2023 Sem-I

Student Information Manual

CSE

Student Information Manual (SIM)

- **Covering page**
- **Index**

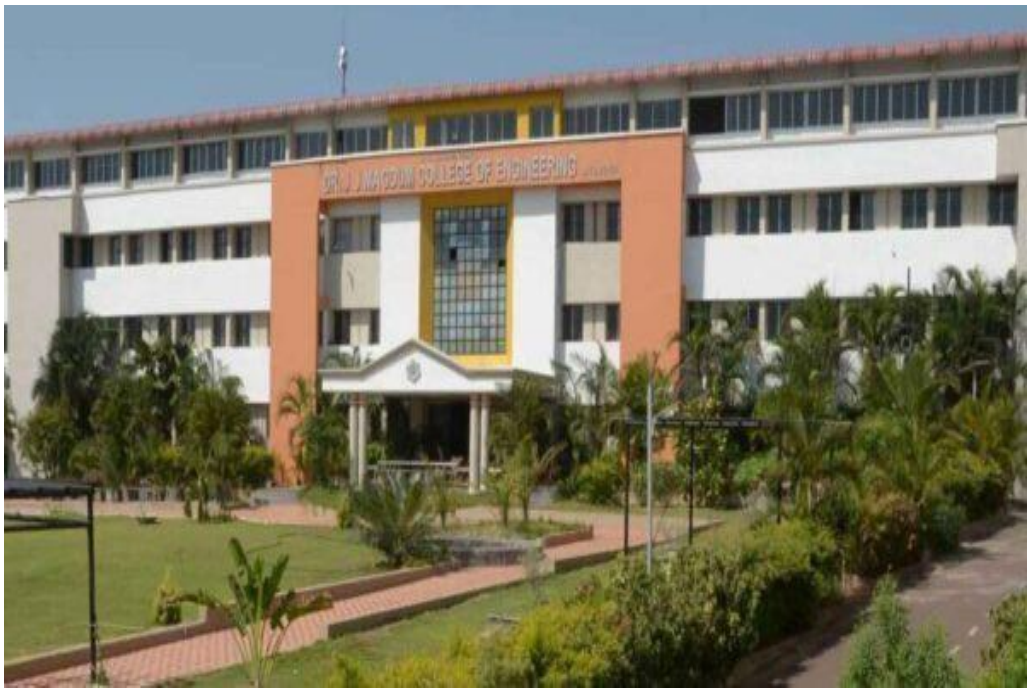
1. Institute Information
2. Vision of Institute
Mission of Institute
Quality Policy
3. Vision of Department
Mission of Department
Program Educational Objectives (PEO's)
Program Outcomes (PO's)
Program Specific Outcomes (PSO)
4. Students role Responsibilities:
Code-of-Conduct:
5. Laboratory and Classroom Instructions
Laboratory instructions:
Classroom instructions:
6. Department Academic Planner
7. Departmental time table
8. Structure of Syllabus
9. Subject Details
Course details/syllabus
Recommended Books
Teaching Plan
List of Experiment
Assignments
10. Project/Seminar Review Form
Rubrics for Project Work assessment
11. Department Faculty
12. Department Staff
13. Activity Record
(Counseling, co/extracurricular, leave)

INSTITUTE INFORMATION

Dr J. J. Magdum College of Engineering was established by Dr J. J. Magdum Trust, Jaysingpur in the year 1992 with an objective to promote the cause of higher education. The institute is approved by All India Council of Technical Education (AICTE), New Delhi and Government of Maharashtra, affiliated to Shivaji University, Kolhapur. The college offers B. Tech program in Mechanical, Civil, Computer Science Engineering, Electronics.

Our Management extends its fullest support in building the institution as a center of excellence with technically superior, ethically strong and competent engineers.

The serene campus vibrant with aesthetic bliss in an exhilarating convenient location, well connected by road, rail and air is easily accessible. The eco-friendly ambience creates and bestows a healthy learning atmosphere.



The institution is meticulous with modern laboratory, workshop facilities and state of art computer center providing an excellent infrastructure.

The institution has spacious library with vast collection of Books, Newspapers, National & International Journals, Magazines, Reference books, Encyclopedia, World of science, ASM hand books and course materials. E-learning through NPTEL Video course by NIT and IIT Professors are available.

The Teaching and Non-Teaching Staff of the institute is a blend of senior experienced and young dynamic faculty members devoted to the noble cause of education. Qualified, experienced, versatile and efficient faculty members mold the students diligently in ethical, moral and academic aspects.

We impart technology based experiential learning through industry visits, live projects, expert talks, MOOC's, workshops, case studies, upscale labs, and virtual classroom sessions.

Industry-Institute interaction and real-time projects nurture and craft the budding engineers to bloom and flourish in the field with the prowess guidance in the campus. The college equips the students with the latest skills which make them employable and future ready.

Due to able and proper guidance and motivation, many of our students have topped at University. Our training and placement work meticulously to improve and develop life skills to the students and tries hard to seek good jobs for our students. In addition to the academics, the students are engaged in sports and cultural activities which helps them to develop versatile personality. Various Club activities are conducted to encourage, motivate and inspire students from diverse culture to harness the talent through their perseverance.

The institute is having specious ground and the modern facilities for both indoor and outdoor games and ultra-modern Gymnasium. Due to proper guidance and motivation, many of our students have grabbed prizes at University level and different sport events.

We are committed to stakeholders for best results and produced more than 10000+ engineers getting campus placements.

VISION OF INSTITUTE

To be a Leading academic organization, creating skilled and Ethical Human Resources by leveraging Technical Education for Sustainable Development of Society.

MISSION OF INSTITUTE

- To produce competent technocrats to meet modern societal and industrial challenges.
- To create ethical and skilled human resources through quality education and various extension activities and outreach programs.
- To leverage technical expertise to solve societal issues for its sustainable development.

VISION OF DEPARTMENT

To be the front runner in the field of computer science and engineering to create skilled, knowledgeable and ethical professionals for development of society.

MISSION OF DEPARTMENT

- To provide quality education with smart tools to face challenges of industry and society.
- To create ethical human resource to provide service to the community.
- To associate with industry for giving opportunities to students to develop their employability and entrepreneur skills.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO'S)

The Computer Science and Engineering Department strives for excellence in creating, applying and imparting knowledge in computer science and engineering through comprehensive education programs,research in collaboration with industry and service to professional societies, the community, the state, and the nation.

PEO1. Graduates of the program will apply their foundational engineering knowledge to achieve success in their careers.

PEO2. Graduates of the program will consistently demonstrate core technological expertise in computing throughout their careers

PEO3. Program graduates will fulfill professional requirements, explore higher education prospects, and exhibit understanding of the complexities of self-employment.

PEO4. Graduates of the program will uphold ethical standards, engage in lifelong learning, and remain attentive to societal needs.

PROGRAMME OUTCOMES (PO'S)

At the end of successful completion of program, the graduates will be able to,

1. **Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis**: Identify, formulate, research literature and 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 specified needs with appropriate consideration for public health and safety, cultural, societal and environmental
4. **Conduct investigations** of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid
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 under-standing of the limitations.
6. **The Engineer and Society**: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering
7. **Environment and Sustainability**: Understand and the impact of professional engineering solutions in societal and environmental contexts and demonstrates knowledge of and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering
9. **Individual and Teamwork**: Function effectively as in visual, and as a member or leader in diverse teams and in multidisciplinary s
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
11. **Project Management and Finance**: Demonstrate knowledge and understanding of engineering and management principles and apply these too noels on work, as a member and leader instead, to manage projects and in multidisciplinary environment.
12. **Lifelong Learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of tech

PROGRAM SPECIFIC OUTCOMES (PSO)

1. Learn and apply latest Software Technologies in the field of Computer Science & Engineering.
2. Identify real time problems and deliver innovative Software solutions for development of society.

STUDENTS ROLES AND RESPONSIBILITIES

CODE-OF-CONDUCT

- very student must carry his/her identity card while being present on the College Premises.Use of Cell phones is strictly prohibited during class/Labs hour.
- Without the permission of the Principal, Students are not allowed to circulate any printed materialswithin the college campus.
- Every student is expected to maintain the general cleanliness within the classrooms, laboratoriesand the campus in general.
- Students should handle the college properties with care. Damage to the furniture or any othermaterials may lead to penalty or suspension from the college.
- Intoxication or possession of narcotics and other dangerous material is strictly prohibited.
- Playing cards, spitting and loitering are strictly prohibited inside the college campus and shall invitesevere punishment/disciplinary action
- Attempted or actual theft of and/or damage to property of the College, or property of a member ofthe College community, or other personal or public property, on or off campus will be considered as a punishable act.
- Every student will remain answerable to the college authority for his/her activity and conduct on the College Premises.
- Any act which obstructs teaching, research, administrative activity and other proceedings of the college is strictly prohibited.
- Indulging ragging, anti-institutional, anti-national, antisocial, communal, immoral or political expressions and activities within the Campus and hostel are strongly prohibited as well as punishable.
- Students are required to check the Notice Board and also website of the college for important announcements.

LABORATORY INSTRUCTIONS

- Students must present a valid ID card before entering the computer lab.
- Remove your shoes/chapels/sandals outside the lab.
- Playing of games on computer in the lab is strictly prohibited.
- Before leaving the lab, students must close all programs positively and keep the desktop blank.
- Students are strictly prohibited from modifying or deleting any important files and install any software or settings in the computer without permission
- Based on the prime priority, users may be requested by the lab in-charge, to leave the workstation any time and the compliance is a must.
- Eating and/or drinking inside the computer lab is strictly prohibited.
- Internet facility is only for educational/ study purpose.
- Silence must be maintained in the lab at all times.
- The lab must be kept clean and tidy at all times.
- If any problem arises, please bring the same to the notice of lab in-charge.
- No bags/ hand bags/ rain coats/ casual wears will be allowed inside the computer lab, however note book may be allowed.
- Lab timing will be as per the academic time table of different classes
- Every user must make an entry in the Computer Lab Register properly.
- Each student or visitor must take mobile phones in "Switched Off" mode while entering and or working in Computer Lab.
- Conversation, discussion, loud talking & sleeping are strictly prohibited.
- Users must turn-off the computer before leaving the computer lab.
- Maintain silence in lab.
- Computer Lab Assistants are available to assist with BASIC computer and software problems.
- Food and drink are not permitted in the computer lab.
- The use of cell phones is prohibited in the computer lab.
- Please take your calls outside. We also ask that you put your cell phone on vibrate mode.
- Unauthorized copying and/or installing of unauthorized software is not permitted
- Tampering with the hardware or software settings will not be tolerated.

CLASSROOM INSTRUCTIONS

- Students should know and obey rules and regulations of department as well as college.
- Students strive to meet Academic Expectations
- students are expected to take all tests at the scheduled times seriously.
- Maintain discipline in the class
- A student should maintain at least 75% attendance in the Lectures of every subject and 100% overall performance. Otherwise, he or she will be debarred from the University Examination.
- Latecomers will not be entertained to enter into the classroom.
- Participate in the activities organized in the Department as well as in the College.
- While discussion, students should conduct and express themselves in a way that is respectful of all persons.
- Develop positive attitudes;
- Be cooperative and considerate.
- Welcome challenges.
- Be helpful to others
- Be kind, polite, and courteous to others
- Do the assigned work on time
- Be prepared for classes with all necessary supplies.
- Be Respectful and Punctual
- Be in the best of behaviors

DEPARTMENT ACADEMIC PLANNER

ACADEMIC PLANNER 2023-24

Dr. J J Magdum College of Engineering, Jaysingpur.

Department of Computer Science & Engineering

Academic Calendar 2023-24 (SEM-I)

July 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

10- Commencement of Semester I

26- Guest Lecture TY
27- EDC Activity (TY & B.Tech)
28- CSI, COMPESA body formation

August 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

5- Project Presentation-I
5- Community Service Activity
8- TPC Activity
14- SIM Submission
18- Guest Lecture B.Tech
19- Feedback
24, 25 SY AIDS Subject Syllabus Training
25- Expert Lecture

September 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

2- Project Presentation-II
13- Guest Lecture SY
16- Advisory board meeting
20,21,22- FDC on DevOps
29- Industrial Visit (02)
30- Project Presentation-III
30- Augmentation Technical

ACADEMIC PLANNER 2023-24

October 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

7- Final Report Presentation
7- Parents Meet
13 Expert Lecture SY
21- Augmentation Non-Technical
21- Compesa Activity
26- Feedback

November 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

3- Expert Lecture SY
4- Industrial Visit
10 -Guest Lecture SY

Prof. A V Gundavade
Academic Coordinator

Dr.D.ANikam
HOD CSE

DEPARTMENTAL TIME TABLE

Second Year Sem-I Time Table

Dr. J. J. Magdum Trust's
Dr. J. J. Magdum College of Engineering, Jaysingpur
Department of Computer Science & Engineering

Class: S.Y. (C.S.E.), Semester I
Year:2023-24

W.E.F:21/08/2023

HR.	TIME	MON	TUE	WED	THUR	FRI	SAT
1	9.30 TO 10.30	S1- CN(WT)-PSA S2-Soft Skills(SH)-PYK S3- Soft Skills(SH)-PYK	EVS-PAC (Mech-103)	DMS-SPK (Mech-102)	CP-SSC (Mech-103)	MP-SAN (Mech-102)	S1,S2,S3-AM(TUT)-DBU(Mech-102) S1,S2,S3-DMS(TUT)-SPK(Mech-102)
2	10.30 TO 11.30		CN-PSA (Mech-103)	AM-DBU (Mech-102)	DMS-SPK (Mech-103)	AM-DBU (Mech-102)	
11.30 am TO 11.40 am- SHORT BREAK							
3	11.40 TO 12.40	CN-PSA (Mech-103)	CP-SSC (Mech-102)	S1- Soft Skills(SH)-PYK S2- CN(WT)-PSA S3-C PROG(OS)-SSC	S1-MP(PL)-SAN S2- C PROG(OS)-SSC S3- MP (CN)-NHS	S1-C PROG(OS)-SSC S2-C PROG(OS)-SSC S3-CN(WT)-PSA	--
4	12.40 TO 1.40	DS-SSC (Mech-102)	MP-SAN (Mech-102)				--
1.40p.m-2.30p.m LUNCH BREAK							
5	2.30 TO 3.30	AM-DBU (Mech-102)	S1- C PROG (OS)- SSC S2- MP(CN)-SAN S3-C PROG(OS)-SSC	MP-SAN (Mech-103)	CN-PSA (Mech-103)	EVS-PAC (Mech-103)	--
6	3.30 TO 4.30	DMS-SPK (Mech-102)		DS-SSC (Mech-103)	DS-SSC (Mech-103)	CP-SSC (Mech-103)	--

Time-Table (In-charge)

Dr. J.J. Magdum College of Engg. Dept of CSE Jaysingpur-416101

H.O.D. (C.S.E)

Third Year Sem-I Time Table

Dr. J. J. Magdum Trust's
Dr. J .J. Magdum College of Engineering, Jaysingpur
Department of Computer Science & Engineering

Class: T.Y. (C.S.E.) Semester I
Year:2023-24

W.E.F: 17/07/2023

HR.	TIME	MON	TUE	WED	THUR	FRI	SAT
1	9.30 TO 10.30	OOMD-AVG (Mech-102)	JAVA-PVK (Mech-102)	T1-JAVA(DB)-PVK T2- Business English(TUT)-(SH)-PYK T3- IS(CN)-RDM T4-- Business English(TUT)-(SH)-PYK	OOMD-AVG (Mech-102)	T1- JAVA(DB)-PVK T2-SP(OS)- SP-SPK T3- SP(OS)-SPK T4-- IS(CN)-RDM	--
2	10.30 TO 11.30	IOT-NHS (Mech-102)	CA-DAN (Mech-102)		JAVA-PVK (Mech-102)		
11.30 am TO 11.40 am- SHORT BREAK							
3	11.40 TO 12.40	T1- SP(WT)-SPK T2- IS(CN)-RDM T3- JAVA(OS)-PVK T4-JAVA(OS)-PVK	T1- Business English(TUT)-(SH)-PYK T2- JAVA(CN)-SPK T3- Business English(TUT)-(SH)-PYK T4-JAVA(WT)-PSA	CA-DAN (Mech-102)	CA-DAN (Mech-102)	CA-DAN (Mech-102)	--
4	12.40 TO 1.40			IOT-NHS (Mech-102)	IS-RDM (Mech-102)	OOMD-AVG (Mech-102)	
1.40p.m-2.30p.m LUNCH BREAK							
5	2.30 TO 3.30	IS-RDM (SH)	T1,T2,T3,T4 CA(TUT)-DAN (SH)	IS-RDM (Mech-102)	T1-IS(CN)-RDM T2- JAVA(WT)-PVK T3-JAVA(DB)-AVG T4- SP(Project Lab)-SPK	SP-SPK (Mech-102)	--
6	3.30 TO 4.30	JAVA-PVK (SH)	SP-SPK (Mech-102)	SP-SPK (Mech-102)		IOT-NHS (Mech-102)	

Time-Table (In-charge)

Dr. J.J. Magdum College of Engg. Dept. of CSE Jaysingpur-416101

H.O.D. (C.S.E)

Final Year Sem-I Time Table

Dr. J. J. Magdum Trust's

Dr. J .J. Magdum College of Engineering, Jaysingpur

Department of Computer Science & Engineering

Class:B.Tech. (C.S.E.) Semester I

Year:2023-24

W.E.F:24/07/2023

HR.	TIME	MON	TUE	WED	THUR	FRI	SAT
1	9.30 TO 10.30	AI-RDM (Mech-103)	B1-PJ-1(Project Lab) B2- WT (OS)-NHS B3-CC(PL)-SAN B4- ADS (DB)- AVG	CC-SAN (Mech-103)	B1- WT(WT)-NHS B2,B3- AI(TUT)-DAN(SH), ACA(TUT)-PSA(SH) B4-CC(PL)-SAN	ADS-AVG (Mech-103)	-
2	10.30 TO 11.30	WT-PVK (Mech-103)		ACA-PSA (Mech-103)		ACA-PSA (Mech-103)	
11.30 am TO 11.40 am- SHORT BREAK							
3	11.40 TO 12.40	B1- ADS (DB)- AVG B2-CC(PL)-SAN B3-PJ-1(Project Lab) B4-WT(OS)- NHS	AI-RDM (Mech-103)	ADS-AVG (Mech-103)	ACA-PSA (Mech-103)	CC-SAN (Mech-103)	--
4	12.40 TO 1.40		ADS-AVG (Mech-103)	WT-PVK (Mech-103)	WT-PVK (Mech-103)	AI-RDM (Mech-103)	
1.40p.m-2.30p.m LUNCH BREAK							
5	2.30 TO 3.30	ACA-PSA (Mech-103)	B1,B4 -AI(TUT)-RDM(SH), ACA(TUT)-PSA(SH) B2-PJ-1(Project Lab) B3- ADS (DB)- AVG	B1-WT (DB)-PVK B2- WT(CN)- NHS B3-PJ-1(Project Lab) B4-PJ-1(Project Lab)	B1- PJ-1(Project Lab) B2- PJ-1(Project Lab) B3- WT(OS)- NHS B4- WT (OS)- NHS	B1- CC(PL)-SAN B2- ADS (DB)- AVG B3- WT (OS)-RDM B4-PJ-1 (Project Lab)	---
6	3.30 TO 4.30	CC-SAN (Mech-103)					

Time-Table (In-charge)

H.O.D. (C.S.E.)

Dr. J.J. Magdum College of Engg. Jaysingpur-416101 Dept. of CSE

STRUCTURE OF SYLLABUS

1. SECOND YEAR COMPUTER SCIENCE AND ENGINEERING – CBCS

SECOND YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN																							
SEMESTER - III																							
		TEACHING SCHEME									EXAMINATION SCHEME												
		THEORY			TUTORIAL			PRACTICAL			THEORY					PRACTICAL			TERMWORK				
Sr. No.	Course Subject / Title	Credits	N0. Of Lectures	Hours	Credits	No. of Hours	Hours	Credits	No. of Hours	Hours	Hours	mode	marks	Total Marks	MIN.	Hours	MAX	MIN.	Hours	MAX	MIN.		
1	BSC - CS301 Applied Mathematics	3	3	3	1	1	1					CIE	30	100	40	AS PER BOS GUIDELINES			AS PER BOS GUIDELINES	25	10		
												ESE	70										
2	PCC-CS302 DiscreteMathematics &Structures	3	3	3	1	1	1					CIE	30	100	40					25	10		
												ESE	70										
3	PCC- CS303 Data Structures	3	3	3								CIE	30	100	40								
												ESE	70										
4	PCC- CS304 Computer Networks - I	3	3	3				1	2	2		CIE	30	100	40		50	20		25	10		
												ESE	70										
5	PCC- CS305 Microprocessors	3	3	3				1	2	2		CIE	30	100	40					25	10		
												ESE	70										
6	PCC- CS306 C programming	3	3	3				2	4	4							50	20		50	20		
7	HM- CS307 Soft Skills							1	2	2							25	10		25	10		
	Total (SEM –III)	***18***	***18***	***18***	***2***	***2***	***2***	***5***	***10***	***10***				***500***			***125***			***175***			

SECOD YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN			
SEMESTER - IV			
		TEACHING SCHEME	EXAMINATION SCHEME

Sr. No.	Course Subject / Title	THEORY			TUTORIAL			PRACTICAL			THEORY					PRACTICAL			TERMWORK		
		Credits	N0. Of Lectures	Hours	Credits	No. of Hours	Hours	Credits	No. of Hours	Hours	Hours	mode	marks	Total Marks	MIN.	Hours	MAX	MIN.	Hours	MAX	MIN.
1	PCC-CS401 Automata Theory	3	3	3								CIE	30	100	40	AS PER BOS GUIDELINES			AS PER BOS GUIDELINES		
												ESE	70								
2	PCC- CS402 Computer Networks - II	3	3	3				1	2	2		CIE	30	100	40		50	20		25	10
												ESE	70								
3	PCC- CS403 Computer Organization and Architecture	3	3	3								CIE	30	100	40						
												ESE	70								
4	PCC- CS404 Operating Systems - I	3	3	3				1	2	2		CIE	30	100	40					25	10
												ESE	70								
5	PCC- CS405 Software Engineering	3	3	3								CIE	30	100	40						
												ESE	70								
6	PCC- CS406 Object Oriented Programming	2	2	2				2	4	4							50	20		50	20
7	PW- CS407 Mini Project							1	2	2							50	20		50	20
8	MC-CS408 Environmental Studies	2	2	2	1	1	1					CIE	30	100	40						
												ESE	70								
	Total (SEM –IV)	***19***	***19***	***19***	***1***	***1***	***1***	***5***	***10***	***10***				***600***			***150***			***150***	
	Total	**37**	**37**	**37**	**3**	**3**	**3**	**10**	**20**	**20**				**1100**			**275**			**325**	

2. THIRD YEAR COMPUTER SCIENCE AND ENGINEERING – CBCS

	THIRD YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN																	
	SEMESTER - V																	
		TEACHING SCHEME							EXAMINATION SCHEME									
Sr. No.	Course Subject / Title	THEORY			TUTORIAL		PRACTICAL		THEORY				ORAL / PRACTICAL		TERMWORK	
		Credits	N0. Of Lectures	Hours	Credits	No. of Hours	Credits	No. of Hours	mode	marks	Total Marks	MIN.	MAX	MIN.	MAX	MIN.
1	PCC-CS501 Information Security	3	3	3			1	2	CIE	30	100	40			50	20
									ESE	70						
2	PCC- CS502 System Programming	3	3	3			1	2	CIE	30	100	40	25	10	50	20
									ESE	70						
3	PCC- CS503 Object-Oriented Modeling & Design	3	3	3					CIE	30	100	40				
									ESE	70						
4	PCC- CS504 Computer Algorithms	4	4	4	1	1			CIE	30	100	40			25	10
									ESE	70						
5	OEC- CS505	3	3	3					CIE	30	100	40				
									ESE	70						
6	PCC- CS506 Java Programming	3	3	3			2	4					50	20	50	20
7	HM- CS507 Business English				1	2							25	10	25	10
	Total (SEM –V)	***19***	***19***	***19***	***2***	***3***	***4***	***8***			***500***		***100***		***200***	

	THIRD YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN																	
	SEMESTER - VI																	
		TEACHING SCHEME							EXAMINATION SCHEME									
Sr. No.	Course Subject / Title	THEORY			TUTORIAL		PRACTICAL		THEORY				ORAL / PRACTICAL		TERMWORK	
		Credits	No. Of Lectures	No. of Hours	Credits	No. of Hours	Credits	No. of Hours	mode	marks	Total Marks	MIN.	MAX	MIN.	MAX	MIN.
1	PCC-CS601 Compiler Construction	3	3	3			1	2	CIE	30	100	40			25	10
									ESE	70						
2	PCC- CS602 Operating System-II	4	4	4			1	2	CIE	30	100	40			25	10
									ESE	70						
3	PCC- CS603 Database Engineering	4	4	4			1	2	CIE	30	100	40	50	20	25	10
									ESE	70						
4	PCC- CS604 Machine Learning	3	3	3	1	1			CIE	30	100	40			25	10
									ESE	70						
5	OEC- CS605	3	3	3					CIE	30	100	40				
									ESE	70						
6	PCC- CS606 C# Programming	2	2	2			1	2					50	20	25	10
7	PW- CS607 Domain Specific Mini Project						1	2					50	20	25	10
	Total (SEM –VI)	***19***	***19***	***19***	***1***	***1***	***5***	***10***			***500***		***150***		***150***	
	Total	**38**	**38**	**38**	**3**	**4**	**9**	**18**			**1000**		**250**		**350**	

CIE- Continuous Internal Evaluation

ESE – End Semester Examination

• Candidate contact hours per week : 30 Hours (Minimum)	• Total Marks for T.Y. Sem V & VI : **800 + 800 =1600**
• Theory and Practical Lectures : 60 Minutes Each	• Total Credits for T.Y. Sem V & VI : **50 (SEM-V: 25 + SEM -VI: 25)**
• In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE.	
• There shall be separate passing for theory and practical (term work) courses.	

