Discuss the evolution and growth of industrial entrepreneurship in India.(Dec 2011) (Jan 2021)
12. Describe the various problems faced by entrepreneurs in promotion of their units.
13. Discuss the scope of entrepreneurship in India.
14. Who are entrepreneur? Explain the difference between entrepreneurs and intrapreneurs. (Dec 2012)
15. Explain evolution of entrepreneurship.
16. Explain the difference between entrepreneurs, intrapreneurs and managers. (June 2010)
17. Explain the types of entrepreneur.
18. What are the barriers of entrepreneurship? (Jan 2010, June 2010, Dec 2012, Dec 2017/Jan 2018)
19. Explain technical and financial feasibility study (Dec 2017/Jan 2018/Jan 2021)

Module 4:

1. Define the term project. What are the features of a project?
2. Explain the project identification and project selection.(July 2015, Dec 2017/Jan 2018)
3. Explain the control variables of a project.
4. What is project management? What are the activities of project management?
5. Explain the need and significance of project report. (Jan 2010, Dec 2011)
6. What is a project report? Why is it needed?
7. Explain the factors which are to be considered for preparation of a good project report. (Dec 2017/Jan 2018)
8. What is project identification? Explain the sources of information for project identification. (Dec 2017/Jan 2018)
9. What is project selection? Explain factors influencing it. (Jan 2021)
10. Explain the planning commission guidelines for preparing a project report. (Jan 2010, Dec 2011, July 2015)
11. List the various components of a project report. What is project appraisal?
12. Explain the phase of project identification with sources. (Jan 2010)
13. What are the errors in preparing a project report? (Dec 2011)
14. What are the guidelines by planning commission for a project report? Explain.
15. Write about project formulation process.
16. What are the contents of –Project Report? Explain. (Dec 2012)
17. What is ERP? Explain its importance and need of ERP. (Dec 2017/Jan 2018/Jan 2021)
18. What is project? Explain various ways of project identification. (Jan 2021)
19. Write a note on functional areas of management- finance and accounting and human resources. (Jan 2021)
20. Write a note on functional areas of management- marketing / sales and supply chain management. (Jan 2021)

Module 5:

1. Define micro and small enterprises.
2. Mention the characteristics and advantages of micro and small enterprises. (Jan 2021)
3. Write case study of Microsoft.
4. Write case study of N R Narayana Murthy & Infosys. (Dec 2017/Jan 2018/Jan 2021)
5. List various supporting agencies of central and state government and list the services offered by them.
6. Explain the objectives and functions of KSFC and NSIC. (Dec 2012)
7. What is TECSOK? Explain the services offered by it.
8. What are objectives and functions of KIADB? (June 2012)
9. Write a note on SIDBI and NSIC. (Jan 2010)
10. Explain the objectives and functions of TECSOK and KIADB. (Dec 2011)
11. Explain the role of KIADB and services offered by it. Explain various functional units of KIADB.
12. Explain assistance provided by KSIMC.
13. Explain the various assistance provided by TECSOK and KSSIDC. (Dec 2012)
14. Write a note on DIC single window agency.
15. What is SIDBI? Explain the services offered by it and various types of assistances provides to Small enterprise. (Dec 2011)
16. Write a note on TECSOK, KIADB, KSSIDC, KSIMC, KSFC. (Jan 2010, June 2010, June 2015)
17. What are the objectives and problems of SFC. (Dec 2017/Jan 2018)
18. What are the different types of patents? Explain. (Dec 2017/Jan 2018/Jan 2021)
19. Briefly explain about trademarks in IPR. (Dec 2017/Jan 2018)
20. Explain steps involved in establishing micro and small enterprises. (Jan 2021)
21. Explain case study of air Deccan. (Jan 2021)

15.0 University Result

Examination	FCD	FC	SC	Fail	% Passing
Feb/March-2022	09	25	17	00	100
Jan/Feb-2021	05	16	16	06	86.04

Prepared by	Checked by		
Prof. N. M. Patel	Dr. K. B. Manwade	HOD	Principal

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Subject Title	COMPUTER NETWORKS AND SECURITY		
Subject Code	18CS52	**IA Marks**	40
Number of Lecture Hrs / Week	05	**Exam Marks**	60
Total Number of Lecture Hrs	50	**Exam Hours**	03
CREDITS-			

FACULTY DETAILS:

Name: Prof. Nyamatulla M Patel	**Designation:** Asst. Professor	**Experience:** 17.02 Years
No. of times course taught: 2 (including present)	**Specialization:** Computer Science & Engineering.	

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Computer Science and Engg	4	Data communication
02	Computer Science and Engg	3	DMS

2.0 Course Objectives

1. Demonstration of application layer protocols.
2. Discuss transport layer services and understand UDP and TCP protocols.
3. Explain routers, IP and Routing Algorithms in network layer.
4. Disseminate the Wireless and Mobile Networks covering IEEE 802.11 Standard.
5. Illustrate concepts of Multimedia Networking, Security and Network Management.

3.0 Course Outcomes

After successful completion of this course, the student will be able to

	Course Outcome	Cognitive Level	Pos
C302.1	Explain principles of application layer protocols	U	1,2,4,5,10,11
C302.2	Identify transport layer services and infer UDP and TCP protocols	U	1,2,4,5,10,11
C302.3	Classify routers, IP and Routing Algorithms in network layer	U	1,2,4,5,10,11
C302.4	Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard	U	1,2,4,5,10,11
C302.5	Explain Multimedia Networking and Network Management	U	1,2,4,5,10,11
Total Hours of instruction		**50**	

4.0 Course Content

Module – 1   10Hours

Application Layer: Principles of Network Applications: Network Application Architectures, Processes Communicating, Transport Services Available to Applications, Transport Services Provided by the Internet, Application-Layer Protocols. The Web and HTTP: Overview of HTTP, Non-persistent and Persistent Connections, HTTP Message Format, User-Server Interaction: Cookies, Web Caching, The Conditional GET, File Transfer: FTP Commands & Replies, Electronic Mail in the Internet: SMTP, Comparison with HTTP, Mail Message Format, Mail Access Protocols, DNS; The Internet's Directory Service: Services Provided by DNS, Overview of How DNS Works, DNS Records and Messages, Peer-to-Peer Applications: P2P File Distribution, Distributed Hash Tables. Socket Programming: creating Network Applications: Socket Programming with UDP, Socket Programming with TCP. **T1: Chap 2**

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Module-2   10Hours

Transport Layer : Introduction and Transport-Layer Services: Relationship Between Transport and Network Layers, Overview of the Transport Layer in the Internet, Multiplexing and Demultiplexing: Connectionless Transport: UDP, UDP Segment Structure, UDP Checksum, Principles of Reliable Data Transfer: Building a Reliable Data Transfer Protocol, Pipelined Reliable Data Transfer Protocols, Go-Back-N, Selective repeat, Connection-Oriented Transport TCP: The TCP Connection, TCP Segment Structure, Round-Trip Time Estimation and Timeout, Reliable Data Transfer, Flow Control, TCP Connection Management, Principles of Congestion Control: The Causes and the Costs of Congestion, Approaches to Congestion Control, Network-assisted congestion-control example, ATM ABR Congestion control, TCP Congestion Control: Fairness. **T1: Chap 3**

Module-3   10Hours

The Network layer: What's Inside a Router? Input Processing, Switching, Output Processing, Where Does Queuing Occur? Routing control plane, IPv6, A Brief foray into IP Security, Routing algorithms: The Link-State (LS) Routing Algorithm, The Distance-Vector (DV) Routing Algorithm, Hierarchical Routing, Routing in the Internet, Intra-AS Routing in the Internet: RIP, Intra-AS Routing in the Internet: OSPF, Inter/AS Routing: BGP, Broadcast and Multicast Routing: Broadcast Routing Algorithms and Multicast. **T1: Chap 4: 4.3-4.7**

Module-4   10Hours

Network Security: Overview of Network Security: Elements of Network Security, Classification of Network Attacks, Security Methods, Symmetric-Key Cryptography: Data Encryption Standard (DES), Advanced Encryption Standard (AES), Public-Key Cryptography: RSA Algorithm, Diffie-Hellman Key-Exchange Protocol, Authentication: Hash Function, Secure Hash Algorithm (SHA), Digital Signatures, Firewalls and Packet Filtering, Packet Filtering, Proxy Server. **T1: Chap: 10**

Module-5   10Hours

Multimedia Networking: Properties of video, properties of Audio, Types of multimedia Network Applications, Streaming stored video: UDP Streaming, HTTP Streaming, Adaptive streaming and DASH, content distribution Networks. Voice-over-IP: Limitations of the Best-Effort IP Service, Removing Jitter at the Receiver for Audio, Recovering from Packet Loss Protocols for Real-Time Conversational Applications, RTP, SIP. **T1: Chap7**

5.0   Relevance to future subjects

Sl. No	Subject	Topics
1	Cryptography, network security and cyber law	Network security
2	Wireless networks and mobile computing	TCP/IP
3	Storage area networks	SAN, NAS Replication (topologies), FC Protocol Stack, FCIP, Replication
4	Cloud Computing	Cloud architecture, basic networking concepts
5	Project work	Network related concepts

6.0   Relevance to Real World

Sl. No	Real World Mapping
01	Mobile Computing, Cloud Computing, Storage Area Networks, etc.

7.0   Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	NPTEL	Computer Networks
02	NPTEL	Data Communication

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8.0   Books Used and Recommended to Students

Text Books
1. James F Kurose and Keith W Ross, Computer Networking, A Top-Down Approach, Sixth edition, Pearson,2017 .

Reference Books
1. Behrouz A Forouzan, Data and Communications and Networking, Fifth Edition, McGraw Hill, Indian Edition.
2. Larry L Peterson and Brusce S Davie, Computer Networks, fifth edition, ELSEVIER.
3. Andrew S Tanenbaum, Computer Networks, fifth edition, Pearson.
4. Mayank Dave, Computer Networks, Second edition, Cengage Learning

Additional Study material & e-Books

9.0   Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

https://en.wikipedia.org/wiki/Leaky_bucket

Wireshark tool

https://tools.ietf.org/html/rfc791

https://www.ietf.org/rfc/rfc793.txt

10.0   Magazines/Journals Used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	IEEE	http://ieeexplore.ieee.org/Xplore/home.jsp
2	CSI	http://www.csi-india.org/

11.0   Examination Note

Internal Assessment: 30+10=40 Marks

    30 marks –from internal assessment test

    10 marks- from the assignments

Scheme of Evaluation for Internal Assessment (50 Marks)

    a) Internal Assessment test is conducted for 50 marks in the same pattern as that of the main examination. Average of all three Test marks will be taken and finally scale down to 30 marks.

    b) Assignment marks for each module is 25. Average of 5 assignment marks will be taken and finally scale down to 10 marks.

Question Paper Pattern (IA):
1. Two main questions to be set from syllabus covered up to IA tests.
2. Student has to answer two full main questions and each question carries 25.
   a.   Q.No I or Q.No II   =25 Marks
   b.   Q.No III or Q.No IV   =25 Marks
   c.   **Total**   **=50 Marks**

Question Paper Pattern and instructions (Main Exam):
1. The question paper will have TEN questions.
2. There will be TWO questions from each module.
3. Each question will have questions covering all the topics under a module.
4. The students will have to answer FIVE full questions, selecting ONE full question from each module.

    Max. Marks: 100 and each question carries 20 marks. Exam Duration: 3 Hrs.

12.0   Course Delivery Plan

Module	Lecture No.	Content of Lecturer	% of Portion
		PART – A	
1	1	Principles of Network Applications	20
	2	The Web and HTTP	
	3	The Web and HTTP (continued)	
	4	The Web and HTTP ,File Transfer: FTP	
	5	Electronic Mail in the Internet	
	6	Electronic Mail in the Internet (continued)	
	7	DNS—The Internet's Directory Service	
	8	Peer-to-Peer Applications	
	9	Socket Programming: Creating Network Applications	
	10	Socket Programming: Creating Network Applications (continued)	
2	11	Introduction and Transport-Layer Services	. 20
	12	Multiplexing and Demultiplexing	
	13	Connectionless Transport: UDP	
	14	Principles of Reliable Data Transfer	
	15	Principles of Reliable Data Transfer(continued)	
	16	Connection-Oriented Transport: TCP	
	17	Connection-Oriented Transport: TCP(continued)	
	18	Principles of Congestion Control	
	19	Principles of Congestion Control (continued)	
	20	TCP Congestion Control	
3	21	What's Inside a Router?	20
	22	The Internet Protocol (IP): Forwarding and Addressing in the Internet	
	23	The Internet Protocol (IP): Forwarding and Addressing in the Internet	
	24	Routing Algorithms	
	25	Routing Algorithms (continued)	
	26	Routing in the Internet	
	27	Routing in the Internet (continued)	
	28	Routing in the Internet (continued)	
	29	Broadcast and Multicast Routing	
	30	Broadcast and Multicast Routing (continued)	
4	31	Network Security: Overview of Network Security: Elements of Network Security	20
	32	Classification of Network Attacks ,Security Methods	
	33	Symmetric-Key Cryptography :Data Encryption Standard (DES)	
	34	Advanced Encryption Standard (AES)	
	35	Public-Key Cryptography :RSA Algorithm ,	
	36	Diffie-Hellman Key-Exchange Protocol	
	37	Authentication :Hash Function , Secure Hash Algorithm (SHA)	
	38	Digital Signatures , Firewalls and Packet Filtering	
	39	Digital Signatures , Firewalls and Packet Filtering	
	40	Packet Filtering , Proxy Server	
5	41	Properties of video, properties of Audio,	20
	42	Types of multimedia Network Applications	
	43	Streaming stored video: UDP Streaming, HTTP Streaming	
	44	Adaptive streaming and DASH, content distribution Networks	
	45	Adaptive streaming and DASH, content distribution Networks	
	46	Voice-over-IP :Limitations of the Best-Effort IP Service	
	47	Removing Jitter at the Receiver for Audio	
	48	Recovering from Packet Loss Protocols for Real-Time Conversational Applications	
	49	RTP	
	50	SIP	

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13.0   Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment1: University Questions Application layer	Students study the Topics and write the Answers. Get practice to solve university questions.	Module-01 of the syllabus	3	Individual Activity.	Text book-1
2	Assignment2: University Questions Transport layer	Students study the Topics and write the Answers. Get practice to solve university questions.	Module-2 of the syllabus	6	Individual Activity.	Text book-1
3	Assignment3: University Questions Network layer	Students study the Topics and write the Answers. Get practice to solve university questions.	Module-03 of the syllabus	8	Individual Activity.	Text book-1
4	Assignment 4: University Questions Mobile and Multimedia Networks	Students study the Topics and write the Answers. Get practice to solve university questions.	Module-04 of the syllabus	10	Individual Activity.	Text book-1
5	Assignment 5: University Questions on Multimedia Networking Applications	Students study the Topics and write the Answers. Get practice to solve university questions.	Module-05 of the syllabus	12	Individual Activity.	Text book-1

14.0   QUESTION BANK

MODULE 1
1. Explain Transport Services Provided by the Internet.
2. Write note on and HTTP and Web caching
3. Explain DNS functionalities.
4. Write note on SMTP.
5. How the DNS resolves queries.
6. With neat diagram explain DNS message format.
7. Write a program for client server interaction by using TCP socket?
8. Write a program for client server interaction by using UDP socket?
9. Differentiate between HTTP persistent connection and non-persistent connection.
10. Compare Client-Server and Peer to Peer architecture.   (5 Marks Dec-2017/Jan2018)
11. Describe HTTP with persistent and non-persistent connection.   (8 Marks Dec-2017/Jan2018)
12. What are the services provided by DNS?   (3 Marks Dec-2017/Jan2018)
13. Demonstrate socket implementation using TCP.   (8 Marks Dec-2017/Jan2018)
14. Write a note on web caching.   (4 Marks Dec-2017/Jan2018)
15. Illustrate the basic operation of SMTP with an example.   (4 Marks Dec-2017/Jan2018)
16. What are the different types of services provided by the internet. (8 Marks June/July-2018)
17. Compose logical note on proxy-server with suitable diagram.   (8 Marks June/July-2018)
18. Discuss how files are distributed in peer-to-peer application. (8 Marks June/July-2018)
19. Design network application using socket programming with UDP. (8 Marks June/July-2018)
20. Explain HTTP messages.   (8 Marks Dec 2018-19)
21. Explain web caching with diagram.   (8 Marks Dec 2018-19)
22. Explain FTP with its command and replies.   (8 Marks Dec 2018-19)
23. Explain SMTP.   (4 Marks Dec 2018-19)
24. Explain DNS resource record.   (4 Marks Dec 2018-19)
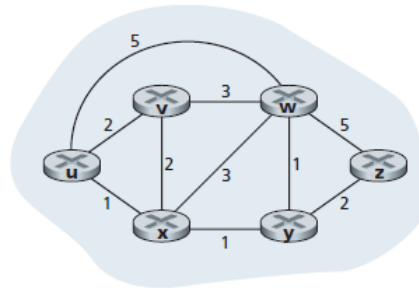
MODULE 2
1. Explain UDP segment Structure.
2. With neat diagram explain Go Back N protocol.
3. With neat diagram explain selective repeat protocol.
4. Write note on multiplexing and demultiplexing.
5. Explain in detail UDP.
6. Explain in detail RDT 1.0.
7. Explain in in detail RDT 2.0.

