Bapatla Engineering College(*Autonomous*)

BAPATLA

Department of Computer Science and Engineering

B.Tech

Computer Science and Engineering

Curriculum Effective from A.Y. 2018-19

(R18 Regulations)

Bapatla Engineering College:: Bapatla
(Autonomous under Acharya Nagarjuna University)
(Sponsored by Bapatla Education Society)
BAPATLA - 522102 Guntur District, A.P.,India
www.becbapatla.ac.in

Bapatla Engineering College::Bapatla
(Autonomous)
Department of Computer Science and Engineering

COURSE STRUCTURE

Course Structure Summary:

S.No.	Category	Proposed	Percentage
1	Humanities & Social Science including Management Courses	9	6
2	Basic Science Courses	26	16
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.	22	13
4	Professional Core Courses	71	41
5	Professional Elective Courses	17	11
6	Open Elective Courses	6	4
7	Project work, seminar and internship in industry or elsewhere	12	7
8	Industry Internship	2	1
9	MOOCs	2	1
8	Mandatory Courses [Indian Constitution, Essence of Indian Traditional Knowledge etc]	(non-credit courses)	--
	Total:-	**167**	**100**

Semester wise Credits

SEMESTER	Credits
I	16
II	22
III	24
IV	22
V	22
VI	21
VII	21
VIII	19
Total	**167**

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Computer Science and Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

First Year B.Tech (SEMESTER – I)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
INDUCTION PROGRAM									
18MA001	Linear Algebra and ODE	4	0	0	4	50	50	100	3
18CY001	Engineering Chemistry	4	0	0	4	50	50	100	3
18CE001	Environmental Studies	3	0	0	3	50	50	100	2
18EL001	Communicative English	3	0	0	3	50	50	100	2
18MEL01	Engineering Graphics	1	0	4	5	50	50	100	3
18CYL01	Chemistry Lab	0	0	3	3	50	50	100	1
18MEL02	Workshop	0	0	3	3	50	50	100	1
18ELL01	English Communication Lab	0	0	3	3	50	50	100	1
	TOTAL	15	0	13	28	400	400	800	16

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Computer Science and Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

First Year B.Tech (SEMESTER – II)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA002	Numerical methods and Advanced Calculus	4	0	0	4	50	50	100	3
18PH001	Semiconductor Physics	4	1	0	5	50	50	100	4
18CS203	Professional Ethics & Human Values	4	0	0	4	50	50	100	3
18CS204	Digital Logic Design	4	0	0	4	50	50	100	3
18EE001	Basic Electronics & Electrical Engineering	4	0	0	4	50	50	100	3
18CS001	Problem Solving using Programming	4	0	0	4	50	50	100	3
18PHL01	Semiconductor Physics Lab	0	0	3	3	50	50	100	1
18EEL01	Basic Electronics & Electrical Engineering Lab	0	0	3	3	50	50	100	1
18CSL01	Problem Solving using Programming Lab	0	0	3	3	50	50	100	1
	TOTAL	24	1	9	34	450	450	900	22

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Computer Science and Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

Second Year B.Tech (SEMESTER – III)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA003	Probability & Statistics	4	0	0	4	50	50	100	3
18CS302	Data Structures	4	0	0	4	50	50	100	3
18CS303	Discrete Mathematics	4	0	0	4	50	50	100	3
18CS304	Object Oriented Programming	4	0	0	4	50	50	100	3
18CS305	Operating System	4	0	0	4	50	50	100	3
18CS306	Microprocessor & Microcontrollers	4	0	2	6	50	50	100	4
18CSL31	Unix Programming Lab	2	0	3	5	50	50	100	3
18CSL32	Data Structures Lab	0	0	3	3	50	50	100	1
18CSL33	OOPs Lab	0	0	3	3	50	50	100	1
	TOTAL	26	0	11	37	450	450	900	24

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Computer Science and Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

Second Year B.Tech (SEMESTER – IV)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA005	Operation Research	4	0	0	4	50	50	100	3
18CS402	Web Technologies	4	0	0	4	50	50	100	3
18CS403	Database Management System	4	0	0	4	50	50	100	3
18CS404	Computer Organization	4	0	0	4	50	50	100	3
18EL002	Technical English	3	0	0	3	50	50	100	2
18CS406	Design and Analysis of Algorithms	4	0	0	4	50	50	100	3
18CSL41	Python Programming Lab	2	0	3	5	50	50	100	3
18CSL42	Web Technologies Lab	0	0	3	3	50	50	100	1
18CSL43	RDBMS Lab	0	0	3	3	50	50	100	1
	TOTAL	26	0	9	35	450	450	900	22

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BAPATLA ENGINEERING COLLEGE : BAPATLA
(Autonomous)
SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Computer Science and Engineering
Effective from the Academic Year 2018-2019 (R18 Regulations)
Third Year B.Tech (SEMESTER – V)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18CS501	Software Engineering	4	0	0	4	50	50	100	3
18CS502	Automata Theory & Formal Languages	4	0	0	4	50	50	100	3
18CS503	Enterprise Programming	4	0	0	4	50	50	100	3
18CS504	Computer Networks	4	0	0	4	50	50	100	3
18CS505	Essence of Indian Traditional Knowledge	3	0	0	3	50	50	100	0
18CSD1_	**Department Elective-I**	4	0	0	4	50	50	100	3
18CSL51	C# Programming	2	0	3	5	50	50	100	3
18CSL52	Enterprise Programming Lab	0	0	3	3	50	50	100	1
18ELL02	Soft Skills Lab	0	0	3	3	50	50	100	1
18CSMO1	MOOCs								2
	TOTAL	25	0	9	34	450	450	900	22

CIE: Continuous Internal Evaluation SEE: Semester End Examination
L: Lecture, T: Tutorial, P: Practical

Department Elective-I

18CSD11 Advanced Computer Architecture.
18CSD12 Data Warehousing & Data Mining
18CSD13 Distributed Computing.

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Computer Science and Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

Third Year B.Tech (SEMESTER – VI)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18CS601	Machine Learning	4	0	0	4	50	50	100	3
18CS602	Compiler Design	4	0	0	4	50	50	100	3
18CS603	Cryptography & Network Security	4	0	0	4	50	50	100	3
18CS604	Middleware Technologies	4	0	0	4	50	50	100	3
18CSD2_	**Department Elective-II**	4	0	0	4	50	50	100	3
18CSD3_	**Department Elective-III**	4	0	0	4	50	50	100	3
18CSL61	Machine Learning Lab	0	0	3	3	50	50	100	1
18CSL62	Middleware Technologies Lab	0	0	3	3	50	50	100	1
18CSLD2_	**Dept. Elective-II Lab**	0	0	3	3	50	50	100	1
	TOTAL	24	0	9	33	450	450	900	21

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Department Elective-II			**Dept. Elective-II Lab**	
18CSD21	Mobile Application Development		18CSLD21	Mobile Application Development Lab
18CSD22	Cloud Programming		18CSLD22	Cloud Programming Lab
18CSD23	Statistics with R		18CSLD23	Statistics with R Lab

Department Elective-III	
18CSD31	Artificial Intelligence
18CSD32	Software Project Management
18CSD33	Block chain Technologies

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Computer Science and Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

Forth Year B.Tech (SEMESTER – VII)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18CS701	Advanced Scripting Languages	4	0	0	4	50	50	100	3
18CS702	Wireless Networks	4	0	0	4	50	50	100	3
18_ _I_ _	**Institutional Elective -I**	4	0	0	4	50	50	100	3
18CSD4_	**Department Elective-IV**	4	0	0	4	50	50	100	3
18CS705	Constitution of India	3	0	0	3	50	50	100	0
18CSL71	Unified Modeling Language Lab	2	0	3	5	50	50	100	3
18CSL72	Advanced Scripting Languages Lab	0	0	3	3	50	50	100	1
18CSLD4_	**Dept. Elective-IV Lab**	0	0	3	3	50	50	100	1
18CSP01	Project - I	0	0	4	4	50	50	100	2
18CSII1	Internship					100	--	100	2
	TOTAL	**21**	**0**	**13**	**34**	**550**	**450**	**1000**	**21**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Department Elective-IV			**Dept. Elective-IV Lab**	
18CSD41	Cyber Security		18CSLD41	Cyber Security Lab
18CSD42	Internet of Things		18CSLD42	Internet of Things Lab
18CSD43	Big Data Analytics		18CSLD43	Big Data Analytics Lab

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Computer Science and Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

Forth Year B.Tech (SEMESTER – VIII)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18ME005	Industrial Management & Entrepreneurship Development	4	0	0	4	50	50	100	3
18_ _I_ _	**Institutional Elective -II**	4	0	0	4	50	50	100	3
18CSD5_	**Department Elective - V**	4	0	0	4	50	50	100	3
18CSP02	Project - II	0	0	10	10	75	75	150	10
	TOTAL	12	0	10	22	225	225	450	19

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Department Elective - V	
18CSD51	Protocols for Secure Electronic Commerce
18CSD52	Artificial Neural Networks and Deep Learning
18CSD53	Natural Language Processing.

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Computer Science and Engineering

List of Institutional Electives

Institutional Elective-I	
18CEI01	Air Pollution & Control
18CEI02	Sustainable Water and Sanitation
18ECI01	Consumer Electronics
18ECI02	Embedded Systems
18EEI01	Application of Wavelets to Engineering Problems
18EEI02	Industrial Electrical Systems
18EII01	Principles & Applications of MEMS
18EII02	Power System Instrumentation
18ITI01	Data Analytics
18ITI02	Cyber Security
18MEI01	Fluid Power and Control Systems
18MEI02	Project Management
18MAI01	Linear Algebra
18PHI01	Nano-Materials and Technology
18PHI02	Fiber Optic Communication
18HUI01	System Thinking

Institutional Elective-II	
18CEI03	Disaster Management
18CEI04	Remote sensing & GIS
18ECI03	Artificial Neural Network
18ECI04	Internet of Things
18EEI03	High Voltage Engineering
18EEI04	Energy Auditing and Conservation
18EII03	Robotics and Automation
18EII04	Advanced Computer Control Systems
18ITI03	Mobile Application Developments
18ITI04	Web Technology
18MEI03	Non-Conventional Energy Sources
18MEI04	Automobile Engineering
18MAI02	Graph Theory
18PHI03	Advanced Materials
18PHI04	Optical Electronics
18HUI02	Organizational Psychology
18HUI03	Telugu Modern Literature
18ELI03	English Through Media

Linear Algebra and ODE I B.Tech –I Semester (Code: 18MA001)					
Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	To learn about solving a system of linear homogeneous and non-homogeneous equations, finding the inverse of a given square matrix and also its Eigen values and Eigen vectors.
CO2	Identify the type of a given differential equation and select and apply the appropriate Analytical technique for finding the solution of first order and higher order ordinary differential equations.
CO3	Create and analyze mathematical models using first and second order differential equations to solve application problems that arises in engineering.
CO4	To learn about solving linear Differential equations with constant coefficients with the given initial conditions using Laplace transform technique.