Note:

1. **PCC-CS:** Professional Core Course – Computer Science and Engineering are compulsory.
2. **HM-CS:** Humanities and Management- Computer Science and Engineering are compulsory.
3. **PW-CS:** Domain Specific Mini Project -– Computer Science and Engineering are compulsory.
4. **#OEC-CS: Open Elective Course** – To be offered to Inter departmental students.

   # - 60% of the students from other branches to be chosen on merit.

   - 40% of the students may be from same branch based on merit.
   - Number of students to be allowed should be 72(Max.) for the branch with intake of 60 students.
   - The above ratio should be followed in proportionate to the sanctioned intake.

OPEN ELECTIVE-I

Sr.No.	Name of the Subject	Name of the concern Branch
1	i) Computer Graphics & Multimedia ii) Internet of Things	Computer Science and Engineering

OPEN ELECTIVE-II

Sr.No.	Name of the Subject	Name of the concern Branch
1	i) E-Commerce & Digital Marketing ii) Cyber Security	Computer Science and Engineering

3. FINAL YEAR COMPUTER SCIENCE AND ENGINEERING – CBCS

	FINAL YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN																	
	SEMESTER - VII																	
		TEACHING SCHEME							EXAMINATION SCHEME									
Sr. No.	Course Subject / Title	THEORY			TUTORIAL		PRACTICAL		THEORY				ORAL / PRACTICAL		TERMWORK	
		Credits	N0. Of Lectures	Hours	Credits	No. of Hours	Credits	No. of Hours	mode	marks	Total Marks	MIN.	MAX	MIN.	MAX	MIN.
1	PCC-CS701 Advanced Computer Architecture	4	4	4	1	1			CIE	30	100	40			25	10
									ESE	70						
2	PCC- CS702 Cloud Computing	3	3	3			1	2	CIE	30	100	40			25	10
									ESE	70						
3	PCC- CS703 Advanced Database Systems	3	3	3			1	2	CIE	30	100	40	50	20	25	10
									ESE	70						
4	PCE- CS704 Elective-I	3	3	3	1	1			CIE	30	100	40			25	10
									ESE	70						
5	PCC- CS705 Web Technologies	3	3	3			2	4					50	20	50	20
6	PW- CS706 Project – I						2	4					50	20	50	20
7	SI-CS707 Internship						1								50	20
	Total (SEM –VII)	***16***	***16***	***16***	***2***	***2***	***7***	***12***			***400***		***150***		***250***	

	FINAL YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN																	
	SEMESTER - VIII																	
		TEACHING SCHEME							EXAMINATION SCHEME									
		THEORY			TUTORIAL		PRACTICAL		THEORY				ORAL / PRACTICAL		TERMWORK			
Sr. No.	Course Subject / Title	Credits	N0. Of Lectures	No. of Hours	Credits	No. of Hours	Credits	No. of Hours	mode	marks	Total Marks	MIN.	MAX	MIN.	MAX	MIN.		
1	PCC- CS801 Big Data Analytics	4	4	4			1	2	CIE	30	100	40	50	20	25	10		
									ESE	70								
2	PCC- CS802 Deep Learning	3	3	3	1	1			CIE	30	100	40			25	10		
									ESE	70								
3	PCE- CS803 Elective-II	3	3	3	1	1			CIE	30	100	40			25	10		
									ESE	70								
4	PCE- CS804 Elective-III	3	3	3	1	1			CIE	30	100	40			25	10		
									ESE	70								
5	PCC- CS805 Mobile Application Development	3	3	3			2	4					50	20	50	20		
6	PW- CS806 Project – II						2	4					50	20	50	20		
7	HM-CS807 Professional Skills				1	1									50	20		
	Total (SEM –VIII)	***16***	***16***	***16***	***4***	***4***	***5***	***10***			***400***		***150***		***250***			
	Total	**32**	**32**	**32**	**6**	**6**	**12**	**22**			**800**		**300**		**500**			

CIE- Continuous Internal Evaluation

ESE – End Semester Examination

• In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE.
• There shall be separate passing for theory and practical (term work) courses.

Note:

1. **PCC-CS:** Professional Core Course – Computer Science and Engineering are compulsory.
2. **PCE-CS:** Professional Core Elective–Computer Science and Engineering are compulsory
3. **HM-CS:** Humanities and Management- Computer Science and Engineering are compulsory.
4. **PW-CS:** Domain Specific Mini Project -– Computer Science and Engineering are compulsory.
5. **SI-CS:** Internship-Computer Science and Engineering are compulsory.

Professional Core Elective – I

1. Artificial Intelligence
2. Software Testing & Quality Assurance
3. Image Processing

Professional Core Elective – II

1. Project Management
2. Natural Language Processing
3. Ad-Hoc Wireless Sensor Networks

Professional Core Elective – III

1. High Performance Computing
2. Blockchain Technologies
3. Human computer Interaction

COURSE DETAILS/SYLLABUS

S. Y. B. Tech (Computer Science and Engineering) Sem – III

1. Applied Mathematics (BSC-CS301)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : 1 Hrs/Week	**Term work:** 25 marks
Practical: ---	**Practical :---**
Credits:- 4	

Prerequisite: Basic probability theory, Statistics

Course Objectives:

1. To develop mathematical skills and enhance thinking power of students.
2. To give the knowledge to the students of fuzzy set theory, numerical methods probability and statistics with an emphasis on the application of solving engineering problems
3. To prepare students to formulate a mathematical model using engineering skills& interpret the solution in real world.

Course Outcomes:

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

1. Describe the statistical data numerically by using Lines of regression and Curve fittings.
2. Solve basic problems in probability theory, including problems involvingthe binomial, Poisson, and normaldistributions.
3. Calculate numericalIntegration.
4. Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, Normality, support,etc.
5. Solve examples on the principle in performing fuzzy number arithmeticoperations such as Addition, Multiplication & fuzzyequation.
6. Solve assignment problems by using different techniques of operationresearch.

Unit No.

1. Correlation, Regression & Curve Fitting:

Introduction, Karl Pearson's Coefficient of Correlation., Lines of regression of bivariate data., Fitting of Curves by method of Least-squares, Fitting of Straight lines. Fitting of exponential curves. Fitting of second degree Parabolic curves. 06

2. Probability Distribution:

Random variables, Discrete Probability distribution, Continuous probability distribution, Binomial Distribution, Poisson Distribution, Normal Distribution. 06

3.	**Numerical Integration:** Newton Cotes formulae. Trapezoidal Rule, Simpson's 1/3rd rule. Simpson's $3/8^{th}$ rule, Weddle's Rule.	06
4.	**Introduction to Fuzzysets:** Crisp set and Fuzzy set, Basic concepts of fuzzy sets, Basic operations on fuzzy sets, Properties of fuzzy sets	06
5.	**Fuzzy Arithmetic:** Fuzzy numbers ,Fuzzy cardinality, Arithmetic Operations on Fuzzy numbers, Solutions of Fuzzy equations of type A + X = B&A.X	06
6.	**Assignment Problem:** Definition, Balanced and Unbalanced assignment problem, Hungarian Method., Balanced assignment problems, Unbalanced assignment problems. Traveling salesmen problem.	09

TEXTBOOKS:

1. Advance Engineering Mathematics by Erwin Kreyszig (WileyIndia).
2. Mathematical Methods of Science and Engineering, by Kanti B. Datta(Cengage Learning)
3. Advanced Engineering Mathematics, 3e, by Jack Goldberg (OxfordUniversity Press).
4. Engineering Mathematics by V. Sundaram (Vikas Publication).
5. Higher Engineering Mathematics, by B. S. Grewal (Khanna PublicationDelhi).
6. Higher Engineering Mathematics, by B. V. Ramana (TataMcGraw-Hill).
7. Advanced Engineering Mathematics, by H. K. Das (S. ChandPublication).
8. Fuzzy Sets and Fuzzy Logic: Theory and Applications, by George J. Klir andBo Yuan (Prentice Hall of India Private Limited).
9. Applied Mathematics by Navneet D. Sangle (Cengage Publication)

General Instructions:

1. For the term work of 25 marks, batch wise tutorials are to be conducted.
2. Number of assignments should be at least six (All units should be covered).

2. Discrete Mathematics & Structures (PCC-CS302)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : 1 Hrs/Week	**Term work:** 25 marks
Practical: ---	**Practical :---**
Credits:- 4	

Prerequisite: Basic Mathematics

Course Objectives:

1. To expose the students to the mathematical logic related to computer science areas.
2. To enhance the problem solving skills in the areas of theoretical computer science.
3. To use mathematical concepts in the development of computer applications.

Course Outcomes:

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

1. Apply logic concepts in designing a program.
2. Illustrate basic set concepts & apply operations onset.
3. Minimize the Boolean Function.
4. Apply basic concepts of probability to solve real world problem.
5. Represent data structures using graph concepts.
6. Design abstract machine, detect deadlocks.

Unit No.	Contents	No. of Lectures
1	**Mathematical Logic:** Statements & Notations, Connectives, Statement Formulas & truth table, Well formed formulas, Tautologies , Equivalence of formulas, Duality law, Tautological Implications, Functionally complete set of connectives, Other connectives, Normal Forms, Theory of Inference for statement calculus.	10
2	**Set Theory:** Basic concepts of set theory, Operations on Sets, Ordered pairs & n-tuples, Cartesian product	04
3	**Relations & Functions:** Relations. Properties of binary relations. Matrix & Graph Representation of Relation., Partition & covering of Set, Equivalence Relations. , Composition of Binary Relation., POSET & Hasse Diagram, Functions, Types of Functions, Composition of functions..	06

4	**Algebraic Systems:** Algebraic Systems: Examples & general Properties, Semi groups & Monoids, Groups: Definitions & Examples, Subgroup & Homomorphism.	06
5	**Lattice and Boolean Algebra:** Lattice as partially ordered sets, Lattice as Algebraic Systems., Special Lattices., Boolean Algebra: Definitions & examples, Boolean Functions., Representation & Minimization of Boolean Functions.	08
6	**Graph Theory:** Basic concepts of graph theory., Paths, Reachability & Connectedness, Matrix, Representations of Graphs., Storage Representation & Manipulations of Graphs. PERT & Related technologies.	05

Text Books:

1. "DiscreteMathematicalStructureswithApplicationtoComputerScience"byJ.P.Tremblay& R. Manohar (MGH International)

Reference Books:

1. Discrete Mathematics –Semyour Lipschutz, Marc Lipson (MGH), Schaum's outlines.
2. Discrete Mathematics and its Applications – Kenneth H. Rosen (AT&T Bell Labs) (mhhe.com/rosen)
3. Discrete Mathematical Structures – Bernard Kolman, Robert Busby, S. C. Ross and Nadeemur-Rehman (Pearson Education)

TERM WORK :

4. It should consist of minimum 10 to 12 assignments based on topics of syllabus & Exercise problems mentioned in text books out of which 4 to 5 implementations of above assignments must be using 'C' programming language.

3. Data Structures (PCC-CS303)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs. / Week.	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work: ---**
Practical : ---	**Practical :---**
Credit:-3	

Prerequisite: C programming

Course Objectives:

1. To make the students familiar with basic data structures.
2. To provide students with foundation in computer programming/problem.
3. To teach the students to select appropriate data structures in computer applications.
4. To provide the students with the details of implementation of various data structures.

Course Outcomes:

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

1. Identify the appropriate data structure for specific application.
2. Design and analyze programming problem statements.
3. Chose appropriate sorting and searching algorithms.
4. Outline the solution to the given software problem with appropriate data structure.

1 Basic of Data Structures 03

Data structure- Definition, Types of data structures, Data Structure Operations, Algorithms: Complexity, Time and Space complexity.

2 Searching and Sorting Techniques 07

Linear search, Binary search, Hashing – Definition, hash functions, Collision, Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort, Radix sort, Complexity and analysis.

3 Stacks and Queues 07

Stack: Definition, operations, Array representation of stack, applications Queue: Definition, operations, Array representation of queue, applications, Circular queue, Priority queue, Deque.

4	**Linked Lists** Definition, representation, operations, implementation and applications of singly, doubly and circular linked lists. Linked representation of stack and Queue.	06
5	**Trees** Terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, B tree, B+ tree, Heaps- Operations and their applications, Heap sort.	06
6	**Graphs:** Basic concept of graph theory, storage representation, graph traversal techniques- BFS and DFS, Graph representation using sparse matrix.	06

TEXT BOOKS:

1. Schaum's Outlines Data Structures – Seymour Lipschutz (MGH)

REFERENCE BOOKS:

2. Data Structure using C- A. M. Tanenbaum, Y. Langsam, M. J. Augenstein(PHI)
3. Data Structures- A Pseudo code Approach with C – Richard F. Gilberg and Behrouz A. Forouzon 2nd Edition

4. Computer Networks – I (PCC-CS304)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs. / Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** 25
Practical: 2 Hrs. /Week	**Practical :**50
Credit:- 4	

Course Objectives: To perceive fundamental concepts of Computer Networks

1. To understand layered architecture and basic networking protocols
2. To illustrate the TCP/IP protocol internal details

Course Outcomes:

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

1. Demonstrate concepts of Computer Networks.
2. Explain OSI and TCP/IP layered architecture
3. Implement network and data link layer.
4. Demonstrate TCP protocol in detail.
5. To analyze the protocol structure using network analyzing tools.
6. apply the principals of socket programming in the networks.

Unit No.	Contents	No. of Lectures
1	**Introduction to Computer Network:** Overview of OSI layer Model and TCP/IP protocol model, Addressing,	05

Underlying technologies for LANs, WANs, and Switched WANs.

2	**Data Link Layer** Design issues for Data Link Layers, Framing methods, Error control: detection and correction, Flow control, Elementary Data Link protocols, Sliding window Protocols, Go back n, Selective repeat.	06
3	**Medium Access Control Sub layer:** Static and Dynamic channel allocation, Multiple Access protocols ALHOA, CSMA, Collision Free Protocols, Ethernet: IEEE 802.3, IEEE 802.4, IEEE 802.5 standards, Wireless LANS 802.11 standards	06
4	**Network Layer:** IPv4 Addresses: Classful Addressing Other Issues, Sub-netting and Super netting, Class less Addressing, Delivery, Forwarding and routing; Routing methods: Shortest path, Link state, Distance vector routing and broadcast routing, Congestion control algorithms: Principles, Congestion prevention policies, congestion control in datagram subnet, Load Shedding, Jitter Control.	06
5	**Internet Protocol:** IP Datagram format, Fragmentation and reassembly models, ARP, RARP, ICMP, IGMP	08
6	**Transport Layer:** The Transport service primitives, UDP: Process to Process communication, User Datagram Format, Operation and uses of UDP. TCP: TCP Services and Features, TCP segment format, TCP Connections, Flow and error control in TCP, TCP Timers; Berkeley Sockets: Socket Addresses, Elementary Socket system calls byte ordering and address conversion routines, connectionless iterative server, connection oriented concurrent server, TCP and UDP Client server Programs.	

TEXT BOOKS:

1. TCP/IP protocol suit 4th Ed. – Behrouz A. Forouzen (Tata Mag.Hill)
2. Computer Networks – Andrew S. Tanenbaum(PHI)
3. Unix Network Programming – W. Richard Stevens (PHI)

REFERENCEBOOKS*:*

1. TCP/IP Illustrated, The Protocols, Vol. I – W. Richard Stevens, G. Gabrani (PearsonEducation.)
2. Internetworking with TCP/IP, Vol. I Principles, Protocols, and Architectures – D. E. Comer (PearsonEd.)
3. Internetworking with TCP/IP, Vol. III, Client-Server Programming and Application (2nd Ed.) –D. E. Comer, David L. Stevens (Pearson Ed.)

TERM WORK

1. Study and demo of LAN, WAN and various connecting devices and components
    - List out component and devices required for a std. LAN,WAN
2. Study, design and configuration of IEEE 802.3 Ethernet and IEEE 802.11Wireless
    - LANs (Referring RFCs)
3. Study of following connectivity test tools with all its options–
   ifconfig, arp, route,trace route nmap, netstat, finger
4. Implementing Framing methods
5. Implementing Elementary data link protocol (Stop & wait protocol)
6. Implementation of Error detection (CRC)code
7. Implementation of Error detection codes (Hamming)
8. Programs to understand IP addressing, classful & classless addressing
9. Implementation of sliding window protocol.
10. Implement shortest path routing algorithm.
11. Programs for connection oriented (TCP) client-server using socket programming
12. Programs for connection less (UDP) client-server using socket programming
13. Study of network protocol analyzer (Ethereal or Wire-Shark) and understanding packet formats for UDP, TCP, ARP, ICMP protocols.

INTRUCTIONS FOR PRACTICAL EXAMINATIONS AND TERMWORK:

Term Work: It should consist of 10-12 experiments based on the syllabus and should be implemented by using Socket Programming. The study experiments should consist of some practical work and observations.

5. Microprocessors (PCC-CS305)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 03 Hrs / Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work :** 25 marks
Practical :02 Hrs / Week	**Practical :---**
Credits:- 4	

Prerequisite: Fundamental of Electronics and Basic Computer

Course Objectives:

1. To learn the Architecture and Basic Programming model.
2. To give the hands on experience of Assembly language programming for 8085 and 8086 Microprocessors
3. Differentiate between Microprocessors and Microcontrollers
4. To differentiate the microprocessor family.

Course Outcomes:

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

1. Describe the Architecture of 8085 microprocessors and microcontroller
2. Classify the 8086 Assembly Instructions set and use in Assembly language Programs
3. Explain Programming model's of 8086 microprocessors
4. Classify the 8086 Assembly Instructions set and use in Assembly language Programs
5. Understand the higher processor architecture
6. Understand the need for other Microprocessors

Unit No.	Contents	No. of Lectures
1	Architecture of 8085 Classification of Instructions, Instruction set of 8085 Introduction to 8051 Micro controllers	06
2	The Microprocessor and its Architecture: a) Internal Microprocessor Architecture b) Real Mode Addressing Addressing Mode: a) data Addressing Mode b) Program Memory Addressing Mode c) Stack memory Addressing mode..	06
3	Data movement Instruction , PUSH and POP , Load Effective Address String Data Transfer Arithmetic Instruction: a) Addition b) Subtraction c)Comparison d) Multiplication e) Division BCD & ASCII Arithmetic, Assembler Details.	06
4	Logic & Program Control Instruction: a) Basic Logic Instruction	06

	Shift & Rotate, Jump Group and Procedures Machine Control & Miscellaneous Instructions Basic Interrupt Processing, Hardware Interrupts	
5	80386Microprocessor: Introduction to 80386 Microprocessor, The Memory System Special 80386 Registers80386 Memory Management , Virtual 8086 Mode Introduction to Protected Mode memory Addressing, Memory Paging Mechanism	09
6	Pentium Pro Microprocessor Introduction to Pentium Pro Microprocessor, Internal Structure of the Pentium Pro, The Memory System Multiple Core technology.	06

TEXT BOOKS:

1. The INTEL Microprocessors; Architecture, Programming and Interfacing By Barry B Brey(8th Edition)

2. Microprocessors and Microcontrollers- N.Senthi Kumar, M, Saravanam and SJeevananthan (Oxford University Press)

REFERENCE BOOKS:

7. Microprocessors Architecture, Programming and Application with 8085 by Ramesh Gaonkar 2 The Microcomputer Systems: the 8086.8088 Family By Yu Chenn A. Gibson (PHI Ltd)

List of Laboratory Experiments:

1. To convert different number from decimal to binary, octal to hexadecimal & vice versa &also study of logic gates.
2. Perform hands on experiment using 8085kit.
3. Storing and displaying the content stored at different registers and memory location
4. Implementation of 8085 programs involving data transfer and arithmetic instruction set.
5. Implementation of 8085 programs involving logical and bit manipulation instruction set.
6. Implementation of 8086 programs involving branch instruction and machine control instruction set.
7. Implementation of DOS debugs utility.
8. Use of assembler directive and find the count and the sum of even, odd numbers from the given array.
9. Implementation of string data transfer instructions and use of Db directive for declaration of 2-Darray
10. Implementation of Dos interrupts to read char from keyboard and display on the screen.
11. Implementation of basic logic instruction, shift and rotate instruction and BCD and ACSII arithmetic instructions.
12. To study memory management unit of 80386 processor which include address calculation, descriptorand paging mechanisms.

6. C Programming (PCC-CS306)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs / Week	**Theory** :---
Tutorial : ---	**Term work:** 50 marks
Practical: 4 Hrs. / Week	**Practical** : 50marks
Credits:- 5	

Prerequisite: Digital Electronics, Computer Fundamentals

Course Objectives:

1. To learn concepts of arrays and pointers in C
2. To learn file handling in C
3. To learn memory management in C
4. To learn structures in C

Course Outcomes:

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

1. Articulate the principles of procedure oriented problem solving and programming.
2. Explain programming fundamentals including statements, control flow and recursion
3. Able to formulate problems and implement algorithms in C . .
4. Analyze and use data structures to solve the complex problem statements. .
5. Demonstrate file operations using file handling concepts through developing applications.

Unit No.		
1	**Introduction to C:** The Form of a C Program, The Library and Linking, Separate Compilation, Compiling a C Program, C's Memory Map; Expressions – The Basic Data Types, Modifying the Basic Types, Identifies Names, Variables, The Four C Scopes, Type Qualifiers-const, volatile, Storage Class Specifiers; Statements - Selection Statements, Iteration Statements, Jump Statements, Expression Statements, Block Statements.	6
2	**Console I/O & Basics of Array and Strings.** Console I/O: Reading and Writing Characters, Reading and Writing Strings, Formatted Console I/O, printf(), scanf(), Suppressing Input. Arrays and Strings- Two-Dimensional Arrays, Arrays of Strings, Multidimensional Arrays, Array Initialization, Variable-Length Arrays.	6
3	**Functions:** The General Form of a Function, Understanding the Scope of a Function, Parameter passing, Passing arrays to functions, Function Arguments, argc and argv-Arguments to main(),The return Statement, What Does main( ) Return?, Recursion, Function Prototypes, Declaring Variable Length Parameter Lists, The inline Keyword.	6
4	**Pointers:** What Are Pointers?, Pointer Variables, The Pointer 0perators, Pointer Expressions, Pointers and Arrays, Arrays of Pointers, Multiple Indirection, Initializing Pointers, Pointers to Functions and structures, C's Dynamic Allocation Functions, restrict-	6

Qualified Pointers, Problems with Pointers.

5	**Structures, Unions, Enumerations, and type def :** Structures, Arrays of Structures, Passing Structures to Functions, Structure Pointers, Arrays and Structures Within Structures, Unions, Bit-Fields, Enumerations, Using sizeof to Ensure Portability, typedef .	6
6	**File I/O :** FileI/O, Standard C vs. UnixFile I/O, Streams and Files, File System Basics, fread() and fwrite(), fseek() and Random-Access I/O, fprintf( ) and fscanf(), The Standard Streams.	6

Instructions for Practical Examinations:

It should consist of minimum 10-12 experiments based on the syllabus and concepts mention below. Students of different batches should implement different programs. Student should perform all experiments using GCC under Linux environment.

TEXT BOOKS:

1. C the Complete Reference by Herbert Schild (Tata McGraw Hill) 4thEdition.
2. The C Programming Language- Brian W. Kernighan, Dennis Ritchie 2ndEdition.

REFERENCE BOOKS:

1. Programming in ANSI C by E. Balaguruswamy.(Tata McGraw Hill)4thEdition.
2. Let Us C By Yashavant P. Kanetkar, 5thEdition.

List of Experiments

1. Branching Statements
2. Looping
3. Arrays
4. Functions
5. Storage Class.
6. Structures.
7. Implementation of STACK.
8. Implementation of QUEUE.
9. Implementation of LINKEDLIST.
10. Copy Contents of one file to another file.
11. Implementation of GRAPH.
12. Implementation of TREE.

7. SOFT SKILLS (HM-CS307)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : ---	**Theory :---**
Tutorial : ---	**Term work:** 25 Marks
Practical: 2 Hrs. / Week	**Practical :** 25Marks
Credits:- 1	

Prerequisite: English language

Course Objectives:

1. To make the engineering students aware of the importance, the role and the content of soft skills through instruction, knowledge acquisition, demonstration and practice.
2. To develop and nurture the soft skills of the students through individual and groupactivities.
3. To expose students to right attitudinal and behavioral aspects and to build the same through activities
4. To encourage the all round development of students by focusing on soft skills.

Course Outcomes:

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

1. Effectively communicate through verbal/oral communication and improve the listeningskills
2. Actively participate in group discussion / meetings / interviews and prepare &deliver presentations.
3. Function effectively in multi-disciplinary and heterogeneous teams through the knowledge ofteam work, Inter-personal relationships, conflict management and leader ship quality.

Contents

1. Understanding Communication Skills:

Verbal Communication – Effective Communication - Active listening – Articulation Paraphrasing – Feedback

Non- Verbal Communication- Body Language of self and others

2. Behavioral Skills /Self Development:

SWOT Analysis, Confidence improvement, values, positive attitude, positive thinking and self esteem.

3. Leadership and Team Building

Culture and Leadership- Salient Features of Corporate Culture, Leadership Styles, Leadership Trends, Team Building- Team Development Stages, Types of Teams, Attributes of a successful team – Barriers involved

4. Developing Writing skills

E-mail writing, report writing, resumes writing, practice.

5. Stress and Time Management

Stress in Today‘s Time- Identify the Stress Source, Signs of Stress, Ways to Cope with Stress. HealthierWays to Combat Stress, Steps to be taken in the Organizations: Open communication, Time Management, Working towards Your Goals, Smart Work, Prioritize your Tasks

6. Professional Skill

Ethics, Etiquette and Mannerism-All types of Etiquette (at Meetings, Etiquette at Dining. Involuntary Awkward Actions, Public Relations Office(PRO)‘s Etiquettes) Technology Etiquette: Phone Etiquette, Email Etiquette, Social Media Etiquette, Video Conferencing Etiquette, Interview Etiquette. Dressing Etiquettes: for Interview, offices and social functions. Ethical Values: Importance of Work Ethics, Problems in the Absence of Work Ethics.