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8. Explain in in detail RDT 3.0.
9. Compare Stop and wait protocol with pipelined protocol.
10. With neat diagram explain three way handshake protocol.
11. With neat diagram explain TCP segment structure.
12. With neat diagram explain TCP connection management.
13. Explain TCP congestion control mechanism in detail.
14. Elaborate the three way handshaking in TCP.   (5 Marks Dec-2017/Jan2018)
15. Discuss Go Back N protocol.   (6 Marks Dec-2017/Jan2018)
16. Explain the connection oriented multiplexing and demultiplexing   (5 Marks Dec-2017/Jan2018)
17. State congestion and discuss the cause of congestion.   (4 Marks Dec-2017/Jan2018)
18. With neat diagram explain the TCP segment structure.   (8 Marks Dec-2017/Jan2018)
19. Suppose that two measured sample RTT values are 106ms and 120ms.compute
    1) Estimated RTT after each of these sample RTT is obtained. Assume α=0.125 and estimated RTT is 100ms just before first of the samples obtained.
    2) Compute DevRTT. Assume β=0.25 and DevRTT was 5ms before first of the samples are obtained.
                                                                    (4 Marks Dec-2017/Jan2018)
20. Describe the various fields of UDP segment. Explain how Checksum is calculated.
                                                                    (8 Marks June/July-2018)
21. Design RDT2.0 protocol.   (8 Marks June/July-2018)
22. With a neat sketch explain the TCP segment and its services.   (8 Marks June/July-2018)
23. Explain how connection is established and teardown in TCP.   (8 Marks June/July-2018)
24. Explain senders view of sequence number and its operation in Goback N protocol.
                                                                    (8 Marks Dec 2018-19)
25. Draw TCP segment structure and explain.   (8 Marks Dec 2018-19)
26. Explain 3 way handshake and closing a TCP connection.   (8 Marks Dec 2018-19)
27. Explain the causes and costs of congestion.   (8 Marks Dec 2018-19)

MODULE 3
1. Explain Network layer functionalities in detail.
2. With neat diagram explain router architecture.
3. Give the classification of IPV4 Addressing.
4. Explain IPV4 header format.
5. Explain IPV6 header format.
6. Write note on subnetting.
7. Write note on CIDR.
8. Write a note on NAT.
9. How the IP performs fragmentation and reassembly of packets.
10. Explain classful addressing scheme.
11. Write a note on DHCP.
12. Write a note on ICMP.
13. Explain the transition issues from IPV4 to IPV6.
14. Differentiate between IPV4and IPV6.
15. Explain the services provided by IPSEC.
16. Give the comparison of LS and DS routing algorithms.
17. Explain Distance Vector routing algorithm.
18. Explain Link State routing algorithm.
19. Explain RIP.
20. Explain BGP.
21. Explain OSPF.
22. Write note on multicast routing algorithm.
23. Write the link-state routing algorithm. Solve the following graph using link-state routing algorithm with source node 'u'.   (8 Marks Dec-2017/Jan2018)

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24. What is routing? Explain the structure of a router. (8 Marks Dec-2017/Jan2018)
25. Discuss the IPV6 packet format. (5 Marks Dec-2017/Jan2018)
26. Elaborate the path attributes in BGP and steps to select BGP routes. (5 Marks Dec-2017/Jan2018)
27. List the broadcast routing algorithms. Explain any one of them. (6 Marks Dec-2017/Jan2018)
28. Draw IPV6 datagram format, mention the significance of each fields. (8 Marks June/July-2018)
29. Illustrate Routing Information Protocol (RIP) with suitable diagram. (8 Marks June/July-2018)
30. Explain the spanning tree algorithm. (8 Marks June/July-2018)
31. Apply distance-vector algorithm for following Fig

(8 Marks June/July-2018)
32. With diagram explain router architecture. (8 Marks Dec 2018-19)
33. Explain IP fragmentation. (8 Marks Dec 2018-19)
34. Explain distance vector algorithm. (8 Marks Dec 2018-19)
35. Explain 4 types of hierarchical OSPF routers. (4 Marks Dec 2018-19)
36. Compare link state with distance vector algorithm. (4 Marks Dec 2018-19)

Module 4
1. Explain DES algorithm.
2. Explain public key encryption protocols.
3. Classify internet infrastructure attacks.
4. Explain the secret key cryptography.
5. With an example, explain public key cryptography.
6. Explain DES standard.
7. Explain RSA algorithm. Using it, encrypt the following: P=5, q=11, e=7, p=18 (Jan-2010)
8. What are the elements of network security? Explain the threats to network security.
   (6M) Jan 2015
9. Explain RSA algorithm. Using RSA algorithm encrypt a message m=9. Assume a=3 and b=11.Find public and private key's and show the ciphertext. (8M) Jan 2015, June /July 2015 6M
10. Explain the routing table poisoning and denial of service attacks. Dec.2015/Jan 2016 6M
11. Differentiate between DES and RSA. Dec.2015/Jan 2016 4M

Module 5
1. Classify multimedia applications.
2. Write note on HTTP Streaming.
3. Explain CDN operation in detail.
4. How the analog audio signal is converted to digital signal.
5. Explain UDP Streaming.
6. Explain HTTP streaming.
7. Explain Adaptive streaming and DASH.
8. Explain the approaches that are used to provide network-level support for multimedia applications.
9. Explain different link scheduling methods.
10. What do you mean by policing? Explain Leaky bucket algorithm.

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11. Explain DiffServ.
12. Elaborate the features of streaming stored video.　　(3 Marks Dec-2017/Jan2018)
13. With neat diagram explain the CDN operation.　　(8 Marks Dec-2017/Jan2018)
14. Summarize the limitations of best effort IP service.　　(5 Marks Dec-2017/Jan2018)
15. Explain the DiffServ internet architecture.　　(5 Marks Dec-2017/Jan2018)
16. Describe the leaky bucket policing mechanism.　　(6 Marks Dec-2017/Jan2018)
17. Discuss the Round robin and weighted fair queuing scheduling mechanism.
　　　　　　　　　　　　　　　(5 Marks Dec-2017/Jan2018)
18. Brief out three broad categories of multimedia network application.(8 Marks June/July-2018)
19. Discuss the followings:1)Adaptive streaming 2)DASH　　(8 Marks June/July-2018)
20. With general format, explain the various fields of RTP.　　(8 Marks June/July-2018)
21. Explain the working procedure of leaky bucket algorithm.　　(8 Marks June/July-2018)
22. With diagram, explain naïve architecture for audio/video streaming.　(8 Marks Dec 2018-19)
23. Explain audio compression in internet.　　(8 Marks Dec 2018-19)
24. With diagram explain interaction between client and server using RTSP (8 Marks Dec 2018-19)
25. Explain how streaming from streaming server to media player is done.　(8 Marks Dec 2018-19)

15.0　　University Result

Examination	FCD	FC	SC	% Passing
Jan-Feb 2021-22	09	24	15	94.11
Jan-Feb 2020-21	12	21	9	97.67

Prepared by	Checked by		
Prof. N. M. Patel	Prof. S. V. Manjaragi	HOD	Principal

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Subject Title	DATABASE MANAGEMENT SYSTEMS		
Subject Code	18CS53	**IA Marks**	40
Number of Lecture Hrs / Week	3:2:0	**Exam Marks**	60
Total Number of Lecture Hrs	50	**Exam Hours**	03
CREDITS – 04			

FACULTY DETAILS:

Name: Prof. Aruna A. Daptardar	**Designation:** Assistant Professor	**Experience:**16.5 Years
No. of times course taught: 04		**Specialization:** Computer Science and Engineering

1.0   Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Computer Science and Engineering	I/II	Programming in C
02	Computer Science and Engineering	III	Data Structures

2.0   Course Objectives

This course will enable students to

1. Provide a strong foundation in database concepts, technology, and practice.
2. Practice SQL programming through a variety of database problems.
3. Demonstrate the use of concurrency and transactions in database
4. Design and build database applications for real world problems.

3.0   Course Outcomes

After studying this course, students will be able to

CO	Course Outcome	Cognitive	POs
C303.1	Define, Identify and analyze database objects, enforce integrity constraints on a database using RDBMS.	L4	PO1-PO3, PO8, PO10, PO12
C303.2	Use Structured Query Language (SQL) for database manipulation.	L3	PO1-PO3, PO8, PO10,PO12
C303.3	Build simple database systems	L3	PO1-PO3, PO8, PO10,PO12
C303.4	Develop application to interact with databases.	L3	PO1-PO3, PO8, PO10,PO12
	Total Hours of instruction		**50**

4.0   Course Content

Module 1   10 Hours

Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, History of database applications. **Overview of Database Languages and Architectures:** Data Models, Schemas, and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment. **Conceptual Data Modeling using Entities and Relationships:** Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization.
Textbook 1:Ch 1.1 to 1.8, 2.1 to 2.6, 3.1 to 3.10

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Module 2   10 Hours

Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations. **Relational Algebra:** Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) examples of Queries in relational algebra. **Mapping Conceptual Design into a Logical Design:** relational Database Design using ER-to-Relational mapping. **SQL:**SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.
Textbook 1: Ch4.1 to 4.5, 5.1 to 5.3, 6.1 to 6.5, 8.1; Textbook 2: 3.5

Module 3   10 Hours

SQL: Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL. **Database Application Development:** Accessing databases from applications, An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures, Case study: The internet Bookshop. **Internet Applications:** The three-Tier application architecture, the presentation layer, The Middle Tier
Textbook 1: Ch7.1 to 7.4; Textbook 2: 6.1 to 6.6, 7.5 to 7.7.

Module 4   10 Hours

Normalization: Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema, Functional Dependencies, Normal Forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form. **Normalization Algorithms:** Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Nulls, Dangling tuples, and alternate Relational Designs, Further discussion of Multivalued dependencies and 4NF, Other dependencies and Normal Forms
Textbook 1: Ch14.1 to 14.7, 15.1 to 15.6

Module 5   10 Hours

Transaction Processing: Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL. **Concurrency Control in Databases:** Two-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering, Multiversion Concurrency control techniques, Validation Concurrency control techniques, Granularity of Data items and Multiple Granularity Locking. **Introduction to Database Recovery Protocols:** Recovery Concepts, NO-UNDO/REDO recovery based on Deferred update, Recovery techniques based on immediate update, Shadow paging, Database backup and recovery from catastrophic failures
Textbook 1: 20.1 to 20.6, 21.1 to 21.7, 22.1 to 22.4, 22.7

5.0   Relevance to future subjects

Sl. No	Semester	Subject	Topics
01	VII	Project work	Academics Project
01	VIII	Seminar	Academic Seminars

6.0   Relevance to Real World

Sl. No.	Real World Mapping
01	Development of database related applications
02	Development of web-based applications

7.0   Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	Tutorial	SQL query processing applications
02	NPTEL	DBMS Applications

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8.0   Books Used and Recommended to Students

Text Books
1. Database systems Models, Languages, Design and Application Programming ,Ramez Elmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson.
2. Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014,McGraw Hill

Reference Books
1. Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, Mc-GrawHill, 2013.
2. Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.

Additional Study material & e-Books
http://www.pearsoned.co.in/ramezelmasri/

9.0   Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References
1. http://freecomputerbooks.com/MySQL-Essentials.html

10.0   Magazines/Journals Used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	CSI communications	www.csi-india.org

11.0   Examination Note

Internal Assessment: 30+10=40 Marks
    30 marks –from internal assessment test
    10 marks- from the assignments

Scheme of Evaluation for Internal Assessment (50 Marks)
    a) Internal Assessment test is conducted for 50 marks in the same pattern as that of the main examination. Average of all three Test marks will be taken and finally scale down to 30 marks.
    b) Assignment marks for each module is 25. Average of 5 assignment marks will be taken and finally scale down to 10 marks.

Question Paper Pattern (IA):
1. Two main questions to be set from syllabus covered up to IA tests.
2. Student has to answer two full main questions and each question carries 25.
    a.   Q.No I or Q.No II   =25 Marks
    b.   Q.No III or Q.No IV   =25 Marks
    c.   **Total**   **=50 Marks**

Question Paper Pattern and instructions (Main Exam):
1. The question paper will have TEN questions.
2. There will be TWO questions from each module.
3. Each question will have questions covering all the topics under a module.
4. The students will have to answer FIVE full questions, selecting ONE full question from each module.
    Max. Marks: 100 and each question carries 20 marks. Exam Duration: 3 Hrs.

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12.0   Course Delivery Plan

Module	Lecture No.	Content of Lecturer	% of Portion
1	1	**Introduction to Databases:** Introduction, Characteristics of database approach	20
	2	Advantages of using the DBMS approach, History of database applications	
	3	**Overview of Database Languages and Architectures:** Data Models, Schemas, and Instances	
	4	Three schema architecture and data independence, database languages, and interfaces	
	5	The Database System environment.	
	6	**Conceptual Data Modeling using Entities and Relationships:** Entity types, Entity sets	
	7	Attributes, roles, and structural constraints, Weak entity types	
	8	ER diagrams	
	9	Examples	
	10	Specialization and Generalization	
2	11	**Relational Model**: Relational Model Concepts	20
	12	Relational Model Constraints and relational database schemas, Update operations,	
	13	Transactions, and dealing with constraint violations	
	14	**Relational Algebra:** Unary and Binary relational operations	
	15	Additional relational operations (aggregate, grouping, etc.)	
	16	Examples of Queries in relational algebra	
	17	**Mapping Conceptual Design into a Logical Design:** relational Database Design using ER-to-Relational mapping	
	18	**SQL:**SQL data definition and data types, specifying constraints in SQL	
	19	Retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL	
	20	Additional features of SQL	
3	21	**SQL : Advances Queries:** More complex SQL retrieval queries	20
	22	Specifying constraints as assertions and action triggers	
	23	Views in SQL	
	24	Schema change statements in SQL	
	25	**Database Application Development:** Accessing databases from applications	
	26	An introduction to JDBC, JDBC classes and interfaces, SQLJ	
	27	Stored procedures	
	28	Case study: The internet Bookshop	
	29	**Internet Applications:** The three-Tier application architecture	
	30	The presentation layer, The Middle Tier	
4	31	**Normalization: Database Design Theory** – Introduction to Normalization using Functional and Multivalued Dependencies	20
	32	Informal design guidelines for relation schema	
	33	Functional Dependencies, Normal Forms based on Primary Keys	
	34	Second and Third Normal Forms, Boyce-Codd Normal Form	
	35	Multivalued Dependency and Fourth Normal Form	
	36	Join Dependencies and Fifth Normal Form	
	37	**Normalization Algorithms:** Inference Rules, Equivalence, and Minimal Cover	
	38	Properties of Relational Decompositions, Algorithms for Relational Database Schema Design	
	39	Nulls, Dangling tuples, and alternate Relational Designs,	
	40	Further discussion of Multivalued dependencies and 4NF, Other dependencies and Normal Forms	
5	41	**Transaction Processing:** Introduction to Transaction Processing	20
	42	Transaction and System concepts, Desirable properties of Transactions	
	43	Characterizing schedules based on recoverability	
	44	Characterizing schedules based on Serializability, Transaction support in SQL	
	45	**Concurrency Control in Databases:** Two-phase locking techniques for Concurrency control	
	46	Concurrency control based on Timestamp ordering, Multiversion Concurrency control techniques	
	47	Validation Concurrency control techniques, Granularity of Data items and Multiple Granularity Locking.	
	48	**Introduction to Database Recovery Protocols:** Recovery Concepts	
	49	NO-UNDO/REDO recovery based on Deferred update	
	50	Recovery techniques based on immediate update, Shadow paging, Database backup and recovery from catastrophic failures	

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13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: Some important University Questions on Module one.	Students study the Topics and write the Answers. Get practice to solve questions	Module one of the syllabus	3	Individual Activity. Witten solutions expected.	Text book
2	Assignment 2: Some important University Questions on Module two	Students study the Topics and write the Answers. Get practice to solve questions	Module two of the syllabus	6	Individual Activity. Witten solutions expected.	Text book
3	Assignment 3: Some important University Questions on module three.	Students study the Topics and write the Answers. Get practice to solve questions	Module three of the syllabus	9	Individual Activity. Witten solutions expected.	Text book
4	Assignment 4: Some important University Questions on and comprehensive questions module four.	Students study the Topics and write the Answers. Get practice to solve questions	Module four of the syllabus	11	Group Activity power point presentation	Text book
5	Assignment 5: Some important University Questions on and comprehensive questions module five.	Students study the Topics and write the Answers. Get practice to solve questions	Module five of the syllabus	13	Group Activity power point presentation	Text book

14.0 QUESTION BANK

MODULE - 1

1. Why when to not use DBMS? (MQP)
2. What is data independence? Explain the types of database independence. (MQP)
3. List the types of DBMS languages and explain the DBMS languages. **OR** What are the types of DMS languages? Explain about the same. (MQP)
4. Define the terms: DDL, DML, DCL, DBA, DBMS, Entity, Attribute, Database, canceled Transaction, data model, metadata, complex attribute, schemaconstruct, value set, database designer, program data independence. (July-2011,Dec-2014)
5. List the DBMS interfaces. Explain about the same. (MQP)
6. What are the DBMS components modules? Explain about the DBMS components modules and their interactions using diagram. (June 2010, Dec-2011,Dec-2013,Dec-2014)
7. Explain about the Database system utilities.
8. Explain about three-tier and N-tier architecture with a neat diagram. (MQP)
9. With a neat diagram explain about high level conceptual data models for Database design.
10. Define the following Entity, entity types entity sets. (Jun-11)
11. Define relationship, relationship sets and relationship instances. (MQP)
12. Discuss the following terms: Candidate Key, Super key, Foreign Key, Primary Key, key constraints. (July-07)
13. What is meant by recursive relationship? Bring out the importance of role manes in recursive relationship, with an example. (Dec-11)
14. Define relationship degree, role names and recursive relationship. (MQP)
15. Explain about structural constraints on relationship types. (MQP,Dec-2014)
16. What is weak entity type and differentiate between primary key and weak entity type. (June-06,Dec-2014)
17. Define ER-Diagram and explain about conventions used in ER-diagram. (MQP,Dec-13)
18. Define the following terms: i) Recursive relationship ii) Weak entity type iii). Atomic attributes iv). Participation role (Dec-13)

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19. Draw an ER diagram for Musicians who perform for album. Assume any 4 entities. Indicate all key and cardinality constraints and any assumptions that are made. (Dec-13)
20. Explain the main characteristics of the database approach versus the file processing approach. (Jan 2018)
21. Explain the three- schema architecture with neat diagram. Why do we need mappings among schema levels? How do different schema definition languages support this architecture? (Jan 2018)
22. Discuss with examples, different types of attributes. (Jan 2018)
23. Draw an ER diagram for a BANK database schema with atleast five entity types. Also specify primary key and structural constraints. (Jan 2018)
24. Explain the types of end users with suitable examples. (Feb-2021)
25. List and explain the advantages of using DBMS approach. (Feb-2022)
26. Describe the Three-Schema architecture. Why do we need mappings between schema levels? (Feb-2021)
27. Explain the different types of attributes in ER model with suitable examples for each. (Feb-2022)

MODULE - 2
1. Explain about relational model concepts. (MQP)
2. List and explain the characteristics of relations. (MQP, Dec-13)
3. Explain about the following: SELECT PROJECT, DIVISION and SET DIFFERENCE with example. (Jan-08)
4. Explain about the sequence of operations and the RENAME operations. (Jan-09)
5. Explain the following UNION, INTERSECTION, SET DIFFERENCE.
6. Explain about join and Cartesian product operation with example. (MQP,Dec-2014)
7. Discuss various types of JOIN operation. Why the theta join is required? (July-12,Dec-2014)
8. Explain about natural and equijoin operation with example. (MQP)
9. Explain the Join Selectivity and Cross Join. Based on what condition Join degenerate into Cartesian Product or cross join.(MQP)
10. Explain the complete set of Relational algebra operations. (MQP, Dec-13)
11. Define the Aggregate Functions and explain at least three aggregate functions with example.
12. Explain with example the OUTER JOIN operation. (MQP)
13. Consider the following relational database schema (Jun-06, Dec-13)
    Sailors (sid, sname, rating,age) Reserve(sid, bid, date) Boat(bid, bname, color)