Course Outcomes: Students will be able to:

CLO-1	Apply elementary row operations to find the rank of a matrix, to solve a system of linear equations and to find the inverse of a matrix.
CLO-2	Find the Eigen values and Eigen vectors of the given square matrix and also compute the higher powers of the given matrix.
CLO-3	Solve separable, linear, exact differential equations with and without initial conditions.
CLO-4	Distinguish between linear and non-linear differential equation.
CLO-5	Write the piecewise continuous functions in terms of unit step functions and hence find its Laplace transforms.
CLO-6	Solve linear differential equation with constant coefficients and unit step input functions using Laplace transforms technique.

UNIT-1 (12 Periods)

Linear Algebra: Rank of a Matrix; Elementary transformations of a matrix; Gauss-Jordan method of finding the inverse;

Consistency of linear System of equations: Rouches theorem, System of linear Non-homogeneous equations, System of linear homogeneous equations; vectors; Eigen values; properties of Eigen values (without proofs); Cayley-Hamilton theorem (without proof).

[Sections: 2.7.1; 2.7.2; 2.7.6; 2.10.1; 2.10.2; 2.10.3; 2.12.1; 2.13.1; 2.14; 2.15.]

UNIT-2 (12 Periods)

Differential Equations of first order: Definitions; Formation of a Differential equation; Solution of a Differential equation; Equations of the first order and first degree; variables separable; Linear Equations; Bernoulli‘s equation; Exact Differential equations.

Equations reducible to Exact equations: I.F found by inspection, I.F of a Homogeneous equation, In the equation M dx+ N dy=0.

Applications of a first order Differential equations: Newton‘s law of cooling; Rate of decay of Radio-active materials.

[Sections: 11.1; 11.3; 11.4; 11.5; 11.6; 11.9; 11.10; 11.11; 11.12.1; 11.12.2; 11.12.4; 12.6; 12.8]

UNIT-3 (12 Periods)

Linear Differential Equations: Definitions; Theorem; Operator D; Rules for finding the

complementary function; Inverse operator; Rules for finding the Particular Integral; Working procedure to solve the equation; Method of Variation of Parameters; **Applications of Linear Differential Equations:** Oscillatory Electrical Circuits. [Sections: 13.1; 13.2.1; 13.3; 13.4; 13.5; 13.6; 13.7;13.8.1;14.1;14.5]	
UNIT-4	(12 Periods)
Laplace Transforms: Definition; conditions for the existence; Transforms of elementary functions; properties of Laplace Transforms; Transforms of derivatives; Transforms of integrals; Multiplication by t^n; Division by t; Inverse transforms- Method of partial fractions; Other methods of finding inverse transforms; Convolution theorem(without proof); **Application to differential equations**: Solution of ODE with constant coefficients using Laplace transforms. [Sections:21.2.1; 21.2.2; 21.3; 21.4; 21.7; 21.8; 21.9; 21.10; 21.12; 21.13; 21.14; 21.15.1]	
Text Books :	1. B.S.Grewal, ‑Higher Engineering Mathematics‖, 44thedition, Khanna publishers, 2017.
References :	1. ErwinKreyszig, ‑Advanced Engineering Mathematics‖, 9th edition, John Wiley & Sons. 2. N.P.Bali and M.Goyal, ‑A Text book of Engineering Mathematics‖ Laxmi Publications, 2010.

ENGINEERING CHEMISTRY-1
(Common to all branches)
I B. Tech. – I Semester (Code: 18CY001)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.
CO2	To understand the thermodynamic concepts, energy changes, concept of corrosion & its control.
CO3	With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of knocking and anti-knocking characteristics
CO4	With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers.

Course Outcomes: Students will be able to:

CLO-1	Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
CLO-2	Apply their knowledge in converting various energies of different systems and protection of different metals from corrosion.
CLO-3	Have the capacity of applying energy sources efficiently and economically for various needs.
CLO-4	Design economically and new methods of organic synthesis and substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.

UNIT-1 (13 Periods)

Introduction: water quality parameters
Characteristics: Alkalinity, Hardness - Estimation & simple neumerical problems,
Boiler Troubles - Sludges, Scales, Caustic embrittlement, boiler corrosion, Priming and foaming;
Internal conditioning- phosphate, calgon and carbonate methods.
External conditioning - Ion exchange process & Zeolite proess WHO Guidelines, Potable water, Sedimentation, Coagulation, Filtration.
Disinfection methods: Chlorination, ozonization and UV treatment.
Salinity – Treatment of Brackish water by Reverse Osmosis and Electrodialysis.

UNIT-2 (13 Periods)

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.
Corrosion: Types of corrosion - Chemical or dry corrosion, Electrochemical or wet corrosion; Galvanic, stress, pitting and differential aeration corrosion; Factors effecting corrosion,
Corrosion control – Cathodic protection, and electro plating (Au) & electrodes Ni plating.

UNIT-3 (12 Periods)

Fuels: Classification of fuels; Calorific value of fuels (lower, higher)
Solid fuels: Determination of calorific value (Bomb Calorimeter) & related problems, Coal ranking.
Liquid Fuels: Petroleum refining and fractions, composition and uses. Knocking and anti-knocking Agents, Octane number and Cetane number; Bio fuels- Biodiesel, general methods

of preparation and advantages **Gaseous fuels:** CNG and LPG, **Flue gas analysis –** Orsat apparatus.	
UNIT-4	(12 Periods)
Organic reactions and synthesis of a drug molecule Introduction to reactions involving substitution (SN^1, SN^2), addition (Markownikoff‘s and anti-Markwnikoff‘s rules) , elimination (E_1& E_2), Synthesis of a commonly used drug molecule.(Aspirin and Paracetamol) **Polymers:** Conducting polymers: Classification, Intrinsic and Extrinsic conducting polymers and their applications**.** Plastics: Thermoplasts and thermosetting plastics, Bskelite and PVC. Bio degradable polymers: types, examples-Polyhydroxybuterate (PHB), Polyhydroxybuterate-co-β-hydroxyvalerate (PHBV), applications.	
Text Books :	1.P.C. Jain and Monica Jain, ―Engineering Chemistry‖ DhanpatRai Pub, Co., New Delhi 17th edition (2017). 2.SeshiChawla, ―Engineering Chemistry‖ DhanpatRai Pub, Co LTD, New Delhi 13 th edition, 2013.
References :	1Essential Of Physical Chemistry by ArunBahl, B.S. Bahl, G.D.Tuli, by ArunBahl, B.S. Bahl, G.D.Tuli, Published by S Chand Publishers, 12th Edition, 2012. 2Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006). 3Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015.

Environmental Studies

I B. Tech. –I Semester (Code: 18CE001)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	To develop an awareness, knowledge, and appreciation for the natural environment.
CO2	To understand different types of ecosystems exist in nature.
CO3	To know our biodiversity.
CO4	To understand different types of pollutants present in Environment.
CO5	Create awareness among the youth on environmental concerns important in the long-term interest of the society

Course Outcomes: Students will be able to:

CLO-1	Develop an appreciation for the local and natural history of the area.
CLO-2	Hope for the better future of environment in India which is based on many positive factors like Biodiversity, successive use of renewable energy resources and other resources, increasing number of people's movements focusing on environment.
CLO-3	Know how to manage the harmful pollutants.
CLO-4	Gain the knowledge of Environment.
CLO-5	Create awareness among the youth on environmental concerns important in the long-term interest of the society

UNIT-1 (13 Periods)

Introduction: Definition, Scope and Importance, Need for public awareness. Ecosystems: Definition, Structure and Functions of Ecosystems, types - Forest, Grassland, Desert, Aquatic (Marine, pond and estuaries).

Biodiversity: Definition and levels of Biodiversity; Values of Biodiversity - Consumptive, Productive, Social, Aesthetic, Ethical and Optional; Threats and Conservation of Biodiversity; Hot Spots of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation. Chipko movement case study

UNIT-2 (13 Periods)

Natural resources: Land: Land as a resource, Causes and effects of land degradation - Soil erosion, Desertification. **Forest**: Use of forests, Causes and effects of deforestation, Afforestation, Mining - benefits and problems. **Water**: Uses, floods and drought, Dams - benefits and problems.

Energy: Importance of energy, Environmental Impacts of Renewable and Non-renewable energy resources. Silent Valley Project and Narmada BachaoAndolan case studies

Sustainability: Definition, Concept and Equitable use of resources for sustainable development; Rain water harvesting and Watershed management. Fieldwork on Rain water harvesting and Watershed management.

UNIT-3 (12 Periods)

Pollution: Definition; Causes, effects and control of air, water and nuclear pollution; Chernobyl Nuclear Disaster case study; Solid Waste: urban, Industrial and hazardous wastes; Integrated waste management - 3R approach, composting and vermicomposting.

Environmental acts: Water and air (Prevention and Control of pollution) acts, Environmental protection act, Forest Conservation act.