TERM WORK:

1. The instructor shows videos to enhance skills supporting career aspects and discussion about same videos. Multiple set of observations based on videos can be prepared by students.
2. Multiple set of activity based assignments can be prepared to allow multiple skills exposure forexample a group task encouraging discussions, team building, value sharing, leadership and role play all at the same time. Every student must be given adequate opportunity to participate actively in each activity.
3. Each student will write one report based on visit / project / business proposal etc.
4. Faculty may arrange one or more sessions from following: Yoga and Meditation. Stress management,relaxation exercises, and fitness exercises. Time management and personal planning sessions.
5. The student must prepare the journal in the form of report elaborating the activities performed in the lab. Continuous assessment of laboratory work is to be done based on overall performance and lab assignments performance of student. Each lab assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion, performance, punctuality, neatness, enthusiasm, participation and contribution in various activities-SWOT analysis, presentations, team activity, event management, group discussion, Group exercises and interpersonal skills and similar other activities/assignments.

TEXT BOOKS:

1. Developing Communication Skills by Krishna Mohan and Meera Banerji; Mac Millan India Ltd., Delhi
2. Gajendra Singh Chauhan, Sangeeta Sharma: Soft Skills – An Integrated Approach to Maximize Personality, WILEY INDIA, ISBN:13:9788126556397
3. Essentials of Effective Communication, Ludlow and Panthon; Prentice Hall of India.

REFERENCE BOOKS:

1. Indrajit Bhattacharya, ―An Approach to Communication Skills¦, Delhi, Dhanpat Rai,2008.
2. Seven Spiritual Laws of Success – Deepak Chopra
3. Simon Sweeney, ―English for Business Communication¦, Cambridge University Press, ISBN13:978-0521754507.

S. Y. B. Tech (Computer Science and Engineering) Sem – IV

1. Automata Theory(PCC-CS-401)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** ---
Practical: ---	**Practical :**---
Credits:- 3	

Prerequisite: Basic Mathematical Concepts, Sets, graphs. **Course Objectives:**

1. To introduce students to the mathematical foundations of computation, the theory of formallanguages and grammars
2. To strengthen the students' ability to understand and conduct mathematical proofs forcomputations
3. To make the students understand the use of automata theory in Compliers & System Programming.
4. To analyze and design finite automata, pushdown automata, grammars & Turing machines

Course Outcomes:

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

1. Understand basic concepts of Regular Language and Regular Expressions
2. Select appropriate abstract machine to recognize a given formal language.
3. Generate complex languages by applying Union, Intersection, Complement, Concatenation andKleene * operations on simple languages.
4. Apply parsing concepts for syntax analysis.
5. Be familiar with thinking analytically and intuitively for problem solving situations in related areasof theory in computer science.

Unit No	Contents	No. of Lectures
1	**Regular Languages and Finite Automata** Proofs, Recursive Definitions, Regular expressions and regular languages, Finite Automata, unions, intersection & complement so fregular languages, Applications of FA	7
2	**Nondeterminism and Kleene's Theorem** Nondeterministic finite automata, NFA with null transition, Equivalence of FA's, Kleene's Theorem (Part I & Part II), Minimal Finite Automata	6
3	**Context free Grammars** Definition, Union, Concatenation and Kleene *'s of CFLs, Derivation trees and ambiguity, Simplified forms and normal forms	5

4	**Parsing and Push down Automata** Definition of Pushdown Automata, Deterministic PDA, Equivalence of CFG's& PDA's, Top down parsing, bottom up parsing.	6
5	**Context free languages** CFL's and non CFL's**,** Pumping Lemma, intersections and complements of CFLs	5
6	**Turing Machines** Definition, TM as language eacceptors, combining Turing Machines**,** Computing partial function with a TM, Multi-tape TMs, and Universal TM	7

Text Books:

1. Introduction to Languages & the Theory of Computations – John C. Martin (Tata MGHEdition)
2. Discrete Mathematical Structures with applications to Computer Science – J .P. Trembley & R. Manohar (MGH)

Reference Books:

1. Introduction to Automata Theory, Languages and computation – John E. Hopcraft,Raje
2. Motwani, Jeffrey D. Ullman (Pearson Edition)
3. Introduction to theory of Computations – Michael Sipser (Thomson Books/Cole)
4. Theory of Computation –Vivek Kulkarni

2. Computer Networks-II (PCC-CS-402)

TEACHING SCHEME	**EXAMINATION SCHEME**
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** 25 marks
Practical: 2 Hrs/Week	**Practical :** 50Marks
Credits:- 4	

Prerequisite: Computer Network-I.

Course Objectives:

1. To understand the Client server model & socket interface
2. To perceive IPv6 addressing and protocol
3. To explain and learn basic internet technology protocols
4. Simulate protocols using software tools.

Course Outcomes:

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

1. program the client server model using sockets
2. understand and apply next generation protocol and addressing model
3. elaborate the fundamentals of Domain Name Systems
4. apply the concepts of Remote login and FTP in network applications
5. learn fundamentals of web, HTTP and e-mail communication protocols.
6. understand multimedia streaming and relevant protocols.

Unit No	Contents	No. of Lectures
1	**Client server model & socket interface:** The Socket Interface, The Client Server model and Software design, Concurrent processing inclient-server software, Algorithms and issues in Client-Server design, Multiprotocol Servers, Multiservice Servers, Concurrency in clients, Unix Internet Super server (inetd).	6
2	**Next Generation IPv6 and ICMPv6:** IPV6 addresses, packet format, ICMPV6, Transaction from IPV4 to IPV6	5
3	**BOOTP, DHCP and Domain name system:** Name Space, Domain Name Space, Distribution of name space, and DNS in internet, Resolution, DNS massages, Types of records, Compression examples, and encapsulation. BOOTP, DHCP	6
4	**Remote Login: TELNET and File TransferFTP,TFTP:** Concept, NVT, Embedding, Options & options/sub-option negotiation, controlling the server, Out-of-band signaling, Escape charter, Mode of operation, user interface. **FTP:** Connections, Communication, Command processing, File transfer, User interface, Anonymous FTP, TFTP.	6
5	**Web Applications Service Protocols:** HTTP: Architecture, Web Documents, HTTP Transaction, RequestandResponse, HTTP Headers and Examples, Persistent Vs Non- Persistent HTTP, Proxy servers. **Electronic Mail:** Architecture, User agent, addresses, Delayed delivery, SMTP commands and responses, Mail transfer phases, MIME, POP3	7
6	**Multimedia In Internet:** Streaming stored audio/video, Streaming live audio/video, Realtimeinteractive audio/video, Real Time Transport Protocol (RTP), Real Time Transport Control Protocol (RTCP), Voice Over IP (VoIP), Session Initiation Protocol (SIP)	6

Text Books:

1. TCP/IP Protocol Suite by Behrouz A. Forouzan McGraw-Hill Publication, 4thEdition.
2. Computer Networks by Andrew STanenbaum.

Reference Books:

1. Data Communications and Networking by Behrouz AForouzan
2. Internetworking with TCP/IP by Douglas Comer
3. Computer Networking: A Top-Down Approach by Jim Kurose

Term work:

It should consist of minimum 8 - 10 experiments based on the following guidelines

1. Client program using UDP to connect to well known services (echo, time of the dayserviceetc.).

2. Implementing concurrent TCP multiservice client/server.
3. Implementing Iterative UDP client/server.
4. Study of following DNS Tools with all its options. nslookup, dig, host,whois.
5. Implement trivial file transfer protocol (TFTP).
6. Configuration of basic services for FTP, HTTP, Telnet etc. on Linux Platform
7. Write program to send a mail using SMTP commands and receive a mail using POP3commands.
8. Capturing & Analyzing operation of various application layer protocols using network protocol analyzer. (Wireshark and tcp dump)
9. Study of various streaming multimedia protocols in Internet (Using various audio/video streaming services on the Internet)

3. Computer Organization and Architecture (PCC-CS-403)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** ---
Practical: ---	**Practical :**---
Credits:- 3	

Prerequisite: Basic Computer and Microprocessor

Course Objectives:

1. To provide a high-level overview of Computer organization.
2. To discuss the basic of I/O addressing and access.
3. To make the students aware of overall design and architecture of computer and its organization.
4. To analyze performance issues in processor and memory design of a digital computer.

Course Outcomes:

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

1. recapitulate the history of computer system and the basic concepts of computer architecture andorganization.
2. understand the concept of I/O organization.
3. apply the different algorithms to perform arithmetic operations.
4. articulate the design issues in the development of processor.
5. conceptualize instruction level parallelism.
6. understand the concept of memory techniques.

Unit No	Contents	No.of Lectures
1	**Computer Evolution and Performance** Evolution of computer – Mechanical Era: Babbage's Difference Engine, Electronic Era: First generation, IAS Computers, Instruction Set and Instruction Execution, Second generation, Input-Output Operation, Programming Language, Third generation and VLSIEra – IC Circuits, Performance Consideration and Measures, Speed up Techniques, Difference between RICS and CISC.	5
2	**Input and Output Organization** Accessing I/O devices, Direct Memory Access (DMA), Buses: Synchronous Bus and Asynchronous Bus, Interface Circuits, Standard IO Interface.	6

3	**Arithmetic** Addition and Subtraction of Signed Numbers, Design of fast Adders,Multiplication of Positive numbers , Signed Operand Multiplication, Fast Multiplication, Integer Division, Floating Point Number Operations: IEEE 754 Floating Point Format, Arithmetic Operations	8
4	**The Processing Unit** Some fundamental Concepts, Execution of complete Instruction, Multiplebus organization, Hardwired control, Micro programmed Control	6
5	**Pipelining** Basic Concepts: Role of Cache Memory, Pipeline Performance. Data Hazards: Operand Forwarding, Handling Data Hazards in Software and Side Effects and Instruction Hazards: Unconditional Branches and Conditional Branches and Branch Prediction	5
6	**Computer Memory System** Some Basic Concepts, Types of Memories :ROM and RAM, Semiconductor RAM memory, Cache Memories: Mapping functions, Replacement Algorithms, Example of Mapping Techniques	6

Text Books:

1. Computer Architecture and Organization-John P Hayes (MGH) 3rdEdition
2. Computer Organization – Carl Hamacher, ZvonkoVranesic and SafwatZaky . Publisher: Tata McGraw Hill. 5thEdition.

Reference Books:

4. Computer Systems Organization & Architecture – John D. Carpinelli (Pearson Education)
5. http://cse.stanford.edu/class/sophomore-college/projects-00/risc/risccisc/(RISC vs.CISC)
6. http://www.cpu-world.com/sspec/

4. Operating System I (PCC-CS-404)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** 25 marks
Practical: 2 Hrs/Week	**Practical :---**
Credits:- 4	

Prerequisite: Computer Network-I.

Course Objectives:

1. To make the students understand basic concepts of operating system
2. To expose the students to various functions of the Operating system and their usage
3. To give hands on exposure to Linux commands and system calls.

Unit No.		
1	**Overview of OS** Abstract view of an operating system, Fundamental principles of OS operations, OS interaction with the computer and user programs, Efficiency , system performance and user service, Batch Processing System, Multiprogramming System, The Time Sharing System, The Real Time Operating System, Distributed operating system, Operation of OS, Operating system with monolithic structure, Virtual machine operating system, Kernel based operating system, Microkernel based operating system	6
2	**Processes, Threads and Synchronization** Processes and programs, Implementing processes, Threads, Process synchronization, Race condition, Critical Section, Synchronization approaches, Classic process synchronization problems, Semaphores, Monitors	6
3	**Process Scheduling** Scheduling terminology and concepts, Nonpreemptive scheduling policies, Preemptive scheduling policies, Long, Medium and short term scheduling	6
4	**Deadlock** What is deadlock, Deadlock in resource allocation, Handling Deadlocks : Deadlock Detection and Resolution, Deadlock prevention, Deadlock avoidance	6
5	**Memory Management** Managing the memory hierarchy, Static and Dynamic Memory Allocation, Heap Management, Contiguous Memory Allocation and Non Contiguous Allocation, Segmentation and Segmentation with paging, Virtual memory basics, Demand paging, Page replacement policies	6

6	**File systems and I/O systems** Overview of file processing, File sand file operations, Fundamental file organizations and access methods, Layers of the Input Output control system, Overview of I/O system	6

Text Books:

1. Operating Systems –A Concept Based approach –Dhananjay M Dhamdhere (TMGH).3rd edition.
2. Operating System Concepts –Abraham Silberschatz, Peter B. Galvin &Grege Gagne(Wiley)

Reference Books:

1. UNIX Concepts and Applications –Sumitabha Das(TMGH).
2. Operating System: Concepts and Design –Milan Milenkovic (TMGH)
3. Operating System with case studies in Unix, Netware and Windows NT –Achyut S. Godbole (TMGH).

Term work:

The tutorials should be conducted on the following guidelines.

1. Six assignments should be based on theoretical / analytical concepts, preferably from the exercises of the books covering all topics of the syllabus.
2. Four assignments should on usage of Unix / Linux commands and system calls concerned with General purpose utilities, file system, handling ordinary files, basic file attributes, the Shell, the Process and Filters using regular expressions as mentioned in the reference book at serial no.1.
3. Installation of any two operating system using Vmware.

These assignments should be practically conducted during the tutorial sessions.

5. Software Engineering (PCC-CS-405)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work: ---**
Practical: ---	**Practical :---**
Credits:- 3	

Course Objectives:

1. To expose the students to basic concepts & principles of software engineering.
2. To make the student aware of the importance of SDLC in their project development work.
3. To expose the students to software testing techniques and software quality management.

Course Outcomes:

1. Comprehend systematic methodologies of SDLC (Software Development Life Cycle)
2. Discriminate competing and feasible system requirements indicating correct real world problemscope and prepare stepwise system conceptual model using stakeholder analysis and requirement validation.
3. Prepare SRS document for a project
4. Apply software design and development techniques
5. Develop a quality software project through effective team-building, planning, scheduling andrisk
6. Understand testing methods at each phase of SDLC

Unit No.	Contents	No. of Lectures
1	**The software Problem** Cost, Schedule & Quality, Scale and Change, Software Processes: Process & Project, Component Software Processes, Software Development process Models, Project Management Process.	6
2	**Software Requirements Analysis & specification** Value of Good SRS, Requirement Process, Requirements Specification, Other Approaches for Analysis ,Validation	5
3	**Software Planning & Scheduling** Responsibilities of Software Project Manager, Project Planning, Project Scheduling, Project Staffing, People CMM, Risk Management	6
4	**Design** Design Concepts, Function Oriented Design, Object Oriented Design, Detail Design, Verification, Metrics	6

5	**Coding & Testing** Coding & Code Review, Testing, Unit Testing, Black Box Testing, White Box Testing, Program Analysis Tools, Integration Testing, System Testing	7
6	**Software Reliability &Quality Management** Reliability, Software Quality, Software Quality Management System, ISO 9000, SEI capability Maturity Model, Six Sigma, Agile Software Development & Extreme Programming, Agile Project Management	6

Text Books:

1. Software Engineering: A precise Approach – Pankaj Jalote (Wiley India) (Unit1,2,4).
2. Fundamentals of Software Engineering – Rajib Mall (3rd Edition)(PHI) (Unit 5,6).
3. Software Engineering by Jan Sommerville (9th Edition) Pearson (Unit 6, 7 &6.8).
4. Software Engineering Principles & Practices by Rohit KhuranaI TLESL (2nd Edition)Vikas Publishing House Pvt. Ltd. (Unit3).

Reference Books:

1. Software Engineering – Concepts & Practices –Ugrasen Suman (Cenage Learning)
2. Software Engineering Fundamentals –Behforooz & Hudson (Oxford: Indian Edition1st)

6. Object Oriented Programming (PCC-CS406)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 2 Hrs/Week	**Theory :---**
Tutorial : ---	**Term work:** 50 marks
Practical: 4 Hrs/Week	**Practical :** 50marks
Credits:- 4	

Pre- requisites: Basics Of C Programming Language

Course Objectives:

1. To learn advanced features of the C++ programming language as a continuation of the previous course.
2. To learn the characteristics of an object-oriented programming language: data abstraction and information hiding, inheritance, and dynamic binding of the messages to the methods.
3. To learn the basic principles of object-oriented design and software engineering in terms of software reuse and managing complexity.
4. To enhance problem solving and programming skills in C++ with extensive programming projects.
5. To become familiar with the LINUX software development environment.

Course Outcomes:

After the completion of this course, a successful student will be able to do the following:

1) Use the characteristics of an object-oriented programming language in a program.

2) Use the basic object-oriented design principles in computer problem solving.

3) Use the basic principles of software engineering in managing complex software project.

4) Program with advanced features of the C++ programming language.

5) Develop programs in the LINUX programming environment.

Unit No.	Contents	No. of Lectures
1	**Basics of Object Oriented Programming** The Origins of C++, Features of Object Oriented Programming, relations of Classes & Structures, Classes & Objects, Encapsulation, Data Abstraction, Inheritance, Inline Function, Constructor &Destructor, function overloading & Operator overloading, Static class member, Static Member Function, Scope resolution Operator, Access members Data member & member Function, Defining member functions, Passing Object to Functions, Nested classes, local classes, Friend functions, Friend class	5
2	**Pointers, Arrays, Dynamic allocation Operator** Arrays Of Object, Pointers to Object, THIS pointer, type checking C++ Pointers, Pointers to Derived types, Pointers to Class members Dynamic Allocation Pointers :-New & Delete Operator	3
3	**Functions & Operator Overloading** Functions Overloading, Operator Overloading, Types Of Constructors, Destructors, Operator Overloading Using Friend Function, Unary & Binary Operator Overloading(Arithmetic, Comparison Operator Overloading), Assignment Operator Overloading(=,+=)	4
4	**Inheritance & Virtual Function** Inheritance, Single Inheritance, Types of Derivations, Passing parameters to base, Multiple Inheritance, Multilevel Inheritance, Hybrid Inheritance, Hierarchical Inheritance , Virtual function, Calling a Virtual function through a base class reference, Virtual functions are hierarchical, Pure virtual functions, Abstract classes, Early and late binding.	5
5	**Templates & Exception handling** Function Template, Class Template, Generic Classes, Generic Functions, Applying Generic Functions Type Name, export keyword Power of Templates Standard Template Library (STL):-STL Container, STL Algorithm, STL iterator. Exception handling :-Exception handling fundamentals, Catching, Throwing ,& Handling Exception, Exception handling options,	5

6	**I/O System Basics, FileI/0** Streams ,File Pointers & Redirections Streams, C++ stream, C++ Predefined stream classes, Formatted I/O, C++ file I/O, manipulators, fstream and the File classes, File operations, namespaces, std namespaces	4

TERM WORK:

- It should consist of minimum 10-12 experiments based on the syllabus and concepts mention below. Students of different batches should implement different programs based on the followingguidelines
- Student should perform the Practicals on Linux platform

List of Experiments

1. Classes &objects
2. Constructors &destructors
3. Friend function and Friend class
4. Inline Function, Static data members & member functions,
5. Array, Array of Objects, Pointer to Object, THIS pointer, Dynamic allocation operators (New & Delete)
6. Function overloading, Operator overloading (unary/binary/arithmetic/comparison)
7. Inheritance (multilevel, multiple, hybrid, Hierarchical)
8. Virtual function and Virtual class, early and late binding
9. Generic function &classes
10. STL
11. Exception Handling
12. File handling

TEXT BOOKS:

1. The Complete Reference C++ by Herbert Schild(Tata McGraw Hill) 4th Edition and onwards.
2. Object oriented Programming in C++ by Rajesh K. Shukla(Wiley) India Edition

REFERENCE BOOKS:

1 Object-Oriented Programming with C++ by E. Balaguruswamy. (Tata McGraw-Hill) 6th Edition and onwards
2. Object oriented Programming with C++- by Sourav Sahay (Oxford) 2nd edition

7. Mini Project (PW-CS407)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : ---	Theory :---
Tutorial : ---	Term work: 50 marks
Practical: 2 Hrs/Week	Practical : 50marks
Credits:- 3	

Pre-requisites: Knowledge of software engineering and C/C++

Course Objectives:

1. To expose the students to solve the real world problems.
2. To utilize the techniques. Skills and modern Engineering tools for building theproject.
3. To follow the methods and tasks as per SDOLC Approach

Course Outcomes:

1. Define the problem statement.
2. Organize, Plan and prepare the detailed project activities.
3. Construct Flowchart, System Architecture based on the project description
4. Implement the solution for their problem.

Platform: - C, C++

Course Contents/Description:-

The Mini Project should be undertaken preferably by a group of 3-4 students who will jointly work together and implement the project. The Mini Project topic should be based on the any one subject concepts that students have studied for their Academic Year. The group will select the project with the approval of the guide and submit the name of the project with a synopsis of the proposed work not more than 02 to 03 pages. In the Synopsis they have to state Flowchart, Usage of the logic, algorithm, functions and suitable data structure for implementing the solution. They have to implement project using C, C++languages.

8. ENVIRONMENTAL STUDIES(PCC-CS408)

	TEACHING SCHEME	**EXAMINATION SCHEME**
	Theory : 2 Hrs/Week	**Term work:**
	Tutorial : 1 Hr/week	**Theory** 100
	Practical:	**Practical :**
	Credits:- 3	

COURSE DETAILS/SYLLABUS

T. Y. B. Tech (Computer Science and Engineering) Sem – V

T. Y. B. Tech (Computer Science and Engineering) Sem – V

1. Information Security (PCC-CS501)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :	**Term work: 50 Marks**
Practical: 2 Hrs./Week	**Practical : –**

Pre-requisites: Computer Network, Modular Arithmetic &Number Theory, C / C++.

Course Objectives

6. To introduce the principles of Crypto-Systems.
7. To expose students to various security services and mechanisms used.
8. To make the students aware of the security features of PGP, S/MIME, Digital Signatures, IPSec& SSL.
9. To make the students understand the system level security issues concerning threats, intruders and use of firewalls and trusted systems.
10. To make students to explore non-cryptographic and software vulnerabilities.

Course Outcomes

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

6. Understand principles of Crypto-systems.
7. Compare and analyze various security services and mechanisms.
8. Apply and use the features of PGP, S/MIME, DSA, IPSec, SSL in their profession.
9. Take precautions of their personal computing system from possible threats and attacks.
10. Explore newer vulnerabilities and provide the solutions to them.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	The OSI Security Architecture, Symmetric Cipher Models: Substitution Techniques, Transposition Techniques, Block Cipher Principles, The Data Encryption Standard.	6
2.	Principles of Public-Key Cryptosystems, The RSA Algorithm, Key Management, Diffie-Hellman Key Exchange, Authentication requirements, Authentication functions, MAC and Hash functions and their requirements,	7
3.	Digital Signature, Digital Signature Standard, Authentication applications - Kerberos, X.509 Authentication service.	5
4.	Email Security - PGP, S/MIME, IP Security - IP Security Architecture, Authentication Header and Encapsulating Security Payload.	5

5.	Web and System Security - Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction, Intruders, Intruder Detection, Password Management, Firewall Design Principles, Trusted Systems.	6
6.	Non-Cryptographic Protocol Vulnerabilities - DoS and DDoS, Session Hijacking and Spoofing, Pharming attacks. Software Vulnerabilities - Phishing, Buffer Overflow, Format String attacks, SQL Injection.	7

Term Work

- Minimum of 10 Experiments to be performed from the list given below.
- Practical should include the implementation and use of the following mechanisms/Algorithms/Tools /Techniques
- Implementation can be in C/C++ Programming Language

Experiment List

14. GCD Using Euclidean algorithm/Computing Multiplicative inverses/ Prime number and modular arithmetic operations.
15. Substitution/Transposition/ Product Cipher and their Analysis
16. Single round of DES algorithm/Double DES/ Triple DES and its analysis
17. RSA Algorithm to provide Confidentiality and Authentication services or any other Public-Key Algorithm.
18. Diffie–Hellman or any other key exchange Algorithm.
19. Implementation and use of any authentication functions / algorithm.
20. Generation and use of Digital Signature for real world situation.
21. Usage of PGP security package and S/MIME features.
22. Experimenting with SSL/TLS/E-Commerce Applications and identifying their Vulnerabilities.
23. Demo and usage of network traffic analysis tools.
24. Experimentation on identifying non-cryptographic Protocol Vulnerabilities and remedies thereon.
25. Experimenting on identifying software Vulnerabilities using various tools/techniques and their analysis.
26. Any other4 Implementation/Demo/Experimentation based on the topics of syllabus.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Cryptography and Network Security	William Stallings	Pearson Edition	(Unit I to V)
2	Network Security and Cryptography	Bernard Menezes	Cengage Learning	Unit -VI

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Cryptography and network security	Atul Kahate	TMGH
2	Cryptography and Network Security	Forouzan	TMGH
3	Network Security Know it All	Joshi et. al	Morgan Kaufmann Publisher

2. System Programming (PCC-CS502)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : ---	**Term work: 50** Marks
Practical: 2 Hrs./Week	**Oral : 25** Marks

Pre-requisites : Basics of Operating Systems and Microprocessor.