    Write the query for the following questions in relational algebra
    i) Find the names of sailors who have reserved red boat.
    ii) Find the names of sailors who have reserved boat 103.
    iii) Find the colors of the boat reserved by Harish
    iv) Find the sid of sailors with age more than 20 who has not reserved red boat.
    v) Find the name of sailors whose rating is more than 7.
    vi) Find the name of sailors who have not reserved any boat
    vii) Find the name of sailors who have reserved all boats.
14. Consider the following relational database schema (July-06)
    EMPLOYEE (Ssn, Ename, Bdate, Address, Sex, Salary, SuperssnDno)
    DEPARTMENT (Dname, Dnumber, Mgrssn, Mgrstdate)
    PROJECT (Pnumber, Pname, Plocation, Dnum)
    WORKS_ON (ESSN, Pno, Hrs)
    DEPENDENT (Essn, Dep_name, Sex, Bdate, Relationship)
Write the query for the following questionsin relational algebra.
    i) Find the name of the employees who work for research department.
    ii) Find the names of employees who have at least two Dependents.
    iii) Find the name and address of female employees who have no dependents.
    iv) Retrieve name of employees and their supervisor name.
    v) Find the names of employee who work on all projects controlled by department 5
    vi) Increase the salary of employees who are working in department 5 to 10%
15. Explain the Relational Database Design using ER-to Relational Mapping. (July-12)
16. What is SQL? What are the features of SQL? (MQP)
17. Explain about specifying constraints in SQL and attributes in SQL.(MQP)
18. Explain the Schema change statements in SQL. (MQP)
19. What is the use of ALTER command in SQL? (MQP)
20. Explain the Basic Queries in SQL. (MQP)
21. Explain the unspecified WHERE clause and use of the Asterisk.(MQP)
22. Explain about the aggregate functions in SQL. (July-12)
23. What is correlated query? Explain with example.(MQP)
24. What is nested query? Explain with example. (MQP)

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25. Explain INSERT, DELTE and UPDATE COMMANDS in SQL with example.(MQP)
26. Explain the additional features of SQL.(MQP)
27. Consider the following relations for a database. (Dec-13)
    Supplier(Sno,Sname,Status,City) Product(Pno, Pname,Color,Weight,City) Shipments(Sno,Pno,Qty)
    Specify the following queries in SQL.
    1.Retrieve names of supplier who supply part P2.
    2.Retrieve the names of suppliers who do not supply any part supplied by S2.
    3. Retrieve parts number for all parts supplied by more than one supplier.
    4.For each part supplied, get the part number ,maximum quantity, minimum quantity supplied for that part.
    5.Retrieve Supplier numbers for suppliers with status less than the current maximum in the supplier table.
28. Explain the following in SQL.(Dec-08,Dec-2014)
    1. EXISTS and NOT EXISTS CLAUSE
    2. UNIQUE
    3. SELECT , FROM , WHERE
29. Describe the characteristics of relations with suitable example for each. (Jan 2018)
30. What are the basic operations that can change the states of relations in the database? Explain how the basic operations deal with constraint violations. (Jan 2018)
31. Describe the steps of an algorithm for ER-to-relational mapping. (Jan 2018)
32. In SQL which command is used for table creation? Explain how constraints are specified in SQL during table creation with suitable example. (Jan 2018)
33. Explain the entity integrity and referential integrity constraints. Why is each considered important? Give examples. (Feb-2021)
34. Discuss equijoin and natural join with suitable examples using relational algebra notations. (Feb-2022)
35. Explain the ER to relational mapping algorithm with suitable example for each step. (Feb-2022)

MODULE - 3
1. Explain the Database programming issues and techniques. (MQP)
2. Explain about approaches to Database programming. (MQP)
3. What is Assertion? Explain how to create Assertion in SQL. Explain its significance. (Dec-11)
4. What is mean by impedance mismatch problem? Explain it. (Dec-11)
5. Write a note on Embedded SQL. With an example, illustrate how would you connect to a database, fetch the records and display. Also explain the concept of stored procedure, in brief.(Jul-12,Dec-2014)
6. Write a note on Dynamic SQL. (Dec-08)
7. When are stored procedures useful? Give an example. (July-11)
8. How do the relations in SQL differ from the relations defined formally? Discuss the difference in terminology. Why does SQL allow duplicate tuples in a table or a query result? (July-05)
9. Explain co-related queries with an example. (July06)
10. How does SQL allow implementation of the entity integrity and referential integrity constraints? (Jan-07)
11. Consider the following relational database schema. (Jun-12)
    Sailors   (sid, sname, rating)
    Reserve (sid, bid, date)
    Boat   (bid, bname, color)
    Write the query for the following questions in SQL
        i.   Find the names of sailors who have reserved red boat.
        ii.   Find the names of sailors who have reserved boat 103.
        iii. Find the colors of the boat reserved by Harish
        iv.   Find the sid of sailors with age more than 20 who has not reserved red boat.
        v.   Find the name of sailors whose rating is more than 7.
        vi.   Find the name of sailors who have not reserved any boat

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12 Consider the following relational database schema.   (Dec-11)

    EMPLOYEE   (Ssn, Ename, Bdate, Address, Sex, Salary, SuperssnDno)
    DEPARTMENT (Dname, Dnumber, Mgrssn, Mgrstdate)
    PROJECT   (Pnumber, Pname, Plocation, Dnum)
    WORKS_ON   (ESSN, Pno, Hrs)
    DEPENDENT   (Essn, Dep_name, Sex, Bdate, Relationship)

Write the SQL query for the following questions.
   i.   Find the name of the employees who work for research department.
   ii. Find the names of employees who have at least two Dependents.
   iii.   Find the name and address of female employees who have no dependents.
   iv. Retrieve name of employees and their supervisor name.
   v.   Find the names of employee who work on all projects controlled by department 5
   vi. Increase the salary of employees who are working in department 5 to 10%

13. List the differences between independent nested and co-related nested query. (Dec-13)
14. Discuss main approaches to database programming. What do you mean by Impedance mismatch(Dec-13)
15. With program segment, explain retrieving of tuples with embedded SQL.(Dec-13)
16. How is view created and dropped? What problems are associated with updating views (Dec-14)
17. Consider COMPANY DATABASE   (Jan 2018)

    EMPLOYEE   (Fname, Minit, Lname, Ssn, Bdate, Address, Sex, Salary, Super-ssn, Dno)
    DEPARTMENT (Dname, Dnumber, Mgr_ssn, Mgr_st_date)
    DEPARTMENT_LOCATIONS(Dnumber, Dlocation)
    PROJECT   (Pname, Pnumber Plocation, Dnum)
    WORKS_ON   (ESSN, Pno, Hours)
    DEPENDENT   (Essn, Dependent_name, Sex, Bdate, Relationship)

Specify the following queries in SQL on the database schema given above:
   a.   For every project located in Stafford , list the project number the controlling department number and the department manager's last name, address and birth date.
   b.   List the names of all employees who have a dependent with the same first name as themselves.
   c.   For each project, list the project name and the total hours per week(by all employees)spent on that project.
   d.   Retrieve the name of each employee who works on all the projects controlled by 'Research' department.

18. Define Stored Procedure. Explain the creating and calling of stored procedure with suitable example. (Jan 2018)
19. Explain the Single-tier and Client –server architecture, with neat diagram.   (Jan 2018)
20. Explain cursors and its properties in embedded SQL with suitable example. (Feb-2021)
21. How are triggers defined in SQL? Explain with example. (Feb-2022)
22. Illustrate insert, delete, update, alter and drop statements in SQL. (Feb-2021)

MODULE - 4
   1.   Explain the informal design Guideline for relational Schemas.(Dec-08)
   2.   Define functional dependency. Prove the six inference rules for functional dependencies. (MQP,Dec-14)
   3.   What is a functional dependency? Write an algorithm to find the minimal cover for a set of functional dependencies. (Jun-12)
   4.   Why normalization is required? Explain the 1NF and 2NF, 3NF with example   (Jun-12)
   5.   Write an algorithm for finding closure of attribute. (MQP, Dec-13)
   6.   Define Normal form? What are the needs of Normalization?   (July-05)
   7.   .Differentiate between prime and non-prime attribute, with an example. (Dec-11)
   8.   Write an algorithm for finding a key.(MQP)
   9.   Write an algorithm for Dependency preserving decomposition into 3NF.(MQP)
   10. Define BCNF. Explain with example.(Jul-07)
   11. Define Closure of F? Write the algorithm to find the Attribute Closure X^+
      Find the closure of B if f= (B->CD, D-E, B-E, B->A, E->C, AD->B)
   12. Consider the universal relational schema R(A,B,C,D,E,F,G,H,I,J) with FD = (AB→C, A→DE, B→F, F→GH, D→IJ) What is the key for R? Decompose R into 2NF, then 3NF relations.
      1) List-all Keys-for-R 2) Is in 3NF? Is in BCNF?   (July-05)
   13. Discuss insertion, deletion and modification anomalies. Why are they considered bad? Illustrate with examples. (Dec-13)

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14. Given below are two sets of FDs for a relation R (A, B, C, D, E). Are they equivalent? I) A$\rightarrow$B, AB$\rightarrow$C, D$\rightarrow$AC, D$\rightarrow$E II) A$\rightarrow$ BC, D$\rightarrow$AE   (Dec-13,Dec-14)

15. Consider the relational schema R (A, B, C, D, E, F) with FD = (A$\rightarrow$B, C$\rightarrow$DF, AC$\rightarrow$E, D$\rightarrow$F) which is the key and highest normal form of R? If it is not in 3NF find a decomposition that is lossless and dependency preserving? (Dec-11)

16. Consider the following Universal relation R={A,B,C,D,E,F,G,H,I,J} with FD set F = {{ A,B}$\rightarrow$C, A$\rightarrow${D,E},B$\rightarrow$F, F$\rightarrow${G,H},D$\rightarrow${I,J}}. What is the key of R? Decompose R into 2NF, then 3NF relations.   (Dec-13)

17. What is the dependency preservation property for decomposition? Why is it important? (Dec-13)

18. Define fourth normal form. When is it violated? Why is it useful?   (Dec-13)

19. Explain the informal design guidelines used as measures to determine the quality of relations schema design. (Jan 2018)

20. Define Normal form. Explain 1NF, 2NF and 3NF with suitable example for each.   (Jan 2018,Feb-2022)

21. Define Minimal cover. Write an algorithm for finding a minimal cover F for a set of functional dependencies E. Find the minimal cover for the given set of FDs be E:{B$\rightarrow$A, D$\rightarrow$A, AB$\rightarrow$D}.   (Jan 2018)

22. Consider the following Universal relation R={A,B,C,D,E,F,G,H,I,J} with FD set F = {{ A,B}$\rightarrow${C}, {A}$\rightarrow${D,E}, {B}$\rightarrow$ {F}, {F}$\rightarrow${G,H}, {D}$\rightarrow${I,J}}. Determine whether each decomposition has the lossless join property with respect to F. D1 = {R$_1$, R$_2$, R$_3$ }; R$_1$= { A,B,C,D, E }; R$_2$ = { B,F,G,H }; R$_3$ ={D,I,J }.(Jan 2018,Feb-2022)

23. Explain Armstrong inference rules. (Feb-2021)

24. Explain types of updates anomalies with examples.(Feb-2022)

MODULE – 5

1. List and explain the desirable properties of transactions.   (MQP)
2. Discuss the ACID properties.(Dec-06,dec-2014)
3. Explain the following: lost update problem and dirty read problem. (jun-11)
4. Explain ARIES recovery algorithm with an example. (July-11)
5. What are the conflicts that may occur because of interleaved transaction processing? Explain.
6. Write a neat diagram of a transaction processing and explain the various states a transaction goes through before termination. (Jan-07)
7. Discuss 2PL and strict 2PL algorithms. Advantages and disadvantages. (Dec-11,Dec-2014)
8. Explain the following with example.
   Serial Schedule and Non Serial schedule Conflict Serializability. Distinguish between conflicts Serializability and view Serializability with example. (MQP)
9. What is deadlock? Explain with example.   (MQP)
10. What is write-ahead logging? What is forced to disk at the time a transaction commits? (June-12)
11. Explain transaction rollback used in recovery. (Jan-07)
12. Write a note on check point. (Jun-12)
13. Discuss binary and shared locks mechanisms.(MQP)
14. What is intention mode locking? Describe the various intention mode locks with the help of an example. (July-05)
15. Write a note on multiversion schemes and multiple granularity locking. (MQP)
16. Explain recoverability and cascade freedom. (MQP)
17. What is seriailisabiliaty? How can serialisabillaty be ensured? Do you need to restrict concurrent execution to transaction to ensure serialisabillaty? Justify your answer. (July-05)
18. Give an example of transactions and how you can force serialisabillaty in those transactions. (July-05)
19. What are the steps one must take with its DBMS, in order to ensure disaster recovery? Define the process if recovery in case of disaster. (July-05)
20. What is shadow paging scheme? Where is it used?   (July-05)
21. What is the multi-version technique of concurrency control? Describe with an example. Will this scheme results in rollback and /or deadlock? Justify your answer.   (July-06)
22. What is time stamping? Explain a mechanism of concurrency control that uses time stamping with the help of an example. (July-05, June-12)
23. What are the anomalies occur due to interleave execution? Explain them with example. (Dec-13)
24. Describe the three steps in crash Recovery in Aries. What is the goal of the each phase? (Dec-13)
25. Consider the three transactions T1, T2 and T3 and schedules S1 and S2 given below. Determine whether each schedule is serializable or not. If a schedule is serializable. Write down the equivalent serial schedule(S).
    T1: R1(X);R1(Z);W1(X);
    T2: R2(Z);R2(Y);W2(Z);W2(Y);
    T3: R3(X);R3(Y);W3(Y);
    S1:R1(X);R2(Z);R1(Z);R3(X);R3(Y);W1(X);W3(Y);R2(Y);W2(Z);W2(Y);
    S2:R1(X);R2(Z);R3(X);R1(Z);R2(Y);R3(Y);W1(X);W2(Z);W3(Y);W2(Y);

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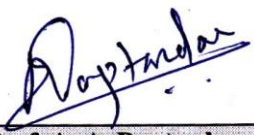
26. Why concurrency control is needed demonstrate with example? (Jan 2018,Feb-2021)
27. Discuss the desirable properties of transactions. (Jan 2018,Feb-2022)
28. When deadlock and starvation problems occurs? Explain how these problems can be resolved. (Jan 2018)
29. Explain how shadow paging helps to recover from transaction failure. (Jan 2018,Feb-2022)

15.0	**University Result**

Examination	FCD	FC	SC	% Passing
Mar - 2021	06	17	12	81.39
Feb - 2022	01	17	28	90.19

Prepared by	Checked by		
Prof. A. A. Daptardar	Prof. A. A. Daptardar	HOD	Principal

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Subject Title	**AUTOMATA THEORY and COMPUTABILITY**		
Subject Code	18CS54	**CIE Marks**	40
Number of Contact Hrs / Week	3:0:0	**SEE Marks**	60
Total Number of Contact Hrs	40	**Exam Hours**	03

FACULTY DETAILS:

Name: Prof. Prasanna Patil	**Designation:** Assistant Professor	**Experience:09** yrs
No. of times course taught:01		**Specialization:** Computer Engineering

1.0   Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Computer Science and Engg.	III	**DMS, DSA**
02	Computer Science and Engg.	IV	**DAA**

2.0   Course Objectives

- Introduce core concepts in Automata and Theory of Computation
- Identify different Formal language Classes and their Relationships
- Design Grammars and Recognizers for different formal languages
- Prove or disprove theorems in automata theory using their properties
- Determine the decidability and intractability of Computational problems.
-

3.0   Course Outcomes

At the end of the course the students should be able to:

COs	Course Outcome	Cognitive Level	POs
CO304.1	Apply the fundamental understanding of automata theory to Design FSMs for regular Languages.	L1,L2,L3	1,2,3,8,10 PSO-1
CO304.2	Demonstrate the understanding of the regular expressions & Regular grammar and their equivalence.	L1,L2,L3	1,2,3,8,10 PSO-1
CO304.3	Apply the fundamental understanding of automata theory to Design and Develop CFG & PDA and their relative powers.	L1,L2,L3	1,2,3,8,10 PSO-1
CO304.4	Apply the Fundamental understanding of Automata theory to Design and Develop Turing Machine.	L1,L2,L3	1,2,3,8,10 PSO-1
CO304.5	Explain the fundamental understanding of Decidability & Complexity of the problems	L1,L2,L3	1,2,3,8,10 PSO-1
Total Hours of instruction		**40**	

4.0   Course Content

Module-1   8 Hours

Why study the Theory of Computation, Languages and Strings: Strings, Languages, A Language Hierarchy, Computation, **Finite State Machines (FSM)**: Deterministic FSM, Regular languages, Designing FSM, Nondeterministic FSMs, From FSMs to Operational Systems, Simulators for FSMs, Minimizing FSMs, Canonical form of Regular languages, Finite State Transducers, Bidirectional Transducers.   **Textbook 1: Ch 1, 2, 3, 4, 5.1 to 5.10**

Module-2   8 Hours

Regular Expressions: What is a RE?, Kleene's theorem, Applications of REs,Manipulating and Simplifying REs. Regular Grammars: Definition, Regular Grammars and Regular languages. Regular Languages (RL) and Non-regular Languages: How many RLs,To show that a language is regular, Closure properties of RLs, to show some languages are not RLs. **Textbook 1: Ch. : 6.1 to 6.4, 7.1, 7.2, 8.1 to 8.4**

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Module-3   8 Hours

Context-Free Grammars: Introduction to Rewrite Systems and CFGs and languages, designing CFGs, simplifying CFGs, proving that a Grammar is correct, Derivation and Parse trees, Ambiguity, Normal Forms. **Pushdown Automata (PDA):** Definition of PDA, Deterministic and Non-deterministic PDAs, Non-determinism and Halting, alternative equivalent definitions of a PDA, alternatives that are not equivalent to PDA.
Textbook 1: Ch: 11.1 to 11.8, 12.1, 12.2, 12.4, 12.5, 12.6

Module-4   8 Hours

Algorithms and Decision Procedures for CFLs: Decidable questions, Un-decidable questions. **Turing Machine**: Turing machine model, Representation, Language acceptability by TM, design of TM, Techniques for TM construction. Variants of Turing Machines (TM), The model of Linear Bounded automata.
Textbook 1: 14.1, 14.2, Textbook 2: 9.1 to 9.8

Module-5   8 Hours

Decidability: Definition of an algorithm, decidability, decidable languages, Undecidable languages, halting problem of TM, Post correspondence problem. Complexity: Growth rate of functions, the classes of P and NP, Quantum Computation: quantum computers, Church-Turing thesis. **Applications:** G.1 Defining syntax of programming language, Appendix J: Security
Textbook 2: 10.1 to 10.7, 12.1, 12.2, 12.8, 12.8.1, 12.8.2
Textbook 1: Appendix: G.1, J.1 & J.2

5.0   Relevance to future subjects

Sl No	Semester	Subject	Topics
01	VI	Compiler Design	Lexical Analysis, Parsing
02	VII	Web Technology	Regular Expressions

6.0   Relevance to Real World

SL.No	Real World Mapping
01	Design of solution to the problems using appropriate computation Models and algorithms.

