(1) Vision: To contribute effectively to the important national endeavor to produce quality human resource in the Computer Science & Engineering and related areas for sustainable development of the country's IT industry needs.

(2) Mission:

- To accomplish state-of-the-art programmes in computer science & engineering.
- To provide one of the best working environments to motivate faculty and students to work towards vision of the department and to attract best faculty and students.
- To develop linkages with industry, other universities/institutes/research laboratories and work in collaboration with them.
- To use our expertise in computer engineering discipline for helping society in solving problems.

(3) Program Educational Preambles (PEO's):

PEO1: To produce engineering graduates who shall excel in a career utilizing their education in computer engineering.

PEO2: Pursue higher education for professional development

PEO3: Exhibit leadership qualities with demonstrable attributes in lifelong learning to contribute to the societal needs.

(4) Programme Outcomes (PO's):

1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and engg. Specialization to the solution of complex engineering problems.

2. Problem Analysis: Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences.

3. Design/Development Of Solutions: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct Investigations Of Complex Problems: User research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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

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

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

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

9. Individual And Team Work: Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.

10. Communication: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.

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

12. Life-Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

(5) Program Specific Outcomes (PSOs)

PSO-1 Apply standard Software Engineering practices and strategies in real-time software project development using open-source programming environment or commercial environment to deliver quality product for the organization success.

PSO- 2 Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics of varying complexity**.**

(06) Programme PO's and PSO's Mapping

			PO 1	PO 2	PO3	PO4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO 12		
S. No	**Program**	**Courses Category**	Engineering Knowledge	Problem Analysis	Design/Development of Solution	Investigation	Modern Tool Usage	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Team Work	Communication	Project Management	Life-Long Learning	**PSO 1**	**PSO 2**
1	BE(CSE)	Humanities and Social Sciences including Management	*	*			*	*		*		*		*		

		courses													
2		Basic Science courses	*	*	*	*	*		*							
3		Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.	*	*	*		*							*		
4		Professional core courses	*	*	*	*										
5		Professional Elective courses relevant to chosen specialization/ branch	*	*	*	*	*	*		*	*					
6		Open subjects – Electives from other technical and /or emerging *subjects	*	*	*	*	*	*	*	*	*			*	*	*
7		Project work, seminar and internship in industry or elsewhere		*	*	*		*	*	*	*	*	*	*		*
8		Specific core subject		*	*	*										
9		Mandatory Course (Non credit)						*	*	*	*	*		*		

(07) Semester wise PO's and SPO's Mapping

S.No.	Course Code	Name of the Courses	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
			Engineering Knowledge	Problem Analysis	Design/ Development of Solution	Investigation	Modern Tool Usage	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Team Work	Communication	Project Management	Life-Long Learning		
1	BEBSC-101	Mathematics-I	*	*	*	*								*		

2	BEBSC- 202	Engineering Physics	*	*		*	*					*	*	*		
3	BEESC-203	Basic Computer Engineering	*	*	*	*	*									
4	BEESC-204	Basic Mechanical Engineering						*		*	*			*		
5	BEESC-205	Basic Civil Engineering & Mechanics	*	*	*	*	*	*	*		*	*				
6	BEHSMC-206	Language Lab		*	*			*			*	*	*	*		
7	BELC-107	Self-Study / GD Seminar	*		*						*	*		*		
8	BEBSC-201	Mathematics-II	*	*	*	*								*		
9	BEBSC-102	Engineering Chemistry	*	*	*		*		*					*		
10	BEHSMC-103	English for Communication	*		*						*	*		*		
11	BEESC-104	Basic Electrical & Electronics Engineering	*	*	*											
12	BEESC-105	Engineering Graphics	*		*	*		*			*			*		
13	BEESC-106	Manufacturing Practices						*		*	*			*		
14	BELC-207	Industrial Training	*	*	*				*							
15	BEA-301	Mathematics- III	*	*	*	*								*		
16	CSA-302	Discrete Structure	*	*	*	*										*
17	CSA-303	Data Structure	*	*	*	*									*	*
18	CSA-304	Digital Systems	*	*	*	*	*				*					*
19	CSA-305	Object Oriented Programming & Methodology	*												*	*
20	CSA-306	Computer Workshop			*	*		*						*		
21	CSA-307	Self-Study/GD Seminar	*		*						*	*		*		
22	BEA-401	Energy, Ecology, Environment And Society	*	*	*									*		
23	CSA-402	Analysis Design of Algorithm	*	*	*										*	
24	CSA-403	Software Engineering	*	*	*							*	*			*
25	CSA-404	Computer Org. & Architecture	*		*											*
26	CSA-405	Operating Systems	*	*									*	*		
27	CSA-406	Programming Practices	*		*	*									*	*
28	CSA-407	Industrial Training-I	*	*	*	*	*	*		*	*		*	*	*	*
29	CSA-501	Database Management Systems	*	*	*										*	*
30	CSA-502	Computer Graphics	*	*	*										*	*

31	CSA-503	PHP Technology	*		*		*							*	*
32	CSA-504(A)	Formal Language & Automata Theory	*	*	*									*	
33	CSA-504(B)	Simulation & Modeling	*	*	*	*					*					
34	CSA-505(A)	E-Commerce & Governance	*				*	*							*	*
35	CSA-505(B)	Signal & Systems	*	*	*	*										
36	CSA-506	Industrial Training-II	*	*	*	*	*	*		*	*		*	*	*	*
37	CSA-601	Compiler Design	*	*	*		*								*	*
38	CSA-602	Computer Network	*	*	*										*	*
39	CSA-603(A)	Advance Computer Architecture	*	*	*	*				*				*		
40	CSA-603(B)	Advanced Data Structure	*	*	*	*									*	*
41	CSA-604(A)	Data Mining and Data Warehousing	*	*	*	*					*			*	*	*
42	CSA-604(B)	Soft Computing	*	*	*										*	*
43	CSA-605(A)	Information Theory & Coding	*	*	*	*								*	*	*
44	CSA-605(B)	Cyber Law & Ethics	*	*		*								*		
45	CSA-606	Minor Project		*	*					*					*	*
46	CSA-701	Ad-hoc and Sensor Network	*	*	*	*					*			*	*	*
47	CSA-702	Digital Image Processing	*	*		*									*	*
48	CSA-703(A)	Artificial Intelligence	*	*		*									*	
49	CSA-703(B)	Neural Networks	*	*		*									*	
50	CSA-704(A)	Information and Storage Management	*		*										*	*
51	CSA-704(B)	Optimization Techniques	*		*		*								*	*
52	CSA-705	Project Stage-I	*		*						*	*		*		
53	CSA-706	Self-Study/GD/Seminar	*		*						*	*		*		
54	CSA-801	Web Engineering	*	*	*	*										
55	CSA-802 (A)	Distributed Computing	*	*	*	*									*	
56	CSA-802(B)	Network Management	*		*		*								*	
57	CSA-803(A)	Internet of Things	*	*	*										*	
58	CSA-803(B)	Mobile computing	*	*	*	*	*	*					*	*	*	*
59	CSA-804	Project Stage-II	*	*	*	*	*	*		*	*		*	*	*	*

(08) Structure of Programme: To fulfill the need of development of all the POs/ GAs, as per above mapping, the following semester wise programme structure are as under.

[L= Lecture, T = Tutorials, P = Practical's & C = Credits]

Total Credits*= 160

Structure of Undergraduate Engineering program:

S. No.	Course Category	Credits of the CSE Curriculum
1.	Humanities and Social Sciences including Management	08
2.	Basic Sciences	17
3.	Engineering Sciences including workshop, drawing, basics of electrical/mechanical/computer etc.	19
4.	Professional Core Subjects	65
5.	Professional Subjects: Subjects relevant to chosen specialization/branch	17
6.	Open Subjects: Electives from other technical and/or emerging subjects	13
7.	Project work, seminar and internship in industry or elsewhere	21
8.	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Knowledge Tradition]	Non-credit
	Total	**160**

***Definition of Credit:**

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
2 Hours Practical (Lab)/week	1 Credit

(09) Scheme of Exanimation (Computer Science and Engineering) Academic Year 2019-20

I Semester

S. No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assign-ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	BEBSC-101	Mathematics-I	60	30	10	-	-	100	3		-	3
2	BEBSC- 202	Engineering Physics	60	30	10	30	20	150	2	1	2	4
3	BEESC-203	Basic Computer Engineering	60	30	10	30	20	150	3	-	2	4
4	BEESC-204	Basic Mechanical Engineering	60	30	10	30	20	150	2	-	2	3
5	BEESC-205	Basic Civil Engineering & Mechanics	60	30	10	30	20	150	3	-	2	4
6	BEHSMC-206	Language Lab	-	-	-	30	10	40	-	-	2	1
7	BELC-107	Self-Study / GD Seminar					10	10			2	1
		Total	**300**	**150**	**50**	**150**	**100**	**750**	**13**	**1**	**12**	**20**

II Semester

S. No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assign-ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	BEBSC-201	Mathematics-II	60	30	10	-	-	100	3		-	3
2	BEBSC-102	Engineering Chemistry	60	30	10	30	20	150	3		2	4
3	BEHSMC-103	English for Communication	60	30	10	30	20	150	3	-	2	4
4	BEESC-104	Basic Electrical Engineering	60	30	10	30	20	150	2	-	2	3
5	BEESC-105	Engineering Graphics	60	30	10	30	20	150	2	1	2	4
6	BEESC-106	Manufacturing Practices	-	-	-	30	10	40	-	-	2	1
7	BELC-207	Industrial Training					10	**10**	**-**	**-**	**2**	**1**
		Total	**300**	**150**	**50**	**130**	**100**	**750**	**13**	**1**	**12**	**20**

III SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assign-ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	BEA-301	Mathematics- III	60	30	10	-	-	100	3	-	-	3
2	CSA-302	Discrete Structure	60	30	10	-	-	100	2	1	-	3
3	CSA-303	Data Structure	60	30	10	30	20	150	3	-	2	4
4	CSA- 304	Digital Systems	60	30	10	30	20	150	2	1	2	4
5	CSA-305	Object Oriented Programming & Methodology	60	30	10	30	20	150	3	-	2	4
6	CSA-306	Computer Workshop	-	-	-	30	20	50	-	-	2	1
7	CSA-307	Self-Study/GD Seminar	-	-	-	-	50	50	-	-	2	1
Total			300	150	50	120	130	750	13	2	10	20

IV SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assign-ments/ Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	BEA-401	Energy, Ecology, Environment And Society	60	30	10	-	-	100	3		-	3
2	CSA-402	Analysis Design of Algorithm	60	30	10	30	20	150	2	1	2	4
3	CSA-403	Software Engineering	60	30	10	30	20	150	3		2	4
4	CSA-404	Computer Org. & Architecture	60	30	10	30	20	150	2	1	2	4
5	CSA-405	Operating Systems	60	30	10	30	20	150	3		2	4
6	CSA-406	Programming Practices	-	-	-	30	20	50	-	-	2	1
7	CSA-407	Industrial Training-I	To be completed during fourth semester semester break. Its evaluation/credit to be added in fifth semester									
TOTAL			300	150	50	150	100	750	13	2	10	20

V SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assign-ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	CSA-501	Database Management Systems	60	30	10	30	20	150	2	1	2	4
2	CSA-502	Computer Graphics	60	30	10	30	20	150	2	1	2	4
3	CSA-503	PHP Technology	60	30	10	30	20	150	2	1	2	4
4	CSA-504	Program Elective-I	60	30	10	-		100	3	1	0	4
5	CSA-505	Open Core Elective - I	60	30	10	-		100	3	1	0	4
6	CSA-506	Industrial Training-I			50	150	50	250			4	2
	TOTAL		**300**	**150**	**100**	**240**	**110**	**900**	**12**	**5**	**10**	**22**

Program Elective-I	CSA-504(A) Formal Language & Automata Theory	CSA-504(B) Simulation & Modeling
Open Core Elective - I	CSA-505(A) E-Commerce & Governance	CSA-505(B) Signal & Systems

VI SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assign-ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	CSA-601	Compiler Design	60	30	10	30	20	150	2	1	2	4
2	CSA-602	Computer Netwaork	60	30	10	30	20	150	2	1	2	4
3	CSA-603	Program Elective-II	60	30	10			100	3	1	0	4
4	CSA-604	Program Elective-III	60	30	10	-		100	3	0	0	3
5	CSA-605	Open Core Elective - II	60	30	10	-		100	3	0	0	3
6	CSA-606	Minor Project	-	-	-	200	100	300	-	-	4	2
	TOTAL		**300**	**150**	**50**	**260**	**140**	**900**	**13**	**3**	**8**	**20**

Program Elective-II	CSA-603(A)Advance Computer Architecture	CSA-603(B) Advanced Data Structure
Program Elective-III	CSA 604 (A) Data Mining and Data Warehousing	CSA-604(B) Soft Computing
Open Core Elective - II	CSA-605(A) Information Theory & Coading	CSA-605(A) Cyber Law & Ethics

VII SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assign-ments/ Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	CSA-701	Ad-hoc and Sensor Networks	60	30	10	30	20	150	3	0	2	4
2	CSA-702	Digital Image Processing	60	30	10	30	20	150	3	0	2	4
3	CSA-703	Program Elective-IV	60	30	10			100	3	0	0	3
4	CSA-704	Open Core Elective - III	60	30	10		-	100	3	0	0	3
5	CSA-705	Project Stage-I	-	-	-	120	80	200	-	-	10	5
6	CSA-706	Self-Study /GD/Seminar					200	200			2	1
	TOTAL		**240**	**120**	**40**	**180**	**320**	**900**	**12**	**0**	**16**	**20**

Program Elective-IV	CSA-703(A) Artificial Intelligence	CSA-703(B) Neural Networks
Open Core Elective - III	CSA-704(A) Information and Storage Management	CSA-704(B) Optimization Techniques

VIII SEMESTER

S.No.	Subject Code	Subject Name	Maximum Marks Theory Slot			Maximum Marks (Practical Slot)		Total Marks	Periods/ hour/ week			Credits
			End Sem. Exam.	Mid Tests	Assign-ments/Quiz	End Sem. Practical & Viva	Practical Record /Assignment/ Quiz / Presentation		L	T	P	
1	CSA-801	Web Engineering	60	30	10	30	20	150	3	0	2	4
2	CSA-802	Program Elective-V	60	30	10			100	3	0	0	3
3	CSA-803	Open Core Elective - IV	60	30	10	-		100	3	0	0	3
4	CSA-804	Project Stage-II	-	-	-	240	160	400	-	-	16	8
	TOTAL		**180**	**90**	**30**	**270**	**180**	**750**	**9**	**0**	**18**	**18**

Program Elective-V	CSA-802 (A) Distributed Computing	CSA-802(B) Network Management
Open Core Elective - IV	CSA-803(A) Internet of Things	CSA-803(B) Mobile computing

(10) Course Content

BEBSC-101

Mathematics-I

BEBSC-101	Mathematics-I	3L:0T:0P	3 credits	3Hrs/Week

Course Objective:-

The Objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course will also introduce fundamentals of mathematical functions, derivatives and aspects of calculus to students. This course deep understanding of matrix, differential equations, Sequences and series, Vector Space as well as a strong sense of how useful the subject can be in other disciplines of learning.

Outcome:-

Course work is designed to provide students the opportunity to learn key concepts of mathematical functions, key concepts of matrix, Vector Spaces as well as fundamentals and applications of integral calculus.

Unit-I Calculus **(10Hrs)**

Rolle's theorem, Mean Value theorems, Expansion of functions by Mc. Laurin's and Taylor's for one variable; Taylor's theorem for function of two variables, Partial Differentiation, Maxima & Minima (two variables), Method of Lagrange's Multipliers.

Unit-II Integral **(6 Hrs)**

Definite Integral as a limit of a sum and Its application in summation of series; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas, Multiple Integral, Change the order of the integration, Applications of multiple integral for calculating area and volumes of the curves.

Unit-III Sequences and series **(6 Hrs)**

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit-IV Vector Spaces **(6 Hrs)**

Vector Space,Vector Sub Space, Linear Combination of Vectors, Linearly Dependent, Linearly Independent, Basis of a Vector Space,Linear Transformations.

Unit-V Matrices **(10Hrs)**

Rank of a Matrix, Solution of Simultaneous Linear Equations by Elementary Transformation, Consistency of Equation, Eigen Values and Eigen Vectors, Diagonalization of Matrices, Cayley-Hamilton theorem and its applications to find inverse.

References:-

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

BEBSC-102

Engineering Chemistry

BEBSC-102	Engineering Chemistry	3L:0T:0P	3 credits	3Hrs/Week

Objective:-

1. To acquire knowledge about hardness of water and importance of water in industrial purpose.
2. To understand the concept of molecular spectroscopy.
3. To gain the knowledge of about polymeric material and biodegradable substances.
4. To understand the mechanism of lubricant and properties of lubricant.

Outcomes:

1. Develop innovative methods to produce soft water for industrial use.
2. Identify the structure of unknown / new compounds with the help of spectroscopy.
3. Substitute metal with conducting polymers and produce cheaper biodegradable polymers to reduce environmental pollution.
4. Apply their knowledge for use and protect to industrial and domestic equipment.

UNIT-I Atomic And Molecular Structure (6Hrs)

Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Molecular orbitals of diatomic molecules and plots of the multi centre orbitals. Equations for atomic and molecular orbitals. water treatment- Introduction, hardness of water, Units of hardness, disadvantage of hard water, scale and sludge formation in boilers, boilers troubles.

UNIT-II Spectroscopic Techniques And Applications (10Hrs)

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterisation techniques. Diffraction and scattering.

UNIT-III Intermolecular Forces And Potential Energy Surfaces (6Hrs)

Ionic, dipolar and van Der Waals interactions. Lubricant-Introduction, mechanism of lubricant, classification of lubricant, properties of lubricating oils.

UNIT-IV Use Of Free Energy In Chemical Equilibrium (10Hrs)

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. High Polymers-Introduction, nomenclature, types of polymerization, classification of polymers, plastics-important, thermo-plastic resins and thermo setting resin.

UNIT-V Periodic Properties (10Hrs)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries.

REFRENCES:

1. University chemistry, by B. H. Mahan
2. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
   Fundamentals of Molecular Spectroscopy, by C. N. Banwell
3. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S.

4. Physical Chemistry, by P. W. Atkins
5. Engg. Chemistry Jain .Jain
6. Engg. Chemistry Shashi Chawla.

BEBSC-102
Engineering Chemistry

BEBSC-102	**Engineering Chemistry**	**0L:0T:2P**	**1 credits**	**2Hrs/Week**

LIST OF EXPERIMENTS:

1. Determination of surface tension and viscosity
2. Determination of chloride content of water
3. Determine the change of viscosity of given lubricating oil with change in temperature by Redwood Viscometer No. 1.
4. Determine the change of viscosity of given lubricating oil with change in temperature by Redwood Viscometer No. 2.
5. To determine the flash and fire point of given lubricating oil by Cleveland's open cup apparatus.
6. To determine the flash and fire point of given lubricating oil by Abel's closed cup apparatus.
7. To determine the flash and fire point of given lubricating oil by Pensky Marten's apparatus.
8. To determine the total hardness of given water sample by titrating it against EDTA solution using EBT as an indicator.

Laboratory Outcomes:

The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
- Synthesize a small drug molecule and analyse a salt sample

BEHSMC-103
English for Communication

BEHSMC-103	English for Communication	3L:0T:0P	3 credits	3Hrs/Week

Objective:-

1. To enhance Professional competence in reading, writing, listening and speaking.
2. To modify the tactic of providing information about the language by using several techniques.
3. To minimize the Grammar Translation Method of ELT by replacing it with Direct Learning Method.
4. To Introduce Communicative Method of ELT and focusing the teaching pedagogy to the student-centered learning rather than the teacher-centered learning.
5. To develop the skills to master three major forms of communications which are vital in academic and professional settings namely professional presentations, interviews and group communications respectively.
6. To provide a deep insight of techniques for delivering effective presentations, appealing job interviews, and actively participating in various forms of group communication.