Course Objectives

4. To expose students to the fundamentals of languages and processing
5. To make students to learn design of grammars, assemblers and compilers
6. To provide hands on experience to the students on simulation of linkers, loaders and software tools for UIs

Course Outcomes

7. Student will be able to identify the role of system programs and application programs.
8. Student will be able to understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
9. Students able to describe the various concepts of assemblers and macro - processors.
10. Students able to understand the various phases of compiler and compare its working with assembler.
11. Students understand how linker and loader create an executable program from an object module created by assembler and compiler.
12. Students will be able to create graphical user interfaces for basic programs and learn about terminal input/output through the termios libraries
13.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Language Processors**: Introduction, Language processing activities, Fundamentals of language processing, Fundamentals of language, Specification, Language Processing Development Tools: LEX and YAC	7
2.	**Assemblers:** Elements of assembly language programming, A simple assembly scheme, pass structure of assemblers, Design of a two pass assemble	5
3.	**Macros and Macro Processors:** Macro definition and call, Macro expansion, Nested macro calls, Advanced macro facilities, Design of macro pre-processor: Design Overview, Data structure of Macro pre-processor with and Example	7
4	**Compilers and Interpreters:** Aspects of compilation, Memory allocation: Static and Dynamic memory allocation, Memory Allocation in block Structure language. Compilation of expressions, Code optimization: Local and Global optimization and Optimization technique, Interpreters	7
5.	**Linkers:** Introduction, Relocation and linking concepts, Self- relocating programs, linking for overlays, Loaders	5
6.	**Software tools:** Introduction, Software tools for program development, Editors, Debug Monitors, Programming Environments, and User Interface	5

Term Work

Minimum of 5 experiments on LEX and 5 case study each on Assembler, Complier, Macro Preprocessor, Linker and Loaders.

Oral Exam

Orals can be conducted over the syllabus contents and Term Work assignments

Textbooks

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1.	System Programming and operating systems	D.M. Dhamdhere	2ndEdition (TMGH)	All Units
2.	Lex &Yacc Publisher:	Doug Brown, John Levine, Tony Mason	2nd Edition O'Reilly Media	For Practical

3. Object Oriented Modeling and Design (PCC-CS503)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : ---	**Term work:** ---
Practical: --	**Oral :** ---

Pre-requisites: Software Engineering Concepts**,** Object Oriented Concepts

Course Objectives

5. To Understand the Object Based View of the System
6. To design Problems using Object Oriented Analysis and Design Techniques
7. To Understand UML notations and compare with OMT
8. To inculcate necessary skills to handle complexities in Software Design

Course Outcomes

5. Student will able to analyze and model software systems
6. Student will able to construct OO view of the system
7. Student will able to design a Software System using OMT design techniques.
8. Student will able to design a Software System using UML design techniques.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction: Ability to analyze and model software systems** Object oriented themes, modeling as a design technique. **Object Modeling:** Object, classes, Link & association, advanced link & Association concepts, generalization & Inheritance, grouping constructs, aggregation, abstract classes, generalization as extension & restriction, multiple inheritance, metadata, candidate key & constraints.	8
2.	**Dynamic & Functional Modeling:** **Dynamic modeling**: Events & states, operations, nested state diagrams, concurrency, advanced dynamic modeling concepts &simple dynamic model, relation of object dynamic models. **Functional Modeling**: functional model, data flow diagrams,	7

	specifying operations, constriction, a simple functional model, relation of functional to object & dynamic model.	
3.	**Design Methodology:** OMT methodology, Impact of an object-oriented approach, analysis, system design with examples, combining models, design algorithms, design optimization, implementation of controls, design association & physical packaging.	3
4.	**Introducing the UML:** An overview of the UML, Conceptual Model of UML, Architecture of UML **Structure modeling Using UML:** Classes, Relationship, Diagrams, Class Diagrams**.**	7
5.	**Behavioral Modeling:** Interactions, Use Cases, Use Case Diagram, Interaction diagrams, Activity diagrams, Events & Signals, State Machines, Process & Threads, Time & Space, State chart diagrams.	**5**
6.	**Architectural Modeling:** Components, Deployment, Collaboration, Patterns & frameworks, component diagrams, Deployment diagrams.	**6**

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Object-orientated Modeling & Design: (Unit 1 to 3)	James Rambaugh, Michael Blaha, William Premerlani, Frederick Eddy, William Lorensen	PHI	Unit 1 to 3
2	The Unified Modeling Language User Guide	Grady Booch, James Rambaugh, Lvar Jacobson	Addison Wesley	Unit 4 to 6

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Object oriented analysis & design using UML	H. Srimathi, H. Sriram, A. Krishnamoorthy	SCITECH PUBLICATION 2nd Edition
2	Object Oriented analysis& Design	Andrew High	TMG
3	Practical Object Oriented Design with UML	Mark Priestley	McGraw-Hill Education
4	Threat first Object oriented analysis & design	BreetMclaughline, Garry Police & Devide West	OREILLY

4. Computer Algorithm (PCC-CS504)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 4 Hrs/Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : 1Hr/Week	**Term work: 25 Marks**
Practical: --	**Oral :** ---

Pre-requisites: Data Structures, Discrete Maths, Engineering Maths, Programming Concepts

Course Objectives

5. To introduce algorithm design methods / techniques with analysis
6. To devise algorithm for given problem statement
7. To introduce complex computational problems
8. Introducing parallel algorithms

Course Outcomes Upon

Completion of this course, students will be able to:

6. Understand and demonstrate algorithm design methods with analysis
7. Devise algorithm for given problem statement and analyze its space and time complexity by using recurrence relation
8. Categorize the problem to determine polynomial and non-polynomial based on its nature
9. Understand and demonstrate basic concepts of parallel algorithms

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Unit 1 : Divide and Conquer** What is algorithm, Algorithm Specification, Recurrence relations, Performance Analysis, Randomized Algorithms. **Divide and Conquer :** The general method, Binary search, Finding the maximum and minimum, Merge sort, Quick sort, DC Selection Algorithm, analysis of Divide and Conquer algorithms.	10
2.	**Unit 2 : The Greedy Method** The general method, Knapsack problem, Job sequencing with deadlines, minimum-cost spanning trees – Prim's and Kruskal's Algorithms, Optimal storage on tapes, Optimal merge patterns, Single source shortest paths.	7
3.	**Unit 3 : Dynamic Programming** The general method, Multistage graphs, All pair shortest paths, 0/1 knapsack, Reliability design, Traveling Sales person problem.	7
4.	**Unit 4 : Basic Traversal and Search Techniques and Backtracking**	13
	Techniques for Binary Trees, Game Tree; Techniques for Graphs – Breadth First Search & Traversal, Depth First Search & Traversal, AND/OR graphs; Connected components and Spanning Trees; Bi-connected components and depth first search. Backtracking - The general method, 8-queen problem, sum of subsets, Knapsack Problem, Hamiltonian Cycle, and Graph Coloring.	
5.	**Unit 5 : NP Hard and NP Complete Problems** Basic Concepts, Introduction to NP Hard Graph Problems.	4
6.	**Unit 6 : Introduction to Parallel Algorithm** Computational Model and Fundamental Techniques and Algorithms – PRAM, MESH and HYPERCUBE.	7

Term Work

It should consist of minimum 10-12 assignments based on following guidelines

- A batch of students will be assigned different algorithms and expected to analyze the algorithms in terms of time and space complexity
- Solve different exercise problems in text book mentioned in syllabus
- Student need to perform at least 6 programs from the syllabus. Perform Priori Analysis and Posteriori Measurement on the same.
- Study of Profiling tools.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Fundamentals of Computer Algorithms	Ellis Horowitz, Satraj Sahani, Saguthevar Rajasejaran	Universities Press, Second Edition	**All Units**

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Fundamentals of Algorithmics	Gilles Brassard, Paul Bratley	Pearson Education
2	Mastering Algorithms with C	Kyle Loudon	SPD O'Reilly
3	Computer Algorithms- Introduction to Design and Analysis	Sara Baase, Allen Van Gelder	Pearson Education

Open Elective - I (OEC-CS505)Computer

Graphics and Multimedia (OEC-CS505)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :	**Term work:**
Practical:	**Practical :**

Course Objectives

5. To provide knowledge to the students about basics of computer graphics and different display devices.
6. To expose students to the various 2D & 3D transformation & projection techniques.
7. To provide knowledge to the students about basics of Illumination models, surface rendering methods.
8. To make the students aware of multimedia system &Multimedia Authoring, Compression techniques.

Course Outcomes

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

5. Express basic ideas of computer graphics and different display devices.
6. Understand & apply various transformation, projection and rendering techniques on graphical objects.

7. Identify & apply the intensity of light on graphical objects using different illumination models.
8. Understand multimedia system & use of Multimedia Authoring & Compression techniques on graphical objects.

Unit No.	Unit Name and Contents	No. of Lectures
1	**Basic of Computer Graphics** Basic of Computer Graphics, Applications of computer graphics, Display devices: Random and Raster scan systems, Input devices, Scan Conversion techniques: RLE, Frame Buffer, Graphics software and standards.	5
2	**Transformations –** Basic 2D & 3D transformations - Translation, Scaling, Rotation, Reflection, Shearing, Multiple Transformations, Rotation about an axis parallel to a coordinate axis, Rotation about an arbitrary axis in space, Affine and Perspective Geometry, Orthographic projections and Axonometric projections.	8
3	**Illumination models and surface rendering methods** Light sources, Basic illumination models, Displaying light intensities, Polygon Rendering methods, Ray tracing methods, Radiosity lighting.	5
4	**Introduction to Multimedia** Multimedia: Historical perspective, multimedia data and multimedia systems, a multimedia system today, Analog and Digital Signals, Analog-to- Digital Conversion, Media Representation and Media Formats - Digital Images, Digital Video, Digital Audio.	6
5	**Multimedia Authoring & Compression** Examples of Multimedia, Requirements for Multimedia Authoring Tools, Intra media Processing, Intermedia Processing, Media Compression - The Need for Graphics Compression, Graphics compression in relation to other media compression, Mesh compression using connectivity encoding.	7
6	**Computer Animation** Introduction: Types, Key frame animation, Procedural animation, Construction of an animation sequence, Motion control methods, VFX, SFX, Introduction to Morphing, Wrapping techniques, Defining virtual & Augmented reality.	5

Text Books:

7. Procedural elements for Computer Graphics - David F. Rogers (MGH International) (For Units 1)
8. Mathematical elements for Computer Graphics - David F. Rogers, J. Alan Adams (MGHInt.) (Unit 2)
9. Computer Graphics C Version second edition –Donald D. Hearn, M. Pauline Baker(Pearson) (Unit 3)
10. Multimedia systems: Algorithms, Standards & Industry Practice-Parag Havaldar&Gerard Medioni, Cengage Learning (Unit 4, 5)
11. Computer Graphics- Rajesh Maurya (WILEY India) (Unit 6)

12. Virtual & Augmented reality - Paul Mealy (Kindle Edition) (Unit 6)

Some assignments on following topics can be given and its evaluation should be considered for CIE

7. Introduction to computer graphics, OPEN GL, GLUT, GLU
8. Design 2D & 3D objects by using graphics primitives
9. Apply the different transformation techniques on 2D & 3D graphical objects
10. Create graphics design using any software(Picasa, Autodesk Maya, SketchUp, Solidworks)
11. Perform rendering using Blender or LuxCoreRender Software
12. Create 2D & 3D animated object using Synfig or Blender Software.

Internet of Things(OEC-CS505)

TEACHING SCHEME	**EXAMINATION SCHEME**
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :	**Term work:**
Practical:	**Practical :**

Pre-requisites: Fundamentals of Computer Network and Internet, basics of C / C++ programming language.

Course Objectives

5. To learn Internet of Things Technology.
6. To know the basics of RFID, Sensor technologies.
7. To know the basics of IoT systems like Raspberi Pi, Arduino, Banana Pi.
8. To aware students about wireless communication technologies and IoT applications.

Course Outcome

5. Students will understand basic concepts of IoT
6. students will be able to learn and implement RFID technology in various applications.
7. Students will be able to write programs for basic applications
8. Student will understand and implement different communication technologies in IoT systems.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	Introduction: IoT, Objects / Things, IoT definitions, IoT frame work, Identification technologies, Internet in IoTs.	4
2.	Fundamental of IoT mechanisms: Identification of IoT objects and services, Traffic characteristics, scalability and inter-operability, security and privacy, Communication capabilities, Mobility support and device power, Sensor technology, RFID technology and satellite technology.	6

3.	Radio Frequency Identification Technology, IoT objects and services, principles of RFID, Components of an RFID system, RFID reader, Tags, middleware, Sensor nodes, connecting nodes, networking nodes.	6
4.	IoT systems: Hardware and Software: Introduction to Raspberi Pi, Familiar with Raspberi Pi hardware, study of I/O ports, Programming with Raspberi Pi: Study of operating system, simple programs in C / C++, Introduction with Python programming.	8
5.	Communication Technologies: WPAN Technologies: Introduction to IEEE 802.15.4 standard, Bluetooth, Zigbee, IEEE 802.15.6; WBANS, NFC, IEEE 802.11 WLAN, Cellular and mobile technologies.	6
6.	IoT Application Examples: Smart Metering, advanced metering infrastructure, e-health / Body Area Network, City Automation (Smart City), Automotive Application, Environmental Applications, Home Automation, Control Applications.	6

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	The Internet of Things - Connecting objects to the web	Hakima Chaouchi	Wiley Publications
2	Building the Internet of Things	Daniel Minoli	Wiley Publications
3	Raspberi Pi Beginner's Guide	Gareth Halfacree	Raspberi Press
4	Introduction to Wireless Telecommunications systems and Networks	Gary J. Mulett.	Cengage Learning (India Edition).

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Raspberi Pi for Dummies	Sean McManus, Mike Cook	A Wiley Brand
2	Architecting the Internet of Things	Bernd Scholz, Reiter	Springer

6. Java Programming (PCC-CS506)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :----** CIE : ---
Tutorial : ---	**Term work:** 50 Marks
Practical: 4 Hrs./Week	**Oral :** 50 Marks

Pre-requisites : C++ and html

Course Objectives

7. To Introduce the concept of object-oriented programming using java.
8. To learn how to implement reliable and secure application using exception handling and package concept.
9. Have the ability to write program to perform file operations.
10. To understand how to design components with java Swing API and present mechanism of multithreading.
11. To familiarize database connectivity through JDBC and learn the collection framework.
12. To explore the concept of networking and web programming using java servlet and jsp.

Course Outcomes

7. Students will be able to articulate the principle of object-oriented problem solving & programming**.**
8. Students will be able to illustrate code reusability, security and abstraction using inheritance, package and interface.
9. Students will be able to develop reliable and user-friendly applications using exception handling and file handling.
10. Students will be able to create desktop apps using SWING and event handling and also illustrate multithreading concepts.
11. Students will be able to use JDBC & collection framework.
12. Students will be able to apply network programming concept & develop web applications using servlet and jsp.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Fundamental Programming in Java:** The Java Buzzwords, The Java **Programming Environment**- JVM, JIT Compiler, Byte Code Concept, HotSpot, A Simple Java Program, Source File Declaration Rules, Comments, Data Types, Variables, Operators, Strings, Input and Output, Control Flow, Big Numbers, Arrays-Jagged Array. **Objects and Classes:** Object-Oriented Programming Concepts, Declaring Classes, Declaring Member Variables, Defining Methods, Constructor, Passing Information to a Method or a Constructor, Creating and using objects, Controlling Access to Class Members, Static Fields and Methods, this keyword, Object Cloning, Class Design Hints,	**5**
2.	**Inheritance, Interface and Packaging**: **Inheritance:** Definition, Super classes, and Subclasses, Overridingand Hiding Methods, Polymorphism, Inheritance Hierarchies, Super keyword, Final Classes and Methods, Abstract Classes and Methods, casting, Design Hints for Inheritance, Nested classes & Inner Classes, finalization and garbage collection. **Interfaces:** Defining an Interface, Implementing an Interface, Using an Interface as a Type, Evolving Interfaces, and Default Methods. **Packages:** Class importing, Creating a Package, Naming a Package, Using Package Members, Managing Source and Class Files. Developing and deploying (executable) Jar File.	**7**
3.	**Exception and I/O Streams:** **Exception:** Definition, Dealing with Errors, The Classification of Exceptions, Declaring Checked Exceptions, Throw an Exception, Creating Exception Classes, Catching Exceptions, Catching Multiple Exceptions, Re-throwing and Chaining Exceptions, finally clause, Advantages of Exceptions, Tips for Using Exceptions. **I/O Streams:** Byte Stream – Input Stream, Output Stream, Data Input Stream, Data Output Stream, File Input Stream, File Output Stream, Character Streams, Buffered Stream, Scanner, File, Random Acces File.	**4**
4.	**Graphical User Interfaces using Swing and Multithreading** Introduction to the Swing, Swing features, Swing Top Level Containers-Creating a Frame, Positioning a Frame, Displaying Information in a Panel, The Model-View-Controller Design Pattern, The J Component Class. **Layout Management:** Introduction to Layout Management, APIs for Border Layout, Flow Layout, Grid Layout	**6**

	Event Handling: Basics of Event Handling, The AWT Event Hierarchy, Semantic and Low- Level Events in the AWT, Low-Level Event Types **User Interface Components:** Text Input, Choice Components, Menus, Dialog Boxes Setting the Look and Feel of UI, Introduction to JApplet **Multithreading:** Processes and Threads, Runnable Interface and Thread Class , Thread Objects, Defining and Starting a Thread, Pausing Execution with Sleep, Interrupts, Thread States, Thread Properties, Joins, Synchronization	
5.	**Collection and Database Programming** Collections: Collection Interfaces, Concrete Collections- List, Queue, Set, Map, the Collections Framework **Database Programming**: The Design of JDBC, The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Metadata, Row Sets, Transactions	**7**
6.	**Networking and Web:** **Networking**: Overview of Networking, Networking Basics, Working with URLs, Creating a URL, Parsing a URL, Reading Directly from a URL, Connecting to a URL, Reading from and Writing to a URL Connection, Sockets, Reading from and Writing to a Socket, Writing the Server Side of a Socket, Datagrams, Writing a Datagram Client and Server. **Servlet and JSP:** Introduction to Servlet, The servlet Lifecycle, Retrieving Information and Sending Information, Database Connectivity using servlet, Introduction toJSP, Writing Scriplets, The jsp Lifecycle, Retrieving Information and Sending Information, Database Connectivity using jsp	**7**

Term Work

1. 25 marks for performance in practical and experiments as part of continuous evaluation
2. 25 marks for Two Practical Tests and oral (Each of 25 Marks) to be conducted during the semester.

Practical

- Minimum 15 experiments should be conducted based on above topics and covering following list. At least two experiments should be conducted on each unit in the syllabus.

19. Create a class called Employee that includes three pieces of information as instance variables- first name, a last name and a monthly salary. Your class should have a constructor that initializes the three instance variables. Provide a set and a get method for each instance variable. If the monthly salary is not positive, set it to 0.0. Write a test application named Employee Test that demonstrates class

Employee's capabilities. Create two Employee objects and display each object's yearly salary. Then give each Employee a 10% raise and display each Employee's yearly salary again.

20. Create class Savings Account. Use a static variable annual Interest Rate to store the annual interest rate for all account holders. Each object of the class contains a private instance variable savings Balance indicating the amount the saver currently has on deposit. Provide method calculate Monthly Interest to calculate the monthly interest by multiplying the savings Balance by annual Interest Rate divided by 12this interest should be added to savings Balance. Provide a static method modify Interest Rate that setsthe annual Interest Rate to a new value

    Write a program to test class Savings Account. Instantiate two savings Account objects, saver1 and saver2, with balances of Rs 2000.00 and Rs 3000.00, respectively. Set annual Interest Rate to 4%, then calculate the monthly interest and print the new balances for both savers. Then set the annual Interest Rate to 5%, calculate the next month's interest and print the new balances for both savers.

21. Create Vehicle Interface with name, max Passanger, and maxSpeed variables. Create Land Vehicle and Sea Vehicle Inteface from Vehicle interface. L and Vehicle has num Wheels variable and drive method. Sea Vehicle has displacement variable and launch method. Create Car class from Land Vehicle, Hover Craft from Land Vehicle and Sea Vehicle interface. Also create Ship from SeaVehicle. Provide additional methods in Hover Craft as enterLand and enterSea. Similarly provide other methods for class Car and Ship. Demonstrate all classes in a application.
22. Create abstract class Shape which has instance variables side, area and perimeter

    And methods calculate Area(), calculate Perimeter() as abstract methods and display() as concrete method. Write subclasses which extend Shape class like Triangle, Rectangle, Circle , Cube and Squere and override abstract methods and display methods in subclass take instance variable if needed as per the formula. And use parameterized constructor to initialize instance variables using “this” reference variable

    Write Test class and Create a reference variable of Shape which will hold the objects of all the sub classes and calculate respective area, perimeter and display the results.

23. Create the interface stack which has variable size, abstract methods push(), pop(), display(), overflow() and underflow(). We need to implement 3 subclasses Integer Stack, String Stack and Double Stack respectively by implementing interface. All the methods in interface are declared for string. And in subclass for integer Stack convert string to integer. Same thing to all other. Create one test class and check for the working of all the classes.
24. Develop a mathematical package for Statistical operations like Mean, Median, Average, Standard deviation. Create a sub package in the math package -convert. In “convert” package provide classes

to convert decimal to octal, binary, hex and vice-versa. Develop application program to use this package, and build executable jar file of it.

25. Develop application which can handle any 5 combination of predefined compile time and runtime exceptions using multiple catch blocks. Use throws and finally keywords as well.
26. Develop a BankAccount class which should contain all methods of Bank i.ebalanceEnquery(), withdraw(), transfer() and deposit(). You should create at least two objects of BankAccount using array and do all operations mentioned above. Also generate user defined exception LowBalance Exception, Negetive Number Exception and Password Mismatch Exception whenever required. To transfer amount from one account to another use two Bank Account objects.
27. Take file name as input to your program through command line, If file is existing the open and display contents of the file. After displaying contents of file ask user – 1.do you want to add the data at the end of file or 2.replace specified text in file by other text. Based on user's response, then accept data from user and append it to file. If file in not existing then create a fresh new file and store user data into it. Also. User should type exit on new line to stop the program. Do this program using Character stream classes.
28. Take Student information such as name, age, weight, height, city, phone from user and store it in the file using Data Output Stream and File Output Stream and Retrive data using Data Input Stream and File Input Stream and display the result. Use Serialization concept and Byte stream classes.
29. Develop a Swing GUI based standard calculator program. Use event handling, Layout of swing package.
30. Create Stop Watch with Swing GUI and Multithreading. Provide Facility for Lap Counting.
31. Write a program to read a text file one line at a time. Read each line as a String and place that String object into a LinkedList. Print all of the lines in the LinkedList in reverse order.
32. Fill a HashMap with key-value pairs. Print the results to show ordering by hash code. Extract the pairs, sort by key, and place the result into a Linked HashMap. Show that the insertion order is maintained.
33. Write a GUI based program to create a student registration and Login. Store Registration data in Database and take Login information from Database.
34. Create GUI Based chat application using TCP or UDP.
35. Design a student registration form which contains all the registration details and after registration display success page which should display all the entered details. And also design login form , home page and logout form using servlet.
36. Write a program to store the above form information in database. And while login check with database. Display all student names in home page. Give one search field and button to search for particular student record and display all his information as search result using servlet and jsp using MVC.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Core Java- Volume I Fundamentals	Cay Horstmann and Gary Cornell	Pearson, Eight edition	Unit 1 to Unit 4
2	Core Java- Volume II Advanced Features	Cay Horstmann and Gary Cornell	Pearson, Eight edition	Unit 5 and Unit 6
3	Java Servlet Programming	Jason Hunter	O'Reilly Publication, 2nd Edition	Unit 6
4	Core-Servlet and JavaServer Pages Volume – 1	Marty Hall, Larry Brown	Pearson Education	Unit 6

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	JAVA-The Complete Reference	Herbert Schildt	Mcgraw Hill, Oracle Press	Ninth edition
2	Head First Java	Eric Freeman Elisabeth Robson Bert Bates Kathy Sierra	O'Reilly Publication	3rd edition
3	Head First Servlets and JSP	Bryan Basham, Kathy Sierra, Bert Bates	O'Reilly Publication	2nd Edition

7. Business English (HM-CS507)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : ---	**Theory : --** CIE : : --
Tutorial : 2 Hrs./Week	**Term work:** 25 Marks
Practical: ---	**Oral : 25** Marks

Pre-requisites:

1) Knowledge of functional grammar and vocabulary in English
2) Knowledge of the importance of business English in their career path
3) Knowledge of linguistic competence and understand intricacies involved in technical communication

Course Objectives

6. Develop basic skills to deal with people in business situations
7. Increase their knowledge of key business concepts worldwide
8. Write and read basic business reports, letters, e-mails etc
9. Expand vocabulary related to general business situations
10. Develop confidence to deal with people and basic issues in the business world

Course Outcomes

6. Learn to communicate with others in practical, business oriented situations
7. Learn to express themselves in English with greater fluency, accuracy and confidence
8. Learn to handle themselves in English in a variety of business contexts, from negotiating, to using the telephone, to making presentations, to socialising
9. Enhance the skills of listening, speaking, pronunciation skills, as well as business vocabulary
10. Acquire the communicative competencies crucial for appropriate workplace behavior

UNIT NO.	UNIT NAME & DETAILS
1.	**Getting acquainted with professional culture** • First day at work • Induction program • Company hierarchy • Behavior pruning
2.	**Vocabulary building and Reading comprehension** • Reading techniques and comprehension skills • Synonyms and antonyms • One-word substitution • Prefixes and Suffixes • Idioms and phrases

	• Homonyms and homographs • Irregular verbs like (write, wrote, written) • Situational vocabulary
3.	**Effective vocal Communication** • Effective Meetings • Video Conferencing • Effective Telephonic Communication • Breaking Bad news
4.	**Effective written Communication** • Business letters • Resume Writing • E-mail writing • Report writing • Minutes of meeting • Memo writing
5.	**Public speaking and Presentation Skills** • Preparing and conducting presentation • Body language • Overcoming stage fear • Best practices • Interviewing and being interviewed
6.	**Miscellaneous** • Group Discussion • Handling Complains • Negotiation Skills • Business Etiquettes

Term Work

- Individual Performance or Presentation to be Evaluated Continuously
- Group Activity Performance to be Evaluated in the Batch
- Assignments or Write up (Minimum 10)

Assignment List

11. Case study of organizational hierarchy
12. Match the following on antonyms & synonyms
13. Irregular verb list (like choose, chose, chosen)
14. Word building by using prefixes suffixes (eg. ir-regular, im-possible)
15. Minutes of Meeting – writing
16. Report writing (any report)
17. Comprehension/paragraph writing

18. Business letter / resume writing / email writing
19. PPT presentation on any non-technical topic. PPT handout should be attached
20. Do's & Dont's of group discussion & Business etiquettes

Textbooks / Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1.	Technical Communication	Ashraf Rizvi	Tata McGraw Hill, 2005	1, 2, 3, 4, 6
2	English for Technical Communication	K. R. Laxminarayan	SCITECH 2nd Edition 2014	2, 4, 3
4.	Technical English	Dr. M. Hemamalini	Wiley, 2014	2, 3, 4, 5

T. Y. B. Tech (Computer Science and Engineering) Sem – VI

1. Compiler Construction (PCC-CS601)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :	**Term work:** 25 Marks
Practical: 2 Hrs./Week	**Oral :** --

Pre-requisites: C- programming , System Programming, Data structures

Course Objectives

4. To introduce the fundamentals of compilers and their phases.
5. To design and implement phases of a compiler.
6. To expose the students to various tools like LEX and YACC.