7.0   Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	Tutorial	Topic: FSM, Regular Expressions, Grammars
02	NPTEL	Topic: PDA, Turing Machine, Decidability/complexity

8.0   Books Used and Recommended to Students

Text Books
1. Elaine Rich, Automata, Computability and Complexity, 1st Edition, Pearson Education,2012/2013
2. K L P Mishra, N Chandrasekaran, 3rd Edition, Theory of Computer Science, PHI, 2012.
Reference Books
1. John E Hopcroft, Rajeev Motwani, Jeffery D Ullman, Introduction to Automata Theory, Languages, and Computation, 3rd Edition, Pearson Education, 2013
2. John C Martin, Introduction to Languages and The Theory of Computation, 3rd Edition,Tata McGraw –Hill Publishing Company Limited, 2013
3. Basavaraj S. Anami, Karibasappa K G, Formal Languages and Automata theory, Wiley India, 2012

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9.0	**Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended**

Website and Internet Contents References

1) *https://ocw.mit.edu/courses/electrical.../6...automata-computability.../lecture-notes*
2) *www.tutorialspoint.com/automata_theory/*
3) *nptel.ac.in/courses/111103016/25*
4) *math.utu.fi/cie2017/formal-languages-and-automata-theory/*

10.0	**Magazines/Journals Used and Recommended to Students**

Sl.No	Magazines/Journals	website
1	Journals	*www.jalc.de*
2	Journals	*https://www.journals.elsevier.com/theoretical-computer-science/*
3	wikipedia	*https://en.wikipedia.org/wiki/Category:Computer_science_journals*

11.0	**Examination Note**

Internal Assessment: 30+10=40 Marks

   30 marks –from internal assessment test
   10 marks- from the assignments

Scheme of Evaluation for Internal Assessment (50 Marks)

   a) Internal Assessment test is conducted for 50 marks in the same pattern as that of the main examination. Average of all three Test marks will be taken and finally scale down to 30 marks.

   b) Assignment marks for each module is 25. Average of 5 assignment marks will be taken and finally scale down to 10 marks.

Question Paper Pattern (IA):
3. Two main questions to be set from syllabus covered up to IA tests.
4. Student has to answer two full main questions and each question carries 25.
   a. Q.No I or Q.No II = 25 Marks
   b. Q.No III or Q.No IV = 25 Marks
   c. Total = 50 Marks

Question Paper Pattern and instructions (Main Exam):
5. The question paper will have TEN questions.
6. There will be TWO questions from each module.
7. Each question will have questions covering all the topics under a module.
8. The students will have to answer FIVE full questions, selecting ONE full question from each module.

   Max. Marks: 100 and each question carries 20 marks. Exam Duration: 3 Hrs.

12.0	**Course Delivery Plan**

Module	Lecture No.	Content of Lecturer	% of Portion
Module-1	1	Strings, Languages, A Language Hierarchy, Computation.	20
	2	**Finite State Machines(FSM)**: Deterministic FSM, Regular languages	
	3	Designing FSM	
	4	Designing FSM	
	5	Nondeterministic FSMs,	
	6	From FSMs to Operational Systems, Simulators for FSMs,	
	7	Minimizing FSMs	
	8	Canonical form of Regular languages, Finite State Transducers, Bidirectional Transducers.	

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Module-2	1	what is a RE?, Kleene's theorem, Applications of REs	20
	2	Manipulating and Simplifying REs	
	3	Regular Grammars: Definition, Regular Grammars and Regular languages	
	4	Regular Languages (RL) and Non-regular Languages: How many RLs,	
	5	Closure properties of RLs,	
	6	Closure properties of RLs,	
	7	To show some languages are not RLs using Pumping Lemma.	
	8	To show some languages are not RLs	
Module-3	1	Introduction to Rewrite Systems and Grammars.	20
	2	CFGs and languages, designing CFGs.	
	3	designing CFGs. Simplifying CFGs	
	4	Proving that a Grammar is correct, Derivation and Parse trees,	
	5	Ambiguity, Normal Forms	
	6	Definition of non-deterministic PDA, Deterministic and Non-deterministic PDAs	
	7	Deterministic and Non-deterministic PDAs	
	8	Non-determinism and Halting, alternative equivalent definitions of a PDA	
	9	Alternatives that are not equivalent to PDA	
Module-4	1	Decidable questions, Un-decidable questions.	20
	2	**Turing Machine**: Turing Machine model, Representation	
	3	Language acceptability by TM, design of TM	
	4	Design of TM	
	5	Techniques for TM construction	
	6	Variants of Turing Machines	
	7	Variants of Turing Machines Contd…	
	8	The model of Linear Bounded automata	
Module-5	1	**Decidability:** Definition of an algorithm, decidability, decidable languages	20
	2	Undecidable languages, Halting problem of TM,	
	3	Post correspondence problem	
	4	**Complexity**: Growth rate of functions, the classes of P and NP	
	5	Quantum Computation: quantum computers,	
	6	Church-Turing thesis.	
	7	**Applications:** G.1 Defining syntax of programming language	
	8	J.1, J.2:Security	

13.0   Assignments, Pop Quiz, Mini Project, Seminars

Sl.No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assig.-I: Finite state Machines and Transducers	Students have to study the Topics and write the Answers.	Module-1 of the syllabus.	3	Individual Activity. Hand written solution expected.	Text books, discussion and class notes.
2	Assig-II: Regular Expressions and Regular Grammars.	Students have to study the Topics and write the Answers.	Module-2 of the syllabus	6	Individual Activity. Hand written solution expected	Text books, discussion and class notes
3	Assig.-III: Context Free Grammars and PDA	Students have to study the Topics and write the Answers.	Module-3 of the syllabus.	9	Individual Activity. Hand written solution expected.	Text books, discussion and class notes
4	Assig.-IV:Turing Machine and Decidability/Complexity	Students have to study the Topics and write the Answers.	Module-4 and 5 of the syllabus	12	Individual Activity. Hand written solution expected	Text books, discussion and class notes

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14.0   QUESTION BANK

Module-1

1. With a neat diagram, explain a hierarchy of Language classes in Automata theory (June-2018)
2. Define the following terms with examples: i) Alphabet ii) Power of an Alphabet iii) Concatenation iv) Languages (Jan- 18)
3. Draw a DFSM to accept strings of a's and b's ending with 'bab'
4. Design a DFSM to accept strings made up of letters "CHARIOT" and recognize those strings containing word " CAT" as a substring.
5. Obtain a DFSM to generate set of strings not containing more than 3 a's over $\sum$= {a, b}.
6. Obtain a DFSM to generate set of strings of 0's and 1's having substring 000
7. Define DFSM with an example?
8. Mention the difference between DFSM and NDFSM.
9. Define the following terms, with an example for each: i) String ii) Alphabet   iii) Power set   iv) Language
10. Design a DFSM which accepts any no of a's followed by a string ba followed by a string a's and b's. RE: a*ba (a+b)*.
11. What is a transition graph and transition table?
12. Obtain a DFSM to accept strings of a's and b's except those containing a substring: **aab**.
13. Design a DFSM to accept strings having a) exactly a b) at least one ac) not more than 3 a's.
14. Obtain a DFA to accept strings starting with 2 0's and ending with at least 2 1's.
15. What is a NDFSM? Write the procedure to convert NFSM to DFSM

Module-2

1. Define a regular expression & find a regular expression for the language:
    L= {w |w ε {0, 1}*} where w has no pair of consecutive zeros
2. Show that regular languages are closed under complementation.
3. Construct an NFA hat accepts the following languages
       a.   L (aa*+aba*b*)
       b.   L (ab (a+ab)*(a+aa))
       c.   L(ab*aa+bba*ab)
       d.   0*+1*2*
4. Show that regular languages are closed under complementation & intersection.
5. Let G (V, T, P, S) be right linear grammar. Prove that L (G) is a regular language.
6. Find Regular expression for the following languages on {a,b}:
       a.   L = {$a^{2n}b^{2m}$: n>=0, m>=0 }
       b.   L=   { w: |w| mod 3 = 0 and w ε {a,b}* }
7. Prove that if L and M are regular Languages, then so is L∩M.
8. Convert the RE: (01 + 1)* to NDFSM
9.   Obtain regular expressions by elimination of states for each of the following DFSM.

Module-3

1. Consider the grammar G.
   S☐S+S | S*S |(S) | a   show that the string a+a*a has two
   Parse trees and Left most derivations.
2. Define S-grammar and inherently ambiguous grammar.
3. Obtain the left linear grammar for the DFA shown below:
4. Write the applications of regular expressions
5. Construct the DFA from regular grammar given below
        S →aA|bs|EA→aA|bB|EB→aA|bc|EC→aC|bc
6. Define leftmost and rightmost derivations. Give example
7. Write the limitations of regular language
8. Prove that for all languages defined by a regular expression their exists an equivalent, NFA which   Accepts exactly the same language.
9. Define CFG. Obtain CFG for the following Languages:
    i) L = {wwR | w ε{ a,b}* , w^R is the reversal of w }
    ii)L = {w : w has a substring ab}

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10. What is ambiguous grammar? Show that the following grammar is ambiguous. E⯈E+E | E – E | E * E | E/E | (E) | a where E is the start symbol.

11. Find the Unambiguous grammar for the grammar in Q 10.

    12 Give the formal definition of a PDA. Discuss about the languages accepted by a push down automata. Design an NPDA for the language L= {w:$a^n b^{2n}$ }

13. Construct an NPDA that accepts the language accepted by the Grammar:
    S⯈0S1|A
    A⯈1A0 | S | ϵ

14. With neat diagram show the working of pushdown automata.

15. Design a PDA to accept the language L={$a^n b^{2n}$ | n>=1}

16. Give the graphical representation for PDA obtained in 67. Show the moves made by the PDA for the string:**aabbbb**.

17. Obtain a PDA equivalent to the following grammar:
    S⯈aA
    A⯈aA|bA|a|b

18. Explain the following: i) languages ii) Instantaneous description of a PDA.

Module-4

1. Find a CFG, without λ productions, unit production and useless productions equivalent to the grammar defined by
   S⯈ABaC A⯈BC B⯈b| λ C⯈D| λ D⯈d

2. What are CNF and GNF of context free grammar? Give examples.

3. Obtain the following CFG in GNF notations:
   S⯈ABA⯈aA|bB|b

4. What are CNF and GNF notations of grammar? Obtain the CNF notation for the following Grammar:S⯈ASB A⯈aAS|a B⯈SbS|aAS|a|bb

5. If L1 and L2 are two context free languages then prove that L1 U L2, L1 .L2 and L1* are context free languages.

6. (a) Define Chomsky Normal Form. Simplify the following CFG and convert it to CNF
       S⯈ASB|ϵ A⯈aAS|a B⯈SbS|A|bb

    (b) Prove that the family of the context free languages is closed under union, concatenation and Reversal operations.

7. (a) Let L be a CFL and R be a regular language. Prove that the language L ∩ R is a CFL.
       (b) Use part (a) to show that the language A= {W: Wϵ {a,b,c}* and contains equal number of a's, b's and c's} is not a CFL.
    (a) Prove that if L is recursive language then L is also recursive language.
    (b) Prove that universal language is RE but not recursive.

8. What are Turing m/c and multitape Turing m/c? Explain the general structure of multi tape Turing M/C.

9. Design a Turing M/C to accept the language L= {$a^n b^n c^n$: n>=1}.

10. Also give the Graphical representation and ID for the input: **aabbcc**

11 a) What is Turing machine? With neat sketch, explain the working of Turing machine.
     b) Design the Turing machine for the following language. Write transition diagram and give ID on input:**aaab** and L= {w : |w|is even wϵ(a+b)*}

Module-5

1. a) With a diagram, explain the working of a basic Turing machine. Design a Turing machine that accepts the language L= {$0^n 1^n$: n > 0}
    b) Explain the general structure of multi-tape and non-deterministic Turing machines and show that those are equivalent to basic Turing machine.

2. Write detailed note on:a. Applications of CFGs b. Multitask machines c. Homomorphism d. Post correspondence problem

3. Write short notes on the following: a) Multitape Turing machine   b) Application of CFGs

4. Explain in brief Growth rate of functions.

5. What is Quantum Computer? Explain.

6. Explain the Linear Bounded automata.

7. Write a note on: i) Undecidable Languages ii) Halting Problem of Turing Machine ii) The Post Correspondence Problem.

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15.0 University Result

Examination	FCD	FC	SC	Pass	Fail	% Passing
Feb/ March-2022	17	21	12	50	01	98.03
Jan/Feb-2021	02	09	19	30	13	69.76

Prepared by	Checked by		
Prof. P. G. Patil	**Dr. K. B. Manwade**	**HOD**	**Principal**

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Subject Title	APPLICATION DEVELOPMENT USING PYTHON PROGRAMMING		
Subject Code	18CS55	IA Marks	40
Number of Lecture Hrs / Week	03 L	Exam Marks	60
Total Number of Lecture Hrs	40	Exam Hours	03
CREDITS – 03			

FACULTY DETAILS:

Name: Dr. Mahesh G. Huddar	**Designation:** Associate Professor	**Experience: 13** Years
No. of times course taught: 05	**Specialization:** Computer Science and Engineering	

1.0   Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Computer Science and Engineering	I/II	Programming in C and Data Structures

2.0   Course Objectives

Students should learn to:

1. Learn the syntax and semantics of Python programming language.
2. Illustrate the process of structuring the data using lists, tuples and dictionaries.
3. Demonstrate the use of built-in functions to navigate the file system.
4. Implement the Object Oriented Programming concepts in Python.
5. Appraise the need for working with various documents like Excel, PDF, Word and Others.

3.0   Course Outcomes

After studying this course, students will be able to

	Course Outcome	Cognitive Level	POs
C327.1	Demonstrate proficiency in handling of loops and creation of functions.	L3	1, 2, 3, 5, 8, 10, 12
C327.2	Identify the methods to create and manipulate lists, tuples and dictionaries.	L2	1, 2, 3, 5, 8, 10, 12
C327.3	Discover the commonly used operations involving regular expressions and file system.	L3	1, 2, 3, 5, 8, 10, 12
C327.4	Interpret the concepts of Object-Oriented Programming as used in Python.	L2	1, 2, 3, 5, 8, 10, 12
C327.5	Determine the need for scraping websites and working with CSV, JSON and other file formats.	L3	1, 2, 3, 5, 8, 10, 12
Total Hours of instruction		**40**	

4.0   Course Content

Module – 1   **8 Hours**
Python Basics, Flow control, Functions

Module – 2   **8 Hours**
Lists, Dictionaries and Structuring Data, Manipulating Strings

Module – 3   **8 Hours**
Pattern Matching with Regular Expressions, Reading and Writing Files, Organizing Files, Debugging

Module – 4   **8 Hours**
Classes and objects, Classes and functions, Classes and methods, Inheritance

Module – 5   **8 Hours**
Web Scraping, Working with Excel Spreadsheets, Working with PDF and Word Documents, Working with CSV files and JSON data

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5.0   Relevance to future subjects

Sl. No	Semester	Subject	Topics
01	VII	Artificial Intelligence and Machine Learning	Laboratory

6.0   Relevance to Real World

Sl. No	Real World Mapping
01	Implementation of machine learning algorithms
02	Final year projects on analytics

7.0   Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	YouTube Videos	Python Tutorials

8.0   Books Used and Recommended to Students

Text Books

1. Al Sweigart,"Automate the Boring Stuff with Python",1 st Edition, No Starch Press, 2015.
(Available under CC-BY-NC-SA license at https://automatetheboringstuff.com/) (Chapters 1 to 18)
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2 nd Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at http://greenteapress.com/thinkpython2/thinkpython2.pdf) (Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above links)

Reference Books

1. Gowrishankar S, Veena A, "Introduction to Python Programming", 1 st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-08153943722.
2. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", 1 st Edition, O'Reilly Media, 2016. ISBN-13: 978-1491912058
3. Charles Dierbach, "Introduction to Computer Science Using Python", 1 st Edition, Wiley India Pvt Ltd, 2015. ISBN-13: 978-8126556014
4. Wesley J Chun, "Core Python Applications Programming", 3 rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365

Additional Study material & e-Books

Python Notes for Professionals, GoalKicker.com Free Programming books

9.0   Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

1. https://www.tutorialspoint.com/python/
2. https://www.guru99.com/python-tutorials.html

10.0   Magazines/Journals Used and Recommended to Students

Sl.No	Magazines/Journals	website
1	Python for Scientific Computing	http://ieeexplore.ieee.org/document/4160250/

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11.0　　　Examination Note

Internal Assessment: 30+10=40 Marks
　　　30 marks –from internal assessment test
　　　10 marks- from the assignments

Scheme of Evaluation for Internal Assessment (50 Marks)
　　a) Internal Assessment test is conducted for 50 marks in the same pattern as that of the main examination. Average of all three Test marks will be taken and finally scale down to 30 marks.
　　b) Assignment marks for each module is 25. Average of 5 assignment marks will be taken and finally scale down to 10 marks.

Question Paper Pattern (IA):
1. Two main questions to be set from syllabus covered up to IA tests.
2. Student has to answer two full main questions and each question carries 25.
　　a.　　Q.No I or Q.No II　　　=25 Marks
　　b.　　Q.No III or Q.No IV　=25 Marks
　　c.　　**Total**　　　　　　　**=50 Marks**

Question Paper Pattern and instructions (Main Exam):
1. The question paper will have TEN questions.
2. There will be TWO questions from each module.
3. Each question will have questions covering all the topics under a module.
4. The students will have to answer FIVE full questions, selecting ONE full question from each module.