Course Outcomes (CO):

At the end of this course students will have:

1. Ability to design a language component or process to meet desired need within Realistic, Constraints such as economic, environmental, social, political, ethical Scenario.
2. Ability to analyze the usage of English words in different contexts.
3. An understanding of technical and academic articles' comprehension.
4. The ability to present oneself at multinational levels knowing the type of different Standards of English

UNIT-I Identifying Common errors in writing (6 Hrs)
Articles, Subject-Verb Agreement, Prepositions, Active and Passive Voice, Reported Speech: Direct and Indirect, Sentence Structure.

UNIT-II Vocabulary building and Comprehension (6 Hrs)
Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, synonyms, antonyms, Reading comprehension.

UNIT-III Communication: (10 Hrs)
Introduction, Meaning and Significance, Process of Communication, Oral and Written Communication, 7 c's of Communication, Barriers to Communication and Ways to overcome them, Importance of Communication for Technical students, nonverbal communication.

UNIT-IV Developing Writing Skills (10 Hrs)
Planning, Drafting and Editing, Precise Writing, Précis, Technical definition and Technical description. Report Writing: Features of writing a good Report, Structure of a Formal Report, Report of Trouble, Laboratory Report, Progress Report.

UNIT-V Business Correspondence (10 Hrs)
Importance of Business Letters, Parts and Layout; Application, Contents of good Resume, guidelines for writing Resume, Calling/ Sending Quotation, Order, Complaint, E-mail and Tender.

References:-

1. 'Technical Communication : Principles and practice', Meenakshi Raman and Sangeeta Sharma (Oxford)
2. 'Effective Business Communication', Krizan and merrier (Cengage learning)
3. 'Communication Skill, Sanjay Kumar and pushlata, OUP2011
4. "Practical English Usage Michael Swan OUP, 1995.

5. "Exercises in spoken English Parts I-III CIEFL, Hyderabad, Oxford University Press
6. On writing well, William Zinsser, Harper Resource Book 2001.
7. Remedial English Grammar, F.T. Wood,Macmillan2007.

BEHSMC-103	English for Communication	0L:0T:2P	1 credits	2Hrs/Week

List of Experiments:-

1. Listening Comprehension.
2. Pronunciation, Intonation, Rhythm
3. Practicing everyday dialogues in English
4. Interviews.
5. Formal Presentation

BEESC-104
Basic Electrical Engineering

BEESC-104	**Basic Electrical Engineering**	**2L:0T:0P**	**2 credits**	**2Hrs/Week**

Objective:-

Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context and to provide students the working knowledge for the analysis of basic DC and AC circuits used in electrical and electronic devices.

Course Outcomes:-

- To understand and analyze basic electric and magnetic circuits.
- To study the working principles of electrical machines and power converters.
- To introduce the components of low voltage electrical installations.

Unit-I Electrical circuit elements **(10 Hrs)**

Electrical circuit elements (R, L and C), Concept of active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, Kirchhoff‟s laws, Loop and-delta transformation, nodal methods, Superposition of a theorem, Thevenin theorem, Norton theorem.

Unit-II AC Circuits **(10 Hrs)**

Representation of Sinusoidal waveforms –Average and effective values, Form and peak factors, Concept of phasors, phasor representation of sinusoidally varying voltage and current. Analysis of single phase AC Circuits consisting of R, L, C, RL, RC, RLC combinations (Series and Parallel), Apparent, active & reactive power, Power factor, power factor improvement. Concept of Resonance in series & parallel circuits, bandwidth and quality factor. Three phase balanced circuits, voltage and current relations in star and delta connections.

Unit-III Magnetic circuit **(6 Hrs)**

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Unit-IV Machines **(10 Hrs)**

DC machines: Principle & Construction, Types, EMF equation of generator and torque equation of motor, applications of DC motors (simple numerical problems)

Three Phase Induction Motor: Principle & Construction, Types, Slip-torque characteristics, Applications (Numerical problems related to slip only), Single Phase Induction motor: Principle of operation and introduction to methods of starting, applications. Three Phase Synchronous Machines: Principle of operation of alternator and synchronous motor and their applications.

Unit-V Components of LT Switchgear **(6 Hrs)**

Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Importance of earthing. Types of Batteries, Important characteristics for Batteries.Elementary calculations for energy consumption and savings, battery backup.

Reference's: -

1. Ritu Sahdev, "Basic Electrical Engineering",
2. S. Singh, P.V. Prasad, "Electrical Engineeri
3. D. C. Kulshreshtha, "Basic Electrical Engine

4. E. Hughes, "Electrical and Electronics Techn
5. S. Bobrow, "Fundamentals of Electrical Engg
6. V. D. Toro, "Electrical Engineering Fundamental

BEESC-104	**Basic Electrical Engineering**	**0L:0T:2P**	**1 credits**	**2Hrs/Week**

Laboratory Preambles:

1. Read and demonstrate the rating of basic equipments used in electrical engineering
2. Connections of different components as per the rules
3. Application different components in electrical field

Laboratory Outcomes

1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.
4. Understand the basic characteristics of transformers and electrical machines.

List of Experiments: -

1. Verification of Kirchhoff's laws
2. Verification of Superposition and Thevenin Theorem.
3. Measurement of power and power factor in a single phase ac series inductive circuit and study improvement of power factor using capacitor
4. Study of phenomenon of resonance in RLC series circuit and obtain resonant frequency.
5. Connection and measurement of power consumption of a fluorescent lamp (tube light).
6. Measurement of power in 3- phase circuit by two wattmeter method and determination of its power factor for star as well as delta connected load.
7. Determination of parameters of ac single phase series RLC circuit
8. To observe the B-H loop of a ferromagnetic material in CRO.
9. Determination of (i) Voltage ratio (ii) polarity and (iii) efficiency by load test of a single phase transformer
10. Determination of efficiency of a dc shunt motor by load test
11. To study running and speed reversal of a three phase induction motor and record speed in both directions.
12. Demonstration of cut-out sections of machines: dc machine, three phase induction machine, single-phase induction machine and synchronous machine.

BEESC-105
Engineering Graphics and Design

BEESC-105	**Engineering Graphics and Design**	**2L:1T:0P**	**3 credits**	**3Hrs/Week**

OBJECTIVE:-

1. Increase ability to communicate with people.
2. Learn to sketch and take field dimensions.
3. Learn to take data and transform it into graphic drawings.
4. Learn basic Auto Cad skills.
5. Learn basic engineering drawing formats.
6. Prepare the student for future Engineering positions.

OUTCOMES: -

Student's ability to hand letter will improve.

1. Student's ability to perform basic sketching techniques will improve.
2. Students will be able to draw orthographic projections and sections.
3. Student's ability to use architectural and engineering scales will increase.
4. Students ability to produce engineered drawings will improve
5. Student's ability to convert sketches to engineered drawings will increase.
6. Students will become familiar with office practice and standards.
7. Students will become familiar with Auto Cad two dimensional drawings.
8. Students will develop good communication skills and team work.

UNIT-I Introduction to Engineering Drawing **(10 Hrs)**
Principles of Engineering Graphics and their significance, usage of Drawing instruments, Lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales –Plain, Diagonal and Venire Scales;

UNIT-II Orthographic Projections **(10 Hrs)**
Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes; Projections of Regular Solids those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale

UNIT-III Sections and Sectional Views of Right Angular Solids **(6 Hrs)**
Prism, Cylinder, Pyramid, Cone –Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only).

UNIT-IV Isometric Projections: **(6 Hrs)**
Principles of Isometric projection –Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

UNIT-V Overview of Computer Graphics: (10 Hrs)

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Objects, Isometric Views of lines, Planes, Simple and compound Solids; Customization & CAD Drawing consisting of set up of the drawing page and the printer, including scale settings, Setting up of Units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance.

References:-

1.Bhatt N.D., Paschal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2.Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3.Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4.Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5.CAD Software Theory and User Manuals

BEESC-105	**Engineering Graphics and Design**	**0L:0T:2P**	**1 credits**	**2Hrs/Week**

List of Experiments:-

1. Sketching and drawing of geometries and projections based on above syllabus
2. Term work: A min. of 30 hand drawn sketches (on size A4 graphic sketch Book) plus 5 CAD-printouts on size A4 sheets plus 10 sheets of size A2 or 6 sheets of size A1, (50% marks to be allotted for this record + 25% marks for attendance +25%marks for Teachers Assessment

BEESC-106

Manufacturing Practices

BEESC-106	**Manufacturing Practices**	**0L:0T:2P**	**1 credits**	**2Hrs/Week**

Objective:-

1. To understand process of cutting shaping.
2. To understand working principles for various machining processes.
3. To understand construction, working and applications of various machine tools.
4. To learn basic set up, working and applications of a few important non-conventional machining processes to get hand on experience on various machine tools.

Course Outcomes:

1. The students will be able to understand the details about machines used in production.
2. The students will be able to understand the mechanics behind metal cutting.
3. The students will be able to understand the finishing and super finishing processes.
4. The students will be able to understand the Physics of material removal behind the various non-conventional machining processes.

Manufacturing is fundamental to the development of any engineering product. The course on Engineering Workshop Practice is intended to expose engineering students to different types of manufacturing / fabrication processes, dealing with different materials such as metals, ceramics, plastics, wood, glass etc. While the actual practice of fabrication techniques is given more weightage, some lectures and video clips available on different methods of manufacturing are also included.

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods
2. CNC machining, Additive manufacturing
3. Fitting operations & power tools
4. Carpentry
5. Plastic molding, glass cutting
6. Metal casting
7. Welding (arc welding & gas welding), brazing

List of Experiments:-

1. Carpentry Shop Experiment To Make a T-LAP joint with wood Pieces
2. Machine Shop Experiment To Perform Knurling on Iron Rod
3. WELDING SHOP (LAP Joint) , Tools, Accessories, Diagram And Explanation
4. SHEET METAL SHOP (Square Tray) , Parts, Accessories, Diagram And Explanation
5. FITTING SHOP (Make a Joint) , Parts, Accessories, Diagram And Explanation
6. CARPENTRY SHOP (T-Lap Joint) , Cutting Tools, Accessories, Diagram and Explanation
7. MACHINE SHOP (the lathe machine) , Parts, Accessories, Diagram and Explanation

BELC 207
Industrial Training

BELC 207	**Industrial Training**	**0L:0T:2P**	**1 credits**	**2Hrs/Week**

- Industrial environment and work culture.
- Organizational structure and inter personal communication.
- Machines/ equipment/ instruments - their working and specifications.
- Product development procedures and phases.
- Project planning, monitoring and control.

BEBSC-201
Mathematics-II

BEBSC-201	Mathematics-II	3L:0T:0P	3 credits	3Hrs/Week

Objective:-

1. To introduce the basic concepts required to understand, construct, solve and interpret differential equations.
2. To teach methods to solve differential equations of various types.
3. To give an ability to apply knowledge of mathematics on engineering problems.

Course Outcomes

1. The students will be able to :
2. Classify differential equations according to certain features.
3. Solve first order linear equations and nonlinear equations of certain types and interpret the solutions.
4. Understand the conditions for the existence and uniqueness of solutions for linear differential equations
5. Solve second and higher order linear differential equations with constant coefficients and construct all solutions from the linearly independent solutions
6. Find series solutions about ordinary and regular singular points for second order linear differential equations.
7. Solve initial value problems using the Laplace transform.
8. Solve systems of linear differential equations with methods from linear algebra

Unit - I Ordinary Differential Equations I **(6 Hrs)**

Differential Equations of First Order and First Degree (Leibnitz linear, Bernoulli's, Exact), Differential Equations of First Order and Higher Degree, Higher order differential equations with constants coefficients, Homogeneous Linear Differential equations, Simultaneous Differential Equations.

UNIT-II Ordinary differential Equations II **(6 Hrs)**

Second order linear differential equations with variable coefficients, Method of variation of parameters, Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Unit III Partial Differential Equations **(10 Hrs)**

Formulation of Partial Differential equations, Linear and Non-Linear Partial Differential Equations, Homogeneous Linear Partial Differential Equations with Constants Coefficients.

Unit IV Functions of Complex Variable **(10 Hrs)**

Functions of Complex Variables: Analytic Functions, Harmonic Conjugate, Cauchy-Riemann Equations (without proof), Line Integral, theorem ,Cauchy Integral formula (without proof), Singular Points, Poles & Residues, Residue Theorem, Application of Residues theorem for Evaluation of Real Integral.

Unit V Vector Calculus **(10 Hrs)**

Differentiation of Vectors, Scalar and vector point function, Gradient, Geometrical meaning of gradient, Directional Derivative, Divergence and Curl, Line Integral, Surface Integral and Volume Integral, Gauss Divergence, Stokes and Green theorems.

References : -

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002.
2. Erwin kreyszig , Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. W. E. Boyce and R. C. Dip Rima, Elementary Differential Equations and Boundary Value Problems, 9th Ed., Wiley India, 2009.
4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5. E. A. Codington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
6. E. L. Inca, Ordinary Differential Equations, Dover Publications, 1958.

7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
9. 9. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

BEBSC- 202
Engineering Physics

BEBSC- 202	**Engineering Physics**	**2L:1T:0P**	**3 credits**	**3Hrs/Week**

Objective:-

- A comprehensive, high-quality education in the physical sciences
- A flexible curriculum with multiple concentrations that allows students to tailor their education according to their specific interests
- The opportunity to experience the excitement of scientific discovery through direct participation in faculty research
- An increased awareness of the physical processes in the surrounding world
- The essential knowledge and analytical, mathematical and computational tools with which to pursue post-graduate education in a variety of physics-related and other fields
- The foundation and practical skillsets for eventual success in any of a broad array of careers
- The motivation for a lifelong love of learning

Outcomes:-

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs within realistic constraints.
- An ability to function on multidisciplinary teams.
- An ability to identify, formulates, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- A recognition of the need for, and an ability to engage in life-long learning.
- A knowledge of contemporary issues.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Unit I Relativistic Mechanics: (6 Hrs)

Frame of reference, Inertial & non-inertial frames, Galilean transformations, Michelson-Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Velocity addition theorem, Variation of mass with velocity, Einstein's mass energy relation, Relativistic relation between energy and momentum, Massless particle.

Unit II Solid state & Nuclear physics (10 Hrs)

Free electron theory of metals, Qualitative discussion of Kronig-penny model and origin of energy bands. Intrinsic and Extrinsic Semiconductors. V-I Characteristics of PN junction diode, Zener diode, Hall-effect. Introduction to Nuclear Physics , Static properties of Nucleus, Nuclear liquid drop model, Nuclear Shell Model, Linear particle accelerator, Cyclotron, Betatron, Bainbridge mass spectrograph.

Unit III Quantum Mechanics: (6Hrs)

Introduction to Quantum mechanics, Wave particle duality, Matter waves, Particle velocity, Phase velocity , Group velocity and their relation. Heisenberg's Uncertainty Principle. Time-dependent and time-independent Schrodinger wave equation, Solution to stationary state Schrodinger wave equation for one-Dimensional particle in a box, Compton effect.

Unit IV Wave Optics: (10 Hrs)

Interference: Coherent sources, Interference in uniform and wedge shaped thin films, Newton's Rings and its applications. Fraunhoffer diffraction at single slit and at double slit, Absent spectra, Diffraction grating, Spectra with grating, Dispersive power of grating, Rayleigh's criterion of resolution. Resolving power of grating and Prism.

Unit V Fibre Optics & Lasers: Fibre Optics (10 Hrs)

Introduction to fibre optics, Acceptance angle, Numerical aperture, Normalized frequency, Classification of fibre, Attenuation and Dispersion in optical fibres.

Laser: Absorption of radiation, Spontaneous and stimulated emission of radiation, Einstein's coefficients, Population inversion, Various levels of Laser, Ruby Laser, He-Ne Laser, Laser applications.

Reference Books: -

1. Concepts of Modern Physics - AurthurBeiser (Mc-Graw Hill)
2. Introduction to Special Theory of Relativity- Robert Resnick (Wiley)
3. Optics - Brijlal& Subramanian (S. Chand)
4. Engineering Physics: Theory and Practical- Katiyar and Pandey (Wiley India)
5. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New)
6. Engineering Physics-Malik HK and Singh AK (McGrawHill)

BEBSC- 202	Engineering Physics	0L:0T:2P	1 credits	2Hrs/Week

List of Experiments: -

1. To determine the wavelength of sodium light by Newton's ring experiment.
2. To determine the wavelength of different spectral lines of mercury light using plane transmission grating.
3. To determine the energy band gap of a given semiconductor material.
4. To determine the plank's constant with help of photocell.
5 .Resolving Power of Telescope.
6 .V-I Charecteristics of P-N Junction diode.
7. Zener diode characteristics.
8. To determine the dispersive power of prism.

BTEESC-203
Basic Computer Engineering

BTEESC-203	**Basic Computer Engineering**	**3L:0T:0P**	**3 credits**	**3Hrs/Week**

Course Objective:-

- Successfully practice computer engineering to serve state and regional industries, government agencies, or national and international industries.
- Work professionally in one or more of the following areas: computer hardware and software design, embedded systems, computer networks and security, system integration, and electronic design automation.
- Achieve personal and professional success with awareness and commitment to their ethical and social responsibilities, both as individuals and in team environments.
- Maintain and improve their technical competence through lifelong learning, including entering and succeeding in an advanced degree program in a field such as engineering, science, or business.

Outcome:-

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- an ability to communicate effectively with a range of audiences.
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Unit –I Computer: (6Hrs)

Definition, Classification, Organization i.e. CPU, register, Memory & Storage Systems, I/O Devices, and System & Application Software. Computer application E-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and, Computer Gaming, Multimedia and Animation etc.

Unit –II Introduction to Algorithms (6 Hrs)

Complexities and Flowchart, Introduction to Programming, Categories of Programming Languages, Program Design, Programming Paradigms, Characteristics or Concepts of OOP, Procedure Oriented Programming VS object oriented Programming. Introduction to C, Character Set, Tokens, Precedence and Associativity, Program Structure, Data Types, Variables, Operators, Expressions, Statements and control structures, I/O operations, Array, Functions,

Unit – III Computer System Overview (10 Hrs)

Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-Preambles and functions, Evolution of Operating System. - Computer System Organization- Operating System Structure and Operations- System Calls, System Programs, OS Generation and System Boot.

Unit IV Computer Networking (10 Hrs)

Introduction, Goals, OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model. Topology, Introduction to Internet, World Wide Web, E• commerce Computer Security Basics: Introduction to viruses, worms, malware, Trojans, Spyware and Anti-Spyware Software, Different types of

attacks like Money Laundering, Information Theft, Cyber Pornography, Email spoofing, Denial of Service (DoS), Cyber Stalking, ,Logic bombs, Hacking Spamming, Cyber Defamation, Security measures Firewall,

Unit V Data base Management System (10 Hrs)

Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages. Cloud computing: definition, cloud infrastructure, cloud segments or service delivery models (IaaS, PaaS and SaaS), cloud deployment models/ types of cloud (public' private, community and hybrid clouds), Pros and Cons of cloud computing

Reference books:

1. Introduction of computers: Peter Norton, TMH
2. Object oriented programming with c++ :E.Balaguruswamy,TMH
3. Object oriented programming in C++: Rajesh k.shukla ,Wiley India
4. Computer network: Andrew Tananbaum,PHI
5. Data base management system,Korth,TMH
6. Operating system-silberschatz and Galvin-Wiley India

BTEESC-203	**Basic Computer Engineering**	**0L:0T:2P**	**1 credits**	**2Hrs/Week**

List of Experiment:-

1. Study of input and output devices of computer systems .
2. Write a program of addition, subtract, multiplication and division by using C.
3. Write a program to check weather a number is prime or not.
4. Study of various types of Operating System.
5. Study and practice of basic Linux commands-ls, cp, mv, rm, chmod kill, ps etc.
6. Design color coding of straight & crossover cable.
7. Installation of oracle 10g. Also create a employee table.