Course Outcomes

7. Recall the compiler phases and compiler construction tools like LEX and YACC.
8. To design and implement Lexical Analyser for a simple language.
9. To design and implement Syntax analyser for a simple expression.
10. To apply Syntax directed translations and Syntax Directed definitions to generate intermediate code.
11. To identify appropriate code optimizing transformation for the given code.
12. To **e**xplain concept of code generation.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**UNIT I: Introduction** Compilers, Phases of a compiler, Compiler construction tools, cousins of the compiler.	**5**
2.	**UNIT 2- Lexical Analysis:** Role of a Lexical analyzer, input buffering, specification and recognition of tokens, finite automata implications, designing a lexical analyzer generator.	**6**
3.	**UNIT 3- Syntax Analysis**: Role of Parser, Writing grammars for context free environments, Top-down parsing, Recursive descent and predictive parsers (LL), Bottom-Up parsing, Operator precedence parsing, LR, SLR and LALR parsers	**7**

4.	**UNIT 4- Syntax Directed Translation and Intermediate Code Generation**: Syntax directed definitions, construction of syntax tree, S-attributed definitions, L-attributed definitions, Intermediate languages, assignment statements, back patching.	**7**
5.	**UNIT 5- Code Optimization**: Principle sources of optimization, optimization of Basic Blocks, loops in flow graphs, Peephole optimization	**5**
6.	**UNIT 6- Code Generation**: Issues in design of a code generator and target machine, Run time storage management, Basic blocks and flow graphs, Next use information and simple code generator, Issues of register allocation, code generation from Dags.	**6**

Term Work

Minimum of 10 to 12 experiments should be carried out based on the following experiments based on following list.

Practical List

Minimum of 10 to 12 experiments should be carried out based on the following experiments.

10. Design of preprocessor for C program.
11. Design a complete lexical analyzer for C language.
12. Program to create a symbol table generator.
13. Design a syntax analyzer for simple expression in c language using top down parsing.
14. Program to create a syntax tree for simple expression in c language using recursive descent parsing.
15. To implement intermediate code generator for Boolean expression in three address code format.
16. Implement intermediate code generator for the conditional statements in three address code format.
17. Implement any one bottom up parsing [LR, SLR, LALR, Operator precedence] technique.
18. To implement a program for code generator from labeled tree.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1.	Compilers - Principles, Techniques and Tools	A.V. Aho, R. Shethi and J.D. Ullman	Pearson Education	ALL Units

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1.	Compiler construction	D.M. Dhamdare	Mc-Millan	-

2.	LEX & YACC	Dong Brown, John Levine, Tony Mason	O'Reilly 2nd Edition	Refer for Practical's

2. Operating System -II(PCC-CS602)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 4 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : ---	**Term work:** 25 marks
Practical: 2 Hrs./Week	**Practical : ---**

Pre-requisites: Data Structures , Concepts of Process, deadlock and System calls.

Course Objectives

8. Fundamental architecture of UNIX operating system kernel.
9. Detail algorithms of buffer cache management.
10. Internal File system organizations and related algorithms in UNIX.
11. System calls for UNIX file system.
12. Process structure, creation and management in UNIX.
13. Architecture and algorithms of process scheduling and memory management.
14. I/O subsystem architecture and algorithms.

Course Outcomes

Upon Completion of this course, students will be able to:

7. To understand UNIX kernel, its architectural components like file subsystem, process control subsystem, memory management.
8. To understand a concrete way (UNIX i-nodes) of organizing a file system on a physical storage medium.
9. To maintain UNIX directories, files, manage processes, manipulate data with proper use of pipes and file redirection, UNIX filters.
10. To implement and handle various UNIX system calls.
11. To explain the principles of paging, virtual memory (VM) and describe the data structures and components (both hardware and software) that are necessary to implement it.
12. To perform shell programming involving decision control, looping and control flow statements on UNIX based machines.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction and buffer cache:** **General Overview of the System** - History, System Structure, User Perspective, Operating System Services, Assumptions About Hardware, Architecture of the UNIX OS, Introduction to System Concepts, Kernel Data Structure, System Administration. **Buffer Cache: -** Buffer Headers, Structure of the Buffer	**10**

	Pool, Scenarios for Retrieval of a Buffer, Reading and Writing Disk Blocks, Advantages and Disadvantages of Buffer Cache.	
2.	**Internal Representation of Files:** I-nodes, Structure of the Regular File, Directories, Conversion of a Pathname to I-node, Super Block, I-node Assignment to a New File, Allocation of Disk Blocks, Other File Types.	**8**
3.	**System Calls for File System:** Open, Read, Write, File and Record Locking, Adjusting the Position of FILE I/O-LSEEK, Close, File Creation, Creation of Special Files, Change Directory and Change Root, Change Owner and Change Mode, Stat and FStat, Pipes, Dup, Mounting and Un-mounting File Systems, Link, Unlink, File System Abstractions, File System Maintenance.	**6**
4.	**The Structure of Processes:** Process States and Transitions, Layout of System Memory, The Context of a Process, Saving Context of a Process, Manipulation of the Process Address Space**.**	**8**
5.	**Process Control and Scheduling:** Process Control: - Process Creation, Signals, Process Termination, Awaiting Process Termination, Invoking Other Programs, The User ID of a Process, The Shell, System Boot and the Init Process. Process Scheduling: - Process Scheduling, System Calls for Time, Clock.	**8**
6.	**Memory management and I/O Subsystem:** Swapping, Demand Paging, A Hybrid System with Demand Paging and Swapping. Driver Interfaces, Disk Drivers, Terminal Drivers, Streams.	**8**

Term Work

- It should consist of minimum 10-12 experiments based on the above topics and covering the following list of assignments. (Reference book – Linux System Programming by Robert Love may be referred for the assignments listed below.)

16. Demonstration of how the Linux Kernel implements and Manages files.
17. Implement User Buffer I/O using ‘C’ program.
18. Study & Implement file management using low level file access system calls.
19. Implementation of various operations on Files (Create, Open, Read, Write, Append, Fstat, Dup etc.,)
20. Implementation of various system call (OPEN, READ, WRITE) by reader & writer process.
21. Study & Implementation of pipe() system call.
22. Demonstration of Unix Process Management – from process creation to process termination.
23. Study & Implementation of signal() system call.
24. Study and demonstration of different Memory Management Techniques.

25. Study and Implement Time, Sleep and Clock Management.
26. Client - Server communication using IPC mechanism: Unnamed pipe, Named pipe.
27. Implementation of Shell Scripts.
28. Implementation of system call for UNIX/Linux.
29. Study of boot loader like "Grub"
30. Study of compilation of Linux kernel.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	The design of Unix Operating System	Maurice J. Bach	PHI	**All Units**

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	Linux System Programming	Robert Love	SPD, O' REILLY
2	Unix concepts and administration	Sumitabha Das	Tata McGrow Hill, 3rd Edition

3. Database Engineering (PCC-CS603)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 4 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : - -	**Term work:** 25 marks
Practical: 2 Hrs./Week	**Practical : 50 Marks**

Pre-requisites: Set Theory, Operating System, Data Structures

Course Objectives

4. To understand fundamental concepts and algorithms of Database Systems.
5. To gain familiarity with SQL and DBMS.
6. To learn database design techniques.

Course Outcomes

7. Understand fundamentals of database management systems.
8. Represent logical design of database using E-R Diagram.

9. Analyze & construct good database design.
10. Apply SQL queries to design & manage the database.
11. Understand transactions, concurrency control and apply to database system.
12. Understand failures in database and appropriate recovery techniques.

UNIT NO.	UNIT Name and Contents	NO. OF LECTURES
1.	**INTRODUCTION TO DATABASES [Text Book 1]** Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Database Users & Administrators, Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.	**8**
2.	**E-R MODEL AND DATABASE DESIGN** **[E-R Model: Text Book 1] [Normalization: Text Book 2]** E-R Model: The Entity-Relationship Model, Mapping Constraints, Keys, Entity-Relationship Diagrams, Reduction to Relational Schemas, Extended ER features-Specialization, Generalization, Aggregation.	**10**
	Normalization: Data Redundancies & Update Anomalies, Functional Dependencies. Canonical Cover, The Process of Normalization, First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Fourth Normal Form, Fifth Normal Form.	
3.	**STRUCTURED QUERY LANGUAGE (SQL) [Text Book 1]** Overview of the SQL Query Language,SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Aggregate Functions, Nested sub Queries, Modification of Databases, Join expression, Views.	**8**
4.	**DATA STORAGE & INDEXING [Text Book 1]** Physical storage media, File Organization,Organization of records in File, Data Dictionary Storage, Database Buffer, Basic Concepts indexing & hashing, Ordered Indices, B+ Tree Index files, Multiple-Key Access, Static Hashing, Dynamic Hashing.	**8**
5.	**TRANSACTION MANAGEMENT [Text Book 1]** Transaction Concept, A Simple Transaction Model, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols.	**9**
6.	**RECOVERY SYSTEM [Text Book 1]** Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Failure with Loss of Nonvolatile Storage, Remote Backup Systems.	**5**

Term Work

Minimum 12 -14 Experiments based on the following topics.

1. Draw an E-R Diagram of any organization.
2. Reduce above mentioned E-R Diagram into tables.
3. Normalize any database from first normal form to Boyce-Codd Normal Form (BCNF).
4. Write a program of Database connectivity with any object oriented language.
5. Use DDL Queries to create, alter (add, modify, rename, drop) & drop Tables.
6. Use DML Queries to insert, delete, update & display records of the tables.
7. Create table with integrity constraints like primary key, check, not null and unique.
8. Create table with referential integrity constraints with foreign key, on delete cascade and on delete set null.
9. Display the results of set operations like union, intersections & set difference.
10. Display the results of Join Operations like cross join, self join, inner join, natural join, left outer join, right outer join and full outer join.
11. Display the records using Aggregate functions like min, max, avg, sum & count. Also use group by, having clauses.
12. Display the results using String operations.
13. Create & Update views for any created table.
14. Write java program to implement dense and sparse indexing
15. Write java program to implement B+ tree indexing.
16. Write java program to implement static hashing.
17. Study of NoSql

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Database System Concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	6th Edition, Mc Graw Hill Education.	**5**
2	Database Systems - A practical approach to Design, Implementation and Management	Thomos Connolly, Carolyn Begg	3rd Edition, Pearson Education	**1**

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Database Systems – Design, Implementation and Management	Rob & Coronel	5th Edition Thomson Course Technology	**3**
2	Fundamentals of Database Systems	Ramez Elmasri, Shamkant B. Navathe	4th Edition, Pearson Education	**2**

4. Machine Learning (PCC-CS604)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :1 Hrs./Week	**Term work:** 25 marks
Practical:	**Practical :** ---

Pre-requisites

Linear Algebra, Statistics, Probability Theory.

Course Objectives

4. To understand Machine Learning Aspects.
5. To understand primitives in learning process by Computer.
6. To understand nature of problems solved with Machine Learning.

Course Outcomes On

completion of the course, student will be able to

5. Explain Machine Learning concepts.
6. Analyze the Machine Learning model.
7. Design solution using Machine Learning techniques.
8. To tackle real world problems in domain of data mining, information retrieval, computervision, linguistics and bioinformatics, etc.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES

1.	**Introduction to Machine Learning:** Introduction to Probability and Statistics, **Machine Learning:** Definition, Terminology, Types of learning, Machine Learning Problem categories, Machine learning architecture, process, Lifecycle, Performance measures, tools and framework, data visualization.	**06 Hrs**
2.	**Regression:** **Simple regression** – hypothesis, cost function, parameter learning with gradient descent, learning rate, Gradient Descent for linear regression, examples, simple regression in matrix form. **Multivariate Linear Regression** – Multiple features, hypothesis functions, Gradient Descent for multiple variables, Feature	**06 Hrs**
	scaling, polynomial regression	
3.	**Classification- logistic regression & Naïve Bayes :** **Logistic Regression** – Definition, Hypothesis representation, decision boundary, cost function, Gradient Descent for Logistic Regression. Multiclass Classification, **Regularization** - Overfitting &Under fitting, cost function, Regularized Linear Regression, Regularized Logistic Regression, Conditional probability and Naïve Bayes Classifier. Instance-based classifier – K- Nearest Neighbor Classifier, Bayesian Network, Hidden Markov Model.	**07Hrs**
4.	**Classification- Decision trees and Support Vector Machine:** **Decision trees:** definition, terminology, the need, advantages, and limitations. Constructing and understanding Decision trees, common problems with Decision trees, Decision tree algorithms, random forest, examples. **Support Vector Machine:** What is SVM, Kernel Trick, Cost Function, Decision Trees vs Support Vector Machine.	**06 Hrs**
5.	**Unsupervised learning :** Clustering, K Means clustering, Hierarchical clustering, Association Rule mining.	**04Hrs**
6.	**Neural Network & Recommendation System:** **Neural Networks-** Neuron representation and model, Hypothesis for neuron, cost function, solution of a problem using single neuron. Gradient descent for a neuron. Neural network, Multiclass classification with neural network. Learning in neural network-back propagation algorithm **Recommendation System:** Popularity based recommender engines, Content based recommendation engines, Classification based recommendation engine, Collaborative filtering.	**07Hrs**

Term Work

- It should consist of minimum 10-12 assignments based on the above topics.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Machine Learning	Tom M. Mitchell	McGraw Hill Education; First Edition	**1,2,3,4,5**
2	Practical Machine Learning	Sunila Gollapudi	Packt Publishing Ltd	**1,2**
3	Machine Learning with Python- an approach to applied ML	Abhishek Vijayvargia	BPB Publications	**All Units**

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Machine Learning for dummies	John Paul Muller	Willey Publication	
2	Introduction to Machine Learning	Ethem Alpaydin	PHI 2nd Edition-2013	**1,2**
3	http://neuralnetworksanddeeplearning.com/			**6**

Open Elective -II (OEC-CS605)

E- Commerce & Digital Marketing (OEC-CS605)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial :	**Term work:**
Practical:	**Practical :**

Course Objectives:

5. To get the knowledge about business advantages of the e-commerce and digital marketing andits importance

6. To develop a digital marketing plan and to make SWOT analysis

7. To get introduced with various digital channels,business tools in social networking

8. To understand the optimization of a Web site and SEO optimization

Course Outcomes :

5. Students will be able to identify the importance of the e-commerce and digital marketing forbusiness success

6. Students will be able to create a digital marketing plan, starting from the SWOT analysis and defining a target group

7. Students will be able to identifying digital channels, business tools used in social networking

8. Students will be able to demonstrate the optimization of web site using business tools.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Introduction to E-commerce, frameworks & architectures** **Introduction:** The term "E-Commerce", Business models related to E-Commerce, Technical and economic challenges **Frameworks and architectures:** Actors and stakeholders, Fundamental sales process, Technological elements	**(4)**

2.	**B2C business, B2B business** **B2C Business:** The process model and its variants, The pricing challenge, The fulfillment challenge, The payment challenge, B2C-business and CRM, B2C software systems **B2B business:** The process model and its variants, B2B software systems	**(5)**

3.	**Introduction to Digital Marketing** How digital technologies transformed marketing?, Definitions-digital marketing and multichannel marketing- Paid, owned and earned media, the growing range of digital marketing platform, digital marketing strategy-key features of digital marketing strategy, applications of digital marketing, benefits of digital marketing, alternative digital business models, difference between e-commerce and e-business, challenges in developing and managing digital marketing strategy	**(6)**
4.	**Online marketplace analysis & macro environment** **Introduction:** situation analysis for digital marketing, the digital marketing environment, understanding customer journeys, online consumer behavior and implications for marketing, business models for e-commerce **Online macro environment**: Technological forces, economic forces, political forces, Legal forces, social forces and culturalforces	**(8)**
5.	**Digital Marketing Strategy and relationship marketing** **Digital Marketing strategy development**: how to structure digital marketing strategy, strategy implementation **Relationship marketing using digital platforms**: Introduction, the challenge of customer engagement, customer lifecycle management	**(6)**
6.	**Marketing Communications** Marketing Communications using digital media channels: Introduction, search engine marketing, online public relations, e-mail marketing and mobile text messaging, social media and viral marketing, offline promotion techniques. **Case study:** How the ministry of food processing took to social media or world food India 2017.	**(7)**

Text Books:

1. Introduction to E-commerce: Combining Business & Information Technology 1st Edition, (2016) MartinKutz. & bookboon.com
2. Digital Marketing: Strategy, Implementation and Practice, 6th Edition by Dave Chaffey, Fiona Ellis-Chadwik, Pearson Education.

Reference Books:

3. The Beginner's Guide to Digital Marketing (2015). Digital Marketer.
   Pulizzi,J.(2014) Epic Content Marketing, Mcgraw Hill Education.
4. "Electronic Commerce" , Jeffrey F Rayport and Bharat Bhasker, Tata McGraw Hill.

It should consist of assignments on following topics within group of 4-5 students & its evaluation will be considered for CIE

6. Define a target group (working in groups)

7. Creating web sites, MS Expression (working in groups)

8. Writing the SEO content (working in groups)

9. Google AdWords (working in groups)

10. CRM strategy (working in groups)

T.Y. B.Tech(Computer Science and Engineering)Sem–VI

1. Cyber Security (OEC-CS606)

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 3 Hrs/Week	Term work: -
Tutorial: --	Theory: ESE 70 Marks CIE 30 Marks
Credits:- 3	

Prerequisite: Fundamental knowledge of Data Communication, Networking and Information Security.

Course Objectives:

1. To gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks
2. To examine secure software development practice
3. To understand key terms and concepts in I.T. ACT
4. To incorporate approaches for incident analysis and response

Course Outcomes:

On completion of the course, student will be able to

1. Explain the cyber security concepts.
2. Describe the cyber security vulnerabilities and prevention techniques.
3. Explain the different rules and regulations under I.T. ACT.
4. Explain the concepts of digital forensics & incident management

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES
1.	**Computer and Network Security** Introduction to Computer Security - Introduction, How Seriously Should You Take Threats to Network Security?, Identifying Types of Threats, Basic Security Terminology, Concepts and Approaches, Online Security Resources Networks and the Internet : Introduction, Network Basics, How the Internet Works, Basic Network Utilities , Advanced Network Communications Topics	**07**

2.	**Cyber Frauds, DoS, Viruses** Cyber Stalking, Fraud, and Abuse: Introduction, How Internet Fraud Works, Identity Theft, Cyber Stalking, Protecting Yourself Against Cyber Crime. Denial of Service Attacks: Introduction, DoS, Illustrating an Attack, Malware: Introduction, Viruses, Trojan Horses, The Buffer-Overflow Attack.The Sasser Virus/Buffer Overflow, Spyware, Other Forms of Malware, Detecting and Eliminating Viruses and Spyware	**07**
3.	**Techniques Used by Hackers** Introduction, Basic Terminology, The Reconnaissance Phase, Actual Attacks, Malware Creation, Penetration Testing	**06**
4.	**Computer Security Technology** Introduction, Virus Scanners, Firewalls, Antispyware, IDS, Digital Certificates, SSL/TLS, Virtual Private Networks, Wi-Fi Security	**06**
5.	**I.T. ACT** Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, I.T. Act	**06**
6.	**Introduction to Forensics** Introduction, General Guidelines, Finding Evidence on the PC, Finding Evidence in System Logs , Getting Back Deleted Files, Operating System Utilities, Operating System Utilities, Mobile Forensics: Cell Phone Concepts	**06**

Text Books :

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1.	Computer Security Fundamentals	Chuck Easttom	Pearson ,third edition	

Reference Books :

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1.	Incident Response & Computer Forensics	Jason Luttgens, Matthew Pepe, Kevin Mandia,	McGrawHill Osborne Media, 3 rd edition , 2014.	
2	Computer Security and Incident Response,	Keith J. Jones, Richard Bejtlich, Curtis W. Rose	Real Digital Forensics: Paperback – Import, 2005.	
3	Hacking Exposed: Network Security Secrets & Solutions	Stuart McClure, Joel Scambray and George Kurtz,	McGraw-Hill, 2005.	
4	Ethical Hacking	Thomas Mathew	OSB Publisher, 2003	
5	Virtualization Security: Protecting Virtualized Environments	Dave Shackleford	John Wiley & Sons, 2012.	
6	. Hacking Exposed Network Security: The Complete Reference	BRAGG	McGraw Hill Professional, 2012	

T.Y.B. Tech (Computer Science and Engineering) Sem – VI

6. C# Programming (PCC-CS607)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 2Hrs./Week	**Theory** :--- CIE :---
Tutorial :	**Term work:** 25 marks
Practical: 2 Hrs./Week	**Practical : 50 marks**

Pre-requisites : C++, Java,HTAML

Course Objectives

a. Understand code solutions and compile C# projects within the .NET framework
b. Demonstrate knowledge of object-oriented concepts using C#.NET application
c. Create and manipulate GUI components in C# and interact with database using ADO.NET in window based application
d. Create network based and multithreaded applications using C#
e. Creating ASP.Net applications using standard .net controls
f. Maintain session and controls related information for users in multi-user web applications

Course Outcomes

g. Students will be able to develop correct, well-documented programs using the C# programming language.
h. Students will be able to learn to develop object-oriented programs using C# classes and objects
i. Students will be able to learn to use Windows Forms and WPF to create GUI-based programs
j. Students will be able to build networking and multithreading based programs using C#
k. Students will be able to design web applications using ASP.NET using ASP.NET controls in web applications.
l. Students will be able to debug and deploy ASP.NET web applications and create database driven ASP.NET web applications.

UNIT NO.	UNIT NAME & DETAILS	NO. OF LECTURES

1.	**.Net architecture and C# Basics:** **.Net Architecture:** The Relationship of C# to .NET, The Common Language Runtime, A Closer Look atIntermediate Language, Assemblies, .NET Framework Classes, Namespaces, **C# basics**: Predefined data types, TheMain () Method,More on Compiling C# Files, Console I/O, Using Comments# Programming Guidelines, Dynamic variables, DLL creation & calling.	**3**
2.	**Object oriented programming in C# :** Classes and Structs, Class Members, Anonymous Types, Structs, Partial Classes, StaticClasses, The Object Class, Extension Methods, **Inheritance**: Types of Inheritance, Implementation Inheritance, Modifiers, Interfaces	**4**
3.	**Arrays, Operators and casts and strings:** **Arrays**: Simple Arrays, Multidimensional Arrays, Jagged Arrays, Array Class, Array and Collection Interfaces, Enumerations **Operators and casts:** Operators, Type Safety, Comparing Objects for Equality, Operator Overloading, User-Defined Casts, **String:** System. String, Building Strings, String Builder Members, Format Strings, Regular Expressions.	**4**
4.	**Windows Form & Database with ADO.NET:** Introduction to GUI application & components –add data control programmatically, Link data to control, process all control, track the visible forms, Find all MDI child forms, Save configuration setting for form, Force list box to scroll items, Restrict text box, Use of auto complete combo box ,Sort a list view,Database with ADO.NET-Overview of Ado.NET, Data components in Visual Studio .NET.	**5**
5.	**Threading and Networking:** **Threading:** Overview, Asynchronous Delegates, the Thread Class	**4**
	and Thread Pools, Threading Issues, Synchronization, Timers. **Networking:** Networking-Obtain information about Local network, Detect changes in network, Download data over HTTP orFTP, Download a File & Process using Stream, Respond to HTTP request from your application.	
6.	**Introduction to ASP.NET 4.5** ONE ASP.NET: Introducing One ASP.NET, Simplifying a Complex Ecosystem, How Do You Benefit? **ASP.NET web form structure:** Application Location Options, The ASP.NET Page Structure Options, ASP.NET 4.5 Page Directives, ASP.NET Page Events, Dealing with Postbacks, Cross-Page Posting ,ASP.NET Application Folders, Compilation, Build Providers, Global.aspx	**4**

Term Work

3. It should consist of 10 to 12 experiments based on the above syllabus covering following list of assignments
4. 50% of the experiment should be console based & 40 % experiment should be windows form application. and 10% should be web-based application

Practical List:

20. Language Introduction (Includes console-based application, creation of dll, running a program without IDE) calling a method from another program.
21. OOPS concepts in C#-Class, Implementation Inheritance, Extension methods (Use Any application).
22. Develop DLL file and use it in application program. (Use Any application)
23. Implementation of Interface Inheritance (Use Any Application).
24. Implementation of Multidimensional & Jagged array (Use Any application).
25. Use of properties in any application.
26. Implementation of Operator overloading (Any application).
27. String manipulation using String & String builder(Any application)
28. Develop program to use Regex. Matches method and Regular Expression pattern matching.
29. Design a Windows Form based application for different controls.(Any application)
30. Design a Windows Form based MDI application with different controls.(Any application)
31. Design a Windows Form based application for field validation.(Any application)
32. Design a any Windows Form based application with Database connectivity with all field validation.(Any application)
33. Develop a Win1dows Form application that performs SELECT, INSERT, UPDAE & DELETE queries and also displays the List of Books available in a Library System by fetching the details from a database. The C# application must also contain the filter capability.
34. Implement console-based networking application to obtain information of network & detect changes in network.
35. Design a Windows form application to download file & process it using stream.