UNIT-4	(12 Periods)
Environmental issues: Green house effect & Global warming, Ozone layer depletion, Acid rains, Green Revolution, Population Growth and environmental quality, Environmental Impact Assessment. Environmental Standards (ISO 14000, etc.) **Case Studies:** Bhopal Tragedy, Mathura Refinery and TajMahal, and Ralegan Siddhi (Anna Hazare). **Field work:** Visit to a local area to document environmental assets – Pond/Forest/Grassland. Visit to a local polluted site- Urban and industry/ Rural and Agriculture.	
Text Books :	1.–Environmental Studies‖ by Benny Joseph, Tata McGraw-Hill Publishing Company Limited, New Delhi. 2.–Comprehensive environmental studies‖- JP Sharma, Laxmi Publications. 3.Text Book of environmental Studies – ErachBharucha
References :	1.–Environmental studies‖, R.Rajagopalan, Oxford University Press. 2.—Introduction to Environmental Science‖, Anjaneyulu Y, B S Publications 3.–Environmental Science‖, 11th Edition – Thomson Series – By Jr. G. Tyler Miller.

Communicative English I B. Tech. – I Semester (Code: 18EL001)					
Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	To comprehend the importance, barriers and strategies of listening skills in English.
CO2	To illustrate and impart practice Phonemic symbols, stress and intonation.
CO3	To practice oral skills and receive feedback on learners' performance.
CO4	To practice language in various contexts through pair work, role plays, group work and dialogue conversations

Course Outcomes: Students will be able to:

CLO-1	Understand basic grammatical units and their usage;
CLO-2	Learn to think, Write critically and coherently;
CLO-3	Recognize writings as a process rather than a product;
CLO-4	Upgrading comprehension skills of English Material of various types; and
CLO-5	Enhancing range of vocabulary to communicate in varied contexts.

UNIT-1	(13 Periods)

1.1 **Vocabulary Development:** Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes
1.2 **Essential Grammar:** Prepositions, Conjunctions, Articles
1.3 **Basic Writing Skills:** Punctuation in writing
1.4 **Writing Practices:** Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT-2	(13 Periods)

2.1 **Vocabulary Development:** Synonyms and Antonyms
2.2 **Essential Grammar:** Concord, Modal Verbs, Common Errors
2.3 **Basic Writing Skills**: Using Phrases and clauses
2.4 **Writing Practices**: Hint Development, Essay Writing

UNIT-3	(12 Periods)

3.1 **Vocabulary Development:** One word Substitutes
3.2 **Essential Grammar:** Tenses, Voices
3.3 **Basic Writing Skills:** Sentence structures (Simple, Complex, Compound)
3.4 **Writing Practices:** Note Making

UNIT-4	(12 Periods)

4.1 **Vocabulary Development**: Words often confused
4.2 **Essential Grammar**: Reported speech, Common Errors
4.3 **Basic Writing Skills**: Coherence in Writing: Jumbled Sentences
Writing Practices: Paraphrasing &Summarizing

Text Books :	1. Communication Skills, Sanjay Kumar &PushpaLatha. Oxford University Press:2011.

	2. Practical English Usage, Michael Swan. Oxford University Press:1995. 3. Remedial English Grammar, F.T.Wood. Macmillan:2007. 4. Study Writing, Liz Hamplyons & Ben Heasley. Cambridge University Press:2006
References :	

Engineering Graphics

I B. Tech. – I Semester (Code: 18MEL01)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	clear picture about the importance of engineering graphics in the field of engineering
CO2	the drawing skills and impart students to follow Bureau of Indian Standards
CO3	To give an idea about Geometric constructions, Engineering curves, orthographic projections and pictorial projections
CO4	imagination skills about orientation of points, lines, surfaces and solids
CO5	basic drafting skills of Auto CAD

Course Outcomes: Students will be able to:

CLO-1	draw projections of points and projections of lines using Auto CAD
CLO-2	plot projections of surfaces like circle, square and rhombus
CLO-3	plot the Projections of solids like Prisms and pyramids
CLO-4	convert the of Orthographic views into isometric views of simple objects
CLO-5	generate the of pictorial views into orthographic views of simple castings

UNIT-1 (13 Periods)

INTRODUCTION: Introduction to Drawing instruments and their uses, geometrical construction procedures

INTRODUCTION TO AUTOCAD:

Basics of sheet selection, Draw tools, Modify tools, dimensioning

METHOD OF PROJECTIONS: Principles of projection - First angle and third angle projection of points. Projection of straight lines. Traces of lines.

UNIT-2 (13 Periods)

PROJECTIONS OF PLANES: Projections of plane figures: circle, square, rhombus, rectangle, triangle, pentagon and hexagon.

UNIT-3 (12 Periods)

PROJECTIONS OF SOLIDS: Projections of Cubes, Prisms, Pyramids, Cylinders and Cones Inclined to one plane

UNIT-4 (12 Periods)

ISOMETRIC PROJECTIONS: Isometric Projection and conversion of Orthographic views into isometric views. (Treatment is limited to simple objects only).

UNIT-5 |(12 Periods)

ORTHOGRAPHIC PROJECTIONS: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings).

Text Books :	1.Engineering Drawing with AutoCAD by Dhananjay M. Kulkarni (PHI

	publication) 2. Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand). (First angle projection)
References :	1. Engineering Drawing by Dhananjay A Jolhe, Tata McGraw hill publishers 2. Engineering Drawing by Prof.K.L.Narayana& Prof. R.K.Kannaiah.

ENGINEERING CHEMISTRY LABORATORY

I B.Tech –I Semester (Code: 18CYL01)

Lectures	:	3 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.
CO2	To understand the thermodynamic concepts, energy changes, concept of corrosion & its control.
CO3	With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of knocking and anti-knocking characteristics
CO4	With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers.

Course Outcomes: Students will be able to:

CLO-1	Develop innovative methods to produce soft water for industrial use and able to solve the industrial problems
CLO-2	the students will be familiar with applications of polymers in domestic and engineering areas & the most recent surface characterization techniques
CLO-3	Have the capacity of classifying fuels, their calorific value determination and applying energy sources efficiently and economically for various needs.
CLO-4	Explain features, classification, applications of newer class materials like smart materials, refrocteries, abbrasives, lubriants and composite materials etc.

LIST OF EXPERIMENTS

1. Introduction to Chemistry Lab (the teachers are expected to teach fundamentals likeCalibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. and error, accuracy, precision, theory of indicators, use of volumetric titrations).

2. Volumetric Analysis:

a**.**Estimation of Washing Soda.
b.Estimation of Active Chlorine Content in Bleaching Powder
c.Estimation of Mohr‘s salt by permanganometry.
d.Estimation of given salt by using Ion-exchange resin using Dowex-50.

3.**Analysis of Water**:

a.Determination of Alkalinity of Tap water.
b.Determination of Total Hardness of ground water sample by EDTA method
c.Determination of Salinity of water sample.

4. Estimation of properties of oil:

a.Estimation of Acid Value
b.Estimation of Saponification value.

5. Preparations:

a.Preparation of Soap
b.Prearation of Urea-formaldehyde resin
c.Preparation of Phenyl benzoate.

Text Books :	1. Practical Engineering Chemistry by K.Mukkanti, Etal, B.S. Publicaitons, Hyderabad, 2009. 2. Inorganic quantitative analysis, Vogel, 5th edition, Longman group Ltd. London, 1979.
References :	1. Text Book of engineering chemistry by R.n. Goyal and HarrmendraGoel. 2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara. 3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

Workshop Practice

I B. Tech. –I Semester (Code: 18MEL02)

Lectures	:	3 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	To impart student knowledge on various hand tools for usage in engineering applications.
CO2	Be able to use analytical skills for the production of components.
CO3	Design and model different prototypes using carpentry, sheet metal and welding.
CO4	Electrical connections for daily applications.
CO5	To make student aware of safety rules in working environments.

Course Outcomes: Students will be able to:

CLO-1	Make half lap joint, Dovetail joint and Mortise &Tenon joint
CLO-2	Produce Lap joint, Tee joint and Butt joint using Gas welding
CLO-3	Prepare trapezoidal tray, Funnel and T-joint using sheet metal tools
CLO-4	Make connections for controlling one lamp by a single switch, controlling two lamps by a single switch and stair case wiring.

1. Carpentry
   a. Half Lap joint
   b. Dovetail joint
   c. Mortise &Tenon joint
1. Welding using electric arc welding process/gas welding
   a. Lap joint
   b. Tee joint
   c. Butt joint
2. Sheet metal operations with hand tools
   a. Trapezoidal tray
   b. Funnel
   c. T-joint
3. House wiring
   a. To control one lamp by a single switch
   b. To control two lamps by a single switch

Stair-case wiring

Text Books :	1. P.Kannaiah and K.L.Narayana, Workshop Manual, SciTech Publishers, 2009. 2. K. Venkata Reddy, Workshop Practice Manual, BS Publications, 2008
References :	

English Communication Skills Laboratory
I B. Tech. –I Semester (Code: 18ELL01)

Lectures	:	3 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	To comprehend the importance, barriers and strategies of listening skills in English.
CO2	To illustrate and impart practice Phonemic symbols, stress and intonation.
CO3	To practice oral skills and receive feedback on learners' performance.
CO4	To practice language in various contexts through pair work, role plays, group work and dialogue conversations

Course Outcomes: Students will be able to:

CLO-1	Learn to research and critically analyze issues to write critically and coherently;
CLO-2	Communicate pleasantly in kinds of Interpersonal Interactions;
CLO-3	Understand dynamics of Telephone Conversations through practice; and
CLO-4	Become familiar with the Pronunciation rules and application

1.1 Listening Skills; Importance – Purpose- Process- Types
1.2 Barriers to Listening
1.3 Strategies for Effective Listening

2.1 Phonetics; Introduction to Consonant, Vowel and Diphthong sounds
2.2 Stress
2.3 Rhythm
2.4 Intonation

3.1 Formal and Informal Situations
3.2 Expressions used in different situations
3.3 Introducing Yourself & Others-Greeting & Parting-Congratulating-Giving Suggestions & Advices-Expressing Opinions-Inviting People-Requesting-Seeking Permission-Giving Information- Giving Directions- Sympathizing- Convincing People- Complaining & Apologizing-Thanking Others- Shopping- Travelling- Conversational Gambits

4.1 JAM Session
4.2 Debates
4.3 Extempore

Text Books :	1. Communication Skills, Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011 2. Better English Pronunciation, J.D. O' Connor. Cambridge University Press:1984 3. New Interchange (4rth Edition), Jack C Richards. Cambridge University Press:2015 4. English Conversation Practice, Grant Taylor. McGraw Hill:2001

Software:	1. Buzzers for conversations, New Interchange series 2. English in Mind series, Telephoning in English 3. Speech Solutions, A Course in Listening and Speaking

Numerical Methods and Advanced Calculus
I B. Tech. –II Semester (Code: 18MA002)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	To learn about some advanced numerical techniques e.g. solving a non-linear equation
CO2	linear system of equations, Interpolation and Approximation techniques
CO3	To learn about evaluation of double and triple integrals and their applications
CO4	To learn some basic properties of scalar and vector point functions and their applications to line, surface and volume integrals.