　　Max. Marks: 100 and each question carries 20 marks. Exam Duration: 3 Hrs.

12.0　　　Course Delivery Plan

Module	Lecture No.	Content of Lecturer	% of Portion
1	1	Python Basics, Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types	20
	2	String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program	
	3	Flow control, Boolean Values, Comparison Operators, Boolean Operators	
	4	Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution	
	5	Flow Control Statements, Importing Modules, Ending a Program Early with sys. exit()	
	6	Functions, def Statements with Parameters	
	7	Return Values and return Statements, The None Value, Keyword Arguments and print()	
	8	Local and Global Scope, The global Statement, Exception Handling, A Short Program: Guess the Number	
2	9	Lists, The List Data Type, Working with Lists	20
	10	Augmented Assignment Operators, Methods	
	11	Example Program: Magic 8 Ball with a List	
	12	List-like Types: Strings and Tuples, References	
	13	Dictionaries and Structuring Data, The Dictionary Data Type	
	14	Pretty Printing, Using Data Structures to Model Real-World Things	
	15	Manipulating Strings, Working with Strings, Useful String Methods	
	16	Project: Password Locker, Project: Adding Bullets to Wiki Markup	
3	17	Pattern Matching with Regular Expressions, Finding Patterns of Text Without Regular Expressions, Finding Patterns of Text with Regular Expressions, More Pattern Matching with Regular Expressions	20
	18	Greedy and Non greedy Matching, The findall() Method, Character Classes, Making Your Own Character Classes, The Caret and Dollar Sign Characters, The Wildcard Character, Review of Regex Symbols, Case-Insensitive Matching, Substituting Strings with the sub() Method	

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	19	Managing Complex Regexes, Combining re .IGNORECASE, re .DOTALL, and re .VERBOSE, Project: Phone Number and Email Address Extractor	
	20	Reading and Writing Files, Files and File Paths, The os.path Module	
	21	The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint. pformat() Function	
	22	Project: Generating Random Quiz Files, Project:Multiclipboard	
	23	Organizing Files, The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module, Project: Renaming Files with American-Style Dates to European-Style Dates	
	24	Project: Backing Up a Folder into a ZIP File, Debugging, Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE's Debugger.	
4	25	Classes and objects, Programmer-defined types, Attributes, Rectangles, Instances as return values	20
	26	Objects are mutable, Copying	
	27	Classes and functions, Time, Pure functions, Modifiers, Prototyping versus planning	
	28	Classes and methods, Object-oriented features, Printing objects, Another example	
	29	A more complicated example, The init method, The __str__ method, Operator overloading	
	30	Type-based dispatch, Polymorphism, Interface and implementation	
	31	Inheritance, Card objects, Class attributes, Comparing cards, Decks, Printing the deck	
	32	Add, remove, shuffle and sort, Inheritance, Class diagrams, Data encapsulation	
5	33	Web Scraping, Project: MAPIT.PY with the web browser Module, Downloading Files from 08 the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML, Parsing HTML with the Beautiful Soup Module	20
	34	Project: "I'm Feeling Lucky" Google Search, Project: Downloading All XKCD Comics, Controlling the Browser with the selenium Module	
	35	Working with Excel Spreadsheets, Excel Documents, Installing the openpyxl Module, Reading Excel Documents	
	36	Project: Reading Data from a Spreadsheet, Writing Excel Documents, Project: Updating a Spreadsheet	
	37	Setting the Font Style of Cells, Font Objects, Formulas, Adjusting Rows and Columns, Charts	
	38	Working with PDF and Word Documents, PDF Documents, Project: Combining Select Pages from Many PDFs, Word Documents	
	39	Working with CSV files and JSON data, The csv Module, Project: Removing the Header from CSV Files, JSON and APIs	
	40	The json Module, Project: Fetching Current Weather Data	

13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book / website / Paper
1	Assignment 1: University Questions on Module 1	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 1 of the syllabus	2	Individual Activity. Printed solution expected.	Book 1
2	Assignment 2: University Questions on Module 2	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 2 of the syllabus	4	Individual Activity. Printed solution expected.	Book 1
3	Assignment 3: University Questions on Module 3	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 3 of the syllabus	6	Individual Activity. Printed solution expected.	Book 1
4	Assignment 4: University Questions on Module 4	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 4 of the syllabus	8	Individual Activity. Printed solution expected.	Book 2

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5	Assignment 5: University Questions on Module 5	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 5 of the syllabus	10	Individual Activity. Printed solution expected.	Book 1

14.0   QUESTION BANK

MODULE – 1

1. List the salient features of python programming language.

2. Explain the math operators in Python from highest to lowest Precedence with an example for each. Write the steps how Python is evaluating the expression (5 - 1) * ((7 + 1) / (3 - 1)) and reduces it to a single value.

3. Demonstrate print(), input() statements with example. (Feb 21)

4. What are Comparison and Boolean operators? List all the Comparison and Boolean operators in Python and explain the use of these operators with suitable examples.

5. What are the different flow control statements supports in python .Explain any 3 with an suitable example program and flow chart.

6. List and explain the syntax of all flow control statements with example.

7. Explain elif, for, while, break continue statements with example. (Feb 21)

8. Illustrate the use of break and continue with a code snippet.

9. Write a python program to check whether a given number is even or odd. (Feb 21)

10. Write a python program to calculate the area of circle, rectangular and triangle. Print the results.

11. What are user defined functions? How can we pass parameters in user defined functions? Explain with suitable example. (Feb 21)

12. What is a function? How to define a function in python? Write a program using function to find out the given string is palindrome or not.

13. What is local and global scope of variable in python .Explain the different scenarios with an example snippet. (Feb 21)

14. Write a function that computes and returns addition, subtraction, multiplication, division of two integers. Take input from user.

15. What is Exception Handling? How exceptions are handled in Python? Write a Python program with exception handling code to solve divide-by-zero error situation.

16. Explain the concept of exception. Write a python program which prompts user for Celsius temperature and convert it to Fahrenheit temperature and printout the converted temperature by handling exceptions. (Feb 21)

17. Define a Python function with suitable parameters to generate first N Fibonacci numbers. The first two Fibonacci numbers are 0 and 1 and the Fibonacci sequence is defined as a function F as *Fn = Fn-1 + Fn-2*. Write a Python program which accepts a value for N (where N >0) as input and pass this value to the function. Display suitable error message if the condition for input value is not followed.

18. Explain Local and Global Scope in Python programs. What are local and global variables? How can you force a variable in a function to refer to the global variable?

19. Write a python program to check whether a given number in palindrome or not.

20. Write a python program to check whether a given number in Armstrong number or not.

21. Write a python program to display the reverse of a given number.

22. Write a python program to find the area of square, rectangle and circle. Print the results. Take input from user.

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23. Write a python program to create a function called collatz() which reads as parameter named number. If the number is even it should print and return number//2 and if the number is odd then it should print and return 3*number+1. The function should keep calling on that number until the function returns a value 1.

24. Define a Python function with suitable parameters to generate prime numbers between two integer values. Write a Python program which accepts two integer values m and n (note: m>0, n>0 and m < n) as inputs and pass these values to the function. Suitable error messages should be displayed if the conditions for input values are not followed.

MODULE – 2

1. What is list? Explain the concept of slicing and indexing with proper examples.

2. What is list? Explain the concept of list slicing with example.

3. What is list? Explain append(), insert() and remove() methods with examples. (Feb 21)

4. How list is different from tuple? Which function is used to convert tuple to list and vice versa? (Feb 21)

5. Create a function to print blank tic-tac-toe game. (Feb 21)

6. What is Dictionary in Python? How is it different from List data type? Explain how a for loop can be used to traverse the keys of the Dictionary with an example.

7. Explain get(), keyas(), values(), and items() methods of dictionary with an example.

8. Explain with code split() and join() methods of string in python. (Feb 21)

9. Develop a program to accept a sentence from the user and display the longest word of that string along with its length. (Feb 21)

10. What is the difference between copy.copy( ) and copy.deepcopy( ) functions applicable to a List or Dictionary in Python? Give suitable examples for each.

11. Explain the methods of List data type in Python for the following operations with suitable code snippets for each. (i) Adding values to a list ii) Removing values from a list (iii) Finding a value in a list iv) Sorting the values in a list

12. Write a Python program that accepts a sentence and find the number of words, digits, uppercase letters and lowercase letters.

13. What is dictionary? How it is different from list? Write a program to count the number of occurrences of character in a string.

14. Explain references with example.

. Discuss the following Dictionary methods in Python with examples. (i) get() (ii) items() (iii) keys() (iv) values() (Feb 21)

16. For a given list num=[45,22,14,65,97,72], write a python program to replace all the integers divisible by 3 with "ppp" and all integers divisible by 5 with "qqq" and replace all the integers divisible by both 3 and 5 with "pppqqq" and display the output.

17. What are the different methods supports in python List. Illustrate all the methods with an example.

18. What is dictionary? Illustrate with an example python program the usage of nested dictionary.

19. List out all the useful string methods which supports in python. Explain with an example for each method.

20. Explain the various string methods for the following operations with examples. (i) Removing whitespace characters from the beginning, end or both sides of a string. (ii) To right-justify, left-justify, and center a string.

21. Write a Python program to swap cases of a given string. Input: Java Output: JAVA.

22. You are creating a fantasy video game. The data structure to model the player's inventory will be a dictionary where the keys are string values describing the item in the inventory and the value is an integer value detailing how many of that

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item the player has. For example, the dictionary value {'rope': 1, 'torch': 6, 'gold coin': 42, 'dagger': 1, 'arrow': 12} means the player has 1 rope, 6 torches, 42 gold coins, and so on. Write a function named display Inventory() that would take any possible "inventory" and display it like the following:

> Inventory:
>
> 12 arrow
>
> 42 gold coin
>
> 1 rope
>
> 6 torch
>
> 1 dagger
>
> Total number of items: 63

MODULE – 3

1. What are regular expressions? What are the different steps to be follow to use a regular expression in python. (Feb 21)

2. Describe star, question mar, plus and dot Regex symbols with suitable python code snippet.

3. Describe use defined character classes in with suitable python code snippet.

4. How do you make a regular expression case-insensitive?

5. List out what are the different character classes and its representation also regular expression symbol and its meaning.

6. Describe the following with suitable Python code snippet. (i) Greedy and Non Greedy Pattern Matching (ii) findall() method of Regex object.

7. Write a python program to create phone number and email address by using regular expression.

8. How would you write a regex that matches a number with commas for every three digits? It must match the following:

   - '42'
   - '1,234'
   - '6,368,745'

   but not the following:

   - '12,34,567' (which has only two digits between the commas)
   - '1234' (which lacks commas)

9. Write a program that reads s string with five characters which starts with 'a' and ends with 'z'. Print search successful if pattern match found. (Feb 21)

10. What are the key properties of a file? Explain in detail file reading/writing process wit an example of python program.

11. What is a relative path and absolute path? Explain briefly

12. What do the os.getcwd() and os.chdir() functions do?

13. Describe the difference between Python os and os.path modules. Also, discuss the following methods of os module a) chdir() b) rmdir() c) walk() d) listdir() e) getcwd()

14. Explain in briefly, what are the different methods of file operations supports in python shutil module.

15. What is the difference between the delete functions in the send2trash and shutil modules? (Feb 21)

16. Write a python program to create a folder PYTHON and under the hierarchy 3 files file1,file2 and file3.write the content in file1 as "VTU" and in file2 as "UNIVERSITY" and file3 content should be by opening and merge of file1 and file2. Check out the necessary condition before write file3.

17. With the code snippet explain saving variables using the selves module and pprint.pformat() functions. (Feb 21)

18. With code snippet, explain reading, extracting and creating ZIP files. (Feb 21)

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19. Explain how to generate logging message in python with programming example.

MODULE – 4

1. What is class, define a class for student.

2. What is object, create a object for student class.

3. What is attribute of class, explain with example.

4. How copying of object helps to avoid multiple copy of data?

5. What is pure function? Explain with example.

6. Explain methods in python class. How it is different than function of class.

7. Explain operator overloading in python.

8. Explain inheritance in python.

9. What is override? Explain how to override methods in python.

10. What is modifier? Explain with example.

11. What is constructor? Explain with example.

12. Compare shallow and deep equality.

13. Compare shallow ans deep copy.

14. Explain overloading and polymorphism in python. (Feb 21)

15. Illustrate the concept of inheritance with an example. (Feb 21)

16. Write a function called printime() that takes the time object and prints in the form of hour:minute:second (Feb 21)

17. What is class, attribute and object? Explain copy.cpoy() function. (Feb 21)

18. Demonstrate the pure and modifier functions with examples. (Feb 21)

19. Use date time module to write a program that gets the current date and prints the day of a week. (Feb 21)

MODULE – 5

1. What is web scraping? How to download files from the web, check the error and save the downloaded files to a hard drive with a request module in python?
2. Explain in detail how to parse HTML with the BeautifulSoup. (Feb 21)
3. How to work with Excel spreadsheet in python? Explain briefly.
4. Explain parsing HTML with BeautifulSoup module with a code snippet for creating finding an element and getting data.
5. What methods do Selenium's web element objects have for simulating mouse clicks and keyboard keys? Explain with a python code snippet. (Feb 21)
6. Write a python program to access a cell in the worksheet. (Feb 21)
7. Write a python program to read the content from a pdf file.
8. Write a python program to encrypt and decrypt the pdf file.
9. Write a python program to get a list of all files with the pdf extension in the current working directory and write the content into a new file.
10. Write a python program to get a list of all files with the pdf extension in the current working directory and sort them. (Feb 21)
11. How to work with PDF documents in python. Explain with extracting text, decrypting, creating copying pages, encrypting PDF.
12. What are CSV and JSON files? Explain with an example program the usage of the JSON module in python.
13. Demonstrate the JSON module with the python program. (Feb 21)
14. What are the advantages of CSV files? Explain the reader objects and writer objects with python code. (Feb 21)
15. Write a python program to get a list of all files with the CSV extension in the current working directory and remove the header from each file.
16. Write a python program to retrieve weather information using API.

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15.0 University Result

Examination	FCD	FC	SC	Fail	% Passing
Jan/Feb 2022	14	14	21	02	96.07
Jan/Feb 2021	00	10	22	11	74.41

Prepared by	Checked by		
Dr. M. G. Huddar	Dr. M. G. Huddar	HOD	Principal

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Subject Title	UNIX PROGRAMMING		
Subject Code	18CS56	**CIE Marks**	40
Number of Lecture Hrs / Week	04	**SEE Marks**	60
Total Number of Lecture Hrs	40	**Exam Hours**	03
CREDITS – 03			

FACULTY DETAILS:

Name: Prof. S. V. Manjaragi	**Designation:** Assistant Professor	**Experience:**18 Years
No. of times course taught: 02		**Specialization:** Computer Science and Engineering

1.0   Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Computer Science and Engineering	I/II	Programming in C
02	Computer Science and Engineering	IV	Operating System

2.0   Course Objectives

This course will enable students to

1. Interpret the features of UNIX and basic commands
2. Demonstrate different UNIX files and permissions
3. Implement shell programs
4. Explain UNIX process, IPC and signals

3.0   Course Outcomes

After studying this course, students will be able to

CO	Course Outcome	RBT Level	POs
C306.1	Explain Unix Architecture, File system and use of Basic Commands	L1, L2	PO1, PO2, PO3, PO8, PO9, PO10, PO11,PO12
C306.2	Illustrate Shell Programming and to write Shell Scripts	L1, L2	PO1, PO2, PO3, PO8, PO9, PO10, PO11,PO12
C306.3	Categorize, compare and make use of Unix System Calls	L1, L2, L3	PO1, PO2, PO3, PO8, PO9, PO10, PO11,PO12
C306.4	Build an application/service over a Unix system	L1, L2, L3	PO1, PO2, PO3, PO8, PO9, PO10, PO11,PO12
C306.5	Explain signal and daemon characteristics	L1, L2, L3	PO1, PO2, PO3, PO8, PO9, PO10, PO11,PO12
Total Hours of instruction		**40**	

4.0   Course Content

Module 1   08 Hours

Introduction: Unix Components/Architecture. Features of Unix. The UNIX Environment and UNIX Structure, Posix and Single Unix specification. General features of Unix commands/ command structure. Command arguments and options. Basic Unix commands such as echo, printf, ls, who, date,passwd, cal, Combining commands. Meaning of Internal and external commands. The type command: knowing the type of a command and locating it. The root login. Becoming the super user: su command. Unix files: Naming files. Basic file types/categories. Organization of files. Hidden files. Standard directories. Parent child relationship. The home directory and the HOME variable. Reaching required files- the PATH variable, manipulating the PATH, Relative and absolute pathnames. Directory commands – pwd, cd, mkdir, rmdir commands. The dot (.) and double dots (..) notations to represent present and parent directories and their usage in relative path names. File related commands – cat, mv, rm, cp, wc and od commands. **RBT: L1, L2**

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Module 2   08 Hours

File attributes and permissions: The ls command with options. Changing file permissions: the relative and absolute permissions changing methods. Recursively changing file permissions. Directory permissions. The shells interpretive cycle: Wild cards. Removing the special meanings of wild cards. Three standard files and redirection. Connecting commands: Pipe. Basic and Extended regular expressions. The grep, egrep. Typical examples involving different regular expressions. Shell programming: Ordinary and environment variables. The .profile. Read and read only commands. Command line arguments. exit and exit status of a command. Logical operators for conditional execution. The test command and its shortcut. The if, while, for and case control statements. The set and shift commands and handling positional parameters. The here (<<) document and trap command. Simple shell program examples. **RBT: L1, L2**

Module 3   08 Hours

UNIX File APIs: General File APIs, File and Record Locking, Directory File APIs, Device File APIs, FIFO File APIs, Symbolic Link File APIs. UNIX Processes and Process Control: The Environment of a UNIX Process: Introduction, main function, Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions, UNIX Kernel Support for Processes. Process Control: Introduction, Process Identifiers, fork, vfork, exit, wait, waitpid, wait3, 08 wait4 Functions, Race Conditions, exec Functions **RBT: L1, L2, L3**

Module 4   08 Hours

Changing User IDs and Group IDs, Interpreter Files, system Function, Process Accounting, User Identification, Process Times, I/O Redirection. Overview of IPC Methods, Pipes, popen, pclose Functions, Coprocesses, FIFOs, System V IPC, Message Queues, Semaphores. Shared Memory, Client-Server Properties, Stream Pipes, Passing File Descriptors, An Open Server-Version 1, Client-Server Connection Functions. **RBT: L1, L2, L3**

Module 5   08 Hours

Signals and Daemon Processes: Signals: The UNIX Kernel Support for Signals, signal, Signal Mask, sigaction, The SIGCHLD Signal and the waitpid Function, The sigsetjmp and siglongjmp Functions, Kill, Alarm, Interval Timers, POSIX.lb Timers. Daemon Processes: Introduction, Daemon Characteristics, Coding Rules, Error Logging, Client-Server Model. **RBT: L1, L2, L3**

5.0   Relevance to future subjects

Sl No	Semester	Subject	Topics
01	VII	Project work	Academics Mini Projects
02	VIII	Project work	Academics Project

6.0   Relevance to Real World

Sl. No.	Real World Mapping
01	Design and development of operating systems

7.0   Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	Tutorial	UNIX and Shell Programming
02	NPTEL	UNIX System Programming

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8.0   Books Used and Recommended to Students

Text Books
1. Sumitabha Das., Unix Concepts and Applications., 4thEdition., Tata McGraw Hill (Chapter 1,2 ,3,4,5,6,8,13,14)
2. W. Richard Stevens: Advanced Programming in the UNIX Environment, 2nd Edition, Pearson Education, 2005 (Chapter 3,7,8,10,13,15)
3. Unix System Programming Using C++ - Terrence Chan, PHI, 1999. (Chapter 7,8,9,10)

Reference Books
1. M.G. Venkatesh Murthy: UNIX & Shell Programming, Pearson Education.
2. 2. Richard Blum , Christine Bresnahan : Linux Command Line and Shell Scripting Bible, 2ndEdition, Wiley,2014.