36. Simple ASP.NET web application deployment in IIS server
37. Design simple login and registration page using client-side validation controls in ASP.NET
38. Do the server-side validation by using database connectivity for above problem and display all the records of database when successfully logged in using ASP.NET.

Text Books

Sr. No.	Title	Author(s) Name	Publication & Edition	Units Covered
1	Professional C# 2012 & .Net 4.5	Christian Nagel, Bill, Evjen, Jay Glynn, Morgan Skinner, Karli Watson	Wrox Publication	1 to 2 and unit 3 (threading)
2	A Programmer's Guide to ADO.Net in C#	Mahaesh Chand	Apress Publication	Unit 3 Windows app and ADO.NET
3	Visual C# 2010 Recipes- A Problem-Solution Approach	Allen Jones, Adam Freeman, Matthew MacDonald, Rakesh Rajan	Apress Publication	Unit 3 Windows app and ADO.Net and Unit 4 networking
4	Professional ASP.NET 4.5 in C# and VB	John Wiley &SonsInc.	WROX publication	Unit 4 ASP part and Unit 5 and 6

Reference Books

Sr. No.	Title	Author(s) Name	Publication & Edition
1	ASP.NET 4.5- Black book	Kogent	Dreamtech Publication

T.Y. B. Tech (Computer Science and Engineering) Sem – VI

Domain Specific Mini-project (PW- CS608)

TEACHING SCHEME	**EXAMINATION SCHEME**
	Theory : --- CIE :---
Theory : --	**Term work:** 25 Marks
Tutorial : --	**Theory :**--
Practical:02 Hrs./Week	**Practical :** 50 Marks

Pre-requisites :

3. Software Engineering Concepts
4. Object Oriented Concepts

Course Objectives

4. To expose the students to use engineering approach to solve domain specific real time problem.
5. To use the appropriate and newer technologies while developing the project.
6. To learn the skills of team building and team work.

Course Outcomes

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

5. Identify specific problem statement from a selected domain.
6. Analyze the problem and prepare SRS and design document.
7. Write code and carry out testing.
8. Write a report covering details of the project and give presentation on a project.

Contents

The students should form group of 4 to 5 students and every group is supposed to choose a specific domain (preferably from Smart India Hackathon problem statement,ACM programming contests, codechef portal) to do the mini project. Further the group should identify the relevant problem in the selected domain and propose the solution, which can be implemented as a mini-project using suitable technology. The mini-project work should be evaluated by a team of teachers appointed by the department. The evaluation and marking should include Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) during which the group should give presentation and demonstration of their work done. Care should be taken to avoid out-sourcing of the work.

COURSE DETAILS/SYLLABUS

Final Year B. Tech (Computer Science and Engineering) Sem – VII

Final Year B. Tech (Computer Science and Engineering)
Semester-VII
1. Advanced Computer Architecture (PCC-CS701)

TEACHING SCHEME EXAMINATION SCHEME
Theory :4 Hrs./Week **Theory :** ESE 70 Marks
CIE 30 Marks
Tutorial :1 Hrs./Week **Term work: 25 Marks**
Practical :- NA **Practical :NA**

Pre-requisites: Digital systems and microprocessors, computer organization and architectures.

Course Objectives

1. To make students know about the Parallelism concepts in Programming
2. To give the students an elaborate idea about the different memory systems and buses.
3. To introduce the advanced processor architectures to the students.
4. To make the students know about the importance of multiprocessor and multi- computers.
5. To study about data flow computer architectures

Course Outcomes

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

1. Demonstrate concepts of parallelism in hardware/software.
2. Discuss memory organization and mapping techniques.
3. Describe architectural features of advanced processors.
4. Interpret performance of different pipelined processors.
5. Explain data flow in arithmetic algorithms.
6. Development of software to solve computationally intensive problems.

The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis:

a) Parallel Processing Mechanisms
b) Parallel Computer Structures: Pipeline Computers
c) Array Processors
d) Multiprocessor Systems
e) Architectural classification Schemes: Multiplicity of Instruction-Data Streams
f) Trends in power and energy in Integrated Circuits
g) Trends in Cost
h) Dependability

2.

Principles of Pipeline:

a) Principles of linear pipeline
b) Classification of Pipelined Processors
c) Interleaved memory organization
d) Hazard detection and resolution
e) Basic compiler Techniques for Exposing ILP

3.

Memory Hierarchy Design :

a) Introduction
b) Ten Advanced optimizations of cache performance

4.

Data Level Parallelism in Vector, SIMD and GPU Architecture:

a) Vector Processing requirement: Characteristics of vector processing
b) Multiple vector Task dispatching
c) Pipelined vector processing methods
d) Associative Array Processing: Associative Memory Organization
e) Associative processors (PEPE and STARAN)
f) Data Level Parallel in Vector :Introduction
g) Vector Architecture
7

5.

Data Level Parallelism in SIMD and GPU Architecture:

a) SIMD ARRAY PROCESSORS: SIMD Computer organization
b) Masking and Data Routing Mechanism
c) SIMD Instruction set extension for Multimedia
d) Graphics Processing Units : Programming the GPU
e) NVIDA GPU Computational structures
f) NVIDA GPU Instruction set Architecture
g) Conditional Branching in GPU
h) NVIDA GPU Memory Structure
7

6.

Multiprocessor Architecture :

a) Introduction
b) Multiprocessor Architecture: Issus and Approach
c) Challenges of parallel processing
d) Centralized shared memory Architecture: Multiprocessors Cache coherence
e) Basic schemes for enforcing coherence
f) Snooping Coherence Protocols
g) Distributed shared memory and directory based coherence
h) Directory Based cache coherence protocol :The basics
7

Term Work

□ □It should consist of minimum 8-10 assignments with emphasis on solving exercise problems

Text Books

1. Computer architecture and Parallel Processing Kai Hwang and Faye A Briggs Tata McGraw- Hill

2. Computer Architecture: A Quantitative Approach John L. Hennessy and Davd A. Patterson Morgan Kaufmann

2. Cloud Computing (PCC – CS702)

TEACHING SCHEME EXAMINATION SCHEME

Theory :3 Hrs./Week **Theory :** ESE 70 Marks
CIE 30 Marks
Tutorial : NA Term work: 25 Marks
Practical : 2 Hrs./Week **Practical :NA**
Pre-requisites: Operating Systems, Fundamentals of Computer Networks.

Course Objectives

1. To become familiar with Cloud Computing and its ecosystem.
2. To learn basics of virtualization and its importance.
3. To evaluate in-depth analysis of Cloud Computing capabilities.
4. To give technical overview of Cloud Programming and Services.
5. To understand security issues in cloud computing.

Course Outcomes

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

1. Describe the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.
2. Explain the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
3. Collaboratively research on the state of the art (and open problems)in cloud computing.
4. Identify problems, and explain, analyze, and evaluate various cloud computing solutions.
5. Choose the appropriate technologies, algorithms, and approaches for the related issues.
6. Display new ideas and innovations in cloud computing.

UNIT NAME & DETAILS

1. Overview of computing paradigm: Recent trends in Computing - Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing. Evolution of cloud computing - Business driver for adopting cloud computing.

Introduction to Cloud Computing: Cloud Computing - Introduction to Cloud Computing, History of cloud Computing, Cloud service providers. Properties, Characteristics& Disadvantages - Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing. Role of Open Standards.

2. Cloud Computing Architecture: Cloud computing stack - Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works,

Role of Networks in Cloud computing, protocols used, Role of Web services. Service Models (XaaS) - Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS). Deployment Models, Public cloud, Private cloud, Hybrid cloud, Community cloud

3. Virtualization:

Introduction and benefits, Implementation Levels of Virtualization, Virtualization at the OS Level, Virtualization Structure, Virtualization Mechanism, Open-Source Virtualization Technology, Xen Virtualization Architecture, Binary Translation with Full Virtualization, Paravirtualization, Virtualization of CPU, Memory and I/O Devices

4.Infrastructure as a Service (IaaS): Introduction to IaaS – IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine (VM).

Resource Virtualization - Server, Storage, Network. Virtual Machine(resource) provisioning and anageability, storage as a service, Data storage incloud computing (storage as a service). Renting, EC2 Compute Unit, Platform and Storage, pricing, customers.

Platform as a Service (PaaS): Introduction to PaaS - What is PaaS, Service Oriented Architecture (SOA). Cloud Platform and Management - computation, storage **Software as a Service (SaaS):** ntroduction to SaaS, Web services, Web 2.0, Web OS, Case Study on SaaS

5.Service Management in Cloud Computing: Service Level Agreements (SLAs), Billing& Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously, Managing Data - Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing **Cloud Security:** Infrastructure Security - Network level security, Host level security, Application-level security. Data security and Storage - Data privacy and security Issues, Jurisdictional issues raised by Data location: Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations

6.Case study on Open Source and Commercial Clouds – Amazon EC2, Google Compute Engine, Microsoft Azure, Cloud foundry, OpenStack

Experiment List

1. Working and Implementation of Infrastructure as a service.
2. Working and Implementation of Software as a service.
3. Working and Implementation of Platform as a services.
4. Practical Implementation of Storage as a Service.
5. Installing a private cloud.
6. Installing OS on a Virtual Machine Monitor.
7. Offline migration of virtual OS.
8. Live migration of virtual OS.
9. Study and implementation of infrastructure as Service using Open Stack.
10. Assignment to install and configure Google App Engine.
11. Hands on virtualization using Xen Server.
12. Hands on containerization using Docker.
13. Deployment and Configuration options in Amazon (AWS).
14. Deployment and Configuration options in Google Cloud.
15. Deployment and Configuration options in Microsoft Azure.
16. Building a 'HelloWorld' app for the cloud.
17. Deploying the 'HelloWorld' app for the cloud.
18. Case study on Amazon EC2 to learn about Amazon EC2,Amazon Elastic Compute Cloud is a central part of Amazon.com's cloud computing platform, Amazon Web Services. How EC2 allows users torrent virtual computers on which to run their own computer applications.

Text Books

1. Cloud Computing for Dummies Judith Hurwitz, R. Bloor, M.Kanfman, F.Halper Wiley India Edition
2. Cloud Computing Black Book Jayaswal, Kallakurchi, Houde, Shah Dreamtech Press
3 Cloud Security Ronald Krutz and Russell Dean Vines Wiley-India
4 Enterprise Cloud Computing GautamShroff Cambridge

3. Advanced Database Systems (PCC- CS703)

TEACHING SCHEME EXAMINATION SCHEME
Theory :3 Hrs./Week (3 Credits)
Theory : ESE 70 Marks
CIE 30 Marks
Tutorial :NA Term work: 25 Marks
Practical :2 Hrs. /Week (1 Credit) **POE : 50 Marks**

Pre-requisites: -

Course Objectives

1. To learn Basics of design of databases.
2. To acquire knowledge on parallel and distributed databases and its applications.
3. To study the usage and applications of SQL and NOSQL databases.
4. To Understand and perform common database administration tasks, such as database monitoring, performance tuning, data transfer, and security.
5. To understand the usage of advanced data models.

Course Outcomes

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

1. Understand and identify issues arising from parallel and distributed processing of data.
2. Select appropriate database and construct solution to real world problems of storing large data.
3. Compare and Contrast NoSQL databases with each other and Relational Database Systems.
4. Make use of SQL cursors, triggers, stored procedures, and procedural SQL to write complex SQL scripts.
5. Learn database administration tasks and security measures.

UNIT NAME & DETAILS

Unit I: Parallel and Distributed Databases

Database System Architectures: Centralized and Client – Server Architectures, Server System Architectures, Parallel Systems, Parallel Database Architectures, Parallel Databases --I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism, Design of Parallel Systems, Distributed Systems, Distributed Database Concepts, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control, Distributed Query Processing, Case Studies- Distributed Databases in Oracle.

Unit II: Advanced SQL

Relational Set Operators, SQL Join Operators, Subqueries and Correlated Queries, SQL Functions, Oracle Sequences, Synonyms, Database Links, Updatable Views, Procedural SQL, Triggers, Stored Procedures, PL/SQL Processing with Cursors, PL/SQL Stored Functions, Embedded SQL, Dynamic SQL. Case study-Postgrey SQL.

Unit III: NoSQL Database Management

NOSQL: Definition and Introduction, Features and Types of NOSQL databases, Sorted Ordered Column-Oriented Stores, Key/Value Stores, Document Databases, Graph Databases. **NOSQL: Getting Initial Hands-On Experience**, Storing and Accessing Data, Storing Data in and Accessing Data from MongoDB, Querying MongoDB**, Interfacing and Interacting with NOSQL**, Case Study- CouchDB, CouchDB vs. MongoDB, Compass / Atlas GUI Tools for MongoDB.

Section - II

Unit IV: Database Administration and Security

The Need for and Role of a Database in an Organization, The Evolution of the Database Administration Function, The Database Environment's Human Component Security, Database Administration Tools: The Data Dictionary, ASE Tools, developing a Data Administration Strategy, The DBA at Work: Using Oracle for Database Administration.

Unit V: Business Intelligence and Data Warehouses

The Need for Data Analysis, Business Intelligence, Business Intelligence Architecture, Decision Support Data, The Data Warehouse, Online Analytical Processing, Star Schemas, Implementing a Warehouse, Data Mining, SQL Extensions for OLAP, Materialized Views, Case Study- Fire Base-Google.

Unit VI: Data analysis and exploration

Mathematical models for decision making, data mining, data preparation, data exploration. Data mining tasks - association rules.

Experiment List

1. Installation of Oracle / MySQL and practicing DDL & DML commands.
Execute basic utilities used to interact with Oracle DBMS / MySQL.
2. Design and implement the Fragmentation schema & the Replication schema for the social networking websites / online e-shopping / e-learning websites.
3. Implementation of 2 Phase Commit protocol for distributed databases.
4. Execute partitioning queries on parallel databases.
5. Implementation of Relational Set Operators, SQL Join queries, Subqueries and Correlated Queries, Oracle Synonyms and Sequence.
6. Demonstrate SQL Functions, Procedures, Cursors, and triggers using PL/SQL, Views.
7. Installation of MongoDB and Apache Cassandra.
8. Exploring MongoDB, and Apache Cassandra basics, Identify the schema design and data modeling techniques in MongoDB.
9. Accessing MongoDB and Apache Cassandra from some of the popular high-level programming languages. Perform Create, Retrieve, Update and Delete or CRUD operations in MongoDB.
10. Install CouchDB on Windows.
11. Create and delete CouchDB database. Run CouchDB query with Mongo.
12. Case study of Oracle Database Administration and Security.
Study of database administrator's responsibilities like –
i) Installing and upgrading the database server and/or application tools.
ii) Creating user's profiles and ensuring system security by careful allocation of user permissions.
iii) Monitoring technical support for both database systems and related applications.
13. Study of CASE concept and tools.
14. Demonstrate all OLAP operations and cube operator in OLAP.
15. Consider a case study of any Big Data system of your choice and design the distributed database architecture and analyze the probable solutions available in the market.
16. Demonstrate data analysis and visualization using any BI Tool.

Text Books

1. Database System Concepts Silberschatz, Korth, Sudarshan MGH, 6th Edition (International edition) 2010
2. Database Systems, Design, Implementation and Management Coronel-Morris- Rob
3. Professional NOSQL Shashank Tiwari John Wiley & Sons, Inc. 2011
4. Business Intelligence - Data Mining and optimization for Decision Making- - Carlo Vercellis Wiley Publications.

4. Artificial Intelligence (PCE– CS704) Elective-I

TEACHING SCHEME EXAMINATION SCHEME

Theory :3 Hrs./Week (3 Credits)

Theory : ESE 70 Marks

CIE 30 Marks

Tutorial :1 Hr. /Week (1 Credit) **Term work: 25 Marks**

Practical : Practical : –

Pre-requisites: Basic Programming in Python, Data Structures

Course Objectives

1. To impart artificial intelligence principles, techniques, and its history.
2. To assess the applicability, strengths, and weaknesses of the basic knowledge representation, problem solving, and learning methods in solving engineering problems.
3. To develop intelligent systems by assembling solutions to concrete computational problems.

Course Outcomes

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

1. Evaluate Artificial Intelligence (AI) methods and describe their foundations.
2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.
3. Demonstrate knowledge of reasoning and knowledge representation for solving real world problems.
4. Analyze and illustrate how search algorithms play vital role in problem solving.
5. Illustrate the construction of learning and expert system.
6. Discuss current scope and limitations of AI and societal implications.

UNIT NAME & DETAILS

1. Artificial Intelligence and Its Issues:

Definitions - Importance of AI, Evolution of AI - Applications of AI, Classification of AI systems with respect to environment, Knowledge Inferring systems and Planning, Uncertainty and towards Learning Systems.

2. Overview to Problem Solving & Heuristic Search:

Problem solving by Search, Problem space - State space, Blind Search - Types, Performance easurement. Types, Game playing mini-max algorithm, Alpha-Beta Pruning

3. Probabilistic Reasoning & Markov Decision process:

Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model. MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.

4. Learning Systems & Expert Systems:

Forms of Learning Types - Supervised, Unsupervised, Reinforcement Learning, Learning Decision Trees. Expert Systems - Stages in the development of an Expert System - Probability based Expert Systems - Expert System Tools - Difficulties in Developing Expert Systems - Applications of Expert Systems.

5. Reinforcement Learning:

Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning.

6. AI with Python:

Study of important inbuilt libraries of Python like NumPy, SciPy, matplotlib, nltk, Simple AI. Installing Python. Setting up PATH. Running Python. Study of real time applications of AI with Python, Case Studies: AI Platforms-Azure ML, Google AI, Swift AI, Tensor flow.

Tutorial List

1. Write a program to conduct uninformed and informed search.
2. Write a program to conduct game search.
3. Write a program to construct a Bayesian network from given data.

4. Write a program to infer from the Bayesian network.
5. Write a program to run value and policy iteration in a grid world.
6. Write a program to do reinforcement learning in a grid world.
7. Develop small AI based Mini Project like:
i) Predicting user's next location
ii) Detecting YouTube comment spam
iii) Identifying the genre of a song
iv) Shock front classification
8. Case Study on any one real time AI application.

Text Books

1. Artificial Intelligence - A Modern Approach Russell, S. and Norvig, P. 3rd edition, Prentice Hall.2015
2. Artificial Intelligence: Foundations of Computational Agents Poole, D. and Mackworth, A. Cambridge University Press.2010

5. Software Testing and Quality Assurance (PCE- CS704) Elective-I

TEACHING SCHEME EXAMINATION SCHEME
Theory :3 Hrs./Week **Theory :** ESE 70 Marks
CIE 30 Marks
Tutorial : 1 Hrs/Week Term work: 25 Marks
Practical : -- Practical : –

Pre-requisites: Software Engineering, SDLC and STLC.

Course Objectives

1. To understand software testing and quality assurance as a fundamental component of software life cycle
2. To understand the fundamentals of software verification
3. To efficiently perform Testing & QA activities using modern software tools
4. To understand and compare testing web applications and desktop applications

Course Outcomes

Upon successful completion of this course, the students will be able to:
1. Understand fundamental component of software life cycle
2. Apply and use the modern software testing tools
3. Compare and analyze the web and desktop application testing
4. Explore newer software project assessment methods

UNIT NAME & DETAILS

1. Introduction :
Some Software Failures, Testing Process, Some Terminologies, Limitations of Testing, The V Shaped software life cycle model

2. Software Verification:
Verification Methods, SRS document verification, SDD document verification, Source code reviews, User documentation verification, Software project audit **Creating test cases from SRS and Use cases:** Use Case Diagram and Use Cases, Generation of test cases from use cases, Guidelines for generating validity checks, strategies for data validity, Database testing

3. Regression Testing:
What is regression testing?, Regression Test cases selection, Reducing the number of test cases, Risk analysis, Code coverage prioritization techniques Object oriented testing: What is Object orientation?, What is object oriented testing?, Path testing, State based testing, Class testing

4. Software Testing Tools:
Selecting and Installing Software Testing tools, Automation and Testing Tools, Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools,

5. Testing Process :

Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing.

6.

Testing Web applications

What is web testing? functional testing, UI testing, Usability testing, configurations and compatibility testing, security testing, performance testing, database testing, post deployment testing, web metrics. **Automated Test data generation:** Automated Test Data generation, Approaches to test data generation, Test data generation tools.

Tutorial List:

It should consist of 8-10 assignments based on the following topics:

1. Software Testing Process, its need and limitations
2. Verification at different phases of SDLC for particular case study (SRS document verification, SDD document verification, Source code reviews, User documentation verification, Software project audit etc.)
3. Creating test cases from SRS and Use cases for particular case study
4. Generation of validity checks for particular case study
5. Regression testing with Test cases selection / Regression testing with reducing the number of test cases / Regression testing with code coverage prioritization techniques
6. Generation of test cases using Path testing/ State based testing/Class testing for particular case Study
7. Measurement in Software Engineering
8. Software Metrics: Object oriented Metrics used in testing
9. Calculation of Software Quality attributes using different prediction models
10. Measurement of Internal / External Product Attributes
11. Generation of test cases in different key areas of Web application testing
12. Automated test data generation

Text Books

1. Software testing: Yogesh Singh, Cambridge University Press, First Edition.
2. Effective Methods for Software Testing ,William E. Perry, Third edition, Wiley India, 2009
3. Software Testing – Principles and Practices (Chapter 12) Naresh Chauhan, Oxford University Press, 2010

6. Image Processing (PCE – CS704) Elective-I

TEACHING SCHEME EXAMINATION SCHEME

Theory :3 Hrs./Week **Theory :** ESE 70 Marks

CIE 30 Marks

Tutorial : 1 Hrs./Week **Term work: 25 Marks**

Practical : Practical : –

Pre-requisites:

Course Objectives

1. To learn the fundamental concepts of Digital Image Processing
2. To study basic image processing operations.
3. To cover the basic analytical methods which are widely used in image processing.

Course Outcomes

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

1. Describe the basic issues and the scope of image processing, and the roles of image processing and systems in a variety of applications.
2. Explore different techniques in image acquisition and color transformation
3. Understand how digital images are represented
4. Evaluate the mathematical principles of digital image enhancement
5. Explore and apply the concepts of Edge detection, segmentation and object recognition

UNIT NAME & DETAILS

Introduction

Concept of Digital Image Processing, Steps in Image Processing, Components of Image Processing System, Applications areas, Image representation, Grey scale and color images.

1. Image Enhancement and Processing :

Basic Grey level transformation, Histogram Processing techniques, Color Fundaments, color models, Pseudo color image processing.

2. Image Restoring and Reconstruction:

Noise models, Noise Reduction, Inverse filtering, MMSE filtering.

3. Image Compression :

Fundamental of Redundancies, Basic Compression Methods, Huffman coding, Arithmetic coding, LZW coding, JPEG compression, Standard.

4. Image Segmentation:

Detection of Discontinuities, Point, Line and Edge detection, Thresholding, Region based Segmentation.

5. Image Processing Applications:

Biometric Pattern Recognition, Face Recognition. Preprocessing of Signature Patterns, Lung Disease Identification.

Text Books

1. Digital Image Processing R.C.Gonzalez and R.E.Woods Pearson Edition 1 to 6

7. WEB TECHNOLOGIES (PCC- CS705)

TEACHING SCHEME EXAMINATION SCHEME

Theory :3 Hrs./Week **Theory :** NA

Tutorial :NA **Term work: 50 Marks**

Practical : 4 Hrs./Week **POE : 50 Marks**

Pre-requisites: Object oriented Programming, Basics of HTML and CSS.

Course Objectives

1. Introduce students with front end web designing.
2. Motivate the students to develop web applications using PHP.
3. To introduce emerging Web technology concepts and tools.
4. To learn database access technologies and state management techniques.
5. To expose students to XAMPP web services.

Course Outcomes

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

1. Apply knowledge of client side scripting.
2. Develop web application using PHP.
3. Design web application using MVC and Angular JS.

4. Demonstrate use of server side technologies.
5. Explore newer tools for web development.

UNIT NAME & DETAILS

1.Front End Web Designing HTML and CSS:

HTML Design Patterns: HTML Structure, XHTML, DOCTYPE, Header Elements, Conditional Style Sheet, structural Block Elements, Terminal Block Elements, Multipurpose Block Elements, Inline Elements, Class and ID Attributes, HTML Whitespaces CSS Selector and Inheritance: Type, Class and ID Selector, Position and Group Selectors, Attribute Selectors, Pseudo-element Selectors, Pseudo-class Selectors, Subclass Selector, Inheritance, Visual Inheritance, and Bootstrap

2. Javascript Basics:

Introduction to javascript, Basic program of javascript, variables, functions, conditions, loops and repetition, Function, Arrays – DOM, Built-in Objects, Regular Expression, Exceptions, Event handling In Javascript, Validating HTML form data using javascript, Validation- AJAX - JQuery

3. Angular Node JS:

Angular - Web Application architecture, MVC and MVVM design pattern, Angular architecture, Angular building blocks, Forms implementation, Filters, Services, Consuming REST Web Services, Modules: Built-in and custom, Directives: Built-in and custom, Routing and Navigation, Animations, Testing Angular application. Node, Node Jsarchitecture ,Modules: Built-in and custom, Event loop, Asynchronous application , Events, Listeners, Timers, and Callbacks in Node.js. Testing node application. Introduction to Mongo DB- Accessing MongoDB from Node.js.

4. PHP basic:

PHP Basics: Embedding PHP code in Your Web Pages, Commenting Your Code, Outputting Data to the Browser, PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures Functions: Invoking a Function, Creating a Function, Function Libraries Array: What is Array?, Creating an array, outputting an Array, Merging, slicing, splicing and Dissecting Arrays, Other useful Array, Functions.