Course Outcomes: Students will be able to:

CLO-1	Solve non-linear equations in one variable and system of linear equations using iteration methods.
CLO-2	Choose appropriate interpolation formulae based on the given data.
CLO-3	Compute the value of a definite integral using numerical integration techniques.
CLO-4	Predict the numerical solution of the derivative at a point from the given initial value.
CLO-5	Problem using appropriate numerical method the Evaluate double and triple integrals using change of variables.
CLO-6	Transform line integrals to surface and surface to volume integrals and evaluate them.

UNIT-1 (12 Periods)

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton-Raphson method; Useful deductions from the Newton-Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss elimination method, Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi‘s iterative method, Gauss-Seidel iterative method.
[Sections: 28.1; 28.2; 28.3; 28.5; 28.6; 28.7.1;28.7.2].

UNIT-2 (12 Periods)

Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton‘s interpolation formulae: Newton‘s forward interpolation formula, Newton‘s backward interpolation formula; Interpolation with unequal intervals; Lagrange‘s interpolation formula; Divided differences; Newton‘s divided difference formula; Numerical integration; Trapezoidal rule; Simpson‘s one-third rule; Simpson‘s three-eighth rule; Numerical solution of ODE‘s: Introduction; Picard‘s method; Euler‘s method; Runge-Kutta method.
[Sections:29.1; 29.1-1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1; 32.2; 32.4; 32.7].

UNIT-3 (12 Periods)

Multiple Integrals: Double integrals; Change of order of integration; Double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integrals, Change of variables.

[Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2].	
UNIT-4	(12 Periods)
Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green's theorem in the plane (without proof); Stokes theorem (without proof); Gauss divergence theorem (without proof). [Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12; 8.13; 8.14; 8.16]	
Text Books :	2. B.S.Grewal, ‒Higher Engineering Mathematics‖, 44thedition, Khanna publishers, 2017.
References :	3. ErwinKreyszig, ‒Advanced Engineering Mathematics‖, 9th edition, John Wiley & Sons. 4. N.P.Bali and M.Goyal, ‒A Text book of Engineering Mathematics‖ Laxmi Publications, 2010.

SEMICONDUCTOR PHYSICS AND NANO MATERIALS

I B. Tech. II-semester: CODE:18PH003

(Common for CSE,IT,EEE,&EIE)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	This unit aim to build the foundation and inspires interest of freshmen into electrical and electronics and to focus on fundamental concepts and basic principles regarding electrical conduction.
CO2	This unit provides various properties of semiconductor materials and their importance in various device fabrications
CO3	This unit aim to educate the student on various opto-electronic devices and their applications.
CO4	This unit provide information about the principles of processing, manufacturing and characterization of nano materials, nanostructures and their applications

Course Outcomes: Students will be able to:

CLO-1	Understand concepts of band structure of solids, concept of hole and effective mass of electron in semiconductors.
CLO-2	Know the concept of Fermi level and various semiconductor junctions.
CLO-3	Familiar with working principles of various opto-electronic devices and their applications.
CLO-4	Understand importance of nano-materials and their characteristic properties.

UNIT-1 (13 Periods)

ELECTRONIC MATERIALS:

Somerfield free electron theory, Fermi level and energy, density of states, Failure of free electron theory (Qualitative), Energy bands in solids, E-K diagrams, Direct and Indirect band gaps. Types of Electronic materials: Metals, Semi conductors and Insulators, Occupation Probability, effective mass, Concept of hole

UNIT-2 (13 Periods)

SEMICONDUCTORS:

Introduction to semiconductors, intrinsic and extrinsic semiconductors, carrier concentrations, Fermi level and temperature dependence, Continuity equation, Diffusion and drift, P-N junction (V-I characteristics), Metal – Semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for opto- electronic devices.

UNIT-3 (12 Periods)

OPTO-ELECTRONIC DEVICES AND DISPLAY DEVICES:

Photo voltaic effect, principle and working of LED, Applications of Photo diode, Solar cell, PIN & APD Diode, Liquid crystal display, Opto electric effect: Faraday Effect and Kerr effect.

UNIT-4 (12 Periods)

NANO-MATERIALS:

Introduction to nano technology, quantum confinement, surface to volume ratio, properties of nano materials, synthesis of nano-materials: CVD, sol-gel methods, laser ablation.

Carbon nano tubes: types, properties, applications. Characterization of nano materials: XRD,

SEM, applications of nano materials.	
Text Books :	1. A text book of engineering physics by Avadhanulu and KshirsagarS.Chand& Co. (2013) *2.* Applied physics by Dr.*P.SrinivasaRao*. Dr.K.*Muralidhar* 3. Introduction to solid state state physics, Charles Kittel, 8th edition 4. Solid state physics, S.O. Pillai
References :	1. Text book on Nanoscience and Nanotechnology (2013): B.S. Murty, P. Shankar, Baldev Raj, B.B. Rath and J. Murday, Springer Science & Business Media. 2. Basic Engineering Physics ,Dr.*P.SrinivasaRao*. Dr.K.*Muralidhar.* Himalaya Publications, 2016

PROFESSIONAL ETHICS & HUMAN VALUES

(Common for all branches)

I B. Tech. – II Semester (Code:18CS203)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Comprehend a specific set of behavior and values any professional must know and must abide by, including confidentiality, honesty and integrity. Understand engineering as social experimentation.
CO2	Know, what are safety and Risk and understand the responsibilities and rights of an engineer such as collegiality, loyalty, bribes/gifts.
CO3	Recognize global issues visualizing globalization, cross-cultural issues, computer ethics and also know about ethical audit
CO4	Discuss case studies on Bhopal gas tragedy, Chernobyl and about codes of Institute of Engineers, ACM

Course Outcomes: Students will be able to:

CLO-1	Know, about human values and virtues such as integrity, civic virtue, respecting others.
CLO-2	Learn the importance of living peacefully, caring and sharing, empathy.
CLO-3	Understand the basics of Engineering Ethics such as Consensus and Controversy, Profession and Professionalism, Professional Roles of Engineers.
CLO-4	Debate on Ethical Theories like Kohlberg's Theory, Gilligan‘s Argument.
CLO-5	Learn Engineering as Social Experimentation, Comparison with Standard Experiments, Knowledge Gained, Conscientiousness, Relevant Information, Learning from the Past.
CLO-6	Propose Engineers as Managers, Consultants, and Leaders, understand Roles of Codes.
CLO-7	Determine what is safety and risk, types of risks, analyze risk-benefit
CLO-8	Discuss responsibilities and rights of engineers, Collegiality, Two Senses of Loyalty, Obligations of Loyalty, Misguided Loyalty, Professionalism and Loyalty,
CLO-9	Debate on Professional Rights, Professional Responsibilities, Conflict of Interest, Self-interest, Customs and Religion, Collective Bargaining,
CLO-10	Explain Confidentiality, Acceptance of Bribes/Gifts, Occupational Crimes, Whistle Blowing.
CLO-11	Visualize Globalization, Cross-cultural Issues, Environmental Ethics, Computer Ethics, and Weapons Development.
CLO-12	Discuss Ethical Problems in Research, Intellectual Property Rights (IPRs).
CLO-13	Know the importance of Ethical Audit, Aspects of Project Realization, Ethical Audit Procedure, and The Decision Makers.
CLO-14	Understand Variety of Interests, Formulation of the Brief, The Audit Statement, And The Audit Reviews.
CLO-15	Discuss Case Studies: Bhopal Gas Tragedy, The Chernobyl Disaster
CLO-16	2 Know about Institution of Engineers (India): Sample Codes of Ethics.

UNIT-1 (12 Periods)

Human Values: Morals, Values and Ethics, Integrity, Work Ethics, Service and Learning, Civic Virtue, Respect for Others, Living Peacefully, Caring and Sharing, Honesty, Courage, Value Time, Cooperation, Commitment and Empathy, Spirituality, Character.

Engineering Ethics: History of Ethics, Engineering Ethics, Consensus and Controversy, Profession and Professionalism, Professional Roles of Engineers, Self Interest, Customs and Religion, Uses of Ethical Theories, Professional Ethics, Types of Inquiry, Kohlberg's Theory, Gilligan‘s Argument, Heinz‘s Dilemma.
Engineering as Social Experimentation: Comparison with Standard Experiments, Knowledge Gained, Conscientiousness, Relevant Information, Learning from the Past, Engineers as Managers, Consultants, and Leaders, Accountability, Roles of Codes, Codes and Experimental Nature of Engineering.

UNIT-2	(12 Periods)

Engineers' Responsibility for Safety and Risk: Safety and Risk, Types of Risks, Safety and the Engineer, Designing for Safety, Risk-Benefit Analysis, Accidents. **Responsibilities and Rights**: Collegiality, Two Senses of Loyalty, Obligations of Loyalty, Misguided Loyalty, Professionalism and Loyalty, Professional Rights, Professional Responsibilities, Conflict of Interest, Self-interest, Customs and Religion, Collective Bargaining, Confidentiality, Acceptance of Bribes/Gifts, Occupational Crimes, Whistle Blowing.

UNIT-3	(12 Periods)

Global Issues: Globalization, Cross-cultural Issues, Environmental Ethics, Computer Ethics, Weapons Development, Ethics and Research, Analyzing Ethical Problems in Research, Intellectual Property Rights (IPRs).
Ethical Audit: Aspects of Project Realization, Ethical Audit Procedure, The Decision Makers, Variety of Interests, Formulation of the Brief, The Audit Statement, The Audit Reviews.

UNIT-4	(12 Periods)

Case Studies: Bhopal Gas Tragedy, The Chernobyl Disaster.
Appendix 1: Institution of Engineers (India): Sample Codes of Ethics.
Appendix 2: ACM Code of Ethics and Professional Conduct.