BEESC-204
Basic Mechanical Engineering

BEESC-204	Basic Mechanical Engineering	2L:0T:0P	2 credits	2Hrs/Week

Objective:-

- To provide a comprehensive knowledge of basic mechanical systems.
- Basic concepts from mechanical engineering sciences,
- Basic concepts I.C Engine
- Modern engineering tools (machine-tools, laboratory instrumentation, Working principle of steam Engine), and related subjects to design mechanical engineering components

Outcome:

- After successful completion of this course students will able to
- To describe and use basic engineering concepts
- principles and components of mechanical equipment
- measuring & testing method of physical quantities
- Assessment of boiler component.

Unit I Materials (6 Hrs)

Classification of engineering material, Composition of Cast iron and Carbon steels, Iron Carbon diagram. Alloy steels their applications. Mechanical properties like strength, hardness, toughness ductility, brittleness , malleability etc. of materials , Tensile test- Stress-strain diagram of ductile and brittle materials ,

Unit II Measurement (10 Hrs)

Concept of measurements, errors in measurement, Temperature, Pressure, Velocity, Flow strain, Force and torque measurement, Vernier caliper, Micrometer, Dial gauge, Slip gauge, Sine-bar and Combination set. Production Engineering: Elementary theoretical aspects of production processes like casting, carpentry, welding etc Introduction to Lathe and Drilling machines and their various operations.

Unit III Fluids (6Hrs)

Fluid properties pressure, density and viscosity etc. Types of fluids , Newton's law of viscosity , Pascal's law , Bernoulli's equation for incompressible fluids, Only working principle of Hydraulic machines, pumps, turbines, Reciprocating pumps .

Unit IV Thermodynamics (10Hrs)

Thermodynamic system, properties, state, process, Zeroth, First and second law of thermodynamics, thermodynamic processes at constant pressure, volume, enthalpy & entropy. Steam Engineering: Classification and working of boilers, mountings and accessories of boilers, Efficiency and performance analysis, natural and artificial draught, steam properties, use of steam tables.

Unit V Reciprocating Machines (10 Hrs)

Working principle of steam Engine, Carnot, Otto, Diesel and Dual cycles P-V & T-S diagrams and its efficiency, working of Two stroke & Four stroke Petrol & Diesel engines. Working principle of compressor.

References : -

1- Kothandaraman & Rudramoorthy, Fluid Mechanics & Machinery, New Age . 2- Nakra & Chaudhary , Instrumentation and Measurements, TMH.
3- Nag P.K, Engineering Thermodynamics , TMH .
4- Ganesan , Internal Combustion Engines, TMH .

5- Agrawal C M, Basic Mechanical Engineering ,Wiley Publication. 6- Achuthan M , , Engineering Thermodynamics ,PHI.

BEESC-204	Basic Mechanical Engineering	0L:0T:2P	1 credits	2Hrs/Week

List of Experiments:-

1- Study of Universal Testing machines.
2- Linear and Angular measurement using, Micrometer, Slip Gauges, Dial Gauge and
3- Study of Lathe Machine.
4- Study of Drilling Machines.
5- Verification of Bernoulli's Theorem.
6- Study of various types of Boilers.
7- Study of different IC Engines.
8- Study of different types of Boilers Mountings and accessories.

BEESC-205
Basic Civil Engineering & Mechanics

BEESC-205	**Basic Civil Engineering & Mechanics**	**3L:0T:0P**	**3 credits**	**3Hrs/Week**

Course Objective:-

The goal of this Engineering Mechanics course is to expose students to problems in mechanics as applied to plausibly real-world scenarios. Problems of particular types are explored in detail in the hopes that students will gain an inductive understanding of the underlying principles at work; students should then be able to recognize problems of this sort in real-world situations and respond accordingly.

The civil engineering program will serve Connecticut and the nation by providing a quality engineering education that enables students to enter a profession that can improve the civil infrastructure, and economic welfare. Our civil engineering program will maintain a strong emphasis on undergraduate education with the goal that our program will be recognized for quality instruction in civil engineering analysis and design.

Outcomes:

- Demonstrate knowledge of various surveying methods.
- Conduct a chain survey.
- Conduct a compass survey.
- Conduct levelling survey and be able to do RL calculations.
- Demonstrate knowledge of properties of various building materials.
- Draw free body diagrams and determine the resultant of forces and/or moments.
- Determine the centroid and second moment of area of sections.
- Apply laws of mechanics to determine efficiency of simple machines with consideration of friction.
- Analyse statically determinate planar frames.

Unit I Building Materials & Construction (10Hrs)

Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete, Nominal proportion of Concrete preparation of concrete, compaction, curing. Elements of Building Construction, Foundations conventional spread footings, RCC footings, brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, staircases – types and their suitability.

Unit II Surveying & Positioning (10 Hrs)

Introduction to surveying Instruments – levels, theodolites , plane tables and related devices. Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal leveling .

Unit III Basics of Engineering Mechanics covering (10 Hrs)

Force Systems Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces ,Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy

Unit IV Centroid and Centre of Gravity covering **(10 Hrs)**

Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Mass moment inertia of circular plate, Cylinder, Cone, Sphere, Hook.

Unit V Friction covering **(10 Hrs)**

Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, Basic Structural Analysis covering, Equilibrium in three dimensions; Method of Sections; Method of Joints; How to determine if a member is in tension or compression; Simple Trusses; Zero force members; Beams & types of beams; Frames

Reference Books:

1. S. Ramamrutam & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
2. Prasad I.B., Applied Mechanics, Khanna Publication.
3. Punmia, B.C., Surveying, Standard book depot.
4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI

BEESC-205	**Basic Civil Engineering & Mechanics**	**0L:0T:2P**	**1 credits**	**2Hrs/Week**

List of Experiments:-

1. To perform traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
2. To perform leveling exercise by height of instrument of Rise and fall method.
3. To measure horizontal and vertical angles in the field by using Theodolite.
4. To determine (a) normal consistency (b) Initial and Final Setting time of a cement Sample.
5. To determine the workability of fresh concrete of given proportions by slump test or compaction factor test.
6. To determine the Compressive Strength of brick .
7. To determine particle size distribution and fineness modulus of course and fine Aggregate.
8. To verify the law of Triangle of forces and Lami's theorem.
9. To verify the law of parallelogram of forces.
10. To verify law of polygon of forces
11. To find the support reactions of a given truss and verify analytically.
12. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
13. To determine the moment of inertia of fly wheel by falling weight method.
14. To verify bending moment at a given section of a simply supported beam.

BEHSMC-206

Language Lab and Seminar

BEHSMC-206	**Language Lab and Seminar**	**0L:0T:2P**	**1 credits**	**2Hrs/Week**

Course Objective:- This course intends to impart practical training in the use of English Language for Communicative purposes and aims to develop students' personality through language Laboratory.

Topics to be covered in the Language laboratory sessions:

1. **1.** Introducing oneself, family, social roles.
2. Public Speaking and oral skills with emphasis on conversational practice, extempore speech, JAM (Just a minute sessions), describing objects and situations, giving directions, debate, telephonic etiquette.
3. Reading Comprehension: Intensive reading skills, rapid reading, and reading aloud (Reading material to be selected by the teacher).
4. To write a book review. Standard text must be selected by the teacher.
5. Role plays: preparation and delivery topic to be selected by teacher/faculty.

BELC–207
Self Study / GD Seminar

BELC–207	**Self-Study / GD Seminar**	**0L:0T:2P**	**1 credits**	**2Hrs/Week**

Objective:

To improve the mass communication and convincing / understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves. Evaluation will be done by assigned faculty based on group discussion and power point presentation.

Outcomes:

- Analytical thinking
- Lateral thinking
- constructive argument
- Communication skill
- Presentation of views

Students will discuss the course related and interdisciplinary topics for problem solving. They will improve the mass communication and convincing / understanding skills about subject and their related problem in a group of students.

BEA- 301
Mathematics-III

BEA- 301	Mathematics-III	3L: 0T:0P	3 Credit	3 Hrs/Week

OBJECTIVE:-

1. To develop logical understanding of the subject.
2. To develop mathematical skill so that students are able to apply mathematical methods & principals in solving problem from Engineering fields.
3. To make aware students about the importance and symbiosis between Mathematics and Engineering.

OUTCOME:-

1. Student will demonstrate basic knowledge of L.D.E.,P.D.E.,Vector & F.T.
2. Student will show the understanding of impact of Engg.Mathematics on Mech
3. Student will Demonstrate their understanding of mathematical ideas from multiple perspectives, such as by
   (a) using the internal connections between geometry, algebra, and numerical computation,
   (b) applying the connections between theory and applications,
   (c) distinguishing between a formal proof and a less formal arguments and understanding the different roles these play in mathematics.

UNIT-I **(8 Hr.)**

Numerical Methods I: Solution of polynomial and transcendental equations – Bisection method, Newton-Raphson method and Regular-Falsi method. Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange‟s formulae

UNIT-II **(8 Hr.)**

Numerical Methods – II: Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson‟s 1/3rd and 3/8 rules. Solution of Simultaneous Linear Algebraic Equations by Gauss‟s Elimination, Gauss‟s Jordan, Crout‟s methods, Jacobi‟s, Gauss-Seidal, and Relaxation method.,

UNIT-III **(9 Hr.)**

Numerical Methods – 3 Ordinary differential equations: Taylor‟s series, Euler and modified Euler‟s methods. RungeKutta method of fourth order for solving first and second order equations. Milne‟s and Adam‟s predicator-corrector methods. Partial differential equations: Finite difference solution two dimensional Laplace equation and Poisson equation, Implicit and explicit methods for one dimensional heat equation (Bender- Schmidt and Crank- Nicholson methods), Finite difference explicit method for wave equation.

UNIT-IV **(8 Hr.)**

Transform Calculus Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace Transform method, Fourier transforms.

UNIT-V **(7 Hr.)**

Concept of Probability Probability Mass function, Probability Density Function, Discrete Distribution: Binomial, Poisson‟s, Continuous Distribution: Normal Distribution, Exponential Distribution.

Textbooks/References:

1. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
7. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
8. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
9. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley,1968.Statistic

CSA- 302
Discrete Structure

CSA- 302	Discrete Structure	2L:1T:0P	3 Credit	3 Hrs/Week

OBJECTIVE:-

1. Discrete Structures is the study of objects that have discrete as opposed to continuous values including the foundations of logic, algorithms and their complexity, mathematical reasoning, relations, graphs, trees and combinatory.

OUTCOME:-

1 To develop understanding of Logic Sets and Functions.

2. To use mathematical reasoning techniques including induction and recursion
3. To understand and apply counting techniques to the representation and characterization of relational concepts.
4. To develop an understanding of how graph and tree concepts are used to solve problems arising in the computer science.

UNIT-I **(9 Hr.)**

Set Theory, Relation, Function, Theorem Proving Techniques : Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions, pigeonhole principle. Theorem proving Techniques: Mathematical induction, Proof bycontradiction.

UNIT-II **(7 Hr.)**

Algebraic Structures: Definition, Properties, types: Semi Groups, Monod, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

UNIT-III **(7 Hr.)**

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, Universal and existential quantifiers. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers

UNIT-IV **(8 Hr.)**

Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and

weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

UNIT-V **(9 Hr.)**

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded and complemented lattices. Combinatorics: Introduction, Permutation and combination, Binomial Theorem, Multimonial Coefficients Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms , Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions , Generating functions , Solution by method of generating functions.

Reference:

1. C.L.Liu, "Elements of Discrete Mathematics" Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Bisht, "Discrete Mathematics",Oxford University Press
5. Biswal,"Discrete Mathematics & Graph Theory", PHI

CSA-303
Data Structure

CSA-303	Data Structure	3L:0T:2P	4 Credit	5 Hrs/Week

OBJECTIVE:-

1. To impart the basic concepts of data structures and algorithms
2. To understand concepts about searching and sorting techniques
3. To Understand basic concepts about stacks,queues,lists,trees and graphs
4. To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

OUTCOME:-

1 Ability to analyze algorithms and aalgorithm correctness.
2 Ability to summarize searching and sorting techniques
3 Ability to describe stack,queue and linked list operation.
4 Ability to have knowledge of treeand graphs concepts.

UNIT-I **(8 Hr.)**

Review of C programming language. Introduction to Data Structure: Concepts of Data andInformation, Classification of Data structures, Abstract Data Types, Implementation aspects: Memory representation. Data structures operations and its cost estimation. Introduction to linear data structures- Arrays, Linked List: Representation of linked list in memory, different implementation of linked list. Circular linked list, doubly linked list, etc. Application of linked list: polynomial manipulation using linked list, etc.

UNIT-II **(8 Hr.)**

Stacks: Stacks as ADT, Different implementation of stack, multiple stacks. Application of Stack:Conversion of infix to postfix notation using stack, evaluation of postfix expression, Recursion. Queues: Queues as ADT, Different implementation of queue, Circular queue, Concept of Dqueue and Priority Queue, Queue simulation, Application of queues.

UNIT-III **(8 Hr.)**

Tree: Definitions - Height, depth, order, degree etc. Binary Search Tree - Operations,Traversal , Search. AVL Tree, Heap, Applications and comparison of various types of tree; Introduction to forest, multi-way Tree, B tree, B+ tree, B* tree and red-black tree.

UNIT-IV **(8 Hr.)**

Graphs: Introduction, Classification of graph: Directed and Undirected graphs, etc,Representation, Graph Traversal: Depth First Search (DFS), Breadth First Search (BFS), Graph algorithm: Minimum Spanning Tree (MST)- Kruskal, Prim‟s algorithms. Dijkstra‟s shortest path algorithm; Comparison between different graph algorithms. Application of graphs.

UNIT-V **(8 Hr.)**

Sorting: Introduction, Sort methods like: Bubble Sort, Quick sort. Selection sort, Heap sort, Insertion sort, Shell sort, Merge sort and Radix sort; comparison of various sorting techniques. Searching: Basic Search Techniques: Sequential search, Binary search, Comparison of search methods. Hashing & Indexing. Case Study: Application of various data structures in operating system, DBMS etc.

Text Books

1. AM Tanenbaum, Y Langsam& MJ Augustein, "Data structure using C and C++", Prentice Hall India.
2. Robert Kruse, Bruse Leung, "Data structures & Program Design in C", Pearson Education.

Reference Books

1. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education.
2. N. Wirth, "Algorithms + Data Structure = Programs", Prentice Hall.
3. Jean – Paul Trembly , Paul Sorenson, "An Introduction to Structure with application", TMH.
4. Richard, GilbergBehrouz, Forouzan ,"Data structure – A Pseudocode Approach with C", Thomson press.

List of experiments:

1. To read the numbers and display it.
2. To demonstrate the concept of one dimensional array finding the sum of array elements.
3. To insert an element in an array.
4. To add two matrix A and B.
5. Implementation of linked list using array.
6. Implementation of stack using array.
7. Implementation of binary search tree using array.
8. Implement linear search.
9. To Search an element using binary search.
10. Implement bubble sort.

CSA- 304
Digital Systems

CSA- 304	Digital Systems	2L	1T	2P	4 Credit	5 Hrs/Week

OBJECTIVE:-

1. Explain the elements of digital system abstractions such as digital representations of information, digital logic, Boolan algebra, state elements and finite state machine (FSMs).
2. Design simple digital systems based on these digital abstractions, using the "digital paradigm" including discrete sampled information.
3. Use the "tools of the trade": basic instruments, devices and design tools.
4. Work in a design team that can propose, design, successfully implement and report on a digital systems project.

OUTCOME:-

1. Describe how analog signals are used to represent digital values in different logic families, including characterization of the noise margins.
2. Create the appropriate truth table from a description of a combinational logic function.
3. Create a gate-level implementation of a combinational logic function described by a truth table using and/or/inv gates, muxes or ROMs, and analyze its timing behavior.
4. Create a state transition diagram from a description of a sequential logic function and then convert the diagram into an implementation of a finite-state machine with the appropriate combinational and sequential components

UNIT-I **(8 Hr.)**

Review of number systems and number base conversions. Binary codes, Boolean algebra, Boolean functions, Logic gates. Simplification of Boolean functions, Karnaugh map methods, SOP-POS simplification, NAND-NOR implementation.

UNIT-II **(8 Hr.)**

Combinational Logic: Half adder, Half subtractor, Full adder, Full subtractor, look- ahead carry generator,BCD adder, Series and parallel addition, Multiplexer – demultiplexer, encoder- decoder, arithmetic circuits, ALU.

UNIT-III **(9 Hr.)**

Sequential logic: flip flops, D,T, S-R, J-K Master- Slave, racing condition, Edge & Level triggered circuits, Shift registers, Asynchronous and synchronous counters, their types and state diagrams. Semiconductor memories, Introduction to digital ICs 2716, 2732 etc. & their address decoding. Modern trends in semiconductor memories such as DRAM, FLASH RAM etc. Designing with ROM and PLA.

UNIT-IV **(8 Hr.)**

Introduction to A/D & D/A convertors & their types, sample and hold circuits, Voltage to Frequency & Frequency to Voltage conversion. Multivibrators : Bistable, Monostable, Astable, Schmitt trigger, IC 555 & Its applications. TTL, PMOS, CMOS and NMOS logic. Interfacing between TTL to MOS.

UNIT-V **(7 Hr.)**

Introduction to Digital Communication: Nyquist sampling theorem, time division multiplexing, PCM, quantization error, introduction to BPSK & BFSK modulation schemes. Shannon‟s theorem for channel capacity.

References:

1. Morris Mano, Digital Circuits & Logic Design, PHI
2. Gothman, Digital Electronics, PHI
3. Tocci, Digital Electronics, PHI
4. Mavino& Leach, Digital Principles & Applications, PHI
5. Taub and schilling, Digital Integrated electronics.
6. Simon Haykin, Introductionto Analog& Digital Communication, Wiley.
7. Lathi B.P., Modern analog& digital communication , Oxford University.

List of Experiments:

1. To study and verify the truth tables of various Logic gates.
2. To verify the properties of NAND and NOR gates as Universal Building Blocks.
3. Simplification and implementation of a Boolean function.
4. Implementation of basic Boolean arithmetic logic circuits such as Half-adder, Half subtractor, Full adder and Full subtractor.
5. Conversion from Binary to Gray and Gray to Binary code.
6. To construct a binary multiplier using combinational logic and to verify withthe truth table
7. To verify 2-bit Magnitude comparator for all possible conditions
8. Generation of various logical functions using 8-to-1 multiplexer
9. Construction of a 4-bit ripple counter and study of its operation.
10. Operation of IC-555 Timer as Monostable, Astable and Bistablemultivibrators.
11. To characterize binary ladder type digital to analog (D/A) and analog to digital (A/D) convertor.
12. Comparison of various Logic families.
13. Design and implementation of various types of flip-flops using JK flip-flop.
14. To study natural sampling of continuous time waveforms using different sampling rates.
15. To study Pulse-Code modulation with Time-division multiplexing (PCM-TDM)
16. To study generation and detection of BPSK and QPSK waveforms.

CSA- 305
Object Oriented Programming & Methodology

CSA- 305	Object Oriented Programming & Methodology	3L:0T:2P	4 Credit	5 Hrs/Week

OBJECTIVE:-

1. Be able to explain the difference between object oriented programming and procedural programming.
2. Be able to program using more advanced C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
3. Be able to build C++ classes using appropriate encapsulation and design principles
4. Be able to apply object oriented or non-object oriented techniques to solve bigger computing problems

OUTCOME:-

1. The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism
2. Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections
3. How to take the statement of a business problem and from this determine suitable logic for solving the problem; then be able to proceed to code that logic as a program written in Java.
4. How to test, document and prepare a professional looking package for each business project using javadoc

Unit-I **(9 Hr.)**

Introduction to Object Oriented Thinking & Object Oriented Programming: Comparison with Procedural Programming, features of Object oriented paradigm– Merits and demerits of OO methodology; Object model; Elements of OOPS, IO processing.