5. PHP session management (state management):

Session Handlers: What Is Session Handling, Configuration Directives, Working with Sessions, practical Session-Handling Examples, Creating Custom Session Handlers, PHP cookies, Uploading Files with PHP

6. PHP Database and small app using Laravel and Code to generate:

Installation Prerequisites, Using the MySqli Extension, Interacting with the Database, Executing Database Transactions.

Experiment List

1. Create html pages for website like login, registration and about us pages.
2. Apply and design the created HTML pages using CSS
3. Write a program demonstrating javascript functions and different validations.
4. Write a program to read and write HTML contents with JQuery.
5. Create a simple Testing Angular application.
6. Write a program demonstrating NodeJs application.
7. Write a program to handle the error in NodeJs..
8. Write a study experiment for Installing Apache and PHP on Linux, Configuring PHP at Build Time on Linux. Or Installation of XAMPP.
9. Hello world Program-Embedded HTML with PHP.
10. Program based on PHP variables, Expression, arrays, control structure.
11. Experiment Based on OOP and Advance OOP PHP
12. Form validation using PHP using regular expressions
13. Upload various types of file from client side to server with validation
14. Write a program to create and handle a session, cookie in PHP

15. Insert user entered data in form to MySQL database using PHP
16. Update user's data stored in MySQL database using PHP
17. Write a program to manage session in PHP having login facility in any web application
18. Write a program to show stored cookies, update, retrieve and delete from browser.

Text Books

1. Pro HTML5 and CSS3 Design Patterns Michael Bowers, DionysiosSynodinos and Victor Sumner Apress edition (Unit I & II)
2. Beginning PHP and MySQL: From Novice to Professional W. Jason Gilmore Fourth Edition Unit IV to VI
3. MEAN Web Development Amos Q. Haviv PACKT PUBLISHING LTD Unit III

Final Year B. Tech (Computer Science and Engineering) Sem– VII

8. Project-I (PW- CS706)

TEACHING SCHEME EXAMINATION SCHEME

Theory : NA Theory : NA
Tutorial : NA Term work: 50 Marks
Practical : 4 Hrs./Week **Demo & OE: 50 Marks**
Pre-requisites: Software Engineering, Mini Project.

Course Objectives

1. Identify the area of project work
2. Recognize the need and ability to engage in lifelong learning
3. Function effectively on teams and to communicate effectively
4. Able to prepare the technical report

Course Outcomes

Upon successful completion of this course, the students will be able to:
1. Explain the need of a software project for the society
2. Identify requirement analysis like functional and technical requirements for the project
3. Come up with design documents for the project consisting of Architecture, Dataflow diagram, Class Diagram, Algorithmic descriptions of various modules, collaboration diagram, ER Diagrams, Database Design Documents, Sequence Diagram, Use Case Diagram
4. Able to demonstrate analysis and design.
5. Prepare the technical report consisting of Requirement specification, Analysis and Design of Project

Contents

The project work is to be carried out in two semesters of Final Year Computer Science and Engineering.
The project should be undertaken preferably by group of 4-5 students who will jointly work and implement the project in the two semesters.
In Semester VII, the group will select a project with the approval of the Guide (staff member) and submit the Name of the project with a synopsis of the proposed work of not more than 02 to 08 pages before second week of August in the academic year. The group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work at the end of semester –VIII as a part of the term work submission in the form of a joint report.
The term work assessment will be done jointly by teachers appointed by Head of the

Institution.
The oral examination will be conducted by an internal and external examiner

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
3. **Care should be taken to avoid copying and outsourcing of the project work.**

9. Internship (SI-CS707)

TEACHING SCHEME EXAMINATION SCHEME
Theory : NA Practical:1 Credit
Tutorial :NA Term work: 50 Marks
Practical : Minimum4 Weeks duration **Mode of Evaluation : –**Internship Report, Presentation and Project Review.

Pre-requisites: Completion of minimum of Six semesters**,** Knowledge of Basic Programming Languages, Database Software.

Course Objectives

The course is designed to expose the students to industry environment and to take up on-site assignment as trainees or interns.

Course Outcomes

At the end of this internship the student should be able to:
1. Have an exposure to industrial practices and to work in teams
2. Communicate effectively
3. Understand the impact of engineering solutions in a global, economic, environmental, and societal context
4. Develop the ability to engage in research and to involve in life-long learning
5. Comprehend contemporary issues
6. Engage in establishing his/her digital footprint

Duration: Minimum 4 Weeks

Details:

Four weeks of work at industry site. Supervised by an expert at the industry.

Term Work

1. Mode of Evaluation: Internship Report, Presentation and Project Review.
2. Collect the Internship Completion Letter given by authorized industry.
3. Assess the work based on progress report (signed by industry

TEACHING PLAN

Dept Of Computer Science and Engineering (SY B-Tech Sem I 2023-24) Lecture Plan: Applied Mathematics	
Lecture No	**Unit 1: Correlation and Lines of Regression, Curve fitting**
01	Correlation
02	Lines of regression of Bivariate data
03	Fitting of Straight Line
04	Fitting of exponential curves
05	Fitting of second degree parabolic curves
06	examples
	Unit 2 : Probability Distribution
07	Defn, Introduction, Random Variables, Types
08	Probability Distributions
09	Binomial Distribution
10	Poisson Distribution
11	Normal Distribution
12	Examples
	Unit 3 :Numerical Integration
13	Introduction :Newton Cotes formulae
14	Trapezoidal Rule
15	Simpson's 1/3 rd rule
16	Simpson's 3/8 th rule
17	Weddle's Rule
18	examples
	Unit 4 : Introduction to fuzzy sets
19	Fuzzy sets versus crisp sets
20	Membership function
21	Alpha cuts & Strong Alpha cuts
22	Scalar cardinality of fuzzy sets
23	Degree of subset hood of fuzzy sets
24	examples
	Unit 5 :Fuzzy Arithmetic
25	Fuzzy numbers
26	Arithmetic operations on Fuzzy numbers
27	Fuzzy cardinality
28	Fuzzy equations A+X=B, A.X=B
29	examples
30	examples
	Unit 6: Assignment Problem
31	Balanced assignment problems- Hungarian method
32	Unbalanced assignment problems
33	examples
34	Travelling Salesman Problem
35	Transportation problem
36	examples

Dept Of Computer Science and Engineering (SY B-Tech Sem I 2023-24) Lecture Plan: Discrete Mathematics & Structures	
Lecture No	**Unit 1: Mathematical Logic**
01	Statements & Notations, Connectives,
02	Statement Formulas & truth table,
03	Well formed formulas, Tautologies
04	Equivalence of formulas, Duality law,
05	Tautological Implications,
06	Functionally complete set of connectives
07	Other connectives,
08	Normal Forms,
09	Theory of Inference for statement calculus.
10	Theory of Inference for statement calculus.
	Unit 2 Set Theory
11	Basic concepts of set theory
12	Operations on Sets
13	Ordered pairs & n-tuples,
14	Cartesian product
	Unit 3 : Relations & Functions
15	Relations. Properties of binary relations.
16	Matrix & Graph Representation of Relation
17	Partition & covering of Set, Equivalence Relations
18	Composition of Binary Relation
19	POSET& Hasse Diagram, Functions
20	Types of Functions, Composition of functions..
	Unit 4 : Algebraic Systems
21	Algebraic Systems: Examples & general Properties,
22	Semi groups & Monoids,.
23	Groups: Definitions & Examples,
24	Groups: Definitions & Examples,
25	Subgroup & Homomorphism
26	Subgroup & Homomorphism
	Unit 5 : Lattice and Boolean Algebra
27	Lattice as partially ordered sets
28	Lattice as Algebraic Systems.,
29	Special Lattices
30	Boolean Algebra: Definitions & examples
31	Boolean Algebra: Definitions & examples, unctions.
32	Boolean Functions F
33	Representation & Minimization of Boolean
34	Representation & Minimization of Boolean
35	Minimization of Boolean Functions
	Unit 6 : Graph Theory
36	Basic concepts of graph theory
37	Paths, Reachability & Connectedness,
38	Matrix, Representations of Graphs.
39	Storage Representation & Manipulations of Graphs
40	PERT & Related technologies.

Dept Of Computer Science and Engineering (SY B-Tech Sem I 2023-24) Lecture Plan: Data Structures		
Lect.No.	**Unit No.**	**Details of syllabus planned**
01	1	Definition, Types of data structures, Control Structure
02		Array , Data Structure Operations,
03		Algorithms: Complexity, Time and Space complexity.
04	2	Linear and Binary Search
05		Hashing-Definition ,Hash Function's, Collision
06		Bubble sort, Selection sort,
07		Insertion sort,
08		Merge sort,
09		Quick sort
10		Radix sort, Complexity and analysis
11	3	Stack Definition, representation, operations
12		Static implementation and application of stack
13		Queue Definition, representation, operations
14		Static implementation and application of queue
15		Circular Queue Definition, representation, operations
16		Static implementation and application of Circular Queue
17		Priority Queue, Deque
18	4	Singly Linked List Definition, representation, operations
19		Singly Linked List Implementation and applications
20		Doubly Linked List Definition, representation, operations
21		Doubly Linked List Implementation and applications
22		Circular Linked List Definition, representation, operations
23		Circular Linked List Implementation and applications
24		Implementation of stack and queue using linked list
25	5	Binary tree, traversal methods
26		Binary Search tree,AVLsearch tree
27		B-tree ,B+ tree
28		Heaps operations, implementation and .
29		Heap Application and Heap Sort
30	6	Basic Concept of graph theory
31		Storage representation
32		Graph traversal technique
33		BFS
34		DFS
35		Graph using Sparse matrix

Dept Of Computer Science and Engineering (SY B-Tech Sem I 2023-24)

Lecture Plan : Computer Networks

Lect. No.	Ch.No.	Details of syllabus planned
1.	1	Introduction to Computer Network: Basic Introduction Computer Network
2.		Overview of OSI layer Model
3.		Overview of TCP/IP protocol model
4.		Addressing
5.		Underlying technologies
6.	2	Data Link Layer: Design issues for Data Link Layers
7.		Framing methods
8.		Error control: detection and correction, Flow control
9.		Elementary Data Link protocols
10.		Sliding window Protocols
11.		Go back n, Selective repeat.
12.	3	Medium Access Control Sub layer: Static and Dynamic channel allocation
13.		Multiple Access protocols ALHOA
14.		CSMA
15.		Collision Free Protocols
16.		Ethernet: IEEE 802.3, IEEE 802.4
17.		IEEE 802.5, standards, Wireless LANS 802.11 standards

18.	4	Network Layer: IPv4 Addresses
19.		Classful Addressing Other Issues
20.		Sub-netting and Super netting
21.		Class less Addressing, Delivery
22.		Forwarding and routing
23.		Routing methods: Shortest path, Link state, Distance vector routing
24.		broadcast routing, Congestion control algorithms : Principles
25.		Congestion prevention policies
26.		Congestion control in datagram subnet, Load Shedding, Jitter Control.
27.	5	Internet Protocol: IP Datagram format,
28.		Fragmentation models
29.		Reassembly models
30.		ARP
31.		RARP
32.		ICMP
33.		IGMP
34.	6	Transport Layer: The Transport service primitives
35.		UDP: Process to Process communication
36.		User Datagram Format
37.		Operation and uses of UDP.
38.		TCP: TCP Services and Features
39.		TCP segment format
40.		TCP Connections
41.		Flow and error

42.		control in TCP, TCP Timers
43.		Berkeley Sockets: Socket Addresses, Elementary Socket system calls byte ordering
44.		Connectionless iterative server,
45.		connection oriented concurrent server
46.		TCP and UDP Client server Programs.

Dept Of Computer Science and Engineering (SY B-Tech Sem I 2023-24) Lecture Plan: C Programming		
Lect. No.	**Unit No.**	**Details of syllabus planned**
01		The Form of a C Program, The Library and Linking, Separate Compilation
02		Compilinga C Program, C's Memory Map
03	1	Expressions – The Basic Data Types, Modifying the Basic Types, Identifies Names
04		Variables, The Four C Scopes, Type Qualifiers-const,volatile
05		Storage Class Specifiers; Statements - Selection Statements, Iteration Statements,
06		Jump Statements, Expression Statements, Block Statements.
07	2	Console I/O: Reading and Writing Characters
08		Reading and Writing Strings, Formatted Console I/O
09		printf(), scanf(), Suppressing Input
10		Arrays and its types- Two-Dimensional Arrays with example
11		Strings- Arrays of Strings, Multidimensional Arrays with example
12		Array Initialization, Variable-Length Arrays with examples
13	3	The General Form of a Function, Understanding the Scope of a Function
14		Parameter passing, Passing arrays to functions-single array element/whole array,
15		Function Arguments- call by value ,call by reference,
16		argc and argv-Arguments to main() ,The return Statement, main( ) Return value
17		Recursion, Function Prototypes
18		Declaring Variable Length Parameter Lists, The inline Keyword
19	4	Pointers, declaring and Initialization of pointer variables,
20		Pointer operations ,Pointer expressions
21		Pointers and arrays, arrays of pointers
22		Multiple Indirection, Initializing Pointers
23		Pointers to Functions and structures
24		Dynamic Allocation Functions, restrict-Qualified Pointers, Problems with Pointers.
25	5	Structure and its usage, Arrays of Structures
26		Passing Structures to Functions, Structure Pointers
27		Arrays and Structures Within Structures
28		Union and its memory allocation scheme
29		Bit-Fields, Enumerations,
30		Using sizeof to Ensure Portability, typedef
31		FileI/O, StandardC vs. UnixFileI/O

32	6	Streams and Files, File System Basics
33		fread() and fwrite()
34		fseek() and Random-Access I/O
35		fprintf( ) and fscanf(),
36		The Standard Streams.

T.Y B.TECH

1. Information Security (PCC-CS501)

Class**:** TY B.Tech CSE Sem.: I

Subject: Information Security

Lecture Plan

Lect. No.	Ch.No.	Details of syllabus planned
01	**1**	The OSI Security Architecture
02		Symmetric Cipher Models
03		Substitution Techniques
04		Transposition Techniques
05		Block Cipher Principles
06		The Data Encryption Standard
07	2	Principles of Public-Key Cryptosystems,
08		The RSA Algorithm,
09		Key Management,
10		Diffie-Hellman Key Exchange,
11		Authentication requirements,

12		Authentication functions,
13		MAC and Hash functions and their requirements
14	3	Digital Signature,
15		Digital Signature Standard,
16		Authentication applications - Kerberos,
17		Authentication applications - Kerberos,
18		X.509 Authentication service
19	4	Email Security – PGP
20		S/MIME, IP Security - IP Security Architecture
21		Authentication Header and Encapsulating
22		Authentication Header and Encapsulating
23		Security Payload.
25	5	Web and System Security: Secure Socket Layer and Transport Layer Security

26		Secure Electronic Transaction
27		Intruders, Intruder Detection
28		Password Management
29		Firewall Design Principles
30		Trusted Systems
31	6	Non-Cryptographic Protocol Vulnerabilities - DoS and DDoS
32		Session Hijacking and Spoofing
33		Pharming attacks. Software
34		Vulnerabilities – Phishing
35		Buffer Overflow
36		Format String attacks, SQL Injection

2. **System Programming (PCC-CS502)**

Class	TY B.Tech CSE Sem.: I
Course	System Programming

Lecture Plan

Lect. No.	Ch No.	Details of syllabus planned
01	1	Introduction to Language Processors
02		Language processing activities
03		Fundamentals of language processing
04		Fundamentals of language
05		Specification
06		Language Processing Development Tools: LEX
07		Language Processing Development Tools: YAC
08	2	Introduction to Assemblers
09		Elements of assembly language programming
10		A simple assembly scheme
11		pass structure of assemblers

12		Design of a two pass assemble
13	3	Introduction to Macro
14		Macro definition and call
15		Macro expansion
16		Nested macro calls
17		Advanced macro facilities
18		Design of macro pre-processor: Design Overview
19		Data structure of Macro pre-processor with and Example
20	4	Aspects of compilation
21		Memory allocation: Static and Dynamic memory allocation
22		Memory Allocation in block Structure language
23		Compilation of expressions
24		Code optimization: Local
25		Code optimization: and Global optimization and Optimization technique
26		Interpreters
27	5	Introduction to Linkers
28		Relocation and linking concepts
29		Self- relocating programs

30		linking for overlays
31		Loaders

32	6	Introduction to Software tools
33		Software tools for program development
34		Editors, Debug
35		Monitors, Programming Environments,
36		User Interface

3. Object Oriented Modeling and Design (PCC-CS503)

Class	TY B.Tech CSE Sem.: I
Course	Object Oriented Modeling and Design

Lecture Plan

Lect. No.	Ch.No.	Details of syllabus planned
1.	**1**	Object oriented themes, modeling as a design technique.
2.		Object, classes
3.		Link & association, advanced link & Association
4.		Generalization & Inheritance, grouping constructs
5.		Aggregation, abstract classes
6.	**2**	Generalization as extension & restriction
7.		Multiple inheritance, metadata
8.		Candidate key & constraints

9.		Events & states, operations
10		Nested state diagrams, concurrency.
11		Advanced dynamic modeling concepts, simple dynamic model
12	**3**	Relation of object dynamic models, functional model
13		Data flow diagrams, specifying operations, constriction
14		A simple functional model
15		Relation of functional to object & dynamic model
16		OMT methodology, Impact of an object-oriented approach,
17		Analysis, system design with examples, combining models, design algorithms
18		Design optimization, implementation of controls, design association & physical packaging
19	4	An overview of the UML
20		Conceptual Model of UML

21		Conceptual Model of UML
22		Architecture of UML
23		Architecture of UML
24		Structure modeling Using UML: Classes, Relationship
25		Structure modeling Using UML: Diagrams, Class Diagrams
26	5	Interactions, Use Case
27		Use Case Diagram, Interaction diagrams
28		Activity diagrams, Events & Signals
29		State Machines, Process & Threads
30		Time & Space, State chart diagrams
31	6	Components, Deployment
32		Collaboration,

33		Patterns & frameworks
34		Patterns & frameworks
35		Component diagrams
36		Deployment diagrams

4. Computer Algorithm (PCC-CS504)

Class	TY B.Tech CSE Sem.: I
Course	Computer Algorithm

Lecture Plan

Lect. No.	Unit.No.	Details of syllabus planned
1.	1	Introduction : What is algorithm & its Specification
2.		Algorithm Specification,Recurrence relations
3.		Performance Analysis
4.		Randomized Algorithms
5.		D ivide and Conquer: The general method
6.		Binary search & its analysis
7.		Finding the maximum and minimum
8.		Merge sort & its analysis
9.		Quicksort & its analysis
10.		Selection sort and its analysis
11.	2	The general method, Knapsack problem
12.		Job sequencing with deadlines
13.		Minimum-cost spanning trees – Prim's and Kruskal's Algorithms
14.		Optimal storage on tapes
15.		Optimal merge patterns
16.		Single source shortest paths
17.	3	The general method
18.		Multistage graphs
19.		All pair shortest paths

20.		Optimal binary search trees
21.		0/1 knapsack
22.		Reliability design Problem
23.		Traveling Sales person problem
24.	4	Basic Traversal and Search Techniques
25.		Techniques for Binary Trees & Game Tree
26.		Techniques for Graphs – Breadth First Search & Traversal
27.		Depth First Search & Traversal
28.		AND/OR graphs, Connected components and Spanning Tree
29.		Bi-connected components
30.		Bi-connected components
31.		Depth first search
32.		Backtracking: The general method
33.		8-queen problem
34.		Sum of subsets
35.		Knapscak Problem
36.		Hamiltanion Cycle
37.		Graph Coloring
38.	5	Basic Concepts
39.		Introducition
40.		Introduction to NP Hard Graph Problems
41.		Introduction to NP Hard Graph Problems
42.	6	Computational Model
43.		Fundamental Techniques
44.		Algorithms
45.		PRAM
46.		MESH
47.		HYPERCUBE
48.		MESH
		HYPERCUBE

B.TECH (C.S.E)

1. Advanced Computer Architecture (PCC-CS701)

Class**:** B.Tech CSE Sem.: I

Subject: Advanced Computer Architecture

Lecture Plan

Lect. No.	Ch No.	Details of syllabus planned
01	1	The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis: a) Parallel Processing Mechanisms
02		The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis: b) Parallel Computer Structures: Pipeline Computers
03		The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis: c) Array Processors
04		The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis: d) Multiprocessor Systems
05		The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis: e) Architectural classification Schemes: Multiplicity of Instruction-Data Streams
06		The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis: f) Trends in power and energy in Integrated Circuits g) Trends in Cost

07		The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis: h) Dependability
08	2	Introduction of pipeline
09		Principles of Pipeline: a) Principles of linear pipeline
10		Principles of Pipeline: b) Classification of Pipelined Processors
11		Principles of Pipeline: c) Interleaved memory organization
12		Principles of Pipeline: d) Hazard detection and resolution
13		Principles of Pipeline: e) Basic compiler Techniques for Exposing ILP
14	3	Memory Hierarchy Design : a) Introduction
15		Ten Advanced optimizations of cache performance : Compiler Optimizations to Reduce Miss Rate, Small and Simple First-Level Caches to Reduce Hit Time and Power
16		Way Prediction to Reduce Hit Time, Pipelined Cache Access to Increase Cache Bandwidth, Pipelined Cache Access to Increase Cache Bandwidth
17		Multi-banked Caches to Increase Cache Bandwidth, Critical Word First and Early Restart to Reduce Miss Penalty, Critical Word First and Early Restart to Reduce Miss Penalty
18		Hardware Prefetching of Instructions and Data to Reduce Miss Penalty or Miss Rate, Hardware Prefetching of Instructions and Data to Reduce Miss Penalty or Miss Rate

19		Data Level Parallelism in Vector, SIMD and GPU Architecture: a) Vector Processing requirement: Characteristics of vector processing

20	4	Data Level Parallelism in Vector, SIMD and GPU Architecture: b) Multiple vector Task dispatching
21		Data Level Parallelism in Vector, SIMD and GPU Architecture: c) Pipelined vector processing methods
22		Data Level Parallelism in Vector, SIMD and GPU Architecture: d) Associative Array Processing: Associative Memory Organization
23		Data Level Parallelism in Vector, SIMD and GPU Architecture: e) Associative processors (PEPE and STARAN)
24		Data Level Parallelism in Vector, SIMD and GPU Architecture: f) Data Level Parallel in Vector :Introduction
25		Data Level Parallelism in Vector, SIMD and GPU Architecture: g) Vector Architecture
26	5	Data Level Parallelism in SIMD and GPU Architecture: a) SIMD ARRAY PROCESSORS: SIMD Computer organization
27		Data Level Parallelism in SIMD and GPU Architecture: b) Masking and Data Routing Mechanism
28		Data Level Parallelism in SIMD and GPU Architecture: c) SIMD Instruction set extension for Multimedia
29		Data Level Parallelism in SIMD and GPU Architecture: d) Graphics Processing Units : Programming the GPU
30		Data Level Parallelism in SIMD and GPU Architecture: e) NVIDA GPU Computational structures
31		Data Level Parallelism in SIMD and GPU Architecture: f) NVIDA GPU Instruction set Architecture
32		Data Level Parallelism in SIMD and GPU Architecture: g) Conditional Branching in GPU h) NVIDA GPU Memory Structure

33	6	Multiprocessor Architecture : a) Introduction
34		b) Multiprocessor Architecture: Issus and Approach
35		c) Challenges of parallel processing
36		d) Centralized shared memory Architecture: Multiprocessors Cache coherence
37		e) Basic schemes for enforcing coherence
38		f) Snooping Coherence Protocols g) Distributed shared memory and directory based coherence
39		h) Directory Based cache coherence protocol :The basics

Signature of the Faculty Checked by Academic Co-Ordinator Verified by HOD

2. Cloud Computing (PCC – CS702)

Class	B.Tech CSE Sem.: I
Course	Cloud Computing
Faculty Name	

Lecture Plan

Lect. No.	Ch.No.	Details of syllabus planned
1.	**1**	**Overview of computing paradigm:** Recent trends in Computing, Grid Computing, Cluster Computing, Distributed Computing ,Utility Computing, Cloud Computing.
2.		Evolution of cloud computing - Business driver for adopting cloud computing.
3.		Introduction to Cloud Computing, History of Cloud Computing, and Cloud service providers. Properties
4.		Characteristics & Disadvantages - Pros and Cons of Cloud Computing
5.		Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing. Role of Open Standards.
6.	**2**	**Cloud Computing Architecture:** Cloud computing stack - Comparison with traditional computing architecture (client/server)
7.		Services provided at various levels, How Cloud Computing Works
8.		Role of Networks in Cloud computing, protocols used
9.		Role of Web Services. Service Models (XaaS)
10.		Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS).
11.		Deployment Models, Public cloud, Private cloud, Hybrid cloud, Community cloud.
12.	**3**	**Virtualization:** Introduction and benefits, Implementation Levels of Virtualization
13.		Virtualization at the OS Level, Virtualization Structure
14.		Virtualization Mechanism, Open-Source Virtualization Technology
15.		XenVirtualization Architecture
16.		Binary Translation with Full Virtualization, Para virtualization
17.		Virtualization of CPU, Memory and I/O Devices

Lect. No.	Ch.No.	Details of syllabus planned
18	**4**	**Infrastructure as a Service (IaaS):** Introduction to IaaS – IaaS definition
19		Resource Virtualization - Server, Storage, Network. Virtual Machine(resource) provisioning and manageability, storage as a service,
20		Data storage in cloud computing (storage as a service). Renting, EC2 Compute Unit, Platform and Storage, pricing, customers.
21		**Platform as a Service (PaaS):** Introduction to PaaS - What is PaaS, Service Oriented Architecture (SOA).
22		Cloud Platform and Management - computation, storage
23		**Software as a Service (SaaS):** Introduction to SaaS, Web services,Web 2.0, Web OS, Case Study on SaaS
24	**5**	**Service Management in Cloud Computing:** Service Level Agreements (SLAs), Billing& Accounting, Comparing Scaling
25		Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously,
26		Managing Data - Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing
27		**Cloud Security:** Infrastructure Security - Network level security, Host level security, Application-level security
28		Data security and Storage - Data privacy and security Issues,
29		Jurisdictional issues raised by Data location: Identity & Access Management, Access Control, Trust, Reputation, Risk,
30		Authentication in cloud computing, Client access in cloud, Cloud
31	**6**	**Case study on Open Source and Commercial Clouds –** Amazon EC2
32		Google Compute Engine
33		Microsoft Azure
34		Cloud foundry
35		OpenStack

3. Advanced Database Systems (PCC- CS703)

Class	B.Tech CSE Sem.: I
Course	Advanced Database Systems
Faculty Name	Prof. Gundavade A.V.