Text Books :	-Professional Ethics & Human Values‖, M.GovindaRajan, S.Natarajan, V.S.SenthilKumar, PHI Publications 2013.
References :	-Ethics in Engineering‖, Mike W Martin, Ronald Schinzinger, TMH Publications.

DIGITAL LOGIC DESIGN

I B.Tech – II Semester(Code: 18CS204)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: Basic Computer Knowledge.

Course Objectives:

CO-1	Understand of the fundamental concepts and techniques used in digital electronics, and Number conversions.
CO-2	Understand basic arithmetic operations in different number systems and simplification of Boolean functions using Boolean algebra and K-Maps.
CO-3	Simplify the Boolean functions using Tabulation method, Concepts of combinational logic circuits.
CO-4	Understand the concepts of Flip-Flops, Analysis of sequential circuits
CO-5	Understand the concepts of Registers, Counters and classification of Memory units.

Course Outcomes: Students will be able to:

CLO-1	To perform all the basic arithmetic operations in various number systems.
CLO-2	To perform subtraction operation using various complements.
CLO-3	To learn various Boolean algebraic rules and laws.
CLO-4	To simplify Boolean function using Boolean algebraic rules and laws.
CLO-5	To learn various Logic gates.
CLO-7	To simplify Boolean functions using Tabulation method.
CLO-8	To simplify Boolean functions using K-Map method.
CLO-9	To Analyze and design of various Combinational logic circuits.
CLO-10	To learn various functionalities of Flip-Flops.

UNIT-1 (13 Periods)

DIGITAL SYSTEMS AND BINARY NUMBERS: Digital System, Binary Numbers, Number base Conversions, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic, Error Detection and Correction: 7 bit Hamming Code.

BOOLEAN ALGEBRA & LOGIC GATES: Introduction, Basic definitions, Axiomatic definition of Boolean algebra, Basic theorems and properties of Boolean algebra, Boolean functions, Canonical and Standard Forms, Other Logic Operations, Digital logic gates.

GATE –LEVEL MINIMIZATION: Introduction, The map method, Four-variable K-Map, Product-of-Sums Simplification, Don‘t –Care Conditions, NAND and NOR implementation, Other Two level Implementations.

UNIT-2 (13 Periods)

MINIMIZATION: The Tabulation method, Determination of prime implicants, Selection of prime-implicants.

COMBINATIONAL LOGIC: Introduction, Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adders - Subtractor, Decimal Adder, Magnitude Comparator, Decoders, Encoders, Multiplexers.

UNIT-3 (12 Periods)

SYNCHRONOUS SEQUENTIAL LOGIC: Introduction, Sequential Circuits, Storage Elements - Latches, Storage Elements -Flip Flops, Analysis of Clocked Sequential Circuits: State Equations, State Table, State Diagram, Flip Flop Input Equations, Analysis with D, JK

and T Flip Flops; State reduction and Assignment, Design Procedure.	
UNIT-4	(12 Periods)
REGISTERS and COUNTERS: Registers, Shift registers, Ripple Counters, Synchronous Counters. **MEMORY and PROGRAMMABLE LOGIC:** Introduction, Random Access Memory: Read and Write Operations, Types of Memories; Read Only Memory, Programmable Logic Devices: PROM, PLA, PAL.	
Text Books :	1. M. Morris Mano, Michael D. Ciletti, ―Digital Design‖, 5th Edition,PrenticeHall, 2013. 2. A. Anand Kumar, ‒fundamentals of digital circuits‖, 4th Edition, PHI.
References :	1. John F. Wakerly, ‒Digital Design: Principles and Practices‖, 4th Edition, Pearson, 2006. 2. Brian Holdsworth , Clive Woods, ‒Digital Logic Design‖, 4th Edition, Elsevier Publisher, 2002. 3. Donald E Givone, ‒digital principles and design‖, TMT.

Basic Electrical and Electronics Engineering

(Common for CSE,IT,ME branches)

I B. Tech. – II Semester (Code: 18EE001)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO-1	To understand basic Laws in circuits, analysis of simple DC circuits, Theorems and its applications, fundamentals of AC circuits & its analysis and concepts of three phase balanced circuits
CO-2	To learn basic properties of magnetic materials and its applications.
CO-3	To understand working principle, construction, applications and performance of DC machines, AC machines.
CO-4	To learn basic concepts, working principal, characteristics and applications of semiconductor diode and transistor family.
CO-5	To gain knowledge about the static converters and regulators.
CO-6	To learn basic concepts of power transistors and operational amplifiers closer to practical applications.

Course Outcomes: Students will be able to:

CLO-1	Solve problems involving with DC and AC excitation sources in electrical circuits.
CLO-2	Compare properties of magnetic materials and its applications
CLO-3	Analyze construction, principle of operation, application and performance of DC machines and AC machines.
CLO-4	Explore characteristics and applications of semiconductor diode and transistion family.
CLO-5	Make the static converters and regulators
CLO-6	Analyze concepts of power transistors and operational amplifiers closer to practical applications

UNIT-1 (12 Periods)

Electrical Circuits

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation.Superposition, Thevenin and Norton Theorems. Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase AC circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-2 (18 Periods)

Electrical Machines

Magnetic materials, BH characteristics, Construction, working of DC machines, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency.Auto-transformer and three-phase transformer connections.Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor.Single-phase induction motor.Construction and working of synchronous generators.

UNIT-3	(12 Periods)
Semiconductor Diodes and applications Semiconductor materials, semiconductor diode, Resistance levels, Diode equivalent circuits, Zener diode, Light emitting diode, Load line analysis, half wave rectification, Full wave rectification, Bridge rectifier, Use of capacitor filter in rectifier, Zener diode voltage regulator, Clippers, Clampers **Bipolar Junction Transistors** Transistor construction and operation, Common base configuration, Transistor amplifying action, Common emitter configuration, Common collector configuration, Limits of operation. DC load line and bias point, Voltage divider bias of transistor.	
UNIT-4	(12 Periods)
Field Effect Transistors Construction and characteristics of JFET and MOSFET **Operational Amplifiers** Introduction, Differential and common mode operation, OP-AMP Basics, Practical OP-AMP circuits: Inverting amplifier, Non inverting amplifier, Unity follower, summing amplifier, Integrator and differentiator	
Text Books :	1. S.K. Bhattacharya, ‐Basic Electrical and Electronics Engineering‖, Pearson Publications 2. Robert L. Boylestad& Louis Nashelsky, _ Electronic Devices and circuit theory‘, PHI Pvt.Limited, 11th edition 3. ‐Basics of Electrical and Electronics Engineering‖, Nagsarkar T K and Sukhija M S, Oxford press University Press.
References :	1. David A. Bell, _Electronic Devices and Circuits‘, oxford publisher,5th edition 2. ‐Basic Electrical, Electronics and Computer Engineering‖, Muthusubramanian R, Salivahanan S and Muraleedharan K A, Tata McGraw Hill, Second Edition, (2006).

PROBLEM SOLVING USING PROGRAMMING

(Common for all branches except Civil Engineering)

I B.Tech – II Semester (Code:18CS001)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: BASIC MATHEMATICS

Course Objectives:

CO-1	Understand basic concepts of C Programming such as: C-tokens, Operators, Input/output, and Arithmetics.
CO-2	Develop problem-solving skills to translate ‗English' described problems into programs written using C language.
CO-3	Use Conditional Branching, Looping, and Functions.
CO-4	Apply pointers for parameter passing, referencing and differencing and linking data structures.
CO-5	Manipulate variables and types to change the problem state, including numeric, character, array and pointer types, as well as the use of structures and unions, File.

Course Outcomes: Students will be able to:

CLO-1	Choose the right data representation formats based on the requirements of the problem.
CLO-2	Analyse a given problem and develop an algorithm to solve the problem.
CLO-3	Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
CLO-4	Write the program on a computer, edit, compile, debug, correct, recompile and run it.
CLO-5	Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.

UNIT-1 (17 Periods)

Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing I/O Operations. Decision Making and Branching.

Programming Exercises for Unit I: C-expressions for algebraic expressions, evaluation of arithmetic and Boolean expressions. Syntactic and logical errors in a given program, output of a given program, values of variables at the end of execution of a program fragment, Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers. Computation of discount amount on different types of products with different discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, finding given year is leap year or not, and conversion of lower case character to its upper case.

UNIT-2 (17 Periods)

Decision Making and Looping, Arrays, Character Arrays and Strings.

Programming Exercises for Unit II: To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number. To print graphic patterns of symbols and numbers. To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is palindrome or not with and without using String Handling Functions. Transpose of a matrix and sorting of names using arrays.

UNIT-3	(18 Periods)
User-defined Functions, Structures and Unions, Pointers **Programming Exercises for Unit - III:** Functions - Recursive functions to find factorial & GCD (Greatest Common Divisor), string operations using pointers and pointer arithmetic. Swapping two variable values. Sorting a list of student records on register number using array of pointers	
UNIT-4	(18 Periods)
File Management in C, Dynamic Memory Allocation, Preprocessor **Programming Exercises for Unit - IV**: Operations on complex numbers, and to read an input file of marks and generate a result file, sorting a list of names using command line arguments. Copy the contents of one file to another file. Allocating memory to variables dynamically.	
Text Books :	Programming in ANSI C by E.Balaguruswamy, Fifth Edition.
References :	1. Kernighan BW and Dennis Ritchie M, –C programming language‖, 2nded, Prentice Hall. 2. Yashavant P. Kanetkar, –Let us C‖, BPB Publications. 3. Herbert Schildt, –C: The Complete Reference‖, 4th edition, Tata Mcgraw-Hill. 4. Ashok N.Kamthane, –Programming in C‖, PEARSON 2nd Edition.