Additional Study material & e-Books
1. https://www.tutorialspoint.com/unix/shell_scripting.htm
2. https://www.shellscript.sh/
3. https://www.softwaretestinghelp.com/unix-shell-scripting-tutorial/
4. https://www.geeksforgeeks.org/introduction-linux-shell-shell-scripting/
5. http://igm.univ-mlv.fr/~yahya/progsys/UnixProgromming.pdf

9.0   Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References
2. https://swayam.gov.in/
3. https://nptel.ac.in/
4. https://www.udemy.com/
5. https://www.mooc.org/
6. https://www.coursera.org/

10.0   Magazines/Journals Used and Recommended to Students

Sl. No	Magazines/Journals	website
1	CSI communications	www.csi-india.org

11.0   Examination Note

Internal Assessment: 30+10=40 Marks
      30 marks –from internal assessment test
      10 marks- from the assignments

Scheme of Evaluation for Internal Assessment (50 Marks)
   a) Internal Assessment test is conducted for 50 marks in the same pattern as that of the main examination. Average of all three Test marks will be taken and finally scale down to 30 marks.
   b) Assignment marks for each module is 25. Average of 5 assignment marks will be taken and finally scale down to 10 marks.

Question Paper Pattern (IA):
1. Two main questions to be set from syllabus covered up to IA tests.
2. Student has to answer two full main questions and each question carries 25.
   a.   Q.No I or Q.No II   =25 Marks
   b.   Q.No III or Q.No IV   =25 Marks
   c. **Total   =50 Marks**

Question Paper Pattern and instructions (Main Exam):
1. The question paper will have TEN questions.
2. There will be TWO questions from each module.
3. Each question will have questions covering all the topics under a module.
4. The students will have to answer FIVE full questions, selecting ONE full question from each module.

   Max. Marks: 100 and each question carries 20 marks. Exam Duration: 3 Hrs.

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12.0	Course Delivery Plan

Module	Lecture No.	Content of Lecturer	% of Portion
1	1	Introduction: Unix Components/Architecture. Features of Unix. The UNIX Environment and UNIX Structure, Posix and Single Unix specification. General features of Unix commands/ command structure. Command arguments and options	20
	2	Basic Unix commands such as echo, printf, ls, who, date, passwd, cal, Combining commands. Meaning of Internal and external commands. The type command: knowing the type of a command and locating it. The root login. Becoming the super user: su command.	
	3	Unix files: Naming files. Basic file types/categories. Organization of files. Hidden files. Standard directories.	
	4	Parent child relationship. The home directory and the HOME variable.	
	5	Reaching required files- the PATH variable, manipulating the PATH, Relative and absolute pathnames.	
	6	Directory commands – pwd, cd, mkdir, rmdir commands.	
	7	The dot (.) and double dots (..) notations to represent present and parent directories and their usage in relative path names.	
	8	File related commands – cat, mv, rm, cp, wc and od commands	
2	9	File attributes and permissions: The ls command with options. Changing file permissions: the relative and absolute permissions changing methods. Recursively changing file permissions. Directory permissions.	20
	10	The shells interpretive cycle: Wild cards. Removing the special meanings of wild cards.	
	11	Three standard files and redirection. Connecting commands: Pipe.	
	12	Basic and Extended regular expressions. The grep, egrep. Typical examples involving different regular expressions.	
	13	Shell programming: Ordinary and environment variables. The .profile. Read and readonly commands. Command line arguments. exit and exit status of a command.	
	14	Logical operators for conditional execution. The test command and its shortcut. The if, while, for and case control statements.	
	15	The set and shift commands and handling positional parameters. The here (<<) document and trap command.	
	16	Simple shell program examples.	
3	17	UNIX File APIs: General File APIs, File and Record Locking, Directory File APIs, Device File APIs, FIFO File APIs, Symbolic Link File APIs.	20
	18	UNIX Processes and Process Control: The Environment of a UNIX Process: Introduction,	
	19	main function, Process Termination, Command-Line Arguments,	
	20	Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation,	
	21	Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions,	
	22	UNIX Kernel Support for Processes. Process Control: Introduction,	
	23	Process Identifiers, fork, vfork, exit, wait, waitpid, wait3, wait4 Functions,	
	24	Race Conditions, exec Functions	
4	25	Changing User IDs and Group IDs, Interpreter Files,	20
	26	System Function, Process Accounting, User Identification, Process Times, I/O Redirection.	
	27	Overview of IPC Methods, Pipes, popen, pclose Functions, Coprocesses,	
	28	FIFOs, System V IPC, Message Queues, Semaphores.	
	29	Shared Memory, Client-Server Properties,	
	30	Stream Pipes, Passing File Descriptors,	
	31	An Open Server-Version 1,	
	32	Client-Server Connection Functions.	
5	33	Signals and Daemon Processes: Signals: The UNIX Kernel Support for Signals,	20
	34	signal, Signal Mask, sigaction,	
	35	The SIGCHLD Signal and the waitpid Function,	
	36	The sigsetjmp and siglongjmp Functions,	
	37	Kill, Alarm, Interval Timers, POSIX.lb Timers.	
	38	Daemon Processes: Introduction, Daemon Characteristics,	
	39	Coding Rules, Error Logging,	
	40	Client-Server Model.	

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13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: Some important University Questions on Module one.	Students study the Topics and write the Answers. Get practice to solve questions	Module one of the syllabus	3	Individual Activity. Witten solutions expected.	Text book
2	Assignment 2: Some important University Questions on Module two	Students study the Topics and write the Answers. Get practice to solve questions	Module two of the syllabus	6	Individual Activity. Witten solutions expected.	Text book
3	Assignment 3: Some important University Questions on module three.	Students study the Topics and write the Answers. Get practice to solve questions	Module three of the syllabus	9	Individual Activity. Witten solutions expected.	Text book
4	Assignment 4: Some important University Questions on and comprehensive questions module four.	Students study the Topics and write the Answers. Get practice to solve questions	Module four of the syllabus	11	Individual Activity. Witten solutions expected.	Text book
5	Assignment 5: Some important University Questions on and comprehensive questions module five.	Students study the Topics and write the Answers. Get practice to solve questions	Module five of the syllabus	13	Individual Activity. Witten solutions expected.	Text book

14.0 QUESTION BANK

Module-1
1. Explain the architecture of UNIX operating system.
2. Define UNIX Operating System.
3. Explain the following commands: type, tput, cat, pwd, mkdir, cd, rmdir and date.
4. With a neat diagram explain the relationship between the kernel and shell of UNIX.
5. Describe the salient features of UNIX operating system.
6. With example explain date and bc command
7. With the help of diagram, explain parent-child relationship. Explain the UNIX file system.
8. What are the different types of files in UNIX, explain them briefly.
9. Explain the flexibility of command usage.
10. Explain about man documentation.
11. What are the types of files? Explain them in detail with example.
12. Create a tree structure in Command prompt window.
13. How files and directory are created and removed?
14. Explain three groups in UNIX file system?
15. Write a short note on MAN command.
16. Explain the following commands with examples – passwd, who.
17. Explain the following file related commands – cat, mv, rm, cp, wc and od
18. Explain the following directory related commands – pwd, cd, mkdir, rmdir
19. Explain the (.) dot and (..) double dot notations to represent present and parent directories.

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Module-2
1. Explain about file ownership.
2. Explain the different types of files supported in UNIX.
3. Briefly describe the different ways of setting file permissions.
4. Explain the following - chmod, chown & chgrp.
5. Explain the absolute pathname and relative pathname with examples.
6. Explain the significance of ls -l in detail.
7. How to change directory permissions? Explain with examples.
8. What is metacharacter? List out 5 metachatacters and explain them in detail with examples.
9. List out the shell wildcards and explain them with example.
10. Explain can we implement escaping and quoting in UNIX with example.
11. Explain -Standard Input, Standard Output & Standard Error.
12. Explain the following commands - bc as filter, who, who am I, cmp, wc with pipe, echo.
13. Explain the grep, with examples.
14. How to search for a pattern using grep? What are the options used by grep?
15. Explain extended regular expression (ERE) set used by grep.
16. Explain Basic Regular Expression (BRE) subset used for constructing regular expressions.
17. What is shell programming? Explain the shell features of while & for with syntax.
18. Write a shell program that will do the following tasks, in order – clear the screen, print the current directory and display current login users.
19. Write a menu driven shell script to display the list of files, process of user, today's date & users of the system.
20. Explain the expr command applicable to numeric and string functions.
21. Explain the following with reference to shell programming: i) $? ii) test iii) shift iv) trap.
22. Explain the shell features of "while" and "for" with syntax.
23. Write a shell script that accepts a word & five filenames as arguments, counts and reports the occurrence of the word in each of the files.
24. Write a shell script to find the smallest of three numbers that are read from keyboard.
25. Write a shell program to create a menu which displays the list of files, current date, process status and current users of the system.
26. Explain the use of test and [ ] to evaluate expressions in shell.
27. What are the special parameters used by the shell?
28. Explain how numeric & string comparison is done by using test.
29. What is the "exit" status of a command and where is it stored?
30. Explain the following two files - /dev/null & /dev/tty.

Module-3
1. Explain open API with its prototype & an example program
2. Explain creat API with its prototype & an example program.
3. Explain read API with its prototype & an example program.
4. Explain write API with its prototype & an example program.
5. Explain fcntl API with its prototype & an example program.
6. Explain open, lseek, stat, read with prototypes.
7. Explain lseek API with its prototype & an example program.
8. Explain link API with its prototype & an example program.
9. Explain unlink API with its prototype & an example program.
10. Explain stat API with its prototype & an example program.
11. Explain fstat API with its prototype & an example program.
12. Explain the implementation of ls –l command.
13. Explain the implementation of mv command.
14. Explain access API with its prototype & an example program.
15. Explain chmod API with its prototype & an example program.
16. Explain fchmod API with its prototype & an example program.
17. Explain chown API with its prototype & an example program.
18. Explain fchown API with its prototype & an example program.
19. Explain utime API with its prototype & an example program.
20. Explain lchown API with its prototype & an example program.
21. Write a *CIC++* program to emulate In command in UNIX.
22. Write a *CIC++* program to emulate mv command in UNIX.
23. Explain opendir, readdir, closedir, rewinddir API's with their prototypes & an example program.
24. Explain rmdir API with its prototype & an example program.

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25. Explain mknod API with its prototype & an example program.
26. Explain mkfifo API with its prototype & an example program.
27. Explain symlink, readlink, lstat API with its prototype & an example program.
28. Bring out differences between hardlink and symbolic link.
29. With neat diagram explain how C program is started & how it terminates.
30. Explain with a neat block diagram, the memory layout of a C program.
31. For the following given C program, identify the various segments when the program is eexecuted:

```
# include <stdio.h>
int a = 5;
int b;
int data [10];
const int i = 5;
int main( )
{
    int X;
    char * ptr, = malloc(50);
    return 0;
}
```

32. Explain the different way for a process to terminate. Explain exit, _exit, atexit functions with examples.
33. Explain atexit function with an example program.
34. Explain in detail about memory layout of a C program.
35. Explain different functions used for dynamic memory allocation.
36. Explain the different functions used for setting & getting the environment variables.
37. Explain setjmp & longjmp functions with an example program.
38. Write a note on automatic, register & volatile variables.
39. Explain setrlimit & getrlimit functions with prototypes. Mention the three rules to change the resource limits. Give four resource rules.
40. With related data structure, explain how UNIX kernel supports for processes.
41. Explain with a neat diagram, UNIX process data structure.
42. Give reasons as to why shared libraries are better, with example.
43. Mention at least SIX resource limits and briefly explain the limits they put on processes.
44. Outline the environment structure of process and mention any four environment variables.
45. Explain the different functions used for setting & getting the different PID's.
46. Write a note on fork function with an example program.
47. What do you mean by fork( ) and vfork( ) functions? Explain both functions with example programs (write-separate programs).
48. With neat diagram explain the sharing of open files between parent & child after fork.
49. Write a note on vfork function with an example program.
50. What is fork and vfork? Explain with an example for each.
51. Explain the working of kernel for the parent when its child terminates.
52. Write a note on wait & waitpid functions with an example program.
53. Explain wait3 & wait4 functions.
54. What do you mean by race condition & how it can be avoided?
55. Explain the different variants of exec functions.

Module-4

1. Explain setuid & setgid functions with an example program.
2. Explain the functions that swap the real user ID & the effective user ID.
3. Write a note on function which is used to set the effective user ID's.
4. Explain interpreter files with an example.
5. Explain system function with its prototype implementation & with an example program.
6. Explain the structure that holds the process accounting information.
7. Write a note on getlogin function.
8. Explain the function used to retrieve the time consumed by the process.
9. Explain pipe API.
10. With neat diagram explain two ways to view a UNIX pipe.
11. With neat diagram explain half duplex pipe after fork.
12. Explain the functions used to synchronize parent & child.
13. What are pipes? What are their limitations? Write a program to send data from parent to child over a pipe.
14. Write a program using pipe to send data from parent to child.

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15. Explain popen function in detail.
16. Explain pclose function in detail.
17. Explain with program about coprocesses communication.
18. With neat diagram & program explain client server communication using fifo.
19. What is FIFO? Explain how FIFO can be used to implement client server communication model with an example.
20. Explain permission structure used in system V IPC.
21. Explain the structure associated with message queue.
22. Write a note on functions associated with message queue.
23. Explain how semaphores help to avoid the race condition.
24. Explain the functions associated with semaphores.
25. Explain the concept of shared memory in IPC.
26. Write a note on shmget, shmat, shmdamdt functions.
27. Write a program for IPC between parent & child using memory mapped I/O of /dev/zero.
28. What are the advantages and disadvantages of XSI IPC?
29. Write a program to send data from parent to child over a pipe.
30. Write short notes on the following: Message queues and Semaphores.
31. What are pipes? Explain the various ways to view a half duplex pipe. Write a program to create a pipe between a parent and its child and to send data down the pipe.
32. List along with prototype declaration and meaning, the different types of system calls available to create and manipulate the semaphore.
33. Write a note on sockets in network IPC.
34. Explain socket descriptors in detail.
35. Write a note on addressing used in socket programming.
36. Explain the concept of shared memory with an example C/C++ program.
37. What do you mean by passingfile descriptors between processes? Explain.
38. With program explain how connection is established using socket program.
39. Explain how data transfer is carried out in socket.
40. Explain socket options in detail.
41. With program illustrate out of band data in network IPC.
42. Write a note on nonblocking I/O in sockets.
43. Write short note on: i) Race condition ii) Network login iii) Message queues.
44. Explain asynchronous I/O in sockets.
45. What is byte ordering? Explain the two types of ordering. Explain the APIs to convert between the
46. processor byte order and the network byte for TCP/IP applications.
47. Explain the following APIs with prototypes listen( ) and accept( ).
48. What is socket? Describe the socket API. Explain the different APIs used for establishing connection between two systems using socket?
49. Write short notes on: i) Race condition ii) File and Record locking.
50. Explain popen and pclose functions with prototypes and demonstrate its usage with a simple C program.
51. Explain with a neat diagram, how STREAM PIPES can be used to implement client server model.

Module-5
1. Write a note on UNIX kernel support for signals.
2. Explain signal API with program.
3. Explain different functions used for masking the signal.
4. Explain the sigaction( ) function by giving the prototype and discuss its features.
5. What is a signal? Mention the different sources of signals. Discuss any four POSIX defined signals.
6. Write a program to setup signal handler for SIGINT and SIGALARM.
7. Explain SIGCHLD signal.
8. Write a note on sigsetjmp & siglongjmp API's with an example program.
9. What is the use of the alarm API? Give the prototype of the alarm API. How can the alarm API be used to implement sleep() API.
10. Explain kill function in detail.
11. Explain alarm function in detail.
12. Briefly explain the pause ( ) API and the alarm ( ) API.
13. List the timer implementation APIs in POSIX.1c.
14. Write a note on timer functions.
15. Explain POSIX.1b timers.
16. Write a program for timer class.
17. Write a note on daemon characteristics.

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18. What is Daemon? Explain coding rules in detail.
19. Explain the three ways to generate log messages.
20. With neat diagram explain SVR4 log driver.
21. With neat diagram explain SVR4 syslog facility.
22. Explain different syslog functions.
23. What is job control? What are the three forms of support from the OS required for job control?
24. Explain in brief about client–server model.
25. What are daemon processes? Explain the BSD facility adopted by daemon processes for error handling.
26. Write a C++ program to illustrate the implementation of the UNIX kill command using the kill API.