Lecture Plan

Lect. No.	Ch.No.	Details of syllabus planned
1.	**1**	Database System Architectures, server system architecture
2.		Parallel systems , Parallel Database architecture
3.		Parallel databases , I/O parallelism
4.		Inter and Intra Query Parallelism , Inter and Intra operation Parallelism
5.		Design of parallel systems, Distributed Database Concepts
6.		Data storage, Distributed Transactions
7.		Commit Protocols , Concurrency Control , Distributed Query Processing
8.	2	Relational Set Operators, SQL Join Operators
9.		Subqueries and correlated queries, SQL functions, oracle sequence and synonyms
10		Database Links, Updatable Views, Procedural SQL, Triggers
11		Stored Procedures, PL/SQL Stored Functions, Embedded SQL
12		Dynamic SQL. Case study-Postgrey SQL
13	3	**NOSQL: Definition and Introduction**, Features and Types of NOSQL
14		Sorted Ordered Column-Oriented Stores
15		Key/Value Stores, Document Databases, Graph Databases
16		**NOSQL: Getting Initial Hands-On Experience**, Storing and Accessing data
17		Storing Data in and Accessing Data from MongoDB
		Querying MongoDB**, Interfacing and Interacting with NOSQL**
		Case Study- CouchDB, CouchDB vs. MongoDB
		Atlas GUI Tools for MongoDB
	4	The Need for and Role of a Database in an Organization

		The Evolution of the Database Administration Function
		The Database Environment's Human Component Security
		The Database Environment's Human Component Security
		Database Administration Tools, CASE Tools
		Developing a Data Administration Strategy
		The DBA at Work: Using Oracle for Database Administration
	5	The Need for Data Analysis, Business Intelligence
		Business Intelligence Architecture
		Decision Support Data, The Data Warehouse
		Online Analytical Processing
		Star Schemas, Implementing a Warehouse, Data Mining
		SQL Extensions for OLAP
		Materialized Views, Case Study- FireBase-Google
	6	Mathematical models for decision making
		data mining, data preparation
		Data exploration
		Data mining tasks - association rules.

5. WEB TECHNOLOGIES (PCC- CS705)

Class	B.Tech CSE Sem.: I
Course	WEB TECHNOLOGIES
Faculty Name	

Lecture Plan

Lect.No.	Ch.No.	Details of syllabus planned
	1	**Front End Web Designing HTML and CSS:**
1		HTML Design Patterns: HTML Structure, XHTML, DOCTYPE, Header Elements, Conditional Style Sheet, Structural Block Elements
2.		Terminal Block Elements, Multipurpose Block Elements, Inline Elements, Class and ID Attributes, HTML Whitespaces
3.		CSS Selector and Inheritance: Type, Class and ID Selector, Position and Group Selectors
4.		Attribute Selectors, Pseudo-element Selectors
5.		Pseudo-class Selectors, Subclass Selector,
6.		Inheritance,Visual Inheritance, and Bootstrap
	2	**Javascript Basics:**
7.		Introduction to javascript, Basic program of javascript
8.		variables, functions, conditions, loops and repetition
9.		, Function, Arrays – DOM, Built-in Objects, Regular Expression,
10		Exceptions, Event handling In Javascript
11		Validating HTML form data using javascript
12		Validation- AJAX -
13		JQuery
	3	**Angular Node JS:**
14		Angular - Web Application architecture, MVC and MVVM design pattern, Angular architecture, Angular building blocks,
15		Forms implementation, Filters, Services, Consuming REST Web Services, Modules: Built-in and custom, Directives

16		Built-in and custom, Routing and Navigation, Animations, Testing Angular application.
17		Node, NodeJsarchitecture ,Modules: Built-in and custom, Event loop, Asynchronous application , Events, Listeners, Timers, and Callbacks in Node.js.
18		Testing node application. Introduction to Mongo DB- Accessing MongoDB from Node.js.
	4	PHP basic:
19		PHP Basics: Embedding PHP code in Your Web Pages, Commenting Your Code, Outputting Data to the Browser,
20		PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures
21		Functions: Invoking a Function, Creating a Function, Function Libraries
22		Array: What is Array, creating an array, outputting an Array,
23		Merging, slicing, splicing and Dissecting Arrays, Other useful Array, Functions
		PHP session management (state management)
24		Session Handlers: What Is Session Handling, Configuration
25		Directives, Working with Sessions
26		Practical Session-Handling Examples
27		Creating Custom Session Handlers,
28		PHP cookies,
29		Uploading Files with PHP
		PHP Database and small app using Laravel and Code to generate:
30		Installation Prerequisites
31		Using the MySQL Extension
32		Interacting with the Database.
33		Interacting with the Database
34		Interacting with the Database
35		Executing Database Transactions
36		Executing Database Transactions

Project/Seminar Review Form

U.G. Students Project Schedule

Sr. No.	Activity	Tentative date of every year
Semester - I		
01	Submission of project topic with names of group member	15th of July
02	Finalization of topic and allotment of guide by department through DRC	29th of July
03	Submission of synopsis duly signed by students and guide	5th of August
04	Presentation of synopsis before DRC	2nd of September
05	Introduction and literature review presentation	30th of September
06	Methodology and future work presentation	7th of OCT

U.G. Students Project Marking Scheme

Sr. No.	Activity	Marks
Semester - I		
01	Submission of project topic with names of group member	A1 = 0.08 × TM1
02	Submission of synopsis duly signed by students and guide	A2 = 0.08 × TM1
03	Introduction and literature review presentation	A3 = 0.24 × TM1
04	Methodology and future work presentation	A4 = 0.30 × TM1
05	Guides mark	A5 = 0.30 × TM1
Semester – II		
06	Progress presentation 1	A6 = 0.20 × TM2
07	Progress presentation 2	A7 = 0.20 × TM2
08	Final presentation before DRC along with submission of spiral bound copy	A8 = 0.30 × TM2
09	Guides mark	A9 = 0.30 × TM2

Notes: -

1. TM1 = Total term work marks allotted by SUK for project work in semester I.
2. TM2 = Total term work marks allotted by SUK for project work in semester II.
3. Distribution of marks is given in form of multiplying factor.

4. Round up or down the marks to get the whole number as per requirement.
5. In rubrics also distribution of marks is given in form of multiplying factor.

U.G. Students Project Rubric for Marking Scheme of Semester – I

Level ⇨ / Activity ⇩	Unsatisfactory	Developing	Satisfactory	Excellent
Submission of project topic with names of group member	Submitted after scheduled date. (0.0 × A1)	Submitted on scheduled date, but without clear title. (0.4 × A1)	Submitted before scheduled date with clear title. (0.8 × A1)	Submitted well before scheduled date with research based title. (1.0 × A1)
Submission of synopsis duly signed by students and guide	Submitted after scheduled date, copied topic. (0.0 × A2)	Submitted on scheduled date, duly signed by group members and Guide. Copied topic but added own value. (0.4 × A2)	Submitted before scheduled date duly signed by group members and Guide. Sufficient number of references. Filling gap of existing work. (0.8 × A2)	Submitted well before scheduled date duly signed by group members and Guide. Sufficient number of references. Innovative idea. (1.0 × A2)
Introduction and Literature review presentation	Presented after scheduled date. No coordination between group members. No collection of literature. (0.25 × A3)	Presented on scheduled date. Poor coordination between group members. Little collection of literature. (0.60 × A3)	Presented on scheduled date. Good coordination between group members. Sufficient collection of literature. (0.85 × A3)	Presented on scheduled date. Excellent coordination between group members. Full collection of literature. Presented

				novel idea. (1 × A3)
Level ⇨ **Activity ⇩**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Excellent**
Methodology and future work presentation	Presented after scheduled date. No coordination between group members. Little idea about methodology, future work and conclusion. (0.25 × A4)	Presented on scheduled date. Poor coordination between group members. Clear about methodology and future work, but no clear idea about conclusion. (0.6 × A4)	Presented on scheduled date. Good coordination between group members. Clear about methodology, future work and conclusion. (0.9 × A4)	Presented on scheduled date. Excellent coordination between group members. Clear about methodology and future work. Confident about conclusion. (1 × A4)
Guides mark	Not reporting regularly. Reporting individually. Unable to explain. (0.25 × A5)	Reporting regularly and in group. Partially explaining, need guides' help. (0.6 × A5)	Reporting regularly and in group. Fully explaining without guides' help. (0.9 × A5)	Reporting regularly and in group. Fully explaining with clear concepts. (1 × A5)

U.G. Students Project Rubric for Marking Scheme of Semester – II

Level ⇨ / Activity ⇩	Unsatisfactory	Developing	Satisfactory	Excellent
Progress presentation 1	Presented after scheduled date. No coordination between group members. No progress. (0.2 × A6)	Presented on scheduled date. Poor coordination between group members. Little progress. (0.65 × A6)	Presented on scheduled date. Good coordination between group members. Satisfactory progress. (0.9 × A6)	Presented on scheduled date. Excellent coordination between group members. Excellent progress. (1 × A6)
Progress presentation 2	Presented after scheduled date. No coordination between group members. No progress. (0.2 × A7)	Presented on scheduled date. Poor coordination between group members. Little progress. (0.65 × A7)	Presented on scheduled date. Good coordination between group members. Satisfactory progress. (0.9 × A7)	Presented on scheduled date. Excellent coordination between group members. Excellent progress. (1 × A7)

Level ⇨ / Activity ⇩	Unsatisfactory	Developing	Satisfactory	Excellent
Final presentation before DRC along with submission of spiral	Presented after scheduled date. No coordination between group members. No	Presented on scheduled date. Poor coordination between group members.	Presented on scheduled date. Good coordination between group	Presented on scheduled date. Excellent coordination between

bound copy	submission of spiral bound. Lack of info. Poor format and poor grammar in presentation. Work done not as per submitted synopsis. (0.25 × A8)	Submitted spiral bound. Little info. Poor format and poor grammar in presentation. (0.7 × A8)	members. Submitted spiral bound. Sufficient info. Perfect format, but poor grammar in presentation. (0.95 × A8)	group members. Submitted spiral bound. Lot of info. No mistake in presentation. (1 × A8)
Guides mark	Not reporting regularly. Reporting individually. Unable to explain. Final bound submitted after scheduled date. (0.25 × A9)	Reporting regularly and in group. Partially explaining, need guides' help. Final bound submitted on scheduled date. (0.7 × A9)	Reporting regularly and in group. Fully explaining without guides' help. Final bound submitted before scheduled date. (0.95 × A9)	Reporting regularly and in group. Fully explaining with clear concepts. Final bound submitted well before scheduled date. (1 × A9)

EXPERIMENT LISTAND ASSIGNMENT LIST

1. Computer Networks – I (PCC-CS304)

Lecture		Practical	Tutorial		Total Hr/Wk
3		2	NA		5
Theory	CIE	T/W	OE	POE	Total Marks
70	30	25	--	--	125

Class	SY B.Tech CSE Sem.: I
Course	Computer Networks

SR.NO	TITLE OF EXPERIMENTS
1.	Study and demo of LAN, WAN and various connecting devices and components (List out component and devices required for a std. LAN, WAN)
2.	Implementation of framing method **character count** program.
3.	Implementation of framing method by **bit stuffing**.
4.	Implementation of framing method **byte stuffing** using socket programming.
5.	Implementation of Error correction using **hamming code.**
6.	Program to understand IP **classful** addressing.
7.	Study and demo Networking Commands · IP config · Ping · Hostname · Netstat · Tracert · Nslookup · Route · ARP

8.	Implementation of data transfer using connection oriented (**TCP**) client-server using socket programming
9.	Implementation of data transfer using connection less (**UDP**) client-server using socket programming
10	Implementation of TCP chat server.

2. C Programming (PCC-CS306)

Lecture		Practical	Tutorial		Total Hr/Wk
3		4*2	NA		11
Theory	CIE	T/W	OE	POE	Total Marks
--	--	50	--	50	100

Class	SY B.Tech CSE Sem.: I
Course	C Programming

Expt No.	Name of the Experiment	Nature of Experiment
1.	Study of Branching Statements in C. (if, if-else, switch)	Performing
2.	To study looping statements: for loop, while loop, do-while loop and implement loop statements.	Performing
3.	To study basics of array: One-dimensional and Multidimensional Array. Implement array in c.	Performing
4.	To study function and parameter passing: call by value and call by reference and implement function.	Performing
5.	To study Structure and implement it in C	Performing
6.	To study Union and implement in C.	Performing
7.	To study pointers in C and implement pointer and double pointer.	Performing
8.	To study and implement file read write operations on file in C	Performing
9.	To study and implement stack and its operations in C.	Performing
10.	To study and implement queue and its operations in C.	Performing
11.	To study linked lists and its operations in C and implement linked list in c.	Performing

T.Y B.TECH

1. Information Security (PCC-CS501)

Class**:** TY B.Tech CSE Sem.: I

Subject: Information Security

List of Experiments

Sr. No	Name of the Experiment
1	Write a program to find out the Modular multiplicative inverse under modulo.
2	Write a program to implement the Substitution Cipher from cryptography and its Analysis.
3	Write a program to implement the RSA algorithm..
4	Write a program to implement and analyze the Deffie-Hellman key exchange algorithm.
5	Single round of DES algorithm/Double DES/ Triple DES and its analysis.
6	Implementation and analysis of Message Digest Algorithm 5.
7	Implementation and analysis of SHA 1 (Secure Hash Algorithm 1).
8	Usage of PGP security package and S/MIME features.
9	Experimenting with SSL/TLS/E-Commerce Applications and identifying their Vulnerabilities.
10	Demo and usage of network traffic analysis tools.
11	Experimentation on identifying non-cryptographic Protocol Vulnerabilities and remedies thereon.
12	Experimenting on identifying software Vulnerabilities using various tools/techniques and their analysis.

2. System Programming (PCC-CS502)

Class	TY B.Tech CSE Sem.: I
Course	System Programming

List of Experiments

Sr. No	Name of the Experiment
1	To study language processing development tool LEX and YACC
2	To study & implement pass one of assembler
3	Implementation of Macros
4	Implementation of Nested Macro
5	Study of Macro Pre-processor
6	Implementation of Parameter passing Mechanism
7	Implementation of code improving transformations
8	Implementation - symbol table generation for input file
9	Study of software tools

TY B.TECH

1. Information Security (PCC-CS501)

Class**:** TY B.Tech CSE Sem.: I

Subject: Information Security

List of Assignments

Assig. No	Questions
1	1. Describe in brief. a. Types of Attacks. b. Symmetric Cipher
2	1. What are the principal elements of public-key cryptosystem? 2. What types of attack are addressed by message authentication? 3. What is message authentication code? 4. Briefly explain Diffie-Hellman key exchange.
3	1. Users A and B uses Diffie-Hellman key exchange technique with a common prime q = 71and a primitive root a = 7. 1) If user A has a private key XA = 5, what is A's public key YA? 2) If user B has private key XB = 12, what is B's public key YB? 3) What is the shared secret key? 2. What are the properties a digital signature should have? 3. Write and explain the Attacks and Forgeries in digital signature. 4. What a note on Kerberos.
4	1. What is a public key certificate ? 2. What is the purpose of the X.509 standard? 3. Explain in detail X.509 certificate revocation ?
5	1. Comment on **a. Web Security Threats.** **b. SSL Record Format** **2. Explain in detail SSL Architecture** **3. Write a note on Handshake Protocol**
6	1. State in details: Software Vulnerabilities, Prevention and Detection.

2. Object Oriented Modeling and Design (PCC - CS503)

Class	TY B.Tech CSE Sem.: I
Course	Object Oriented Modeling and Design

List of Assignments

Sr. No	Name of the Assignments
1	1. What is abstract class and abstract operation? 2. Explain object modeling themes. 3. Explain difference between aggregation, association and generalization
2	1. Explain the nested state diagrams. 4. Draw and explain data flow diagrams for ATM. 5. Example dynamic model
3	1 Impact of object oriented approach. 2. Explain choosing algorithm and choosing data structure 3. What is implementation of control? Explain with example.
4	1. Explain four kinds of things in UML 2. Explain the terms and concepts in UML
5	1. Explain the terms and concepts in behavior modeling. 2. Explain with example : Action state and activity state 3. Explain time and concept in advanced behavior modeling

6	1. Explain terms and concepts of components 2. What is modeling processors and devices? 3. What is pattern and architecture in architecture modeling?

3.Computer Algorithm (PCC-CS504)

Class	TY B.Tech CSE Sem.: I
Course	Computer Algorithm
Faculty Name	Dr. Nikam D. A.

List of Assignments

Sr. No	Name of the **Assignments**
1	Introduction to algorithm
2	Performance Analysis
3	Recurrence Relation
4	Divide & Conquer-Search and Sort Algorithms
5	Greedy Method
6	Basic Search and Travels
7	Backtrack
8	Dynamic Programming
9	NP Hard and NP Complete Problem
10	Introduction to Parallel algorithm

FINAL YEAR B.TECH

1. Cloud Computing (PCC – CS702)

Class	B.Tech CSE Sem.: I
Course	Cloud Computing

Experiment List

Expt No.	Ch.No.	Details of syllabus planned
1		Study of various service models in cloud-IaaS, Paas and SaaS.
2		Working and Implementation of Software as a Service-Make Google Forms, Spreadsheets, Google Classroom.
3		Working and Implementation of Platform as a Service-Working in Codenvy
4		Working and Implementation of Storage as a Service- Dropbox, JustCloud.
5		Installing a private cloud
6		Installing OS on a Virtual Machine Monitor
7		Study of Virtual Machine Migration.
8		Working and Installation of Google App Engine
9		Working and Installation of Microsoft Azure/Amazon Web Service
10		Study of Amazon EC2 and S3
11		

2. Advanced Database Systems (PCC- CS703)

Class	B.Tech CSE Sem.: I
Course	Advanced Database Systems

Experiment list

Exp. No.	Ch.No.	Name of the Experiment
1.		Installation of Oracle / MySQL and practicing DDL & DML commands. Execute basic utilities used to interact with Oracle DBMS / MySQL.
2.		Design and implement the Fragmentation schema & the Replication schema for the social networking websites / online e-shopping / e-learning websites.
3.		Implementation of 2 Phase Commit protocol for distributed databases.
4.		Execute partitioning queries on parallel databases.
5.		Implementation of Relational Set Operators, SQL Join queries, Subqueries and Correlated Queries, Oracle Synonyms and Sequence.
6.		Demonstrate SQL Functions, Procedures, Cursors, and triggers using PL/SQL, Views

7.		Installation of MongoDB and Apache Cassandra
8.		Exploring MongoDB, and Apache Cassandra basics, Identify the schema design and data modeling techniques in MongoDB.
9.		Accessing MongoDB and Apache Cassandra from some of the popular high-level programming languages. Perform Create, Retrieve, Update and Delete or CRUD operations in MongoDB.
10		Install CouchDB on Windows.
11		Create and delete CouchDB database. Run CouchDB query with Mongo.
12		Case study of Oracle Database Administration and Security. Study of database administrator's responsibilities like – i) Installing and upgrading the database server and/or application tools. ii) Creating user's profiles and ensuring system security by careful allocation of user permissions. iii) Monitoring technical support for both database systems and related applications.
13		Study of CASE concept and tools.
14		Demonstrate all OLAP operations and cube operator in OLAP.

15		Consider a case study of any Big Data system of your choice and design the distributed database architecture and analyze the probable solutions available in the market.
16		Demonstrate data analysis and visualization using any BI Tool.

3. WEB TECHNOLOGIES (PCC- CS705)

Class	B.Tech CSE Sem.: I
Course	WEB TECHNOLOGIES

Experiment List

Lect. No.	Experiment
1.	Create html pages for website like login, registration and about us pages.
2.	Apply and design the created HTML pages using CSS
3.	Write a program demonstrating javascript functions and different validations.
4.	Write a program to read and write HTML contents with JQuery
5.	Create a simple Testing Angular application.
6.	Write a program demonstrating NodeJs application.
7.	Write a program to handle the error in NodeJs.
8.	Write a study experiment for Installing Apache and PHP on Linux, Configuring PHP at Build Time on Linux. Or Installation of XAMPP.
9.	Hello world Program-Embedded HTML with PHP.
10.	Program based on PHP variables, Expression, arrays, control structure.
11.	Experiment Based on OOP and Advance OOP PHP
12.	Form validation using PHP using regular expressions
13.	Upload various types of file from client side to server with validation
14.	Insert user entered data in form to MySQL database using PHP
15.	Update user's data stored in MySQL database using PHP
16.	Write a program to show stored cookies, update, retrieve and delete from browser.

FACULTY LIST

DEPARTMENT FACULTY LIST

Academic Year- 2023-2024

Sr. No.	Faculty Name
01	Dr. Prof. D. A. Nikam
02	Prof. P. V. Kothawale
03	Prof. A. V. Ghundavade
04	Prof. R. D. Mane
05	Prof. P. S. Ambupe
06	Prof. S. A. Narade
07	Prof. S. S. Chougule
08	Prof. N.H. Sayyad
09	Prof. Dargad

STAFF LIST

DEPARTMENT STAFF LIST

Academic Year- 2023-2024
SEM- I

Sr. No.	Faculty Name
01	Mr. S.M. Swami (Tech. Assistant)
02	Mr. C.A. Mane (Tech. Assistant)
03	Mr. D. B. Mane (Peon)

ACTIVITY RECORD

Sr no	Cell & Name of Coordinator	Name & Nature Of activity	Number of Activity	Targeted Audience	Date & Place
1	**Industrial Visit** Prof. Mrs. N. H. sayyad	Industrial Visit	01	S.Y Students	Last week of SEPT 2023, Akashwani Kolhapur
2			01	T.Y Students	First week of NOV 2023 TCognition Kolhapur
3			01	B.Tech Students	Last week of SEPT 2023
4	**Guest Lecture** Prof. Mrs. A. V. Gundavade	Distributed file system	01	S.Y Students	2nd week of NOV 2023.
5		Microprocessor and microcontroller applications.	01		2nd week of SEPT 2023
6		Mobile device security	01	T.Y Students	Last week of July 2023
7		Internet of things	01		3rd week of SEPT 2023
8		cloud security	01	B.Tech Students	Third Week of AUG 2023
9		NO SQL	01		3rd week of SEPT 2023
10	**Expert Lecture** Prof. Mrs. A. V. Gundavade	As per discussion with all Subject Teachers	01 01	S.Y Students	2nd Week of OCT 2023 1st week of NOV 2023
		As per discussion with all Subject Teachers	02	T.Y Students	Last week of AUG2023 Last week of SEPT2023
		As per discussion with all Subject Teachers & Guides	02	B.Tech Students	Last week of AUG 2023 Last week of SEPT 2023
11	**Augmentation course** Prof. Mrs. N. H. sayyad	Technical-Cloud Computing	01	S.Y Students	Last week of SEPT 2023
12		Non-technical (Stress management or yoga)	01		3rd week of OCT 2023
13		Technical-Big Data	01	T.Y Students	Last week of SEPT 2023
14		Non-technical (Stress management or yoga)	01		3rd week of OCT 2023
15		Technical-Cloud Computing	01	B.Tech Students	Last week of SEPT 2023
16		Non-technical (Stress management or yoga)	01		3rd week of OCT 2023
17	**Alumni Cell** Prof. R. D. Mane	Will be finalized as per discussion with Teachers	--	--	third Week of SEPT and second week of OCT 2023
18	**Faculty Development cell-** Prof. P. V. Kothawale	Workshop- Big data, data science	01	Faculty Members	Third week of SEPT 2023
19	**CSI. & COMESA Prof. P. S. Ambupe**	Technical Event	01	All students	3rd week of OCT 2023

20	**Training** Prof. Mr. R. D. Mane	Technical Mock Test	--	T.Y & B.Tech Students	First week of SEPT
21	**Lab Development cell** Prof. Mr. P. S. Ambupe	Will Conduct a meeting with all faculty for considering Open source software's in all laboratories for Curriculum	--	Department	Seminar Hall, Second week of October
22	**Entrepreneurship Development Cell** Prof. R. D. Mane	Opportunities in Entrepreneurship	--	T.Y & B.Tech	Last Week of July
23	**Community activity Plan** Prof. Mrs. N. H. sayyad	Awareness Programs for society by SY,TY & B.Tech students.	01	S.Y Students	First week of NOVEMBER
24			01	T.Y Students	Last week of AUG 2023
25			01	B.Tech Students	Third week of NOVEMBER
26	**MoU** Prof. S. A. Narade	Renew MoU and arrange guest lecture	--	Department & Students	Third week of AUG 2023
27	**Parent Meet** Prof. S. S. Chougule	Parent Meet	01	S.Y, T.Y, B.Tech students & their Parents.	2nd week of OCT 2023
28	**Departmental Advisory Board** Prof. S. A. Narade	Departmental Advisory Board meeting	01	Department & All Board Members.	3rd week of SEPT 2023
29	**Project Presentation** Prof. S. S. Chougule	synopsis presentation	--	B.Tech students	1st week of AUG 2023
30		Progress presentation	--		1st week of SEPT 2023
31		Progress presentation	--		Last week of SEPT 2023
32	**Student Feedback** Prof. P. V. Kothawale	Student Feedback	--	S.Y, T.Y & B.Tech students	3rd week of Aug 2023 and Last week of OCT