Physics Laboratory

I B.Tech– II Semester (Code: 18PHL01)

(COMMON TO ALL BRANCHES)

Lectures	:	3 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	This unit aim to build the foundation and inspires interest of freshmen into electrical and electronics and to focus on fundamental concepts and basic principles regarding electrical conduction.
CO2	This unit provides various properties of semiconductor materials and their importance in various device fabrications
CO3	This unit aim to educate the student on various opto-electronic devices and their applications.
CO4	This unit provide information about the principles of processing, manufacturing and characterization of nano materials, nano structures and their applications

Course Outcomes: Students will be able to:

CLO-1	Students demonstrate the ability to apply the knowledge of band theory of solids and concept of energy band gap and hole
CLO-2	Classify the different types of magnetic and dielectric materials and their applications
CLO-3	Understand importance of Nano materials, properties and their applications.
CLO-4	To familiarize the phenomenon of superconductivity and opto-electronic devices.
CLO-5	Students to understand the principle in the production and applications of ultrasonic
CLO-6	Students are able to estimate the crystal structures by x-ray diffraction technique.

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee‘s apparatus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Determination of radius of uatue of a Plao oe les foig Newton‘srings.
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. Determination of dispersive power of a given material of prism using prism minimum deviation method.
7. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
8. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using sonometer.
10. Determine the rigidity modulus of the given material of the wire using Torsional pendulum.
11. Draw the load characteristic curves of a solar cell.
12. Determination of Hall coefficient of a semiconductor.

13. Determination of voltage and frequency of an A.C. signal using C.R.O. 14. Determination of Forbidden energy gap of Si &Ge. 15. Determination of wavelength of laser source using Diode laser. **Any three experiments are virtual**	
Text Books :	1. Engineering physics laboratory manual 2. P.Srinivasarao & K.Muraldhar, Himalaya publications.
References :	

Basic Electrical and Electronics Engineering Lab *(Common for CSE,IT,ME branches)* I B.Tech – I Semester (Code: 18EEL01)					
Lectures	:	3 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	To understand basic Laws in circuits, analysis of simple DC circuits, Theorems and its applications, fundamentals of AC circuits & its analysis and concepts of three phase balanced circuits
CO2	To learn basic properties of magnetic materials and its applications.
CO3	To understand working principle, construction, applications and performance of DC machines, AC machines.
CO4	To learn basic concepts, working principal, characteristics and applications of semiconductor diode and transistor family.
CO5	To gain knowledge about the static converters and regulators.
CO6	To learn basic concepts of power transistors and operational amplifiers closer to practical applications.

Course Outcomes: Students will be able to:

CLO-1	Solve Problems involving with DC and AC excitation sources in electrical circuits
CLO-2	Compare properties of magnetic materials and its applications
CLO-3	Analyze construction, principle of operation, application and performance of DC machines and AC machines
CLO-4	Explore characteristics and applications of semi conductor diode and transistor family
CLO-5	Make the static converts and regulators

Text Books :	
References :	

Problem Solving using Programming(Lab) I B.Tech – II Semester (Code: 18CSL01)					
Lectures	:	3 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Understand basic concepts of C Programming such as: C-tokens, Operators, Input/output, and Arithmetics.
CO2	Develop problem-solving skills to translate ‗English' described problems into programs written using C language.
CO3	Use Conditional Branching, Looping, and Functions.
CO4	Apply pointers for parameter passing, referencing and differencing and linking data structures.
CO5	Manipulate variables and types to change the problem state, including numeric, character, array and pointer types, as well as the use of structures and unions, File.

Course Outcomes: Students will be able to:

CLO-1	Choose the right data representation formats based on the requirements of the problem
CLO-2	Analyze a given problem and deploy an algorithm to solve the problem
CLO-3	Use the comparison and limitations of the various programming construct and choose the right one for the task in hand
CLO-4	Write the program on a computer, edit, compile, debug, correct, recompile and run it

1. A program for electricity bill taking different categories of users, different slabs ineach category. (Using nested if-else statement).

Domestic Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 200	0.50 per unit	
201 – 400	100 plus	0.65 per unit
401 – 600	230 plus	0.80 per unit
601 and above	390 plus	1.00 per unit
Commercial Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 100	0.50 per unit	
101 – 200	50 plus	0.6 per unit
201 – 300	100 plus	0.70 per unit
301 and above	200 plus	1.00 per unit

2. Write a C program to evaluate the following (using loops):
   a) $1 + x^2/2! + x^4 / 4!+ \ldots$up to ten terms
   b) $x + x^3/3! + x^5/5!+ \ldots$ up to ten terms
3. Write a C program to check whether the given numbers
   a) Prime or not.
   b) Perfect or Abundant or Deficient.

4. Write a C program to display statistical parameters (using one – dimensional array).
    a) Mean
    b) Mode
    c) Median
    d) Variance.
5. WriteaCprogramtoreadalistofnumbersandperformthefollowingoperations
    a) Print the list.
    b) Delete duplicates from the list.
    c) Reverse the list.
6. Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message –Element not found in the List‖.
7. Write a C program to read two matrices and compute their sum and product.
8. Write a C program to read list of student names and perform the following operations
    a) To print the list of names.
    b) To sort them in ascending order.
    c) To print the list after sorting.
9. Write a C program that consists of recursive functions to
    a) Find factorial of a given number
    b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.
10. A Bookshop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author, and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed, if it is, then the system displays the book details and request for the number of copies required ,if the requested copies are available the total cost of the requested copies is displayed otherwise the message –required copies not in stock‖ is displayed. Write a program for the above in structures with suitable functions.

11. Write a C program to read a data file of students‘ records with fields(Regno, Name, M1,M2,M3,M4,M5) and write the successful students data (percentage > 40%) to a data file.

12. Write a C program to read a file as command line argument and count the given word frequency in a file

Text Books :	
References :	

PROBABILITY STATISTICS

II B. Tech. –III Semester (Code: 18MA003)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	The Aptitude to learn about the concept of random variables and their properties
CO2	Evaluation of various Sampling Distributions
CO3	Statistical analysis for making decisions and choosing actions.
CO4	The Capability to infer the meaningful conclusions to the given data using statistical methods like Point Estimation

Course Outcomes: Students will be able to:

CLO-1	Understand the concept of random variables and probability mass functions, densities
CLO-2	Understand the mean and variance of a random variable.
CLO-3	Know various well-known distributions and how they are used in practice.
CLO-4	Understand joint, marginal, and conditional distributions
CLO-5	Interpret a confidence interval for a population mean when the population standard deviation is known and unknown.

UNIT-1 (12 Periods)

Continuous Random Variables, Normal Distribution, Normal Approximation to the Binomial Distribution, Uniform Distribution, Gamma Distribution and its applications, Beta Distribution and its applications, Joint Distributions (Discrete),Joint Distributions (Continuous).Populations and Samples, Law of large numbers, Central limit theorem and its applications, The sampling distribution of the mean (σ unknown),The sampling distribution of the variance.

(Sections 5.1, 5.2, 5.3, 5.5,5.7, 5.8, 5.10, 6.1, 6.2, 6.3, 6.4 of Text Book [1])

UNIT-2 (12 Periods)

Point estimation, Interval estimation, Tests of Hypotheses, Null Hypothesis and Tests of Hypotheses, Hypothesis concerning one mean, Comparisons-Two independent Large samples, Comparisons-Two independent small samples, Paired sample t test.

(Sections 7.1,7.2, 7.4, 7.5, 7.6, 8.2, 8.3, 8.4 of Text Book [1])

UNIT-3 (12 Periods)

The Estimation of variances, Hypotheses concerning one variance, Hypotheses Concerning two variances, Estimation of proportions, Hypotheses concerning one proportion, Hypotheses concerning several proportions, Procedure for Analysis of Variance (ANOVA) for comparing the means of k (>2) groups- one way classification (Completely randomized designs), Procedure for Analysis of Variance (ANOVA) for comparing the means of k (>2) groups- two way classification (Randomized block designs).

(Sections 9.1, 9.2, 9.3, 10.1, 10.2, 10.3, 12.2, 12.3 of Text Book [1])

UNIT-4 (12 Periods)

Multivariate Analysis: The concept of bivariate relationship, scatter diagram, Pearson‟s correlation and correlation matrix. Simple linear regression model and assumptions, Least Squares Estimation of the parameters of the model, Testing the significance of the model. Regression versus Correlation, Multiple linear regression model with k explanatory variables and assumptions of the model. . Test for significance of the regression model and individual regression coefficients. Applications of multiple regression analysis. (1^{st} and 2^{nd} Chapters of Text Book [2])1	
Text Books :	1.Miller & Freund‟s ―Probability and Statistics for Engineers‖,Richard A. Johnson,8^{th} Edition, PHI. **2.** Introduction to Linear Regression Analysis, Douglas C. Montgomery, E.A. Peck and G.G. Vining, 3^{rd} edition, Wiley.
References :	1. R.E Walpole, R.H. Myers & S.L. Myers ,„Probability & Statistics fo Engineers and Scientists‟, 6^{th} Edition, PHI. 2. Fundamentals of Mathematical Statistics, S. C. Gupta and V.K.Kapoor, 11^{th} Edition, Sultan Chand & Sons. 3.Murray R Spiegel , John J. Schiller, R. Alu Srinivas Probability & Satistics‟, Schaum‘s outline series. 4. K.V.S. Sarma, Statistics Made Simple – Do it yourself on PC‟, Prentice Hall India, Second Edition, 2015.

DATA STRUCTURES

II B. Tech. – III Semester (Code: 18CS302)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Analyse concepts of Abstract data type, data structure, performance measurement, time and
CO2	Space complexities of algorithms.
CO3	To develop the implementation of array list and linked lists.
CO4	To learn the implementation linear data structures such as stacks, queues and their

Course Outcomes: Students will be able to:

CLO-1	Understand and program basic data structures like arrays and linked lists with their applications. Understand concepts of Algorithm complexities.
CLO-2	Understand and Program data structures like stacks and queues with their applications. Understand and implement sorting algorithms.
CLO-3	Understand and program on trees, binary trees, binary search trees, AVL trees, expression trees and their traversal methods, including algorithm complexities.
CLO-4	Understand and program on priority queues, hashing and their mechanisms. Basic knowledge of Disjoint Sets.

UNIT-1 (13 Periods)

Algorithm Analysis: Mathematical Background, Model, what to Analyze, Running Time Calculations.

Lists: Abstract Data Types, The List ADT, Singly Linked List ADT, Doubly Linked List ADT, Circular Linked List ADT, Polynomial ADT: addition, multiplication operations.