UNIT-II **(10 Hr.)**

Encapsulation and Data Abstraction- Concept of Objects: State, Behavior & Identity of an object; Classes: identifying classes and candidates for Classes Attributes and Services, Access modifiers, Static members of a Class, Instances, Message passing, and Construction and destruction of Objects.

UNIT-III **(7 Hr.)**

Relationships – Inheritance: purpose and its types, „is a" relationship; Association, Aggregation. Concept of interfaces and Abstract classes.

UNIT-IV **(7 Hr.)**

Polymorphism: Introduction, Method Overriding & Overloading, static and run time Polymorphism.

UNIT-V **(7 Hr.)**

Strings, Exceptional handling, Introduction of Multi-threading and Data collections. Case study like: ATM, Library management system.

Text Books

1. Timothy Budd, "An Introduction to Object-Oriented Programming", Addison- Wesley Publication, 3rd Edition.

2. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I, Fundamentals", Prentice Hall publication.

Reference Books

1. G. Booch, "Object Oriented Analysis& Design", Addison Wesley.
2. James Martin, "Principles of Object Oriented Analysis and Design", Prentice Hall/PTR.
3. Peter Coad and Edward Yourdon, "Object Oriented Design", Prentice Hall/PTR.
4. Herbert Schildt, "Java 2: The Complete Reference", McGraw-Hill Osborne Media, 7th Edition

List of Experiment:-

1. Write a program for multiplication of two matrices using OOP.
2. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imag parts to equal values and third which takes two argument is used to initialized real and imag to two different values.
3. Write a program to find the greatest of two given numbers in two different classes using friend function.
4. Implement a class string containing the following functions:
   Overload + operator to carry out the concatenation of strings. Overload = operator to carry out string copy. Overload <= operator to carry out the comparison of strings. Function to display the length of a string. Function tolower( ) to convert upper case letters to lower case. Function toupper( ) to convert lower case letters to upper case.
5. Create a class called LIST with two pure virtual function store() and retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
6. Write a program to define the function template for calculating the square of given numbers with different data types.
7. Write a program to demonstrate the use of special functions, constructor and destructor in the class template. The program is used to find the bigger of two entered numbers.
8. Write a program to perform the deletion of white spaces such as horizontal tab, vertical tab, space, line feed ,new line and carriage return from a text file and store the contents of the file without the white spaces on another file.
9. Write a program to read the class object of student info such as name , age ,sex ,height and weight from the keyboard and to store them on a specified file using read() and write() functions. Again the same file is opened for reading and displaying the contents of the file on the screen.
10. Write a program to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

CSA- 306
Computer Workshop

CSA- 306	Computer Workshop	0L	0T	2P	1 Credit	2 Hrs/Week

OBJECTIVE:-

1. learn basic principles of using Windows operation system.
2. learn and practice basic keyboarding and mouse use
3. Be able to access the Internet, Worldwide Web, as well as use Internet directories and search engines, and locate www addresses.
4. In general, develop an intuitive sense of how computers work and how they can be used to make your academic work more efficient.

OUTCOME:-

1. Bridge The fundamental concept of computer with the present lavel of knowledge of the students.
2. Familiarise operating systems, programming languages, peripheral devices, networking, multimedia and internet.
3. Understand binary , hexadecimal and octal number system and their arithamatic
4. Understand how logic circuits and Boolean algebra forms as the basics of digital computer.

UNIT – I **(9 Hr.)**

Basic components: - Type of component, Active and Passive, A.C. and D.C. Resistors: Types of resistors, color code. Capacitors: Type of capacitors, color code. Inductor: inductance and its type, concept of a coil. Diode: Introduction working and types. Transistors: Introduction and its type.

UNIT-II **(10Hr.)**

Transformer: Introduction, working and its type. Function Generator: Introduction and its type. SMPS: Introduction, working and its type. LED: Introduction, working and its type. Voltage Regulator: Introduction, working and its type. Battery: Introduction, working and its type. IFT: Introduction, working and its type. Relay: Introduction, working and its type.

UNIT – III **(7 Hr.)**

Testing & Measurement Tools: Introduction, Working and uses of Multimeter, Voltmeter,Ammeters, Wattmeter and CRO.

UNIT – IV **(7 Hr.)**

Printed Circuit Board: Introduction, Manufacturing Process, PCB Type, Designing, Etching Component Assembly, Soldering.

UNIT – V **(7 Hr.)**

Personal Computer Assembling: Assemble All Computer parts like Motherboard, RAM, Hard Disk, SMPS, Cable, Buses, Keyboard, Mouse.

References:

1. Electronic Device and Circuit,Jacob Millman, Christos C. Halkias, McGraw-Hill
2. Hardware bible By : Winn L Rosch, Techmedia publications.

3. Modern All about printers By: Manohar Lotia, Pradeep Nair, Bijal Lotia BPB publications.
4. The complete PC Upgrade and maintenance guide, Mark Minasi BPB Publication

List of Experiments :-

1. Testing of NPN and PNP Transistor using Multimetre
2. Testing of Ceramic and Electrolytic Capacitor using Multimetre
3. Testing of Inductor using Multimetre.
4. Testing of Values Voltages at different points on PCB using Multimetre.
5. Testing of Current at different points on PCB using Multimetre.
6. Testing of SMPS using Multimetre. Testing of Step Up and Step down Transformers using Multimetre.
7. Testing of IFT(Intermediate Frequency Transformer) using Multimetre
8. Testing of Resistance using Multimetre and Reading of Resistance using Colour Coding Table
9. Assemble Mono Stable, Astable, and Bistable multivibrator(Clocked and Unclocked) using PCB.

CSA 307
Self Study / GD Seminar

CSA 307	Self Study / Gd Seminar	0L:0T:2P	1 Credit	2 Hrs/Week

OBJECTIVE:-

Objective of GD and seminar is to improve the mass communication and convincing/understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves. Evaluation will be done by assigned faculty based on group.

BEA-401
Energy, Ecology, Environment and Society

BEA-401	Energy, Ecology, Environment and Society	3L:0T:0P	3Credit	3Hrs/Week

OBJECTIVE:-

1. To improve the quality of life of the local community through management and conservation of natural resources.
2. To ensure that the natural environment is used wisely and continues to be available for the benefit and enjoyment of future generations.
3. To decrease vulnerability and improve adaptation capacity among poor local communities associated with Climate Change

OUTCOME:-

1. Enhance the use of recycled material for construction work and optimize the use of conventional energy sources.
2. Take care of issues related to Conservation & Hazard Management while working as computer engineer.
3. Assess the effects of pollution on resources.

UNIT – I **(7 Hr.)**

Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass Geothermal, Hydrogen, Solar, Wind, hydro, nuclear sources.

UNIT-II **(8 Hr.)**

Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation

UNIT-III **(9 Hr.)**

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain. Sound Pollution: Causes, controlling measures, measurement of sound pollution (deciblage), Industrial and non – industrial.

UNIT-IV **(8 Hr.)**

Water Pollution– Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent. Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

UNIT-V **(8 Hr.)**

Society, Ethics & Human values– Impact of waste on society. Solid waste management Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study . Preliminary studies regarding Environmental Protection Acts , introduction to value education, self exploration, sanyam & swasthya.

REFERENCES:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3. Raynold, GW "Ethics in information Technology"; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6. BK Sharma, "Environmental Chemistry" ; Goel Publ. House.
7. Bala Krishnamoorthy; "Environmental management"; PHI
8. Gerard Kiely, "Environmental Engineering" ; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunninghan WP and MA; principles of Environment Sc; TMH
11. Gandhiji M.K.- My experiments with truth

CSA- 402
Analysis Design Of Algorithm

CSA- 402	Analysis Design Of Algorithm	2L:1T:2P	4 Credit	5 Hrs/Week

OBJECTIVE:-

1. To teach paradigms and approaches used to analyze and design algorithms and to appreciate the impact of algorithm design in practice.
2. To make students understand how the worst-case time complexity of an algorithm is defined, how asymptotic notation is used to provide a rough classification of algorithms.
3. To explain different computational models (e.g., divide-and-conquer), order notation and various complexity measures (e.g., running time, disk space) to analyze the complexity/performance of different algorithms.

OUTCOME:-

1. Analyze the asymptotic performance of algorithms.
2. Apply important algorithmic design paradigms and methods of analysis.
3. Synthesize efficient algorithms in common engineering design situations.

UNIT-I **(8 Hr.)**

Algorithms, Designing algorithms, analyzing algorithms, asymptotic notations, heap and heap sort. Introduction to divide and conquer technique, analysis, design and comparison of various algorithms based on this technique, example binary search, merge sort, quick sort, strassen's matrix multiplication.

UNIT-II **(8Hr.)**

Study of Greedy strategy, examples of greedy method like optimal merge patterns, Huffman coding, minimum spanning trees, knapsack problem, job sequencing with deadlines, single source shortest path algorithm.

UNIT-III **(7 Hr.)**

Concept of dynamic programming, problems based on this approach such as 0/1 knapsack, multistage graph, reliability design, Floyd-Warshall algorithm

UNIT-IV **(9 Hr.)**

Backtracking concept and its examples like 8 queen's problem, Hamiltonian cycle, Graph coloring problem etc. Introduction to branch & bound method, examples of branch and bound method like traveling salesman problem etc. Meaning of lower bound theory and its use in solving algebraic problem, introduction to parallel algorithms.

UNIT-V **(8 Hr.)**

Binary search trees, height balanced trees, 2-3 trees, B-trees, basic search and traversal techniques for trees and graphs (In order, preorder, postorder, DFS, BFS), NP-completeness.

References:

1. Coremen Thomas, Leiserson CE, Rivest RL; Introduction to Algorithms; PHI.
2. Horowitz & Sahani; Analysis & Design of Algorithm
3. Dasgupta; algorithms; TMH
4. Ullmann; Analysis & Design of Algorithm;
5. Michael T Goodrich, Robarto Tamassia, Algorithm Design, Wiely India
6. Rajesh K Shukla: Analysis and Design of Algorithms: A Beginner's Approach; Wiley

List of Experiments:

1. Write a program for Iterative and Recursive Binary Search.
2. Write a program for Merge Sort.
3. Write a program for Quick Sort.
4. Write a program for Strassen's Matrix Multiplication.
5. Write a program for optimal merge patterns.
6. Write a program for Huffman coding.
7. Write a program for minimum spanning trees using Kruskal's algorithm.
8. Write a program for minimum spanning trees using Prim's algorithm.
9. Write a program for single sources shortest path algorithm.
10. Write a program for Floye-Warshal algorithm.
11. Write a program for traveling salesman problem.
12. Write a program for Hamiltonian cycle problem.

CSA- 403
Software Engineering

CSA- 403	Software Engineering	3L:0T:2P	4Credit	5 Hrs/Week

OBJECTIVE:-

1. Knowledge of basic SW engineering methods and practices, and their appropriate application.
2. Describe software engineering layered technology and Process frame work.
3. A general understanding of software process models such as the waterfall and evolutionary models.

OUTCOME:-

1. Basic knowledge and understanding of the analysis and design of complex systems.
2. Ability to apply software engineering principles and techniques.
3. Ability to develop, maintain and evaluate large-scale software systems

UNIT –I **(8 Hr.)**

The Software Product and Software Process Software Product and Process Characteristics, Software Process Models: LinearSequential Model, Prototyping Model, RAD Model, Evolutionary Process Models likeIncremental Model, Spiral Model, Component Assembly Model, RUP and Agileprocesses. Software Process customization and improvement, CMM, Product andProcess Metrics**.**

UNIT II **(7 Hr.)**

Requirement Elicitation, Analysis, and Specification Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability

UNIT III **(7 Hr.)**

Software Design The Software Design Process, Design Concepts and Principles, Software Modeling andUML, Architectural Design, Architectural Views and Styles, User Interface Design, Function- oriented Design, SA/SD Component Based Design, Design Metrics.

UNIT IV **(9 Hr.)**

Software Analysis and Testing Software Static and Dynamic analysis, Code inspections, Software Testing, Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, TestOracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit, Testing Frameworks, Integration Testing, System Testing and other Specialized, Testing, Test Plan, Test Metrics, Testing Tools. , Introduction to Object-oriented analysis, design and comparison with structured Software Engg.

UNIT V **(9 Hr.)**

Software Maintenance & Software Project Measurement Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project

Management Concepts, Feasibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance(SQA). Project Plan, Project Metrics.

Practical and Lab work Lab work should include a running case study problem for which different deliverable sat the end of each phase of a software development life cycle are to be developed. This will include modeling the requirements, architecture and detailed design. Subsequently the design models will be coded and tested. For modeling, tools like Rational Rose products. For coding and testing, IDE like Eclipse, Net Beans, and Visual Studio can be used

References

1. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning
3.R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition2006, McGraw-Hill.
4.Sommerville,"Software Enginerring",Pearson Education.
5.Richard H.Thayer,"Software Enginerring & Project Managements", WileyIndia
6.Waman S.Jawadekar,"Software Enginerring", TMH
7.Bob Hughes, M.Cotterell, Rajib Mall " Software Project Management", McGrawHill

List of Experiments:

1. To identify the role of the software in today's world across a few significant domains related to day to day life.
2. To identify the problem related to software crisis for a given scenario
3. To identify the suitable software development model for the given scenario.
4. To identify the various requirement development activities viz. elicitation, analysis, specification and verification for the given scenarios.
5. To identify the various elicitation techniques and their usage for the Banking case study.
6. To Classify the requirement into functional and non-functional requirements.
7. To identify the elements in software Requirements Specification document.
8. To verify the requirements against the quality attributes.
9. Understand Importance of SDLC approach & various processes.

CSA- 404
Computer Organization & Architecture

CSA- 404	Computer Organization & Architecture	2L:1T:2P	4 Credit	5 Hrs/Week

OBJECTIVES:-

Students to be familiarize the basic principles of computer architecture, Design and Multi Processing, Types of data transfer, Concept of semi conductor memories which is useful for research work in field Computer System

OUTCOME:-

1. Explain the functional units of a processor
2. Distinguish the organization of various parts of a system memory hierarchy
3. Describe the fundamental organization of computer.

UNIT-I **(9 Hr.)**

Basic Structure of Computer: Structure of Desktop Computers, CPU: General Register Organization-Memory Register, Instruction Register, Control Word, Stack Organization, Instruction Format, ALU, I/O System, bus, CPU and Memory Program Counter, Bus Structure, Register Transfer Language-Bus and Memory Transfer, addressing modes. Control Unit Organization: Basic Concept of Instruction, Instruction Types, Micro Instruction Formats, Fetch and Execution cycle, Hardwired control unit, Micro- programmed Control unit micro program sequencer Control Memory, Sequencing and Execution of Micro Instruction.

UNIT-II **(8 Hr.)**

Computer Arithmetic: Addition and Subtraction, Tools Compliment Representation, Signed Addition and Subtraction, Multiplication and division, Booths Algorithm, Division Operation, Floating Point Arithmetic Operation. design of Arithmetic unit.

UNIT-III **(7 Hr.)**

I/O Organization:I/O Interface –PCI Bus, SCSI Bus, USB, Data Transfer: Serial, Parallel, Synchronous, Asynchronous Modes of Data Transfer, Direct Memory Access(DMA), I/O Processor.

UNIT-IV **(8 Hr.)**

Memory Organization: Main memory-RAM, ROM, Secondary Memory –Magnetic Tape, Disk, Optical Storage, Cache Memory: Cache Structure and Design, Mapping Scheme, Replacement Algorithm, Improving Cache Performance, Virtual Memory, memory management hardware.

UNIT-V **(8 Hr.)**

Multiprocessors: Characteristics of Multiprocessor, Structure of Multiprocessor-Inter- processor Arbitration, Inter-Processor Communication and Synchronization. Memory in Multiprocessor System, Concept of Pipelining, Vector Processing, Array Processing, RISC And CISC, Study of Multicore Processor – Intel, AMD.

Reference Books:

1. Morris Mano , "Computer System Organization "PHI
2. Alan Clements: "Computer Organization and Architecture", Cengage Learning
3. Subrata Ghosal: "Computer Architecture and Organization", Pearson
4. William stalling ,"Computer Architecture and Organization" PHI
5. M. Usha, T.S. Shrikant: "Computer System Architecture and Organization", Willey India 6.Chaudhuri, P.Pal: "Computer Organization and Design", PHI
7. Sarangi: "Computer Organization and Architecture",Mc-Graw Hills

List of Experiments:

1. Study of Multiplexer and Demultiplexer
2. Study of Half Adder and Subtractor
3. Study of Full Adder and Subtractor
4. WAP to add two 8 bit numbers and store the result at memory location 2000
5. WAP to multiply two 8 bit numbers stored at memory location 2000 and 2001 and stores the result at memory location 2000 and 2001.
6. WAP to add two 16-bit numbers. Store the result at memory address starting from 2000.
7. WAP which tests if any bit is '0' in a data byte specified at an address 2000. If it is so, 00 would be stored at address 2001 and if not so then FF should be stored at the same address.
8. Assume that 3 bytes of data are stored at consecutive memory addresses of the data memory starting at 2000. Write a program which loads register C with (2000), i.e. With data contained at memory address2000, D with (2001), E with (2002) and A with (2001).
9. Sixteen bytes of data are specified at consecutive data-memory locations starting at 2000. Write a program which increments the value of all sixteen bytes by 01.
10. WAP to add t 10 bytes stored at memory location starting from 3000. Store the result at memory location 300A

CSA- 405
Operating Systems

CSA- 405	Operating Systems	3L:0T:2P	4 Credit	5 Hrs/Week

OBJECTIVE:-

1. To understand the main components of an OS & their functions.
2. To study the process management and scheduling.
3. To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.

OUTCOME:-

1. Describe the important computer system resources and the role of operating system in their management policies and algorithms.
2. Understand the process management policies and scheduling of processes by CPU
3. Evaluate the requirement for process synchronization and coordination handled by operating system

UNIT-I **(7 Hr.)**

Introduction to Operating Systems: Function, Evolution, Different Types, Desirable Characteristics and features of an O/S, Operating Systems Services: Types of Services, Different ways of providing these Services – Utility Programs, System Calls.

UNIT-II **(8 Hr.)**

File Systems: File Concept, User's and System Programmer's view of File System, Disk Organization, Tape Organization, Different Modules of a File System, Disk Space Allocation Methods – Contiguous, Linked, Indexed. Directory Structures, File Protection, System Calls for File Management, Disk Scheduling Algorithms.

UNIT-III **(9 Hr.)**

CPU Scheduling : Process Concept, Scheduling Concepts, Types of Schedulers, Process State Diagram, Scheduling Algorithms, Algorithms Evaluation, System calls for Process Management; Multiple Processor Scheduling; Concept of Threads. Memory Management: Different Memory Management Techniques – Partitioning, Swapping, Segmentation, Paging, Paged Segmentation, Comparison of these techniques, Techniques for supporting the execution of large programs: Overlay, Dynamic Linking and Loading, Virtual Memory – Concept, Implementation by Demand Paging etc.

UNIT-IV **(8 Hr.)**

Input / Output : Principles and Programming, Input/Output Problems, Asynchronous Operations, Speed gap Format conversion, I/O Interfaces, Programme Controlled I/O, Interrupt Driven I/O, Concurrent I/O. Concurrent Processes : Real and Virtual Concurrency, Mutual Exclusion, Synchronization, Inter- Process Communication, Critical Section Problem, Solution to Critical Section Problem : Semaphores – Binary and Counting Semaphores, WAIT & SIGNAL Operations and their implementation. Deadlocks: Deadlock Problems, Characterization, Prevention, Avoidance, Recovery.

UNIT-V **(8 Hr.)**

Introduction to Network, Distributed and Multiprocessor Operating Systems. Case Studies: Unix/Linux, WINDOWS and other Contemporary Operating Systems.

TEXT BOOKS RECOMMENDED:

1. Silberschatz, Galvin, Gagne, "Operating System Concepts'', Wiley, 9/E
2. William Stalling, "Operating Systems", Pearson Education.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, "Modern Operating Systems", 3/e, Prentice Hall
2. Maurice J. Bach, " The Design of Unix Operating System", Prentice Hall of India,
3. Bovet & Cesati, "Understanding the Linux Kernel", O'Reily, 2/E.