16.0   University Result

Examination	FCD	FC	SC	% Passing
Feb/March-2022	09	19	22	98.03
Jan/Feb-2021	16	26	01	100

Prepared by	Checked by		
Prof. S. V. Manjaragi	Prof. A. A. Daptardar	HOD	Principal

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Subject Title	Computer Network Laboratory		
Subject Code	18CSL57	**IA Marks**	40
No of Lecture Hrs + Practical Hrs/ Week	01+02	**Exam Marks**	60
Total No of Lecture + Practical Hrs	36	**Exam Hours**	03
CREDITS:			

FACULTY DETAILS:

Name: Prof. S. I. Mane	**Designation:** Asst. Professor	**Experience:** 08
No. of times course taught: 1(including present)	**Specialization:** Computer Network Engineering	

1.0　　Prerequisite Subjects:

Sl. No	Branch	Subject
01	Computer Science and Engg	USP
02	Computer Science and Engg	OOC
03	Computer Science and Engg	Tcl Scripting

2.0　　Course Objectives

- Demonstrate operation of network and its management commands
- Simulate and demonstrate the performance of GSM and CDMA
- Implement data link layer and transport layer protocols.

3.0　　Course Outcomes

The student, after successful completion of the course, will be able to

CO	Course Outcome	Cognitive Level	Pos
CO316.1	Analyze and Compare various networking protocols.	L4	1,2,4,5,12
CO316.2	Demonstrate the working of different concepts of networking.	L2	1,2,4,5,12
CO316.3	Implement, analyze and evaluate networking protocols in NS2 / NS3 and JAVA programming	L5	1,2,4,5,12
Total Hours of instruction			**36**

4.0　　Course Content

PART A
For the experiments below modify the topology and parameters set for the experiment and take multiple rounds of reading and analyze the results available in log files. Plot necessary graphs and conclude using any suitable tool.

1. Implement three nodes point – to – point network with duplex links between them. Set the queue size, vary the bandwidth and find the number of packets dropped.
2. Implement transmission of ping messages/trace route over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.
3. Implement an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination.
4. Implement simple ESS and with transmitting nodes in wire-less LAN by simulation and determine the performance with respect to transmission of packets.
5. Implement and study the performance of GSM on NS2/NS3 (Using MAC layer) or equivalent environment.
6. Implement and study the performance of CDMA on NS2/NS3 (Using stack called Call net) or equivalent environment.

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PART B
Implement the following in Java:

7. Write a program for error detecting code using CRC-CCITT (16- bits).
8. Write a program to find the shortest path between vertices using bellman-ford algorithm.
9. Using TCP/IP sockets, write a client – server program to make the client send the file name and to make the server send back the contents of the requested file if present.
10. Write a program on datagram socket for client/server to display the messages on client side, typed at the server side.
11. Write a program for simple RSA algorithm to encrypt and decrypt the data.
12. Write a program for congestion control using leaky bucket algorithm.

5.0   Relevance to future subjects

SL. No	Semester	Subject	Topics / Relevance
1	7 & 8	Project Work	Network related projects

6.0   Relevance to Real World

SL. No	Real World Mapping
01	Client server Programming, Security, cellular networks, congestion control mechanism

7.0   Books Used and Recommended to Students

Text Books

1. James F Kurose and Keith W Ross, Computer Networking, A Top-Down Approach, Sixth edition, Pearson,2017 .
2. Introduction to java programming by Daniel Liang.

Reference Books

3. Behrouz A Forouzan, Data and Communications and Networking, Fifth Edition,McGraw Hill, Indian Edition

Additional Study material & e-Books

4. NS2 manual

8.0   Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

https://www.isi.edu/nsnam/ns/

https://www.youtube.com/watch?v=zpL-ykyhtBQ

9.0   Magazines/Journals Used and Recommended to Students

Sl. No	Magazines/Journals	Website
1	Ieee Communications Surveys & Tutorials, Vol. 12, No. 3, Third Quarter 2010	https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5462976

10.0   Examination Note

Experiment distribution

For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity. For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity. Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.

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Marks Distribution

i) For laboratories having only one part – Procedure + Execution + Viva-Voce: 15+70+15 = 100 Marks

ii) For laboratories having PART A and PART B

i. Part A – Procedure + Execution + Viva = 6 + 28 + 6 = 40 Marks

ii. Part B – Procedure + Execution + Viva = 9 + 42 + 9 = 60 Marks

11.0 Course Delivery Plan

Expt. No	Lecture/ Practical No	Name of the Experiment	% Of Portion
1	1	Implement three nodes point – to – point network with duplex links between them. Set the queue size, vary the bandwidth and find the number of packets dropped.	7.14
2	2	Implement transmission of ping messages/trace route over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.	7.14
3	3	Implement an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination.	7.14
4	4	Implement simple ESS and with transmitting nodes in wire-less LAN by simulation and determine the performance with respect to transmission of packets.	7.14
5	5	Implement and study the performance of GSM on NS2/NS3 (Using MAC layer) or equivalent environment.	7.14
6	6	Implement and study the performance of CDMA on NS2/NS3 (Using stack called Call net) or equivalent environment.	7.14
7	7	Write a program for error detecting code using CRC-CCITT (16- bits).	7.14
8	8	Write a program to find the shortest path between vertices using bellman-ford algorithm.	7.14
9	9	Using TCP/IP sockets, write a client – server program to make the client send the filename and to make the server send back the contents of the requested file if present.Implement the above program using as message queues or FIFOs as IPC channels.	7.14
10	10	Write a program on datagram socket for client/server to display the messages on client side, typed at the server side.	7.14
11	11	Write a program for simple RSA algorithm to encrypt and decrypt the data.	7.14
12	12	Write a program for congestion control using leaky bucket algorithm.	7.14

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12.0	QUESTION BANK

9. What is computer/ wireless networking?
10. What is the difference between bit and byte?
11. What is client/server networking?
12. What is peer-to-peer networking?
13. What is internet?
14. What is an intranet?
15. List out names of layers in OSI model.
16. List out the functionality of each layer in OSI model.
17. What is the difference between Hub and Switch?
18. What is the port and what are port numbers?
19. What is the difference between bps and Bps?
20. Explain parity and checksums.
21. What is bit error rate?
22. What is TCP/IP?
23. What is IP?
24. What are sockets?
25. DNS uses which protocol? Why?
26. Data link layer is subdivided into how many layers?
27. What are the differences between TCP and UDP?
28. What is the difference between MAC sub layer and LLC sub layer?
29. RARP resolves what? Address or IP?
30. ARP resolves what? Address or IP?
31. What is MAC address?
32. Difference between communication and transmission?
33. What is ping utility?
34. What is bandwidth?
35. What is subnet?
36. What is ICMP?
37. What is mesh network?
38. What is FTP?
39. What is the port number of FTP and TELNET?
40. What is network topology?
41. What is ESS?
42. Mention one real use of TCP/IP.
43. What is client/server?

13.0	University Result

Examination	FCD	FC	SC	F	% Passing
Feb/Mar 2021-22	18	20	10	03	94.11
Jan/Feb 2020-21	21	06	15	01	97.67

Prepared by	Checked by		
Prof. Sujata Mane	**Prof. S. V. Manjaragi**	**HOD**	**Principal**

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Subject Title	DBMS LABORATORY WITH MINI PROJECT		
Subject Code	18CSL58	IA Marks	40
No of Lecture Hrs + Practical Hrs/ Week	02L + 02P	Exam Marks	60
Total No. of Lecture Hrs	36	Exam Hours	03

FACULTY DETAILS:

Name: Prof. Aruna A. Daptardar	Designation: Assistant Professor	Experience:16.5 Years
No. of times course taught:04		Specialization: Computer Science and Engineering

1.0   Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Computer Science & Engineering	I/II	Programming in C
02	Computer Science & Engineering	III	Data Structures

2.0   Course Objectives

1. Foundation knowledge in database concepts, technology and practice to groom students into well-informed database application developers.
2. Strong practice in SQL programming through a variety of database problems.
3. Develop database applications using front-end tools and back-end DBMS.

3.0   Course Outcomes

The student, after successful completion of the course, will be able to

CO	Course Outcome	Cognitive Level	POs
C308.1	Demonstrate creation and manipulation operations on database.	L2	PO1-PO3, PO8-PO12
C308.2	Demonstrate the working of different concepts of DBMS	L2	PO1-PO3, PO8-PO12
C308.3	Develop and demonstrate the project developed for an application.	L6	PO1-PO3, PO8-PO12
Total Hours of instruction		**40**	

4.0   Course Content

Part A: SQL Programming

1. Consider the following schema for a Library Database:
   BOOK(Book_id, Title, Publisher_Name, Pub_Year)
   BOOK_AUTHORS(Book_id, Author_Name)
   PUBLISHER(Name, Address, Phone)
   BOOK_COPIES(Book_id, Programme_id, No-of_Copies)
   BOOK_LENDING(Book_id, Programme_id, Card_No, Date_Out, Due_Date)
   LIBRARY_PROGRAMME(Programme_id, Programme_Name, Address)
   Write SQL queries to
   1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each branch, etc.
   2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017.
   3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.
   4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.
   5. Create a view of all books and its number of copies that are currently available in the Library.

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2. Consider the following schema for Order Database:
   SALESMAN(Salesman_id, Name, City, Commission)
   CUSTOMER(Customer_id, Cust_Name, City, Grade, Salesman_id)
   ORDERS(Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id)
   Write SQL queries to
   1. Count the customers with grades above Bangalore's average.
   2. Find the name and numbers of all salesman who had more than one customer.
   3. List all the salesman and indicate those who have and don't have customers in their cities (Use UNION operation.)
   4. Create a view that finds the salesman who has the customer with the highest order of a day.
   5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.

3. Consider the schema for Movie Database:
   ACTOR(Act_id, Act_Name, Act_Gender)
   DIRECTOR(Dir_id, Dir_Name, Dir_Phone)
   MOVIES(Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id)
   MOVIE_CAST(Act_id, Mov_id, Role)
   RATING(Mov_id, Rev_Stars)
   Write SQL queries to
   1. List the titles of all movies directed by 'Hitchcock'.
   2. Find the movie names where one or more actors acted in two or more movies.
   3. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).
   4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
   5. Update rating of all movies directed by 'Steven Spielberg' to 5.

4. Consider the schema for College Database:
   STUDENT(USN, SName, Address, Phone, Gender)
   SEMSEC(SSID, Sem, Sec)
   CLASS(USN, SSID)
   SUBJECT(Subcode, Title, Sem, Credits)
   IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, FinalIA)
   Write SQL queries to
   1. List all the student details studying in fourth semester 'C' section.
   2. Compute the total number of male and female students in each semester and in each section.
   3. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects.
   4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.
   5. Categorize students based on the following criterion:
         If FinalIA = 17 to 20 then CAT = 'Outstanding'
         If FinalIA = 12 to 16 then CAT = 'Average'
         If FinalIA< 12 then CAT = 'Weak'
         Give these details only for 8th semester A, B, and C section students.

5. Consider the schema for Company Database:
   EMPLOYEE(SSN, Name, Address, Sex, Salary, SuperSSN, DNo)
   DEPARTMENT(DNo, DName, MgrSSN, MgrStartDate)
   DLOCATION(DNo,DLoc)
   PROJECT(PNo, PName, PLocation, DNo)
   WORKS_ON (SSN, PNo, Hours)
   Write SQL queries to
   1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.
   2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.
   3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department.
   4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator).
   5. For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs. 6,00,000.

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Part B: Mini project
- For any problem selected, write the ER Diagram, apply ER-mapping rules, normalize the relations, and follow the application development process.
- Make sure that the application should have five or more tables, at least one trigger and one stored procedure, using suitable frontend tool.
- Indicative areas include; health care, education, industry, transport, supply chain etc.

5.0   Relevance to future subjects

SL. No	Semester	Subject	Topics / Relevance
01	VIII	Project work	Academic projects

6.0   Relevance to Real World

SL.No	Real World Mapping
01	Development of database related applications
02	Development of web-based applications

7.0   Books Used and Recommended to Students

Text Books
3. Database systems Models, Languages, Design and Application Programming,RamezElmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson.
4. Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014,McGraw Hill

Reference Books
3. Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, Mc-GrawHill, 2013.
4. Coronel, Morris, and Rob, Database Principles Fundamentals of Design,Implementation and Management, Cengage Learning 2012.

Additional Study material & e-Books
http://www.pearsoned.co.in/ramezelmasri/

8.0   Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References
1.   http://www.nptel.ac.in

9.0   Magazines/Journals Used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	CSI communications	www.csi-india.org

10.0   Examination Note

Lab Internal Assessment:

SCHEME OF EXAMINATION:
Conduction of Practical Examination:
1. All laboratory experiments from part A are to be included for practical examination.
2. Mini project has to be evaluated for 40 Marks.
3. Report should be prepared in a standard format prescribed for project work.
4. Students are allowed to pick one experiment from the lot.
5. Strictly follow the instructions as printed on the cover page of answer script.

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6. Marks distribution:
   a) Part A: Procedure + Conduction + Viva: 09 + 42 +09 =60 Marks
   b) Part B: Demonstration + Report + Viva voce = 20+14+06 = 40 Marks
7. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

Scheme of Evaluation for Continuous Assessment (24 Marks)

Description	Max. marks
Write-up & Conduction	09
Outcome and Conclusion	03
Viva-Voce	02
Mini Project	10
Total	24

Scheme of Evaluation for Internal Assessment (16 Marks)
- Lab IA will be conducted for 16 marks.

Description	Max. marks
Write-up & Conduction	03
Outcome & Conclusion	10
Viva-Voce	03
Total	16

11.0   Course Delivery Plan

Expt. No	Lecture/Practical No	Name of the Experiment	% Of Portion
		PART - A	
1	1 2	Consider the following schema for a Library Database: BOOK(Book_id, Title, Publisher_Name, Pub_Year) BOOK_AUTHORS(Book_id, Author_Name) PUBLISHER(Name, Address, Phone) BOOK_COPIES(Book_id, Programme_id, No-of_Copies) BOOK_LENDING(Book_id, Programme_id, Card_No, Date_Out, Due_Date) LIBRARY_PROGRAMME(Programme_id, Programme_Name, Address) Write SQL queries to:- 1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each branch, etc. 2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017. 3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation. 4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query. 5. Create a view of all books and its number of copies that are currently available in the Library.	15

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2	4	3	Consider the following schema for Order Database: SALESMAN(Salesman_id, Name, City, Commission) CUSTOMER(Customer_id, Cust_Name, City, Grade, Salesman_id) ORDERS(Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id) Write SQL queries to 1. Count the customers with grades above Bangalore's average. 2. Find the name and numbers of all salesman who had more than one customer. 3. List all the salesman and indicate those who have and don't have customers in their cities (Use UNION operation.) 4. Create a view that finds the salesman who has the customer with the highest order of a day. 5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.	15
3	6	5	Consider the schema for Movie Database: ACTOR(Act_id, Act_Name, Act_Gender) DIRECTOR(Dir_id, Dir_Name, Dir_Phone) MOVIES(Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id) MOVIE_CAST(Act_id, Mov_id, Role) RATING(Mov_id, Rev_Stars) Write SQL queries to 1. List the titles of all movies directed by 'Hitchcock'. 2. Find the movie names where one or more actors acted in two or more movies. 3. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation). 4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title. 5. Update rating of all movies directed by 'Steven Spielberg' to 5.	15
4	8	7	Consider the schema for College Database: STUDENT(USN, SName, Address, Phone, Gender) SEMSEC(SSID, Sem, Sec) CLASS(USN, SSID) SUBJECT(Subcode, Title, Sem, Credits) IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, FinalIA) Write SQL queries to 1. List all the student details studying in fourth semester 'C' section. 2. Compute the total number of male and female students in each semester and in each section. 3. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects. 4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students. 5. Categorize students based on the following criterion: If FinalIA = 17 to 20 then CAT = 'Outstanding' If FinalIA = 12 to 16 then CAT = 'Average' If FinalIA< 12 then CAT = 'Weak' Give these details only for 8th semester A, B, and C section students.	15
5	9		Consider the schema for Company Database:	15

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	10	EMPLOYEE(SSN, Name, Address, Sex, Salary, SuperSSN, DNo)
		DEPARTMENT(DNo, DName, MgrSSN, MgrStartDate)
		DLOCATION(DNo,DLoc)
		PROJECT(PNo, PName, PLocation, DNo)
		WORKS_ON (SSN, PNo, Hours)
		Write SQL queries to
		   1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.
		   2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.
		   3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department.
		   4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator).
		   5. For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs. 6,00,000.	

PART - B				
6	11 12 13 14	• For any problem selected, write the ER Diagram, apply ER-mapping rules, normalize the relations, and follow the application development process. • Make sure that the application should have five or more tables, at least one trigger and one stored procedure, using suitable frontend tool. • Indicative areas include; health care, education, industry, transport, supply chain,etc	25	

12.0   Question Bank

SL. NO.	Viva Questions
1	What is database? What is DBMS?
2	What is a Database system?
3	Why DBMS is necessary?
4	What is the use of Normalization?
5	Which S/W used for frontend design and backhand design?
6	Disadvantage in File Processing System? Advantages of DBMS.
7	Describe the three levels of data abstraction and hence Data Independence.
8	Define the "integrity rules". What is data independence?
9	What is a view? How it is related to data independence?
10	What is data model? What is an entity? What is E-R model?
11	What is an entity type? What is an entity set?
12	What is an weak entity set? What is a relation schema & a relation?
13	What is an attribute? What is relationship?
14	What is relationship set? What is degree of relation?
15	What is relationship type? What is degree of relationship type?
16	What is VDL? What is SDL?
17	Why DBMS is necessary?
18	What is the use of Normalization?
19	What is DML compiler? What is DDL interpreter?
20	What is query evaluation engine?
21	What is Recalled-at-a-time? What is Set-at-a-time or set-oriented?
22	What is relational algebra? What is relational calculus?
23	How does tuple-oriented relational calculus differ from domain oriented relational calculus?
24	What is normalization? What is functional dependency?
25	What is 1NF (normal Form), 2NF, 3NF?
26	What is BCNF (Boyce-Codd Normal Form)? What is 4NF? What is 5NF?