UNIT-2 (13 Periods)

Stacks and Queues: The Stack ADT and its applications such as Infix to Postfix expression conversions, Evaluation of Postfix expressions. The Queue ADT, Queue Application-Radix sort.

Basic Sorting Techniques: Bubble sort, Selection sort, Insertion sort, Shell sort

UNIT-3 (12 Periods)

Trees: Preliminaries, Binary Trees, Expression trees, The Search Tree ADT, Binary Search Trees, Splay Trees, Implementations, AVL Trees-Single Rotations, Double rotations, Implementations.

UNIT-4 (12 Periods)

Hashing: General Idea, Hash Function, Separate Chaining, Open Addressing.

Priority Queues (Heaps): Model, Simple implementations, Binary Heap, Heap Sort.

Disjoint Set ADT: Dynamic equivalence problem, Basic Data Structure, Smart Union Algorithms, Path Compression.

Text Books :	1. Mark Allen Weiss, –Data Structures and Algorithm Analysis inC‖, Second Edition, Pearson Education.
References :	1.Y.Langsam, M.J.Augeustein and A.M.Tenenbaum, –Data Structures Using C‖,

	Pearson Education Asia, 2004.Richard F.Gilberg, Behrouz A. Forouzan, –Data Structures – A 2. Pseudocode Approach with C‖, Thomson Brooks / COLE, 1998. Aho, J.E. Hopcroft and J.D. Ullman, ―Data Structures andAlgorithms‖, Pearson Education Asia, 1983.

DISCRETE MATHEMATICS

II B. Tech. – III Semester (Code: 18CS302)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Understand operations on discrete structures such as sets, functions, relations, and Sequences. Formulate short proofs using the following methods: direct proof, indirect proof, and proof by contradiction, and case analysis etc. Apply algorithms and use definitions to solve problems to prove statements in elementary number theory. Construct mathematical arguments using logical connectives and quantifiers. Verify the correctness of an argument using propositional and predicate logic and truth tables.
CO2	Understand to solve problems using counting techniques and combinatory in the context of discrete probability.
CO3	Understand problems on involving recurrence relations and generating functions. And Know the properties of equivalence relations and partial orderings.
CO4	Understand basic definitions and properties associated with simple planar graphs, including isomorphism, connectivity, and Euler's formula, and describe the difference between Eulerian and Hamiltonian graphs. Use graphs and trees as tools to visualize and simplify situations.

Course Outcomes: Students will be able to:

CLO-1	Understand the basic principles of sets and operations in sets.
CLO-2	Identify the type of given binary relation.
CLO-3	Construct digraph for the given binary relation
CLO-4	Find out the transitive closure of given relation.
CLO-5	Determine when a function is one to one and "onto".
CLO-6	Use the rules of inference and verify the correctness of an argument.

UNIT-1 (13 Periods)

Set Theory: Sets and subsets, Venn Diagrams, Operations on sets, laws of set theory, Power sets and products, Partition of sets, The principle of inclusion - Exclusion. **Relations:** Definition, Types of relation, Composition of relations, Domain and range of a relation, Representation of Relations, Operations of relation, Special properties of a binary relation, Equivalence Relations and Partial Ordering Relations , POSET diagram and lattice, Paths and Closures.

Functions:

Definition and types of functions, Composition, Inverse and Identity of functions.

UNIT-2 (13 Periods)

Logic: Fundamentals of Logic, Logical Inferences, Methods of Proof of an implication, First order Logic & Other methods of proof, Rules of Inference for Quantified propositions, Mathematical Induction.

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumerating Combinations and Permutations with repetitions.

UNIT-3 (12 Periods)

Recurrence relations: Generating functions of sequences, Calculating Coefficients of Generating Functions. Solving recurrence relations by Substitution and generating functions. The methods of characteristic roots, solutions of inhomogeneous recurrence relations.	
UNIT-4	(12 Periods)
Graphs: Basic concepts, Directed Graphs and Adjacency Matrices, Application: Topological Sorting. Isomorphism and Sub graphs, Planar Graphs, Euler's Formula; Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four Color Problem.	
Text Books :	1. Toe L.Mott, Abraham Kandel& Theodore P.Baker, –Discrete Mathematics for Computer Scientists & Mathematicians‖, PHI 2nd edition.
References :	1. C.L. Liu, –Elements of Discrete Mathematics‖. 2. Rosen, –Discrete Mathematics‖.

OBJECT ORIENTED PROGRAMMING II B. Tech. –III Semester (Code: 18CS304)					
Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Understand advantages of OO programming over procedural oriented programming, learn the basics of variables, operators, control statements, arrays, strings, classes and objects.
CO2	Understand, write and implement Operator Overloading, Indexers, Properties, Inheritance, Interfaces, Structures, and Enumerations.
CO3	Understand and write programs on Exception Handling, I/O, Delegates and Events.
CO4	Understand Namespaces, the Preprocessor, Assemblies, Generics, Collections, Enumerators, and Iterators.

Course Outcomes: Students will be able to:

CLO-1	Understand basic Java language syntax and semantics to write Java programs, use concepts such as variables, conditional and iterative execution methods etc. And use the Java SDK environment to create, debug and run Java programs
CLO-2	Identify classes, objects, members of a class and relationships among them needed for a specific problem and Write Java application programs using OOP principles and proper program structuring
CLO-3	Demonstrate the concepts of polymorphism, inheritance, packages and interfaces.
CLO-4	Write Java programs to implement error handling techniques using exception handling

UNIT-1	(13 Periods)

The History and Evolution of Java
An Overview of Java
Data Types, Variables and Arrays
Operators
Control Statements
Introducing Classes
A Closer Look at Methods and Classes

UNIT-2	(13 Periods)

Inheritance
Packages and Interfaces
Strings: String Constructors, Program using 10 String methods
String Buffer class, Program using 10 String Buffer methods Introducing StringBuilder class.
Type Wrappers, Auto boxing/unboxing.
Collections: Collections Overview, Names of Collection Interfaces, Classes. Programs using Collection classes LinkedList<String>, Array List<String>

UNIT-3	(12 Periods)

Exception Handling
Multithreaded Programming
I/O: I/O Basics, Reading Console Input, Writing Console Output, The Print Writer class, Reading and Writing Files, Automatically Closing a File

UNIT-4	(12 Periods)
The Applet Class: Applet Architecture, An Applet Skeleton, Applet program to draw shapes, setting Color, Font using Graphics class **Event Handling:** **Introducing the AWT:** Window Fundamentals, Program using AWT components Label, Text Field, Text Area, Checkbox, Checkbox Group, Button, Program using Flow Layout, Grid Layout, and Border Layout. **GUI Programming with Swing:** The Origins of Swing, Advantages of Swing over AWT, The MVC Connection, Program using Swing Components JLabel, JText Field, JText Area, JCheck box, JButton, JTabbed Pane, JTable, JTree, JCombo Box	
Text Books :	1. –Java The Complete Reference‖, 9th Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.
References :	

OPERATING SYSTEMS

II B. Tech. –III Semester (Code: 18CS305)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Understand different structures, services of the operating system and the use of scheduling and operations on process.
CO2	Understand the use of scheduling, operations on process, the process scheduling algorithms and synchronization concepts.
CO3	Understand the concepts of deadlock, memory and virtual memory management techniques.
CO4	Understand the concepts of File System, Input/output systems and system protection of various operating systems.

Course Outcomes: Students will be able to:

CLO-1	Analyze the structure of OS and basic architectural components involved in OS design
CLO-2	Student is able to point the problems related to process management and synchronization as well as is able to apply learned methods to solve basic problems.
CLO-3	Student is capable of explaining the cause and effect related to deadlocks and understand the concepts of memory management including virtual memory
CLO-4	Understand the issues related to file system management and familiar with I/O and file protection mechanisms

UNIT-1 (13 Periods)

Introduction: What OSs Do, Computer System Operation, Storage structure, OS Structure, OS Operations.

Operating-System Structures: OS Services, User and operating system Interface, System Calls, Types of System Calls, System Programs, OS Design and Implementation, OS Structure.

Processes: Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication.

Threads: Overview, Multicore Programming, Multithreading Models.

[Sections:1.1, 1.2.1, 1.2.2,1.4,1.5, 1.5.1,2.1, 2.2,2.3,2.4, 2.5, 2.6, 2.7,2.7.1,2.7.2,2.7.3,2.7.43.1, 3.2,3.3,3.4, 4.1,4.2,4.3]

UNIT-2 (13 Periods)

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms.

Process Synchronization: Background, The Critical-Section Problem, Peterson‘s Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of Synchronization, Monitors.

[Sections : 5.1,5.2,,5.3,5.4,5.5,5.6,5.7,5.8, 6.1,6.2,6.3]

UNIT-3 (12 Periods)

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance, Detection and Recovery.

Main Memory: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table.

Virtual-Memory: Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing, Other Considerations.

[Sections; 7.1,7.2,7.3,7.4,7.5,7.6,7.7,8.1,8.2,8.3,8.4,8.5,8.6,9.1, 9.2,9.3,9.4,9.5,9.6,9.9]

UNIT-4	(12 Periods)
File System Interface: File concept, Access Methods, Directory and Disk Structure, **File System Implementation**: File System Structures, Directory Implementation, Allocation Methods **Protection**: Goals of Protection, Principles of Protection, Domain of Protection- Domain Structure, Access Matrix, Implementation of Access Matrix. **Mass Storage Structure**: Over View, Disk Structure, Disk Scheduling, Disk Management, RAID levels [Sections:10.1,10.2,10.4,10.5,10.7,11.1,11.2,11.3,11.5,12.1,12.3,12.4,14.1,14.2,14.3,14.3.1, 14.4,14.5]	
Text Books :	1.Silberschatz & Galvin, ―Operating System Concepts‖, 9th edition, John Wiley & Sons (Asia) Pvt.Ltd.
References :	1.William Stallings, ‐Operating Systems – Internals and Design Principles‖, 5/e, Pearson 2. Charles Crowley, ‐Operating Systems: A Design-Oriented Approach‖, Tata McGraw Hill Co., 1998 edition 3. Andrew S.Tanenbaum, ‐Modern Operating Systems‖, 2nd edition, PHI

Microprocessors & Microcontrollers
II B. Tech. –III Semester (Code: 18CS306)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Learn the architecture and the instruction set of an Intel 8086 microprocessor.
CO2	Develop the skills of programming and interfacing peripherals of microprocessors and microcontrollers.
CO3	Analyse and design algorithms for solving problems in 8086 assembly language
CO4	Understand the 8086 bus activities during the read and write cycles.