List of Experiment:

1. Write a program to implement FCFS CPU scheduling algorithm.
2. Write a program to implement SJF CPU scheduling algorithm.
3. Write a program to implement Priority CPU Scheduling algorithm.
4. Write a program to implement Round Robin CPU scheduling algorithm.
5. Write a program to compare various CPU Scheduling Algorithms over different Scheduling Criteria.
6. Write a program to implement classical inter process communication problem (producer consumer).
7. Write a program to implement classical inter process communication problem(Reader Writers).
8. Write a program to implement classical inter process communication roblem Dining Philosophers)
9. Write a program to implement & Compare various page replacement algorithm.
10. Write a program to implement & Compare various Disk & Drum scheduling Algorithms
11. Write a program to implement Banker's algorithms.
12. Write a program to implement Remote Proccedure Call(RPC).
13. Write a Devices Drivers for any Device or pheriperal.

CSA-406
Programming Practices

CSA-406	Programming Practices	0L:0T:2P	1 Credit	2 Hrs/Week

OBJECTIVE:-

This course explores concepts underlying the definition, implementation, and use of programming languages. The goal is to provide you with an understanding of (and a vocabulary for) common language features, including how they are implemented, how other language-design choices affect them, and how they can be used effectively in program development.

OUTCOME:-

1. When given a moderate-sized Scheme program and relevant input, calculate the result of that program.
2. Describe, compare, and contrast various language features.
3. Implement an interpreter for a simple language incorporating lexical or dynamic scope, side effects and state, environments, closures, and recursion

UNIT-I **(8 Hr.)**

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods,Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

UNIT-II **(9 Hr.)**

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un- modifiable Collections.

UNIT-III **(7 Hr.)**

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI,Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

UNIT-IV **(9 Hr.)**

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions,

Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT-V **(7 Hr.)**

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. E. Balaguruswamy, "Programming In Java"; TMH Publications
2. The Complete Reference: Herbert Schildt, TMH
3. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
4. Cay Horstmann, Big JAVA, Wiley India.
5. Merlin Hughes, et al; Java Network Programming, Manning Publications/Prentice H

List of Experiment:

1. Installation of J2SDK
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in JAVA
4. Write a program to show Type Casting in JAVA
5. Write a program to show How Exception Handling is in JAVA
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
9. Write a program to show use and Advantages of CONTRUCTOR
10. Write a program to show Interfacing between two classes
11. Write a program to Add a Class to a Package
12. Write a program to show Life Cycle of a Thread
13. Write a program to demonstrate AWT.
14. Write a program to Hide a Class
15. Write a Program to show Data Base Connectivity Using JAVA
16. Write a Program to show "HELLO JAVA " in Explorer using Applet
17. Write a Program to show Connectivity using JDBC
18. Write a program to demonstrate multithreading using Java.
19. Write a program to demonstrate applet life cycle.
20. Write a program to demonstrate concept of servlet.

CSA-407
Industrial Training –I

CSA-407	Industrial Training –I	0L:0T:0P	0 Credit

OBJECTIVE:-

The following objective should be fulfilled in industrial training –I, and student must participate in any aerospace/aeronautical industry where they can learn to apply the Technical knowledge in real Industrial situations.

- Gain experience in writing Technical reports/projects.
- Expose students to the engineer's responsibilities and ethics.
- Expose the students to future employers.
- Understand the social, economic and administrative considerations that influence the working environment of industrial organizations

OUTCOME:-

- Capability to acquire and apply fundamental principles of engineering.
- Become master in one's specialized technology
- Become updated with all the latest changes in technological world.
- Ability to communicate efficiently.

CSA- 501
Database Management System

CSA-501	Database Management Systems	2L:1T:2P	4 Credit	5 Hrs/Week

Objectives :-
The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Learning Outcomes:

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

1. Describe the fundamental elements of relational database management systems
2. Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
3. Design ER-models to represent simple database application scenarios
4. Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.

UNIT-I **(9 Hr.)**
Basic Concepts: - DBMS Concepts and architecture, Introduction, Review of file organization techniques, Database approach v/s Traditional File accessing approach, Advantages of database systems, Data models, Schemas and instances, Data independence, Functions of DBA and designer, Entities and attributes, Entity types, Value, Sets, Key attributes, Relationships, Defining the E-R diagram of database,

UNIT-II **(9 Hr.)**

Data models and Relational Databases: - Various data models, Basic concepts of Hierarchical data model, Network data model, and Relational data model, Comparison between the three types of models, Relational Data models: - Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints, Intension and Extension,

UNIT-III **(8 Hr.)**

Relational Query languages & SQL: - Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union. SQL: - Data definition in SQL, update statements and views in SQL, QUEL & QBE, Data storage and definitions, Data retrieval queries and update statements.

UNIT-IV **(7 Hr.)**
Database Design:- Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and dangling tuples, multi-valued dependencies.

UNIT-V **(7 Hr.)**
Advance Concepts:- Introduction of Distributed databases, protection, security and integrity constraints, concurrent operation on databases, recovery and transaction processing, basic concepts of object oriented data base system and design.

References:

1. Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3. Toledo; Data base management systems;TMH
4. Panneeselvam "Database Management System" PHI
5. Date C J, "An Introduction To Database System", Addision Wesley
6. Ashutosh Kumar Dubey "Data Base Management Concepts" Katson Publication

LIST OF EXPERIMENTS:-

1. Study of DBMS, RDBMS and ORDBMS.
2. To study Data Definition language Statements.
3. To study Data Manipulation Statements.
4. Study of SELECT command with different clauses.
5. Study of SINGLE ROW functions (character, numeric, Data functions).
6. Study of GROUP functions (avg, count, max, min, Sum).
7. Study of various type of SET OPERATORS (Union, Intersect, Minus).
8. Study of various type of Integrity Constraints.
9. Study of Various type of JOINS.
10. To study Views and Indices.

CSA-502

Computer Graphics & Multimedia

CSA-502	Computer Graphics	2L:1T:2P	4Credit	5 Hrs/Week

Objectives :-

This course will introduce students to all aspects of computer graphics including hardware, software and applications. Students will gain experience using a graphics application programming interface (OpenGL) by completing several programming projects.

Learning Outcomes:

At the end of this course students should:

1. Have a basic understanding of the core concepts of computer graphics.
2. Be capable of using OpenGL to create interactive computer graphics.
3. Understand a typical graphics pipeline.
4. Have made pictures with their computer

UNIT–I **(9 Hr.)**

Introduction and Overview of Graphics Systems:- Introduction to Computer Graphics, Application area of Computer Graphics, Introduction to Raster scan & Random scan displays, refreshing, flickering, interlacing, colour monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball, tablets and joysticks, graphical input techniques etc.

UNIT–II **(7 Hr.)**

Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Beizier Method, B-spline Method.

UNIT–III **(9 Hr.)**

2-D Transformation: - Translation, Rotation, Scaling, Shearing, Reflection, Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping:- World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & Polygon Clipping Algorithms

UNIT–IV **(7 Hr.)**

3-D Transformations: - Translation, Rotation and Scaling, Parallel & Perspective Projection:- Types of Parallel & Perspective Projection, Hidden Surface elimination:- Depth comparison, Back face detection algorithm, Painter's Algorithm, Z-Buffer Algorithm, Curve generation, Bezier and Bspline methods. Basic Illumination Model:- Diffuse reflection, Specular reflection, Phong Shading, Gouraud shading, Ray Tracing, Color models like RGB, YIQ, CMY, HSV.

UNIT–V **(8 Hr.)**

Multimedia :- Characteristics of a multimedia presentation, Uses of Multimedia, Text:– Types, Unicode Standard, text Compression, Text file formats, Audio Components of an audio system, Digital Audio, Digital Audio processing, Sound cards, Audio file formats, Audio Processing software, Video: -Video color spaces, Digital Video,

Digital Video processing, Video file formats. Animation:- Uses of Animation, Principles of Animation, Computer based animation, 3D Animation, Animation file formats, Animation software's.

REFERENCES:-

1. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill

2. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003

LIST OF EXPERIMENTS:

1. To implement Bresenham's algorithms for circle and ellipse drawing.
2.Program for Line Drawing using Bresenham‟s algorithm using C and OpenGL.
3. To perform 2D Transformations such as translation, rotation, scaling, reflection and sharing.
4. To implement Cohen–Sutherland 2D clipping and window–viewport mapping.
5. To perform 3D Transformations such as translation, rotation and scaling.
6. To visualize projections of 3D images and Hidden Surface Elimination.
7. To convert between color models.
8. To implement text compression algorithm.
9. Program to implement basic graphics primitives in OpenGL.
10. Program for Line Drawing using DDA algorithm using C and OpenGL

CSC-503
PHP Technology

CSC-503	PHP TECHNOLOGY	2L:1T:2P	4 Credit	5 Hrs/Week

Objectives: -
The main objective of this course is to introduce the major concept areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages.

Learning Outcomes:
At the end of the course, students will have basic understanding of the web technology and be able to architect, write, debug, and run complete web applications using PHP and MySQL.

UNIT-I **(8 Hr.)**
Introduction to PHP: Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression. Handling HTML Form With PHP: Capturing Form Data, Dealing with Multi-value filed, Generating File uploaded form , Redirecting a form after submission.

UNIT-II **(8 Hr.)**
Decisions and loop: Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html. Function: What is a function, Define a function, Call by value and Call by reference, Recursive function.

UNIT-III **(8 Hr.)**
String: Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function. Array: Anatomy of an Array, Creating index based and Associative array, Accessing array Element, Looping with Index based array, Looping with associative array using each() and for each(), Some useful Library function.

UNIT-IV **(8 Hr.)**
Working with file and Directories: Understanding file& directory, Opening and closing a file, Coping, renaming and deleting a file, Working with directories, Building a text editor, File Uploading & Downloading. State management: Using query string(URL rewriting), Using Hidden field, Using cookies, Using session.

UNIT-V **(8 Hr.)**
String matching with regular expression: What is regular expression, Pattern matching in Php, Replacing text, Splitting a string with a Regular Expression. Generating Images with PHP: Basics of computer Graphics, Creating Image, Manipulating Image, Using text in Image.

REFERENCES:

1. Learning PHP, MySQL, books by „ O‟ riley Press.

2. PHP & MySQL: Novice to Ninja by Kevin Yank.

3. PHP for the Web: Visual QuickStart Guide (4th Edition) by Larry Ullman.

List of experiments:

1. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
2. Write a PHP program to display a digital clock which displays the current time of the server.
3. Write the PHP programs to do the following: a. Implement simple calculator operations. b. Find the transpose of a matrix. c. Multiplication of two matrices. d. Addition of two matrices.
4. Write a PHP program named states.py that declares a variable states with value "Mississippi Alabama Texas Massachusetts Kansas".
5. write a PHP program that does the following: a. Search for a word in variable states that ends in xas. Store this word in element 0 of a list named states List. b. Search for a word in states that begins with k and ends in s. Perform a case insensitive comparison. Store this word in element1 of statesList. c. Search for a word in states that begins with M and ends in s. Store this word in element 2 of the list. d. Search for a word in states that ends in a. Store this word in element 3 of the list.
6. Write a PHP program to sort the student records which are stored in the database using selection sort

CSA – 504 (A)
Automata & Compiler Design

CSA-504(A)	Automata & Compiler Design	3L:1T:0P	4 Credit	4 Hrs/Week

Objectives: -

The main objective of this course is to introduce the major concept areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages.

Learning Outcomes:

By the end of the course, the successful student will be able to do:

1. To realize basics of compiler design and apply for real time applications.
2. To introduce different translation languages
3. To understand the importance of code optimization
4. To know about compiler generation tools and techniques
5. To learn working of compiler and non compiler applications
6. Design a compiler for a simple programming language

UNIT – I **(8Hr.)**

Introduction: Alphabets, Strings and Languages, Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Arden's theorem.

UNIT – II **(8Hr.)**

Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler. Lexical Analysis: The role of Lexical Analyzer, A simple approach to the design of Lexical Analyzer, Implementation of Lexical Analyzer. The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of CFG. Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, Predictive Parsers. .

UNIT – III **(8Hr.)**

Bottom–Up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC, Intermediate Code Generation: Different Intermediate forms: three address code, Quadruples & Triples. Syntax Directed translation mechanism and attributed definition. Translation of Declaration, Assignment, and Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation.

UNIT – IV **(8Hr.)**

Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semantic errors.

UNIT – V **(8 Hr.)**

Code Optimization and Code Generation: Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection

REFERENCES:

1.Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2.Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.
3.A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
4.Raghavan, Compiler Design, TMH Pub.

List of Experiments:

1. Develop a lexical analyzer to recognize a few patterns.
2.Write a programme to parse using Brute force technique of Topdown parsing.
3. Develop LL (1) parser (Construct parse table also).
4. Develop an operator precedence parser (Construct parse table also)
5.Develop a recursive descent parser
6. Write a program for generating for various intermediate code forms i) Three address code ii) Polish notation
7. Write a program to simulate Heap storage allocation strategy
8. Generate Lexical analyzer using LEX
Generate YACC specification for a few syntactic categories.
10. Given any intermediate code form implement code optimization techniques

CSA- 504(B)
Simulation & Modeling

CSA- 504(B)	SIMULATION & MODELING	3L:1T:0P	4Credit	4 Hrs/Week

Objectives: -

The aim of this course is to introduce various system modelling and simulation techniques, and highlight their applications in different areas. It includes modelling, design, simulation, planning, verification and validation. After learning the simulation techniques, the students are expected to be able to solve real world problems which cannot be solved strictly by mathematical approaches. This course begins by demonstrating the usefulness of simulation as a tool for problem solving in business, industry, government, and society.

Learning Outcomes:

• Knowledge and understanding

Understand different methods for random number generation
Have a clear understanding of the need for the development process to initiate the real problem.
Have a clear understanding of principle and techniques of simulation methods informed by research direction.

• Cognitive skills (thinking and analysis)

(a) Be able to describe the components of continuous and discrete systems and simulate them.

(b) Be able to model any system from different fields

(c) Be able to implement numerical algorithm to meet simple requirements, expressed in English.

(d) Be able to discuss the simulation methods and select the suitable technique on the problems.

UNIT-I (9 Hr.)

Introduction to Modelling and Simulation: Nature of Simulation Systems, Models and Simulation, Continuous and Discrete Systems, system modelling, concept of simulation, Components of a simulation study, Principles used in modelling, Static and Dynamic physical models, Static and Dynamic Mathematical models, Introduction to Static and Dynamic System simulation, Advantages, Disadvantages and pitfalls of Simulation.

UNIT-II (8 Hr.)

System Simulation and Continuous System Simulation: Types of System Simulation, Monte Carlo Method, Comparison of analytical and Simulation methods, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model, Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, Continuous system simulation languages, Hybrid simulation, Real Time simulations.

UNIT –III (8 Hr.)

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves, Generalization of growth models, System dynamics diagrams, Multi segment models, Representation of Time

Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

UNIT-IV (8 Hr.)

Simulation of Queueing Systems and Discrete System Simulation: Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue, Application of queuing theory in computer system, Discrete Events, Generation of arrival patterns, Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization , Recording Distributions and Transit times.

UNIT-V (7 Hr.)

Introduction to Simulation languages and Analysis of Simulation output GPSS: Action times, Succession of events, Choice of paths, Conditional transfers, program control statements, SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements, Estimation methods, Relication of Runs, Batch Means, Regenerative techniques, Time Series Analysis, Spectral Analysis and Autoregressive Processes.

REFERENCES:

1. Gorden G., System simulation, Prentice Hall.

2. Seila, Simulation Modeling, Cengage Learning.

3. Law .,Simulation Modeling And Analysis, McGraw Hill.

4. Deo, System Simulation with Digital Computer, PHI.

5. Harrington, Simulation Modeling methods, McGraw Hill.

6. Severance, " System Modeling & Simulation, Willey Pub.

CSA- 505(A)
E-Commerce & Governance

CSA- 505(A)	E-COMMERCE & GOVERNANCE	3L:1T:0P	4Credit	4 Hrs/Week

Objectives: -
The main objective of this course are to :-

1. Examine the different definitions of e-commerce and e-governance
2. Describe major players in e-commerce
3. Explain the key drivers of e-commerce
4. Attempt a classification of e-commerce
5. Mention the role played by governments in the development of e-commerce
6. Examine the prerequisites for e-governance
7. Identify the skills needed for the successful functioning of e-governance
8. Describe the different models of e-governance

Learning Outcomes:
On completing this module, you should know clearly the meaning of the terms E-commerce and E-governance. You should also be aware of the various e- governance initiatives in India. You also need to have an idea of the role libraries, especially public libraries, can play in such initiatives.

UNIT-I **(8Hr.)**
Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal, environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

UNIT-II **(8 Hr.)**
Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

UNIT-III **(8 Hr.)**
E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

UNIT-IV **(8 Hr.)**
E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, Case studies: NICNET-role of nationwide networking in e-governance, e-seva.

UNIT-V **(8 Hr.)**
E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

REFERENCES:

1. Gary P. Schneider, "E-commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-governence: concept and case study", PHI Learning Private Limited.
3. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
4. David Whiteley, "E-commerce study, technology and applications", TMH.

CSA-505(B)
Signals & Systems

CSA-505(B)	Signal & Systems	3L:1T:0P	4Credit	4 Hrs/Week

Objectives-
he main objectives of this course are :-

Understanding the fundamental characteristics of signals and systems.
Understanding the concepts of vector space, inner product space and orthogonal series.
Understanding signals and systems in terms of both the time and transform domains, taking advantage of the complementary insights and tools that these different perspectives provide.

Outcomes :-

1. Analyze system properties based on impulse response and Fourier analysis.
2. Apply the Laplace transform and Z- transform for analyze of continuous-time and discrete-time signals and systems.
3. Understand the process of sampling and the effects of under sampling.

Unit I- **(8 Hr.)**
Introduction to Signal & Systems: Signals, classification of signals, basic continuous time and discrete time signals, continuous LTI, discrete LTI systems , impulse and step functions, impulse response stability, linearity, stability, time invariance, Eigen values and Eigen functions, discrete convolution ,properties of discrete and continuous LTI systems ,systems described by difference and differential equations.

Unit II- **(8 Hr.)**
Fourier Analysis of Continuous Time Signals and Systems: Fourier series, Fourier series representation of continuous periodic signal & its properties, Fourier transform and its properties, parseval's theorem, frequency response of LTI systems.

Unit III- **(8 Hr.)**
Fourier Analysis of Discrete Time Signals & Systems: Discrete-time Fourier series, discrete time Fourier transform (including DFT) and properties, frequency response of discrete time LTI systems, continuous time fourier transform for periodic and non-periodic signals, properties of CTFT.

Unit IV- **(8 Hr.)**
Laplace & Z-Transform Transform: Laplace transform and its inverse: definition, existence conditions, region of convergence and properties, application of Laplace transform for the analysis of continuous time LTI system, Z-Transform, properties of Z-transform inversion of Z-transform, two dimensional Z- transform, convergence of Z-transform, region of convergence and properties, application of Z-transform for the analysis of discrete time LTI systems, solving eq. using Z transform.

Unit V- **(8 Hr.)**
State Space Analysis: Concept of state, state space representation discrete time LTI systems , state space representation of continuous time LTI systems ,solutions of state equation for discrete time LTI systems , solutions

of state equation for continuous time LTI systems ,FFT. Sampling: Sampling theorem, ideal & real sampling, reconstruction of signal from its samples, aliasing sampling in frequency domain, sampling of discrete-time signals.

References:

1. Alan V. Oppenheim, Alan S. Willsky and H. Nawab, Signals and Systems, Prentice Hall, 1997
2. Simon Haykin, Communication Systems, 3rd Edition, John Wiley, 1995.
3. Signals & Systems, 2nd Edition, by Alan Oppenheim, Alan Wilsky, S. Nawab. Prentice Hall, 1997.
4. Signals and Systems, by Simon Haykin and Barry Van Veen. Wiley, 1999.