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27	What is loss less join property? What is domain-key normal form?
28	What are partial, alternate, artificial, compound & natural key?
29	What is system catalog or catalog relation? How is better known as?
30	What is meant by query optimization? What do you mean by flat file database?
31	What is durability in DBMS? What is "transparent DBMS"?
32	What is a check point & when does it occur?
33	What is a query? Name the sub system of a RDBMS?
34	How do you communicate with an RDBMS?
35	Define SQL & state the difference between SQL & other conventional programming languages?
36	Name the three major set of files on disk that compose a database in Oracle.
37	Which is the subset of SQL commands used to manipulate Oracle DB structure, including tables?
38	What operator performs pattern matching? What operator tests column for the absence of data?
39	Which command executes the content of a specified file?
40	What is parameter substitution symbol used with INSERT INTO command?
41	Which command displays the SQL command in the SQL buffer, & then executes it?
42	What are the wildcards used for pattern matching?
43	State true or false. EXISTS, SOME, ANY, are operator in SQL.
44	State true or false. !=, <>, ^= all denote the same operation.
45	What are the privileges that can be granted on a table by a user to others?
46	What command is used to get back the privileges offered by the GRANT command?
47	Which system tables contain information on privileges granted & privileges obtained?
48	What is DML compiler? What is DDL interpreter?
49	What is query evaluation engine?
50	What is Recalled-at-a-time? What is Set-at-a-time or set-oriented?
51	What is relational algebra? What is relational calculus?
52	How does tuple-oriented relational calculus differ from domain oriented relational calculus?
53	What is normalization? What is functional dependency?
54	What is 1NF (normal Form), 2NF, 3NF?
55	What is BCNF (Boyce-Codd Normal Form)? What is 4NF? What is 5NF?

13.0   University Result

Examination	FCD	FC	SC	% Passing
Mar - 2021	36	03	04	100
Feb - 2022	46	04	01	100

Prepared by	Checked by		
Prof. A. A. Daptardar	**Prof. A. A. Daptardar**	**HOD**	**Principal**

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Subject Title	**ENVIRONMENTAL STUDIES**		
Subject Code	18CIV59	**IA Marks**	40
Number of Lecture Hrs / Week	01	**Exam Marks**	60
Total Number of Lecture Hrs	25	**Exam Hours**	02
		CREDITS – 01	

FACULTY DETAILS:

Name: Dr. M. S. Hanagadakar Prof. S. J. Walaki	Designation: i) Assoc. Professor ii) Asst. Professor	Experience:i) 18.0 ii)7.0
No. of times course taught:i) 09 **ii)** 04	**Specialization:**i) Physical Chemistry ii) Organic Chemistry	

1.0	**Prerequisite Subjects:**

Fundamentals of Chemistry, Physics, Mathematics, Biology, Engineering, Anthropology, Sociology, (Social problems), Economics (production, consumption, and transfer of wealth), management, Ecology Knowledge are required.

2.0	**Course Learning Objectives**

1. Recognize major concepts in environmental sciences and demonstrate in-depth understanding of the environment.
2. Develop analytical skills, critical thinking, and demonstrate problem-solving skills using scientific techniques.
3. Demonstrate the knowledge and training for entering graduate or professional schools, or the job market.

3.0	**Course Outcomes**

Having successfully completed this course, the student will be able to

Course Code	Course Outcome	RBT level	POs
C309.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.	L1,L2	1,2,3,6,7,9,10,12
C309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.	L1, L2	1,2,3,6,7,9,10,12
C309.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.	L1, L2	1,2,3,6,7,9,10,12
C309.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.	L1, L2	1,2,3,6,7,9,10,12
C309.5	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.	L1,L2	1,2,3,6,7,9,10,12
Total Hours of instruction		**25**	

4.0	Course Content

Module-1
Ecosystems (Structure and Function): Forest, Desert, Wetlands, Riverine, Oceanic and Lake.
Biodiversity: Types, Value; Hot-spots; Threats and Conservation of biodiversity, Forest Wealth, and Deforestation.

Module -2
Advances in Energy Systems (Merits, Demerits, Global Status and Applications)**:** Hydrogen, Solar, OTEC,Tidal and Wind.
Natural Resource Management (Concept and case-studies): Disaster Management, Sustainable Mining, Cloud Seeding, and Carbon Trading.

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Module -3

Environmental Pollution (Sources, Impacts, Corrective and Preventive measures, Relevant Environmental Acts, Case-studies)**:** Surface and Ground Water Pollution; Noise pollution; Soil Pollution and Air Pollution.

Waste Management & Public Health Aspects: Bio-medical Wastes; Solid waste; Hazardous wastes; E-wastes; Industrial and Municipal Sludge.

Module-4

Global Environmental Concerns:(Concept, policies and case-studies):Ground water depletion/recharging, Climate Change; Acid Rain; Ozone Depletion; Radon and Fluoride problem in drinking water; Resettlement and rehabilitation of people, Environmental Toxicology.

Module-5

Latest Developments in Environmental Pollution Mitigation Tools (Concept and Applications): G.I.S. &Remote Sensing, Environment Impact Assessment, Environmental Management Systems, ISO14001; Environmental Stewardship-NGOs.

Field work: Visit to an Environmental Engineering Laboratory or Green Building or Water Treatment Plant or Waste water treatment Plant; ought to be followed by understanding of process and its brief documentation.

5.0   Relevance to future subjects

Sl. No.	Semester	Subject	Topics
01	Common to all	Common to all engineering Subjects	Sustainable development, waste management, Pollution control, Energy systems, Environmental issues.

6.0   Relevance to Real World

Sl.No	Real World Mapping
01	All engineering applications / projects leading to the sustainable development, waste management, pollution control, to resolve global related issues.

7.0   Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	NPTEL	http://nptel.ac.in/courses

8.0   Books Used and Recommended to Students

Text Books
1. Benny Joseph (2005), "Environmental Studies", Tata McGraw – Hill Publishing Company Limited.
2. R.J.Ranjit Daniels and JagadishKrishnaswamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi.
3. R Rajagopalan, "Environmental Studies – From Crisis to Cure", Oxford University Press, 2005,
4. Aloka Debi, "Environmental Science and Engineering", Universities Press (India) Pvt. Ltd. 2012.

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Reference Books

. Raman Sivakumar, "Principals of Environmental Science and Engineering", Second Edition, Cengage learning Singapore, 2005

2. P. Meenakshi, "Elements of Environmental Science and Engineering", Prentice Hall of India Private Limited, New Delhi, 2006

3. S.M. Prakash, "Environmental Studies", Elite Publishers Mangalore, 2007

4. ErachBharucha, "Text Book of Environmental Studies", for UGC, University press, 2005

5. G.Tyler Miller Jr., "Environmental Science – working with the Earth", Tenth Edition, Thomson Brooks

/Cole, 2004

6. G.Tyler Miller Jr., "Environmental Science – working with the Earth", Eleventh Edition, Thomson

Brooks /Cole, 2006

7. Dr.Pratiba Sing, Dr.AnoopSingh and Dr.PiyushMalaviya, "Text Book of Environmental and Ecology",

Acme Learning Pvt. Ltd. New Delhi.

9.0	**Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended**

Website and Internet Contents References

Web links and Video Lectures:
https://nptel.ac.in/courses/120/108/120108005/
https://nptel.ac.in/courses/120/108/120108002/
https://nptel.ac.in/courses/120/108/120108004/
https://nptel.ac.in/courses/105/102/105102089/
https://www.my-mooc.com/en/categorie/environmental-science
https://academicearth.org/environmental-studies/

10.0	**Magazines/Journals Used and Recommended to Students**

Sl.No	Magazines/Journals	website
1	Environmental-science	http://nlspub.ac.in/category/journals/journal-of-environmental-law-policy-and-development/
2	Environmental-research	https://www.journals.elsevier.com/environmental-research

11.0	**Examination Note**

Question paper pattern:
- The Question paper will have 100 objective questions.
- Each question will be for 01 marks
- Student will have to answer all the questions in an OMR Sheet.

The Duration of Exam will be 2 hours.

Scheme of Evaluation for CIE (40 Marks)

Internal Assessment test will be done in the same pattern as that of the main examination.

Internal Assessment: 30 Marks

Assignment: 10 Marks

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12.0   Course Delivery Plan

Module No.	Lecture No.	Content of Lecturer	% of Portion
1	1	**Ecosystems** (Structure and Function):, Wetlands, Riverine	20
	2	Forest and Desert	
	3	Oceanic and Lake	
	4	**Biodiversity:** Types, Value; Hot-spots; Threats and Conservation of biodiversity.	
	5	Forest Wealth, and Deforestation	
2	6	**Advances in Energy Systems** (Merits, Demerits, Global Status and Applications)**:** Hydrogen,	20
	7	Solar and OTEC	
	8	Tidal and Wind.	
	9	**Natural Resource Management** (Concept and case-studies): Disaster Management.	
	10	Sustainable Mining, Cloud Seeding, and Carbon Trading.	
3	11	**Environmental Pollution** (Sources, Impacts, Corrective and Preventive measures, Relevant Environmental Acts, Case-studies)**:** Surface and Ground	20
	12	Water Pollution and Noise pollution	
	13	Soil Pollution and Air Pollution.	
	14	**Waste Management & Public Health Aspects:** Bio-medical Wastes; Solid waste	
	15	Hazardous wastes; E-wastes; Industrial and Municipal Sludge	
4	16	**Global Environmental Concerns:**(Concept, policies and case-studies):Groundwater depletion/recharging.	20
	17	Climate Change; Acid Rain and Ozone Depletion	
	18	Radon and Fluoride problem in drinking water	
	19	Resettlement and rehabilitation of people	
	20	Environmental Toxicology.	
5	21	**Latest Developments in Environmental Pollution Mitigation Tools (Concept and Applications):** G.I.S. & Remote Sensing.	20
	22	Environment Impact Assessment,	
	23	Environmental Management Systems, ISO14001, Environmental Stewardship-NGOs.	
	24	**Field work:** Visit to an Environmental Engineering Laboratory or Green Building or Water Treatment Plant or Waste water treatment Plant.	
	25	Ought to be followed by understanding of process and its brief documentation.	

13.0   Assignments

Sl.No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: University Questions/ Write up	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 1 of the syllabus	2	Individual Activity.	Book 1, of the reference list. Website of the Reference list
2	Assignment 2: University Questions/ Write up	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 2 of the syllabus	4	Individual Activity.	Book 1, 2 of the reference list. Website of the Reference list

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3	Assignment 3: University Questions/ Write up	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 3 of the syllabus	6	Individual Activity.	Book 1, 2 of the reference list. Website of the Reference list
4	Assignment 4: University Questions/ Write up	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 4 of the syllabus	8	Individual Activity.	Book 1, 2 of the reference list. Website of the Reference list
5	Assignment 5: University Questions/ Write up	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 5 of the syllabus	10	Individual Activity.	Book 1, 2 of the reference list. Website of the Reference list

14.0   QUESTION BANK

Module-1

1. The term 'Environment' has been derived from the French word which means to encircle or surround
a) Environ   b) Oikos   c) geo   d) Aqua

2. The objective of environmental education is
a) Raise consciousness about environmental conditions   b) To teach environmentally appropriate behavior   c) Create an environmental ethic   d) All of the above

3. Which of the following conceptual spheres of the environment is having the least storage capacity for matter?
a) Atmosphere   b) Lithosphere   c) Hydrosphere   d) Biosphere

4. Which of the following components of the environment are effective transporters of matter?
a) Atmosphere and Hydrosphere   b) Atmosphere and Lithosphere
c) Hydrosphere and Lithosphere   d) Biosphere and Lithosphere

5. Biosphere is
a) The solid shell of inorganic materials on the surface of the earth
b) The thin shell of organic matter on the surface of earth comprising of all the living things
c) The sphere which occupies the maximum volume of all of the spheres   d) all of these.

6. Atmosphere consists of 79 per cent Nitrogen and 21 per cent Oxygen by
a) Volume   b) weight   c) Density   d) All the three

7. Which of the following is a biotic component of an ecosystem?
a) Fungi   b) solar light   c) temperature   d) humidity

8. In an ecosystem, the flow of energy is
a) Bi-directional   b) Cyclic   c) Unidirectional   d) Multidirectional

9. Which Pyramid is always upright?
a) Energy   b) biomass   c) numbers   d) food chain

10. In complex ecosystems the degree of species diversity is
a) Poor   b) high   c) medium   d) none

Module-2

1. Which of the following is considered as an alternate fuel?
a) CNG   b) Kerosene   c) Coal   d) Petrol

2. Solar radiation consists of
a) UV   b) Visible light   c) Infrared   d) All of these

3. Reduction in usage of fuels cannot be brought about by
a) Using alternate fuels   b) Changing lifestyles   c) Reducing car taxes   d) Both a) & b)

4. Which of the following is a hazard of a nuclear power plant?
a) Accident risk when tankers containing fuel cause spill
b) Radioactive waste of the power plant remains highly toxic for centuries
c) Release of toxic gases during processing   d) All of these

5. The most important fuel used by nuclear power plant is
a) U – 235   b) U- 238   c) U – 245   d) U – 248

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Recognized under 2(f) & 12B of UGC Act, 1956
Accredited at 'A' Grade by NAAC & Programmes Accredited by NBA: CSE & ECE

Dept. of CSE
Academic
Course Plan
2022-23 ODD

6. Biogas is produced by
a) Microbial activity   b) Harvesting crop   c) Both a) & b)   d) None of these

7. Oil and Gas are preferred because of
a) Easy transportation   b) Cheap   c) Strong smell   d) All of these

8. Biomass power generation uses
a) Crops   b) Animal dung   c) Wood   d) All of these

9. Chernobyl nuclear disaster occurred in the year
a) 1984   b) 1952   c) 1986   d) 1987

10. Which of the following is not a renewable source of energy?
a) Fossil fuels   b) Solar energy   c) Tidal wave energy   d) Wind energy

Module-3

1. Environmental pollution is due to
a) Rapid Urbanization   b) deforestation   c) Afforestation   d) a & b

2. Which of the following are natural sources of air pollution?
a) Volcanic eruption   b) solar flare   c) earth quake   d) all

3. Which of the following are biodegradable pollutants?
a) Plastics   b) Domestic sewage   c) detergent   d) all

4. The liquid waste from baths and kitchens is called
a) Sullage   b) Domestic sewage   c) Storm waste   d) Run off

5. Noise pollution can be minimized by
a) Urbanization   b) Maintaining silence   c) Reducing noise at source   d) none

6. BOD Means
a) Biochemical oxygen demand   b) chemical oxygen demand   c) biophysical oxygen demand   d) all

7. Which of the following industry generates colored waste?
a) Software industry   b) Textile industry   c) Biomedical industry   d) none

8. Physical pollution of water is due to
a) Dissolved oxygen   b) Turbidity   c) pH   d) none of these

9. Which of the following source is surface water?
a) Springs   b) streams   c) deep wells   d) all

10. Deforestation can
a) Increase the rain fall   b) Increase soil fertility   c) Introduce silt in the rivers   d) None of these

11. Which of the following is non-point source of water pollution?
a) Factories   b) Sewage treatment plant   c) Urban and Sub-urban land   d) all of the above

Module-4

1. Acid rain can be controlled by
a) Reducing SO_2 and NO_2 emissions.   b) Reducing oxygen emission.
c) Increasing number of lakes.   c) Increasing the forest cover.

2. Atmospheric oxidation of SO_2 to SO_3 is influenced by
a) Sunlight.   b) Humidity   c) presence of hydrocarbons   d) all of these

3. Reduction in brightness of the famous TajMahal is due to
a) Global warming.   b) Air pollution   c) Ozone depletion   d) Afforestation.

27. The Effect of Acid rain
a) Reduces soil fertility.   b) increases atmospheric temperature.
c) Causing respiratory problems   d) skin cancer

4. The process of movement of nutrients from the soil by the Acid rain iscalled
a) Transpiration.   b) Evapo transpiration   c) Leaching   d) Infiltration.

5. Ozone layer is present in
a) Troposphere   b) Stratosphere   c) Mesosphere   d) Thermosphere

6. Which of the following statements about ozone is true?
a) Ozone is a major constituent of photochemical smog
b) Ozone protects us from the harmful uv radiation of sun
c) Ozone is highly reactive   d) All of the above

7. Major compound responsible for the destruction of stratospheric ozone layer is
a) Oxygen   b) CFC   c) Carbon dioxide   d) Methane

8. Ozone layer thickness is measured in
a) PPM   b) PPB   c) Decibels   d) Dobson units

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9. Normal average thickness of stratospheric ozone layer across the globe is around
a) 200 DU   b) 300 DU   c) 400 DU   d) 500 DU
10. ChloroFluro Carbon's (CFC) are
a) Nontoxic   b) Nonflammable   c) Non carcinogenic   d) All these
11. Ozone layers absorbs
a) UV rays   b) infra-red rays   c) Cosmic rays   d) CO
12. Which of the following is not an ill effect of acid rain?
a) Results in killing fish   b) causes stone leprosy. c) Leaches nutrients from the soil. d) Causes cataract.

13. Formation of ozone layer is explained by
a) Rosenmund reaction   b) Henderson's reaction   c) Chapman's reaction.   d) Perkin's reaction
14. Each Chlorine free Radical can destroy the following number of ozone molecules.
a) 1000   b) 10,000   c) 1, 00, 000   d) 100
15. Which of the following statements about ozone is true?
a) Ozone is a major constituent of photochemical smog   b) Ozone is highly reactive
c) Ozone protects us from the harmful UV radiation of sun.   d) All of these

Module-5
1. Sustainable development means
a) Meeting present needs without compromising on the future needs   b) Progress in human well beings
c) Balance between human needs and the ability of Earth to provide the resources   d) All the above
2. The most important remedy to avoid negative impact due to industrialization is
a) Industry should be closed   b) Don't allow new industrial units
c) Industry should treat all the wastes generated by it before disposal
d) Industries should be shifted far away from human habit tats.
3. Mining means
a) To conserve & preserve minerals   b) To check pollution due to mineral resources
c) To extract minerals and ores   d) None
4. E.I.A. can be expanded as
a) Environment & Industrial Act   b) Environment & Impact Activities
c) Environmental Impact Assessment   d) Environmentally Important Activity
5. E.I.A. is related to
a) Resource conservation   b) Efficient equipment/process
c) Waste minimization   d) All of the above
6. In order to protect the health of people living along the adjoining areas of roads, one should.
a) Plant trees alongside of the roads   b) Not allow diesel driven vehicles
c) Shift them (people) to other places   d) None of the above
7. The pollution caused by transportation/vehicular activities depends on
a) Type of the vehicle's engine   b) Age of the vehicle
c) Traffic congestion   d) All of the above
8. Sustainable development will not aim at
a) Social economic development which optimizes the economic and societal benefits available in the present, without spoiling the likely potential for similar benefits in the future
b) Reasonable and equitably distributed level of economic well being that can be perpetuated continually
c) Development that meets the needs of the present without compromising the ability of future generations
d) Maximizing the present day benefits through increased resource meet their own needs consumption
10. Which of the following is a key element of EIA?
a) Scoping   b) Screening   c) Identifying and evaluating alternatives   d) all of these

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