CSA-506
Industrial Training –I

CSA-506	Industrial Training –I	0L:0T:4P	2 Credit	4 Hrs/Week

OBJECTIVE:-

The following objective should be fulfilled in industrial training –I, and student must participate in any aerospace/aeronautical industry where they can learn to apply the Technical knowledge in real Industrial situations.

- Gain experience in writing Technical reports/projects.
- Expose students to the engineer's responsibilities and ethics.
- Expose the students to future employers.
- Understand the social, economic and administrative considerations that influence the working environment of industrial organizations

OUTCOME:-

- Capability to acquire and apply fundamental principles of engineering.
- Become master in one's specialized technology
- Become updated with all the latest changes in technological world.
- Ability to communicate efficiently.

CSA-601
Compiler Design

CSA-601	Compiler Design	2L:1T:2P	4 Credit	5 Hrs/Week

Objective:
The main objective of this course is to introduce the major concept areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages.

Outcome :
By the end of the course, the successful student will be able to do:

1. To realize basics of compiler design and apply for real time applications.
2. To introduce different translation languages ¬ To understand the importance of code optimization.
3. To know about compiler generation tools and techniques.
4. To learn working of compiler and non-compiler applications.
5. Design a compiler for a simple programming language

UNIT–I **(9 Hr.)**
Introduction: Alphabets, Strings and Languages, Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Arden's theorem.

UNIT–II **(10 Hr.)**
Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler. Lexical Analysis: The role of Lexical Analyzer, A simple approach to the design of Lexical Analyzer, Implementation of Lexical Analyzer. The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of CFG. Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, Predictive Parsers.

UNIT–III **(8 Hr.)**
Bottom–Up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC, Intermediate Code Generation: Different Intermediate forms: three address code, Quadruples & Triples. Syntax Directed translation mechanism and attributed definition. Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation.

UNIT–IV **(8 Hr.)**
Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semantic errors.

UNIT–V **(5 Hr.)**
Code Optimization and Code Generation: Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection

REFERENCES:

1.Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2.Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.
3.A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
4.Raghavan, Compiler Design, TMH Pub.

List of Experiments:

1. Develop a lexical analyzer to recognize a few patterns.
2. Write a program to parse using Brute force technique of Topdown parsing.
3. Develop LL (1) parser (Construct parse table also).
4. Develop an operator precedence parser (Construct parse table also)
5. Develop a recursive descent parser
6. Write a program for generating for various intermediate code forms i) Three address code ii) Polish notation
7. Write a program to simulate Heap storage allocation strategy
8. Generate Lexical analyzer using LEX
9. Generate YACC specification for a few syntactic categories.
10. Given any intermediate code form implement code optimization techniques

CSA-602
Computer Network

CSA-602	Computer Network	2L:1T:2P	4 Credit	5 Hrs/Week

Objective:

This course is to provide students with an overview of the concepts and fundamentals of data communication and computer networks. Topics to be covered include: data communication concepts and techniques in a layered network architecture, communications switching and routing, types of communication, network congestion, network topologies, network configuration and management, network model components, layered network models (OSI reference model, TCP/IP networking architecture) and their protocols, various types of networks (LAN, MAN, WAN and Wireless networks) and their protocols.

Outcomes:

The students will be able to:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

UNIT–I **(9 Hr.)**

Introduction to computer networks and Internet, overview Advantages - network, Types-server based, peer, hybrid, Server types, Network Topology: Bus, Star, Ring, Star bus, Star ring, Mesh, Network Protocols Hardware Protocols, Software Protocols, Selecting and design the network for an organization.

UNIT-II **(8 Hr.)**

Signal Transmission: Digital signaling, Analog Signaling, Bit synchronization, Baseband and Broadband transmission, Network Media types- properties & specialties, Network adapters– working principals, configuration and selection.

UNIT-III **(8Hr.)**

Network Layer: Network Layer Design issues, Store and Forward Packet Switching, connection less and connection oriented networks, routing algorithm's, optimality principle, shortest path, flooding, Distance Vector Routing, Control to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT-IV **(8 Hr.)**

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP. Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Crash Recovery.

UNIT-V **(7 Hr.)**

UDP, RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

Application Layer: Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH.

REFERENCES:

1. Andrew & Tanenbaum, "Computer Network ".
2. Prakash C Gupta, "Data Communication.
3. William Stallings, "Data and Computer Communication".
4. Computer Networking and the Internet (5th edition),Fred Halsall, Addison Wesley.
5. TCP/IP Protocol Suite (3rd edition), Behrouz Forouzan, McGraw Hill.

LIST OF EXPERIMENTS:

1. Establishment and configuration of LAN.
2. Study of WAN.
3. Case study of ARP AND RARP Protocols.
4. Study of basic networking commands like ping, ipconfig, etc.
5. Case study of various Routing Strategies.
6. Case studies of various Network Topologies.
7. Study of sliding window protocol.
8. Configuring routers, bridges and switches and gateways.
9. Case study of client-server application.
10. Study of IPv4, IPv6 Protocol.

Program Elective-II
CSA-603(A)
Advance Computer Architecture

CSA-603(A)	Advance Computer Architecture	3L:1T:0P	4 Credit	4 Hrs/Week

Objective:

The objective of this course is to make students know about the Parallelism concepts in Programming, to give the students an elaborate idea about the different memory systems and buses, to introduce the advanced processor architectures to the students, to make the students know about the importance of multiprocessor and multicomputers, to study about data flow computer architectures.

Outcome:

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

UNIT-I **(9 Hr.)**

Flynn‟s Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and Multicomputers, Multivector and SIMD Computers. Data and resource dependences, Hardware and Software Parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, Data flow and Demand driven mechanisms. Static interconnection networks, Dynamic interconnection Networks, Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks.

UNIT- II **(9 Hr.)**

Instruction set Architecture, CISC Scalar Processors , RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning. Interleaved memory organization, Memory interleaving, Pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System, Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

UNIT-III **(8 Hr.)**

Linear Pipeline Processor, Nonlinear Pipeline Processor, Instruction Pipeline design, Mechanisms for instruction Pipelining, Pipeline Hazards, Dynamic instruction scheduling - score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic Pipeline, Multifunctional Arithmetic Pipelines. Superscaler Pipeline design, Super Pipeline Processor Design.

UNIT-IV **(7 Hr.)**

Cache Coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, Deadlock and virtual channel. Vector Processing Principles, Vector instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD

organization, Distributed memory model and shared memory model. Principles of Multithreading, Multithreading Issues and Solutions, Multiple-Context Processors.

UNIT-V **(7 Hr.)**

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

REFERENCES:

1. Kai Hwang, "Advanced computer architecture", TMH.
2. J.P. Hayes, "computer Architecture and organization"; MGH.
3.V.Rajaranam & C.S.R. Murthy, "Parallel computer"; PHI Learning.
4. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning

CSA-603(B)
Advanced Data Structure

CSA-603(B)	Advanced Data Structure	3L:1T:0P	4 Credit	4 Hrs/Week

Objective:
The objective of this course is to impart the basic concepts of data structures and algorithms, to understand concepts about searching and sorting techniques, to Understand basic concepts about stacks, queues, lists, trees and graphs, to understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures.

Outcome:
Students will be able to :

1. Ability to analyze algorithms and algorithm correctness.
2. Ability to summarize searching and sorting techniques
3. Ability to describe stack, queue and linked list operation.
4. Ability to have knowledge of tree and graphs concepts

UNIT-I **(9 Hr.)**

Introduction: Basic Terminology, Data types and its classification, Algorithm complexity notations like big Oh, Array Definition, Representation and Analysis of Arrays, Single and Multidimensional Arrays, Address calculation, Array as Parameters, Ordered List and operations, Sparse Matrices, Storage Pools, Garbage collection.

UNIT-II **(9 Hr.)**

Recursion: - Recursion- definition and processes, simulating recursion, Backtracking, Recursive algorithms, Tail recursion, Removal of recursion. Tower of Hanoi Problem. Linear Data Structure:- Stack, Array Implementation of stack, Linked Representation of Stack, Application of stack, Queue, Array and linked implementation of queues, Circular queues, D -queues and Priority Queues.

UNIT-III **(8Hr.)**

Introduction of Linked list, Implementation of Singly Linked List, Two-way Header List, Doubly linked List, Linked List in Array. Generalized linked list, Non Linear Data Structure :-Trees: Basic terminology, Binary Trees, , algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Binary Search Tree(BST), Height-balanced and weight-balanced trees, B-trees, B+ -trees.

UNIT-IV **(7 Hr.)**

Searching, Sorting and Design Techniques:- Searching Techniques, Sorting-Internal Sorting, Bubble Sort, Insertion Sort, Quick Sort, Heap Sort, Bin Sort, Radix Sort, External Sorting, Merge Sort, Multi-way Merge Sort ,Design Techniques -Divide and Conquer, Dynamic Programming, Greedy Algorithm, Backtracking, Local Search Algorithms.

UNIT-V **(7 Hr.)**

Memory Management: -Issues -Managing Equal Sized Blocks, Garbage Collection Algorithms for Equal Sized Blocks, Storage Allocation for Objects with Mixed Sizes, Buddy Systems, Garbage collection and compaction.

Reference Books:

1. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education P
2. Lipschutz; Data structure (Schaum); TMH
3. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002

Program Elective-III

CSA-604(A)

Data Mining and Data Warehousing

CSA-604(A)	Data Mining and Data Warehousing	3L:0T:0P	3Credit	3 Hrs/Week

Objectives:

The objective of this course is to familiar with mathematical foundations of data mining tools, Understand and implement classical models and algorithms in data warehouses and data mining, Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.

Outcomes:

Students will be able to:

1. Understand Data Warehouse fundamentals, Data Mining Principles
2. Design data warehouse with dimensional modeling and apply OLAP operations.
3. Identify appropriate data mining algorithms to solve real world problems
4. Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
5. Describe complex data types with respect to spatial and web mining

UNIT- I **(9 Hr.)**

Data Mining: Basic concept ,technology and rules, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNIT-II **(9 Hr.)**

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNIT-III **(7 Hr.)**

Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis. E-Metrics.

UNIT-IV **(8 Hr.)**

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNIT-V **(7 Hr.)**

Data warehousing : Data warehouse, OLAP and Data mining. OLTP vs OLAP. Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection. OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:1 partitioning strategy, aggregation, data marting, metadata. Capacity planning, tuning the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

Reference Books :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.
2. Data Mining; Adriaans & Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.
4. Data Mining; Dunham; Pearson education.

CSA-604(B)
Soft Computing

CSA-604(B)	Soft Computing	3L:0T:0P	3Credit	3 Hrs/Week

Objective:

The objective of this course is to develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory, introduce students to artificial neural networks and fuzzy theory from an engineering perspective.

Scope:

The students are expected to:

1. Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.
2. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
3. To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations
4. Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
5. Reveal different applications of these models to solve engineering and other problems

UNIT-I **(9 Hr.)**

Soft Computing:- Introduction of soft computing, soft computing vs hard computing, various types of soft computing techniques, applications of soft computing. Introduction to Neural Network:- Concept, biological neural network, evolution of artificial neural network, McCulloch-Pitts neuron models, Learning (Supervise & Unsupervised) and activation function, Models of ANN-Feed forward network and feedback network, Learning Rules Hebbian, Delta, Perceptron Learning and Windrow-Hoff, winner take all.

UNIT – II **(9 Hr.)**

Supervised Learning: Perceptron learning,- Single layer/multilayer, linear Separability, Adaline, Madaline, Back propagation network, RBFN. Application of Neural network in forecasting, data compression and image compression.

UNIT – III **(7 Hr.)**

Unsupervised learning: Kohonen SOM (Theory, Architecture, Flow Chart, Training Algorithm) Counter Propagation (Theory, Full Counter Propagation NET and Forward only counter propagation net), ART (Theory, ART1, ART2), Application of Neural networks in pattern and face recognition, intrusion detection, robotic vision.

UNIT – IV **(7 Hr.)**

Fuzzy Set: Basic Definition and Terminology, Set-theoretic Operations, Member Function, Formulation and Parameterization, Fuzzy rules and fuzzy Reasoning, Extension Principal and Fuzzy Relations, Fuzzy if-then Rules, Fuzzy Inference Systems. Hybrid system including neuro fuzzy hybrid, neuro genetic hybrid and fuzzy genetic hybrid, fuzzy logic controlled GA. Application of Fuzzy logic in solving engineering problems.

UNIT – V **(7 Hr.)**

Genetic Algorithm: Introduction to GA, Simple Genetic Algorithm, terminology and operators of GA (individual, gene, fitness, population, data structure, encoding, selection, crossover, mutation, convergence criteria). Reasons for working of GA and Schema theorem, GA optimization problems including JSPP (Job shop scheduling problem), TSP (Travelling salesman problem), Network design routing, timetabling problem. GA implementation using MATLAB.

REFERENCES:

1. S.N. Shivnandam, "Principle of soft computing", Wiley
2. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.
3. Klir & Yuan, Fuzzy sets & Fuzzy Logic: Theory & Appli., PHI Pub.
4. S, Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications, PHI Publication.

Open Core Elective-II
CSA-605(A)
Information Theory & Coding

CSA-605(A)	Information Theory & Coding	3L:0T:0P	3Credit	3 Hrs/Week

Objective:

The objectives of this course are to understand the fundamentals of Cryptography, to acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity, to understand the various key distribution and management schemes, to understand how to deploy encryption techniques to secure data in transit across data networks, to design security applications in the field of Information technology.

Outcome:

The students at the end of the course will be able to:

1. Understand and explain the basic concepts of information theory, source coding, channel and channel capacity, channel coding and relation among them.
2. Describe the real life applications based on the fundamental theory.
3. Calculate entropy, channel capacity, bit error rate, code rate, steady-state probability and so on.
4. Implement the encoder and decoder of one block code or convolutional code using any program language

UNIT-I **(9 Hr.)**

Uncertainty, Information and Entropy Information Measures, Characteristics on information measure, Shannon's concept of information, Shannon's measure of information, Model for source coding theorem, Communication system, Source coding and line/channel coding, channel mutual information capacity (Bandwidth).

UNIT-II **(8Hr.)**

Channel coding, Theorem for discrete memory less channel, Information capacity theorem: Error detecting and error correcting codes, Types of codes, Block codes, Tree codes, Hamming Codes, Description of linear block codes by matrices, Description of linear tree code by matrices, Parity check codes, Parity check polynomials.

UNIT-III **(9 Hr.)**

Compression: Lossless and lossy, Huffman codes, Binary Image compression schemes, Run length Encoding, CCITT group-3 1D compression, CCITT group-3 2D compression, CCITT group-4 2D compression.

UNIT-IV **(7 Hr.)**

Video Image Compression: Requirement of full motion video compression, CCITT H 261 video coding algorithm, MPEG compression methodology, MPEG-2 compression, Audio (Speech) compression.

UNIT-V **(7Hr.)**

Cryptography: Encryption, Decryption, Cryptogram (cipher text), Concept of cipher, Cryptanalysis, Keys: Single key (Secret key), Cryptography, two-key (Public key) cryptography, Single key cryptography, Ciphers, Block Cipher code, Stream ciphers, Requirements for secrecy, The data Encryption Standard, Public Key Cryptography, Diffie- Hellmann public key distribution, The Rivest- Shamin Adelman(R-S-A) system for public key cryptography, Digital Signature.

REFERENCES:

1. Rajan Bose "Information Theory, Coding and Cryptography", TMH, 2002.
2. G A Jones J M Jones, "Information and Coding Theory", Springer Verlag, 2004.
3. Cole, "Network Security", Bible, Wiley INDIA, Second Addition.
4. K Sayood, "Introduction to Data Compression" 3/e, Elsevier 2006.

CSA-605(B)
Cyber Law & Ethics

CSA-605(B)	Cyber Law & Ethics	3L:0T:0P	3Credit	3 Hrs/Week

Objective:
The Objectives Of This Course Is To Enable Learner To Understand, Explore, And Acquire A Critical Understanding Cyber Law. Develop Competencies For Dealing With Frauds And Deceptions (Confidence Tricks, Scams) And Other Cyber Crimes For Example, Child Pornography Etc. That Are Taking Place Via The Internet.

Outcomes:
Student will be able to:
1. Make Learner Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace.
2. Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace;
3. Develop The Understanding Of Relationship Between Commerce And Cyberspace; And
4. Give Learners In Depth Knowledge Of Information Technology Act And Legal Frame Work Of Right To Privacy, Data Security And Data Protection.
5. Make Study On Various Case Studies On Real Time Crimes.

UNIT-I **(9 Hr.)**
Cyber world: an overview, internet and online resources, security of information, digital signature, intellectual property (IP), historical background of IP, IPR governance, National patent offices, the world intellectual property organization (WIPO).

UNIT-II **(9 Hr.)**
Introduction about the cyber space, cyber law, regulation of cyber space, scope of cyber laws: ecommerce; online contracts; IPRs (copyright, trademarks and software patenting), e-taxation; e-governance and cyber-crimes, cyber law in India with special reference to Information Technology Act, 2000.

UNIT-III **(8 Hr.)**
Introduction to computer and cyber-crimes, Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber-crimes cyber stalking; cyber pornography, forgery and fraud, crime related to IPRs, cyber terrorism; computer vandalism etc. Cyber forensics, computer forensics and the law, forensic evidence, computer forensic tools.

UNIT-IV **(7 Hr.)**
Regulation of cyber-crimes, Issues relating to investigation, issues relating to jurisdiction, issues relating to evidence, relevant provisions under Information Technology Act 2000, Indian penal code, pornography Act and evidence Act etc.

UNIT-V **(7 Hr.)**
Copyright issues in cyberspace: linking, framing, protection of content on web site, international treaties, trademark issues in cyberspace: domain name dispute, cyber-squatting, uniform dispute resolution policy, computer software and related IPR issues.

REFERENCES:

1. Nelson, Phillips, "Computer Forensics and Investigations", Cengage Learning India.
2. Vinod V. Sople, "Managing Intellectual Property" PHI Learning Private Limited.
3. Dr.R.K.Tiwari P.K.Sastri,K.V. Ravikumar, "Computer crime and Computer Forensics",
First Edition 2002, Select publishers.
4. NIIT, Understanding Forensics in IT, PHI Learning

CSA-606
Minor Project

CSA-606	Minor Project	0L:0T:4P	2 Credit	4 Hrs/Week

Objectives:

1. Address the real world problems and find the required solution
2. Study the basic concepts of programming/ hardware/ emulator for Raspberry pi/Arduino/ ARM Cortex/ Intel Galileo etc.
3. Fabricate and implement the mini project intended solution for project based learning.
4. Build and test the mini project successfully.
5. Improve the team building, communication and management skills of the students

Outcomes: Students will be able to:

1. Identify the requirements for the real world problems.
2. Study and enhance software/ hardware skills.
3. Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing.
4. To report and present the findings of the study conducted in the preferred domain 6. Demonstrate an ability to work in teams and manage the conduct of the research study

CSA-701
Ad-Hoc And Sensor Network

CSA-701	Ad-HOC AND SENSOR NETWORK	3L:0T:2P	4 Credit	5 Hrs/Week

OBJECTIVE :-

To understand the state–of–the–art in network protocols, architectures and applications, Analyze existing network protocols and networks, Develop new protocols in networking, To understand how networking research is done, To investigate novel ideas in the area of Networking via term–long research projects

OUTCOME:-

After completion of the course the student will be able to

1. Describe the unique issues in ad-hoc/sensor networks.
2. Describe current technology trends for the implementation and deployment of wireless ad-hoc/sensor networks.
3. Discuss the challenges in designing MAC, routing and transport protocols for wireless ad-hoc/sensor networks.
4. Discuss the challenges in designing routing and transport protocols for wireless Ad-hoc/sensor networks.

UNIT-I **(8 Hr.)**

Introduction :Introduction-Fundamentals of Wireless Communication Technology, The Electromagnetic Spectrum, GSM, GPRS, PCS, WLAN and UMTS, Components of Packet Radios, Routing in PRNETs, Ad Hoc Wireless Networks, Wireless Sensor Networks, Traffic Profiles, Types of Ad Hoc Mobile Communications, Types of Mobile Host Movements, Challenges Facing Ad Hoc Mobile Networks.

UNIT II **(9 Hr.)**

Ad Hoc wireless MAC protocols-Introduction, Synchronous and asynchronous MAC protocols, Problem in Ad Hoc channel access, Receiver-initiated and sender-initiated MAC protocols, Existing Ad Hoc MAC protocols, Ad Hoc Routing Protocols-Introduction, Classifications of Routing Protocols: Table-Driven Routing Protocols –Destination Sequenced Distance Vector (DSDV), Wireless Routing Protocol (WRP), Source-Initiated On-Demand Approaches - Ad Hoc On-Demand Distance Vector Routing (AODV), Dynamic Source Routing (DSR), Temporally Ordered Routing Algorithm (TORA), Signal Stability Routing (SSR) Location Aided Routing (LAR).

UNIT III **(8 Hr.)**

Multicast routing In Ad Hoc Networks : Introduction, Issues in Designing a Multicast Routing Protocol, Operation of Multicast Routing Protocols, An Architecture Reference Model for Multicast Routing Protocols, Classifications of Multicast Routing Protocols, Tree-Based Multicast Routing Protocols, Mesh-Based Multicast Routing Protocols, Summary of Tree-and Mesh-Based Protocols -Energy-Efficient Multicasting.

UNIT IV **(7 Hr.)**

Transport Layer, Security Protocols : Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management.

UNIT V **(8 Hr.)**

QoS and Energy Management : Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classifications of QoS Solutions, MAC Layer Solutions, Network Layer Solutions,Energy Management in Ad Hoc Wireless Networks –Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Energy Management Schemes.

REFERENCES BOOKS:-

1. C. Siva Ram Murthy and B.S. Manoj "Ad Hoc Wireless Networks: Architectures and Protocols", Pearson Education.
2. C.K. Toh, "Ad Hoc Mobile Wireless Networks: Protocols and Systems", Pearson Education.
3. George Aggelou, "Mobile Wireless Networks", Tata McGraw-Hill.

LIST OF EXPERIMENT:-

1. Introduction of Wireless sensor network applications and its simulation.
2. Network Simulator installation of wireless sensor network.
3. Write TCL script for transmission between mobile nodes.
4. Write TCL script for sensor nodes with different parameters.
5. Generate tcl script for udp and CBR traffic in WSN nodes.
6. Generate tcl script for TCP and CBR traffic in WSN nodes.
7. Implementation of routing protocol in NS2 for AODV protocol.
8. Implementation of routing protocol in NS2 for DSR protocol.
9. Implementation of routing protocol in NS2 for TORA protocol.
10. Study other wireless sensor network simulators (Mannasim. Contiki.)

CSA-702
Digital Image Processing

CSA-702	DIGITAL IMAGE PROCESSING	3L:0T:2P	4 Credit	5 Hrs/Week

OBJECTIVE:-

1. Describe and explain basic principles of digital image processing;
2. Design and implement algorithms that perform basic image processing (e.g., noise removal and image enhancement);
3. Design and implement algorithms for advanced image analysis (e.g., image compression, image segmentation & image representation);
4. Assess the performance of image processing algorithms and systems.

OUTCOME:-

1. Design and Implementation of different transforms like: Fourier Transform, Z Transform, Discrete Cosine Transform, Walsh Transform, Hadamard Transform,
2. Design and Implementation of Digital Filters like: FIR, IIR.
3. Design and Implementation of multi-rate and adaptive systems.
4. Power spectrum estimation and analysis

UNIT-I (8 Hr.)
Digital ImageProcessing: Elements of aDigital ImageProcessing system, Structure of the Human eye, Image formation andcontrastsensitivity, Sampling and Quantization, Neighbours of a pixel, Distance measures, Photographicfilestructure and exposure, Filemcharacteristics, Linear scanner, Video camera, Image processing applications.

UNIT-II (7 Hr.)
mage Transforms: Introduction to Fourier transform DFT, Properties of two dimensional FT, Separability, Translation, Periodicity, Rotation, Average value, FFT algorithm, Walsh transform, Hadamard transform, Discrete Cosine transform.

UNIT-III (8 Hr.)
Image Enhancement: Definition, Spatial domain methods, Frequency domain methods, Histogram modify technique, Neighborhood averaging, Media filtering, Low pass filtering, Averaging of multiple images, Image sharpening by differentiation and high pass filtering.

UNIT-IV (9 Hr.)
Image Restoration: Definition, Degradation model, Discrete formulation, Circulant matrices, Block circulant matrices, Effect of diagnolization of circulant and block circulant matrices, Unconstrained and constrained restorations, Inverse filtering, Wiener filter, Restoration in spatial domain.

UNIT-V (8 Hr.)
Image Encoding: Objective and subjective fidelity criteria, Basic encoding process, The mapping, The quantizer, The coder, Differential encoding, Contour encoding, Run length encoding, Image encoding relative to fidelity criterion, Differential pulse code modulation.

REFERENCES:

1. Rafael, C. Gonzlez., and Paul, Wintz, "Digital Image Processing", Addison-Wesley Publishing Company.
2. Jain Anil K., "Fundamentals of Digital Image Processing", Prentice Hall.
3. Sosenfeld, and Kak, A.C., "Digital Image Processing", Academic Press
4. William K. Pratt., "Digital Image Processing", John Wiley and Sons.

LIST OF EXPERIMENT:-

1. To study the Image Processing concept.
2. To obtain histogram equalization image.
3. To Implement smoothing or averaging filter in spatial domain.
4. Program for opening and closing of the image.
5. To fill the region of interest for the image.
6. Program for edge detection algorithm.
7. Program of sharpen image using gradient mask.
8. Program for morphological operation: erosion and dilation
9. Program for DCT/IDCT computation.

CSA-703(A)
Artificial Intelligence

CSA-703(A)	ARTIFICIAL INTELLIGENCE	3L:0T:0P	3 Credit	3 Hrs/Week

OBJECTIVE:-

It presents the concepts of Artificial Intelligence and the participants will get to work in the areas of Machine learning, Deep Learning, implement methods to solve problems using Artificial Intelligence and Natural Language Processing, etc.

OUTCOME:-

This course is designed in synchronization with the industry to provide the participants in-depth knowledge and skills required by AI fields around the globe. It provides comprehensive knowledge about the fundamental principles, methodologies and industry practices in AI.

1. Fundamentals of neural networks and fuzzy logic.
2. Supervised learning and unsupervised learning.
3. Neuro dynamical models

UNIT-I **(9 Hr.)**

Introduction: Artificial Intelligence, AI Problems, AI Techniques, The Level of the Model, Criteria For Success. Defining the Problem as a State Space Search, Problem Characteristics, Production Systems, Search: Issues in The Design of Search Programs, Un-Informed Search, BFS, DFS; Heuristic Search Techniques: Generate-And-Test, Hill Climbing, Best-First Search, A*Algorithm, Problem Reduction, AO*Algorithm, Constraint Satisfaction, Means-Ends Analysis.

UNIT:-II **(8 Hr.)**

Knowledge Representation: Procedural Vs Declarative Knowledge, Representations & Approaches to Knowledge Representation, Forward Vs Backward Reasoning, Matching Techniques, Partial Matching, Fuzzy Matching Algorithms and RETE Matching Algorithms; Logic Based Programming-AI Programming languages: Overview of LISP, Search Strategies in LISP, Pattern matching in LISP , An Expert system Shell in LISP, Over view of Prolog, Production System using Prolog

UNIT-III (8 Hr.)

Reasoning under Uncertainty: Introduction to Non-Monotonic Reasoning, Truth Maintenance Systems, Logics for Non-Monotonic Reasoning, Model and Temporal Logics; Statistical Reasoning: Bayes Theorem, Certainty Factors and Rule-Based Systems, Bayesian Probabilistic Inference, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic: Crisp Sets ,Fuzzy Sets, Fuzzy Logic Control, Fuzzy Inferences & Fuzzy Systems.

UNIT-IV **(7 Hr.)**

Overview of Computational Intelligence and Artificial Evolution , Artificial Neural Networks (ANNs), Introduction to ANNs, Learning in ANNs, Supervised Learning in ANNs, Unsupervised Learning in ANNs, Reinforcement Learning in ANNs, Deep Learning in ANNs, Performance of ANNs.

UNIT-V **(8 Hr.)**

Artificial Evolution, Fundamentals of Evolution, Introduction to Evolutionary Computation (EC), Common EC Methods, Genetic Algorithms, Genetic Programming, Evolutionary Programming, Evolution Strategies, Grammatical Evolution, Cultural Evolution, Introduction to Artificial Life (ALife), Artificial Neural Networks and Artificial Evolution, Introduction to Neuro evolution, Topology Evolution, Learning Rule Evolution, Deep Neuro evolution.

TEXTBOOKS:-

1. Artificial Intelligence, George F Luger, Pearson Education Publications
2. Artificial Intelligence, Elaine Rich and Knight, Mcgraw-Hill Publications
3. Computational Intelligence: An Introduction, Second Edition, Andries P. Engelbrecht, 2007,
4. Bio-Inspired Artificial Intelligence: Theories, Methods, and Technologies, Dario Floreano and Claudio Mattiussi, 2008, The MIT Press
5. Writing for Computer Science, Third Edition, Justin Zobel, 2014, Springer

REFERANCES:-

1. Introduction To Artificial Intelligence & Expert Systems, Patterson, PHI
2. Multi Agent systems-a modern approach to Distributed Artificial intelligence, Weiss.G, MIT Press.
3. Artificial Intelligence : A modern Approach, Russell and Norvig, Printice Hall

CSA-703(B)
Neural Network

CSA-703(B)	Neural Network	3L:0T:0P	3 Credit	3 Hrs/Week

Objective:
Introduce major deep learning algorithms, the problem settings, and their applications to solve real world problems.

Outcomes:

Student should be able to:

1. Describe the structure and function of the most common artificial neural network (ANN) types, e.g. multi-layer perceptron, recurrent network, self-organizing maps, Boltzmann machine, deep belief network, autoencoder, and provide examples of their applications
2. Explain mechanisms of supervised/unsupervised learning from data and information processing in different ANN architectures, and also account for derivations of the basic ANN algorithms discussed in the course
3. Demonstrate when and how deep architectures lead to increased performance in pattern recognition and data mining problems
4. Quantitatively analyse the process and outcomes of learning in ANNs, and account for their shortcomings, limitations
5. Apply, validate and evaluate suggested types of ANNs in typical small problems in the realm of regression, prediction, pattern recognition, scheduling and optimisation
6. Devise and implement ANN approaches to selected problems in pattern recognition, system identification or predictive analytics using commonly available development tools, and critically examine their applicability

Unit-I **(9Hrs)**

Neural Network (NN): Introduction, benefits of neural network, models of a neuron, neural network as directed graph, network architectures, artificial intelligence and neural network.
Learning processes: error correction learning, memory based learning, Hebbian learning, competitive learning, Boltzman learning, learning tasks, adaptation, statistical nature of learning process, statistical learning theory.

Unit-II **(9Hrs)**

Perceptrons Single layer perceptrons: adaptive filtering problem, unconstrained optimization technique, linear least squares filter, least mean square algorithm (LMS), perceptron convergence theorem.
Multilayer perceptron: architecture, back propagation algorithm, generalization, approximations of functions, network pruning techniques
.

Unit-III **(6Hrs)**

Radial Basis Function (RBF) Networks: Cover's theorem on the separability of patterns, interpolation problem, supervised learning as an Ill-posed hypersurface reconstruction problem, regularization theory, regularization network, generalized radial basis function networks (RBF), estimation of the regularization parameter, approximation properties of RBF networks, comparison of RBF networks and multilayer perceptrons, Kernel regression and its relation to RBF networks, learning strategies.

Unit-IV **(7Hrs)**

Information-Theoretic Models: Entropy, maximum entropy principle, mutual information, Kullback-Leibler divergence, mutual information as an objective function to be optimized, maximum mutual information principle, infomax and redundancy reduction, spatially coherent and incoherent features, independent components analysis, maximum likelihood estimation, maximum entropy method.

Unit V **(9Hrs)**

Dynamically Driven Recurrent Networks: Introduction, recurrent network architectures, state space model, non-linear autogressive with exogenous inputs model, computational power of recurrent networks, learning algorithms, back propagation through time, real time recurrent learning, Kalman filter, decoupled Kalman filter, vanishing gradients in recurrent networks, system identification, model reference adaptive control.

References:

1. S. Haykin: Neural Networks- A Comprehensive Foundation, PHI Learning.
2. S. N. Sivanandam, S. Sumathi and S. N. Deepa: Introduction to Neural Networks using Matlab 6.0, TMH, New Delhi.
3. J. A Freeman and D. M. Skapura: Fundamentals of Neural Networks- algorithms, applications and programming techniques, Pearson Education.
4. M. T. Hagan, H. B. Demuth and M. Beale: Neural Network Design, Cengage Learning.
5. J.A Anderson: An introduction ro Neural Networks, PHI Learning.
6. Satish Kumar: Neural Networks, TMH, New Delhi.

CSA-704(A)
Information And Storage Management

CSA-704(A)	INFORMATION AND STORAGE MANAGEMENT	3L:0T:0P	3 Credit	3 Hrs/Week

OBJECTIVE:-

ISM is very useful for efficient and effective planning and control functions of the management. Management is the art of getting things done through others. MIS will be instrumental in getting the things done by providing quick and timely information to the management. Reports give an idea about the performance of men, materials, machinery, money and management. Reports throw light on the utilization of resources employed in the organization.

OUTCOME:-

1. Search, retrieve and synthesize information from a variety of systems and sources.
2. Evaluate systems and technologies in terms of quality, functionality, cost-effectiveness and adherence to professional standards.
3. Integrate emerging technologies into professional practice.
4. Apply theory and principles to diverse information contexts

UNIT-I **(8 Hr.)**

Introduction:-Data proliferation, evolution of various storage technologies, Overview of storage infrastructure components,Data creation and The value of data to a business,Information Lifecycle Management, Challenges in data storage and data management, Solutions available for data storage, Core elements of a Data Center infrastructure,Data categorization.

UNIT-II **(8 Hr.)**

Storage Systems Architecture:-Intelligent disk subsystems overview, Contrast of integrated vsmodular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing, Front end to host storage provisioning, mapping and operation.

UNIT-III **(9 Hr.)**

Introduction To Networked Storage:-Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS,IP-SAN, Applications, Elements, connectivity, standards, management, security and limitations of DAS, NAS, CAS & SAN.

Introduction to Information Availability: -Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques.

UNIT-IV **(8 Hr.)**

Managing & Monitoring:-Management philosophies (holistic vs. system & component), Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management, Metric analysis methodologies & trend analysis, Reactive and pro-active management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview.

UNIT-V **(7 Hr.)**

Securing Storage and Storage Virtualization:-Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain, Virtualization technologies, block-level and file-level virtualization technologies and processes.

REFERENCE BOOKS:

1. EMC Corporation, Information Storage and Management, Wiley, India.
2. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill , Osborne, 2003.
3. Marc Farley, "Building Storage Networks", Tata McGraw Hill ,Osborne, 2001.
4. Additional resource material on www.emc.com/resource-library/resource-library.esp

CSA-704(B)
Optimization Techniques

CSA-704(B)	OPTIMIZATION TECHNIQUES	3L:0T:0P	3 Credit	3 Hrs/Week

OBJECTIVE:-

The student should be made to:

- Be exposed to compiler writing tools.
- Learn to implement the different Phases of compiler
- Be familiar with control flow and data flow analysis
- Learn simple optimization techniques

OUTCOME:-

- Implement the different Phases of compiler using tools
- Analyze the control flow and data flow of a typical program
- Optimize a given program
- Generate an assembly language program equivalent to a source language program

UNIT-I (8 Hr.)

INTRODUCTION Non-linear programming. Mathematical fundamentals. Numerical evaluation of gradient. Unconstrained Optimization: One dimensional, single variable optimization. Maximum of a function. Unimodal-Fibonacci method. Polynomial based methods.

UNIT-II (7 Hr.)

UNCONSTRAINED MINIMIZATION Multivariable functions. Necessary and sufficient conditions for optimality. Convexity. Steepest Descent Method -Convergence Characteristics. Conjugate Gradient Method. Linear programming -Simplex Method.

UNIT-III (8 Hr.)

CONSTRAINED MINIMIZATION Non-linear programming. Gradient based methods. Rosens`s gradient, Zoutendijk`s method, Generalizedreduced gradient, Sequential quadratic programming. Sufficient condition for optimality.

UNIT-IV (9 Hr.)

DIRECT SEARCH METHODSDirect search methods for nonlinear optimization. Cyclic coordinate search. Hooke and Jeeves Pattern search method. Generic algorithm. Discrete And Dynamic Programming: Integer and discrete programming. Branch and bound algorithm for mixed integers. General definition of dynamic programming problem. Problem modeling and computer implementation. Shortest path problem.

UNIT –V (8 Hr.)

OPTIMIZATION APPLICATION:Transportation problem. Transportation simplex method. Network problems. Maximum flow in networks. General definition of dynamic programming. Problem modeling and computer implementation. Finite Element Based Optimization: Parameter optimization using gradient methods -Derivative calculation. Shape optimization. Topology optimizationof continuum structures

After Class Students should learn:

1. Implementation of Symbol Table
2. Develop a lexical analyzer to recognize a few patterns in C. (Ex. identifiers, constants, comments, operators etc.)
3. Implementation of Lexical Analyzer using Lex Tool
4. Convert the BNF rules into Yacc form and write code to generate Abstract Syntax Tree.
5. Implement control flow analysis and Data flow Analysis
7. Implement any one storage allocation strategies (Heap, Stack, Static)
8. Implementation of Simple Code Optimization Techniques (Constant Folding., etc.)

TEXT BOOK

1. George Leitmann, Optimization Techniques, Volume 51st Edition, ISBN: 9780080955131,Academic Press

REFERENCES BOOK

1.Foulds, L. R., Optimization Techniques anIntroduction, springer

CSA-705
Project Stage-I

CSA-705	PROJECT STAGE-I	0L:0T:10P	5 Credit	10 Hrs/Week

Students must observe following points to enrich their learning in electrical engineering during industrial training:

1. The training must be the advance/ different already done on minor training
2. Industrial environment and work culture
3. Organizational structure and inter personal communication
4. Machines/ equipment/ instruments -their working and specifications.
5. Product development procedures and phases.
6. Project planning, monitoring and control.
7. Quality control and assurance.-Maintenance system.
8. Costing system.-Stores and purchase systems.-Roles and responsibilities of different categories of personnel.
9. Customer services.
10. Problems related to various areas of Work etc.
11. Layout if any

To be submitted :The students has to submit the power point presentation of minimum15 slides of the training performed (comprising of points stated above) along with the original certificate of training performed with proper seal and signature of the authorized person.

CSA-706
Self Study/GD/Seminar

CSA-706	SELF STUDY/GD/SEMINAR	0L:0T:2P	1 Credit	2 Hrs/Week

Objective

To improve the mass communication and convincing / understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves. Evaluation will be done by assigned faculty based on group discussion and power point presentation.
A group discussion among students is being organized to see and evaluate their thinking skills, listening abilities and how they are communicating their thoughts. One should learn to control the conversation through listening attentively and then having the perseverance to mold it towards his/her own direction.

Outcomes:

1. Analytical thinking
2. Lateral thinking
3. constructive argument
4. Communication skill
5. Presentation of views

Students will discuss the course related and interdisciplinary topics for problem solving. They will improve the mass communication and convincing / understanding skills about subject and their related problem in a group of students.

CSA-801
Web Engineering

CSA-801	WEB ENGINEERING	3L:0T:2P	4 Credit	5 Hrs/Week

OBJECTIVE :-
The goals of the course are as follows: To be able to analyze and design comprehensive systems for the creation, dissemination, storage, retrieval, and use of electronic records and documents

OUTCOME:-
Students should be able to:

1. Employ techniques to analyze and evaluate software architectures on a real-world large-scale web-based software systems.
2. Create and document a reference architecture for a non-trivial Webbased technological product.
3. Present findings of case study analysis of software architectures of a family of large-scale web-based software systems.
4. Envision an innovative product for a wicked problem and develop an architecture for the product that utilizes service-oriented computing technologies
5. Write a research-in-progress paper on a Web engineering topic that utilizes Design Science Research methodology and adheres to appropriate academic standards.

UNIT-I **(8 Hr.)**

Web Engineering: Introduction, History, Evolution and Need, Time line, Motivation, Categories & Characteristics of Web Applications, Web Engineering Models, Software Engineering v/s Web Engineering. World Wide Web: Introduction to TCP/IP and WAP, DNS, Email, TelNet, HTTP and FTP. Browser and search engines: Introduction, Search fundamentals, Search strategies, Directories search engines and Meta search engines, Working of the search engines. Web Servers: Introduction, Features, caching, case study-IIS, Apache.

UNIT II **(9 Hr.)**

Information Architecture: Role, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites parameters and Intranets Website Design: Development, Development phases, Design issues, Conceptual Design, High-Level Design, Indexing the Right Stuff, Grouping Content. Architectural Page Mockups, Design Sketches, Navigation Systems. Searching Systems, Good & bad web design, Process of Web Publishing. Web-site enhancement, submission of website to search engines. Web security: issues, security audit. Web effort estimation, Productivity Measurement, Quality usability and reliability. Requirements Engineering for Web Applications: Introduction, Fundamentals, Requirement Source, Type, ,Notations Tools. Principles Requirements Engineering Activities, Adapting RE Methods to Web Application.

UNIT III **(8 Hr.)**

Technologies for Web Applications I: HTML and DHTML: Introduction, Structure of documents, Elements, Linking, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers, Audio and Video Support with HTML Database integration, CSS,

Positioning with Style sheets, Forms Control, Form Elements. Introduction to CGI, PERL, JAVA SCRIPT, JSP,PHP, ASP & AJAX. Cookies: Creating and Reading

UNIT IV **(7 Hr.)**

Technologies for Web Applications II: XML: Introduction, HTML Vs XML, Validation of documents, DTD, Ways to use, XML for data files, Embedding XML into HTML documents, Converting XML to HTML for Display, Displaying XML using CSS and XSL, Rewriting HTML as XML, Relationship between HTML, SGML and XML, web personalization , Semantic web, Semantic Web Services, Ontology

UNIT V **(8 Hr.)**

E-Commerce: Business Models, Infrastructure, Creating an E-commerce WebSite, Environment and Opportunities. Modes & Approaches, Marketing & Advertising Concepts. Electronic Publishing issues, approaches, legalities and technologies, Secure Web document, Digital Signatures and Firewalls, Cyber crime and laws, IT Act. Electronic Cash, Electronic Payment Systems: RTGS, NEFT, Internet Banking, Credit/Debit Card. Security: Digital Certificates & Signatures, SSL, SET, 3D Secure Protocol.

Recommended Books:

1.Roger S.Pressman, David Lowe, “Web Engineering”, Tata Mc Graw Hill Publication, 2007
2.Achyut S Godbole and Atul Kahate, “Web Technologies”, Tata McGraw Hill
3.Gopalan N P , Akilandeswari, “Web Technology: A Developer s Perspective” , PHI
4.Neil Gray, “Web server Programming” Wiley
5.Chris Bates, “Web Programming: Building Internetapplications” Wiley
6.Moller, “An Introduction to XML and Web Technologies”, Pearson Education New Delhi, 2009
7.“Web Technologies: Black Book”, Kogent, Dreamtech
8.Internet & World Wide Web How to Program, Pearson education, 3rd edition, by: H.M. Deitel, P.J. Deitel, A.B. Goldberg.
9.C. Xavier, “Web Technology & Design ”, Tata McGraw Hill.
10.Ivan Bay Ross, “HTML,DHTML,Java script,Perl CGI” , BPB

LIST OF EXPERIMENTS:

1.Program to show HTML Page Structure.
2.Program to show the Impact of HTML Headings.
3.Program to show the id attribute in HTM page.
4.Program to show The HTML <style> Element
5.Create The IT Department website home page for various tags.
6.Program to Make a hyperlink of an imageIN HTML.
7.Program to implement table in HTML.
8.Program for HTML Document, which provides a form that collects names and phone numbers.
9.JavaScript program to show factorial of a number.
10.Design a Home Page for IT Department OIST using various HTML Tags.

CSA-802(A)

Distributed Computing

CSA-802(A)	DISTRIBUTED COMPUTING	3L:0T:0P	3 Credit	3 Hrs/Week

OBJECTIVE:

1. To learn the principles, architectures, algorithms and programming models used in distributed systems.
2. To examine state-of-the-art distributed systems, such as Google File System.
3. To design and implement sample distributed systems.

OUTCOME:

1. Students will identify the core concepts of distributed systems: the way in which several machines orchestrate to correctly solve problems in an efficient, reliable and scalable way.
2. Students will examine how existing systems have applied the concepts of distributed systems in designing large systems, and will additionally apply these concepts to develop sample systems.

UNIT-I **(7 Hr.)**

Introduction to distributed systems Architecture:for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages & Disadvantage distributed system, Issues in designing Distributed System.

UNIT-II **(9 Hr.)**

Distributed Share Memory And Distributed File System :Basic Concept of Distributed Share Memory (DSM), DSM Architecture & its Types, Design & Implementations issues In DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing, Desirable features of good Distributed File System, File Model ,File Service Architecture ,File Accessing Model ,File Sharing Semantics, File Catching Scheme ,File Application & Fault tolerance, Naming: Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

UNIT-III **(8 Hr.)**

Inter Process Communication And Synchronization API for Internet Protocol :Data Representation & Marshaling, Group Communication, Client Server Communication, RPC-Implementing RPC Mechanism, Stub Generation, RPC Messages ,Synchronization :Clock Synchronization, Mutual Exclusion, Election Algorithms: Bully & Ring Algorithms

UNIT-IV **(8 Hr.)**

Distributed Scheduling And Dead lock Distributed Scheduling: Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues, Deadlock-Issues indead lock detection & Resolutions ,Deadlock Handling Strategy, Distributed Deadlock Algorithms.

UNIT-V **(8 Hr.)**

Distributed Multimedia &Database system: Distributed Data Base Management System(DDBMS), Types of Distributed Database, Distributed Multimedia: Characteristics of multimedia Data, Quality of Service Managements.

REFERENCES:

1.Sinha,Distributed Operating System Concept & Design, PHI.
2. Coulouris & Dollimore,Distributed SystemConcepts and Design, Pearson Pub
3. Singhal & Shivratari, Advance Concept in Operating System, McGraw Hill.
4. Attiya &Welch, Distributed Computing, Wiley Pub

CSA-802(B)

Network Management

CSA-802(B)	NETWORK MANAGEMENT	3L:0T:0P	3 Credit	3 Hrs/Week

OBJECTIVE:-

Network management and security are essential factors in the reliable, efficient, and secure operation of networks. As businesses become increasingly dependent on networking services, keeping these services running and secure becomes synonymous with keeping the business running. This course provides a thorough introduction to network management technologies and standards as well as to a wide variety of techniques for evaluating, monitoring, and defending the security of computer networks and systems.

OUTCOME:-

On the successful completion of the course, students will be able to

1. Examine the need of security for the given network scenario.
2. Criticize the preventive measures to secure routing and switching.
3. Design of firewall, VPN and IDS / IPS for the given network.

UNIT-I **(8 Hr.)**

Network Management Framework, Network Based Managements, Evolution of Network Management: SGMP, CMIP, SNMP. Network Implementation and Management Strategies, Network Management Categories: Performance Management, Fault Management, Configuration Management, Security Managements, Accounting Managements. Network Management Configuration: Centralized Configuration, Distributed Configuration, Selected Management Strategy

UNIT:-II **(8 Hr.)**

Management Information Base (MIB), Structure of Management Information, NMS Presentation of the SMI, NMS Meter-ware Network View, Remote Monitoring (RMON), RMON Group. Desktop Management: Desktop Management Interface (DMI), DMI Architecture, DMI Browser, DMI/SNMP Mapping, Desktop SNMP Extension Agents, Setting up LAN Access, SNMP Configuration.

UNIT-III **(9 Hr.)**

Introduction, layering, OSI Layering, TCP/IP Layering, Protocols & Standards, Internet standards, Internet administration, Internet Addresses, Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet mask, special case of IP addresses, Comparative Study of IPV4 & IPV6, port numbers Address Resolution Protocol, ARP packet format, Proxy ARP, ARP command, ARP Example, Reverse Address Resolution Protocol (RARP): Introduction, RARP Packet format, RARP Examples, RARP server design

UNIT-IV **(8 Hr.)**

Delivery and Routing of IP Packets, Routing Methods, Static versus Dynamic Routing, Routing table and Routing Module, Classless Addressing: CIDR. Internet Protocol (IP), Datagram, Fragmentation, Options, IP Package. Interior and Exterior Routing, Routing information protocol (RIP), Open shortest path first protocol (OSPF), BGP, GGP. Private Networks. Virtual Private Network (VPN), Network Address Translation (NAT).

UNIT-V **(7 Hr.)**

Internet Control Message Protocols (ICMP):-Types of message, message format, error reporting, query, checksum, ICMP Package. IGMP, IGMP Message and its Operation, IGMP Package. Transmission control protocol, Process-to-Process Communication, TCP Services Flow Control, TCP Timers. TCP Operation, TCP Package, Application layers protocol, Telnet Protocol, File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), X-Window system protocol, Remote procedure call, and Network file system.

REFERENCES:

1.Forouzan, TCP/IP Protocol Suite 4th edition, TMH
2.Stevens, TCP/IP Illustrated Volume-I, Pearson
3.J.Richard Burkey, Network Management Concept and Practice, PHI

CSA-803(A)

Internet Of Things

CSA-803(A)	INTERNET OF THINGS	3L:0T:0P	3 Credit	3 Hrs/Week

OBJECTIVE:
Students will be explored to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop IOT Devices.

OUTCOME:
1. Able to understand the application areas of IOT ·
2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
3. Able to understand building blocks of Internet of Things and characteristics.

UNIT –I **(7 Hr.)**

Introduction: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.

UNIT–II **(8 Hr.)**

Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services.

UNIT–III **(9 Hr.)**

Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles, Internet Connectivity, Internet based communication, IP addressing in IOT, Media Access control.

UNIT–IV **(8 Hr.)**

Sensor Technology, Participatory Sensing, Industrial IOT and Automotive IOT, Actuator, Sensor data Communication Protocols, Radio Frequency Identification Technology, Wireless Sensor Network Technology.

UNIT–V **(8 Hr.)**

IOT Design methodology: Specification requirement, process, model, service, functional & operational view, IOT Privacy and security solutions, Raspberry Pi & arduino devices. IOT Case studies, smart city streetlights control & monitoring.

REFERENCES:

1. Rajkamal,"Internet of Things", Tata McGraw Hill publication.
2. Vijay Madisetti and Arshdeep Bahga, "Internet of things(A-Hand-on-Approach)" 1st Edition ,Universal Press.
3. Hakima Chaouchi "The Internet of Things: Connecting Objects", Wiley publication.
4. Charless Bell "MySQL for the Internet of things", Apress publications

CSA-803(B)

Mobile Computing

CSA-803(B)	MOBILE COMPUTING	3L:0T:0P	3 Credit	3 Hrs/Week

OBJECTIVE:-

The objective of this course is to learn about the concepts and principles of mobile computing; to explore both theoretical and practical issues of mobile computing; to develop skills of finding solutions and building software formobile computing applications

OUTCOME:-

Student will be able to:

1. Describe the basic concepts and principles in mobile computing
2. Understand the concept of Wireless LANs, PAN, Mobile Networks, and Sensor Networks
3. Explain the structure and components for Mobile IP and Mobility Management
4. Understand positioning techniques and location-based services and applications
5. Describe the important issues and concerns on security and privacy Professional Skill
6. Design and implement mobile applications to realize location-aware computing
7. Design algorithms for location estimations based on different positioning techniques and platforms
8. Acquire the knowledge to administrate and to maintain a Wireless LAN Attitude
9. Recognize the important issues and concerns on security and privacy

UNIT-I **(7 Hr.)**

INTRODUCTION: Introduction to Mobile Computing –Applications of Mobile Computing-Generations of Mobile Communication Technologies-Multiplexing –Spread spectrum -MAC Protocols –SDMA-TDMA-FDMA-CDMA

UNIT-II **(9 Hr.)**

MOBILE TELECOMMUNICATION SYSTEM: Introduction to Cellular Systems –GSM –Services & Architecture –Protocols –Connection Establishment –Frequency Allocation –Routing –Mobility Management –Security –GPRS-UMTS –Architecture –Handover –Security

UNIT-III **(8 Hr.)**

MOBILE NETWORK LAYER: Mobile IP –DHCP –AdHoc–Proactive protocol-DSDV, Reactive Routing Protocols –DSR, AODV , Hybrid routing –ZRP, Multicast Routing-ODMRP, Vehicular Ad Hoc networks (VANET) –MANET Vs VANET –Security.

UNIT-IV **(8 Hr.)**

MOBILE TRANSPORT AND APPLICATION LAYER: Mobile TCP–WAP –Architecture –WDP –WTLS –WTP –WSP –WAE –WTA Architecture –WML

UNIT-V **(8 Hr.)**

MOBILE TRANSPORT AND APPLICATION LAYER: Mobile Device Operating Systems –Special Constraints & Requirements –Commercial Mobile Operating Systems –Software Development Kit: iOS, Android, BlackBerry, Windows Phone –M Commerce –Structure –Pros & Cons –Mobile Payment System –Security Issues

TEXT BOOKS:

1.JochenSchiller, ―Mobile Communications‖, PHI, Second Edition, 2003.
2.Prasant Kumar Pattnaik, Rajib Mall, ―Fundamentals of Mobile Computing‖, PHI Learning Pvt.Ltd, New Delhi – 2012

REFERENCES:

1.Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless andMobile systems",Thomson Asia Pvt Ltd, 2005.
2.Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, ―Principles of Mobile Computing‖, Springer, 2003.
3.William.C.Y.Lee,―Mobile Cellular Telecommunications-Analog and Digital Systems‖, Second Edition,TataMcGraw Hill Edition ,2006.
4.C.K.Toh, ―AdHoc Mobile Wireless Networks‖, First Edition, Pearson Education, 2002.
5.Android Developers : http://developer.android.com/index.html
6.Apple Developer : https://developer.apple.com/
7.Windows Phone DevCenter : http://developer.windowsphone.com
8.BlackBerry Developer : http://developer.blackberry.com

CSA-804

Project Stage –II

CSA-804	PROJECT STAGE -II	0L:0T:16P	8 Credit	16 Hrs/Week

Project -II should be the outcome of the training done/performed during after 7thsemester .It should be submitted in hardware form (proto type)or simulation form along with proper data and certificates issued during project training. It should cover the electrical engineering aspects learned during training. A Power point presentation should also be submitted at the time of submission. It can be in the form of major project

MANDATORY COURSES

Sr. No.	Course Code	Course Title	Credits	Preferred Semesters
1	MC	[Environmental Sciences, Induction Program, NSS/NCC] Constitution of India	Nil	I, III, IV,
		Total		0

Induction Program

MC	Induction Program	0L:0T:0P	Nil	2Hrs/Week

Induction program (mandatory)	3 weeks duration (Please refer Appendix-A for guidelines & also details available in the curriculum of Mandatory courses)
Induction program for students to be offered right at the start of the first year.	• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations

A student has to undergo this induction program after joining the institute and before the commencement of classes. Normal classes of the engineering program shall begin after the students have undergone a three-weeks induction program. The Induction program for students comprises of Physical activities; Learning an art form; Literature & Cinema; Social Awareness; Lectures &Visits; Universal Human Values; Familiarization to Department/ Branch, College& Innovations.

NSS/NCC

NSS/NCC	**0L:0T:0P**	**Nil**	**2Hrs/Week**

Course Objective:

- To develop qualities of Character, Courage, Comradeship, Discipline, Leadership, Secular Outlook, Spirit of Adventure and the ideals of Selfless Service amongst the Youth of the Country.
- To Create a Human Resource of Organized, Trained and Motivated Youth, to Provide Leadership in all Walks of life and be always available for the Service of the Nation
- To Provide a Suitable Environment to Motivate the Youth to Take Up a Career in the Armed Forces.

Course Outcomes:

- To develop student's personality through community services
- Instilling discipline in the souls of the cadets,
- Imparting leadership, discipline, integration, adventure, military, physical and community development training

Course Content:

The National Cadet Corps (India)) was formed under NCC Act of 1948 and is open to school and college students on voluntary basis. The Cadets are given basic military training in small arms and parades. The motto of NCC is "Unity and Discipline". One week long NSS camp is organized every year where students undertake various social welfare activities like Blood Donation Camp, Tree Plantation and awareness programs on drug de-addiction, AIDS, Swine-flu and campaign for saving water and cleanliness.

Constitution of India

MC	**Constitution of India**	**0L:0T:0P**	**Nil**	**2Hrs/Week**

Unit 1. Introduction
Concept of liberty; Concept of positive and negative obligations

Unit 2 The Premises of Social Revolution:
Intellectual and historical origins of the concept of Social Economic Justice in India.

Unit 3 Sixty years of civil rights movement in India:
Moderate nationalism and the emergence of the politics of socio-economic justice; Annie Besant, the Theosophical Society and the Home Rule League Movement,

Unit 4 Impact of Socialism on the Writing of the Indian Constitution [I], [1914-31]:
From the First World War to the Karachi Resolution: [a] Jawaharlal Nehru's arrival in national politics and his initiation in municipal politics; [b] The Bolshevik Revolution [1917] and its impact on growth of Indian socialism; [c] Growth and influence of Fabian socialists on Indian nationalism; [d] Commonwealth of India Bill [1925]; [e] National Demand or the Motilal Nehru Report [1927-8] and the Calcutta Congress [1928]; [f] Karachi Resolution of the Indian National Congress [1931]

Unit 5 Impact of Socialism on the Writing of the Indian Constitution [II], [1932-52]:
From the Demand for Adult Suffrage to Passing of the Constitution of India: [a] Growth of the Congress Socialist Party and the demand for the adoption of adult suffrage; [b] Panchayati Raj and empowerment in the Indian Constitution; [c] The National Plan [1938], the Bombay Plan [1944] and proposals for large-scale industrialisation in India; [d] The August Offer [1940], Cripps Mission [1942] and the Cabinet Mission proposals [1946]; [e] The establishment of Indian Constituent Assembly [1946], the Indian Independence Act [1947], the working of the Constituent Assembly and the Assembly debates and the role of the Oligarchy comprising of Jawahaharlal Nehru, Vallabhbhai Patel, Maulana Abul Kalam Azad and Rajendra Prasad in it; [f] Social reforms and State Security v. 'Due Process of Law'; [g] The introduction, passage and development of the Hindu Code Bill, 1956

(11) Assessment

PO/Course Assesment Tools Types	PO/Course Assesment Tools	PO 1	PO 2	PO3	PO4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO 12
		Engineering Knowledge	Problem Analysis	Design/Development of Solution	Investigation	Modern Tool Usage	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Team Work	Communication	Project Management	Life-Long Learning
Direct Tools	Test	□	□	□	□				□		□	□	
	Assignments	□	□			□				□			
	lab /seminar/industrial training/projects(Rubrics)	□	□	□		□		□	□	□	□	□	□
Indirect Tools	Course end survey	□				□		□					
	Exit survey	□	□										□
	Faculty Survey		□	□	□			□					
	Alumni Survey	□			□		□		□	□	□		□
	Program Statistics	□			□				□			□	