Course Outcomes: Students will be able to:

CLO-1	Have knowledge to program using 8086 microprocessor.
CLO-2	Be equipped with the basic knowledge of microprocessor and microcontroller interfacing and their applications.
CLO-3	Interpret programs in assembly language Format.
CLO-4	Analyze the interfacing circuitry and programs required for peripheral support chips and other hardware

UNIT-1 (13 Periods)

The 8086 Microprocessor Family, The 8086 Internal Architecture,
Introduction to Programming the 8086: 8086 Family Assembly Language Programming; Implementing standard Program Structures in 8086 Assembly language.

UNIT-2 (13 Periods)

Writing and Using Procedures: Introduction, The 8086 CALL and RET instructions,The 8086 Stack, A Near Procedure CALL and Example, Another Look at Stack Operation during CALL and RET, Using PUSH and POP to save register content, Passing Parameters to and from Procedures, Writing and debugging programs containing Procedures, Reentrant and Recursive Procedures, Recursive Procedure example, Writing and Calling Far Procedures. **Writing and Using Assembler Macros**.

UNIT-3 (12 Periods)

8086 Interrupts and Interrupt Applications: 8086 Interrupts and Interrupts Responses.
8086 System Connections & Timing: The Basic 8086 Microcomputer System, 8086 Bus activities during the Read and Write Machine Cycles, 8086 pin Diagram. **The 8086 String Instructions.**

UNIT-4 (12 Periods)

Interfacing Peripherals and Applications: Interfacing the Microprocessor to the Keyboard, Alphanumeric displays, 8259 Priority Interrupt Controller, 8237 DMA Controller.
The 8051 Microcontrollers – Assembly language Programming- JUMP, LOOP, CALL Instructions. Addressing Modes, Arithmetic, Logic, Single – bit instructions.

LISTOFEXPERIMENTS

1. Write a 8086 assembly language program to arrange the given numbers in ascending order.
2. Write a 8086 assembly language program to find the given number is prime or not.
3. Write a 8086 assembly language program to convert BCD number into binary using

registers as pointers.
4. Write a 8086 assembly language program to calculate nCr by using near procedures.
5. Write a 8086 assembly language program for comparison of two strings.
6. Write a 8086 assembly language program to move a String from one segment to another segment.
7. Assume that 5 BCD data items are stored in RAM locations starting at 40H. Write a 8051 microcontroller program to find the sum of all the numbers. The result must be in BCD.
8. Write a 8051 microcontroller program to count the number of positive elements, negative elements and zeros in the given array.

Text Books :	1.Douglas V. Hall, –Microprocessors and Interfacing‖, Tata McGraw- Hill, Revised Second Edition
References :	1. Yu-cheng Liu, Glenn A. Gibson, –Microcomputer systems: The 8086 /8088 Family architecture, Programming and Design‖, Second 2. Barry B. Brey, –The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, Pentium II, Pentium III, Pentium IV, Architecture, Programming & Interfacing‖, Sixth Edition, Pearson Education Prentice Hall of India, 2002.

UNIX PROGRAMMING LAB

II B. Tech. –III Semester (Code: 18CSL301)

Lectures	:	3 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Organize and manipulate files and directories
CO2	Use the vi text editor to create and modify files
CO3	Use SED command for insertion, deletion, and search and replace (substitution).
CO4	Understand pattern scanning and processing using AWK.
CO5	Create structured shell programming which accept and use positional parameters and exported variables.
CO6	Understand File management system calls to provide I/O support for storage device types and multiple users.

Course Outcomes: Students will be able to:

CLO-1	Understand the major components and describe the architecture of the UNIX operating system
CLO-2	Use the UNIX system documentation
CLO-3	Use UNIX utilities to create simple tools for the information processing
CLO-4	Understand SED command in Unix to support regular expression which allows it perform complex pattern matching.
CLO-5	Use Awk in a scripting language for manipulating data and generating reports.
CLO-6	Understand how the shell functions at the user interface and command line interpreter.
CLO-7	Use shell flow control and conditional branching constructs (while, for, case, if, etc.)
CLO-8	Modify built-in shell variables and create and use user-defined shell variables.
CLO-9	Use system calls for creation or deletion of files.
CLO-10	Use system calls for Reading and writing from files.

UNIT-1 (8 Periods)

Directory commands – pwd, cd, mkdir, rmdir commands. The dot (.) and double dots (..) notations to represent present and parent directories and their usage in relative path names. File related commands –Editing with vi, cat, mv, rm, cp , wc . File attributes and permissions and knowing them. The ls command with options. Changing file permissions: (chmod) the relative and absolute permissions changing methods. Recursively changing file permissions. Directory Permissions. Other Basic commands: cal, date, df, du, find, jobs, kill ,less and more, ps, set, wc, who.

LIST OF EXPERIMENTS

1. Obtain the following results (i) To print the name of operating system (ii) To print the login name (iii) To print the host name
2. Find out the users who are currently logged in and find the particular user too.
3. Display the calendar for (i) Jan 2000 (ii) Feb 1999 (iii) 9th month of the year 7 A.D (iv) For the current month (v) Current Date Day Abbreviation , Month Abbreviation along with year
4. Display the time in 12-Hour and 24 Hour Notations.
5. Display the Current Date and Current Time.
6. Display the message –GOOD MORNING‖ in enlarged characters.

7. Display the name of your home directory.
8. Create a directory SAMPLE under your home directory.
9. Create a subdirectory by name TRIAL under SAMPLE.
10. Change to SAMPLE.
11. Change to your home directory.
12. Change from home directory to TRIAL by using absolute and relative pathname.
13. Remove directory TRIAL.
14. Create a directory TEST using absolute pathname.
15. Using a single command change from current directory to home directory.
16. Remove a directory using absolute pathname.
17. Create files my file and your file under Present Working Directory.
18. Display the files my file and your file.
19. Append more lines in the my file and your file files.
20. How will you create a hidden file?.
21. Copy myfile file to emp.
22. Write the command to create alias name for a file.
23. Move yourfile file to dept.
24. Copy emp file and dept file to TRIAL directory
25. Compare a file with itself.
26. Compare myfile file and emp file.

UNIT-2 (8 Periods)

The Stream editor(sed):Line addressing, multiple instructions, context addressing, writing selected lines to a file, text editing ,substitution, basic regular expressions.
File Handling and Text Processing utilities: grep, egrep, fgrep.
AWK: sample awk filtering , splitting a line into fields, formatting output, variables and expressions, comparison operators, number processing, storing awk programs in a file, the BEGIN and END sections, Built in variables and arrays, control structures.

LIST OF EXPERIMENTS

1. A. Create the following file as sed.lab: unix is great os. unix is open source. unix is free os. learn operating system. Unix linux which one you choose.(*Each sentence in a line*)

1. Replace _unix‘ with _linux‘.
2. Replace only the third (3rd) instance of _unix‘ with _linux‘.
3. Try sed ‘s/unix/linux/g‘ sed.lab.
4. Replace _unix‘ with _linux‘ but only on line 3.
5. Add a new line, _Actually Windows is best‘ after the second line.

B.

1. Viewing a range of lines of a document
2. Viewing the entire file except a given range
3. Viewing non-consecutive lines and ranges
4. Replacing words or characters inside a range
5. Using regular expressions
6. Viewing lines containing with a given pattern
7. Inserting spaces in files
8. Performing two or more substitutions at once

C.

1. Design a command **“wishme”** that will great you ―good morning‖,‖good Afternoon‖, according to current time.
2. Design a command **“fags”** thats will list the files and their ages, to date.
3. Design a command **“word-freq”** that will print the words and number of Occurrences of that word in the given text.

UNIT-3	(12 Periods)
Shell programming:shell,functions of shell,metacharacters,input redirections and output redirections,pipes, shell as a programming language,shell variables,predefined local variables,predefined environment variables,arithmetic and conditional expressions ,control structures,positional parameters,passing command line arguments,built in shell comands,shell programs,functions and arrays.	

LIST OF EXPERIMENTS

1.
A. Design a command **" which"** that prints the path of the command given as Argument
B. Design a command **"filelist[-c <char>]"** which prints all file names beginning with The charter specified as argument to the command ,if the position is not specified It should print all the file names.
C. Design a command **getline[-f <filename> -n <line number>]** which prints the line number **lineno** in the file specified with -f option.If the line number is not specified it should list all the lines in the given file
D. Design a command **monthly-file[-m <month>]** which list the files created in a given month where month is argument to be command. If the options is not specified it list the files in all the months.
2.
A. Design a command **list lines[-f <file name> -v <varname>]** which prints the line from the given file **file name** ,which containing the variable **varname**.if **arname** Is not specified it should list ,all the lines.
B. Design a command **avg[-n <colon> -f <file name>]** which prints the average of the given column in a file where **colon** and **file name** are arguments to the commands

UNIT-4	(12 Periods)
File management System calls:Regular File management system calls: open(), read(), write(), lseek(), close(), unlink(), stat(), getdents().	

LIST OF EXPERIMENTS

1. Write a C program to copy data from source file to destination file, where the file names are provided as command-line arguments.
2. Write a C program that reads every 100th byte from the file, where the file name is given as command-line argument.
3. Write a C program to display information of a given file which determines the type of file and inode information, where the file name is given as command-line arguments.

Text Books :	1. UNIX Concepts and Applications, Sumitabha Das, 4th edition, TATA McGraw Hill. 2. UNIX for programmers and users‖, 3rd edition, Graham Glass, King Ables, Pearson education.
References :	1. –The Design of UNIX operating System‖, Maurice J.Bach, PHI. 2. ―Advanced programming in the UNIX environment‖, W Richard Stevens, 2nd Edition, Pearson education. 3. –UNIX programming environment‖, Kernighan and pike, Pearson Education. 4. –Your UNIX the ultimate guide, Sumitabha Das, TMH, 2nd edition. 5. –Advanced UNIX programming‖, Marc J. Rochkind, 2nd edition, Pearson Education.

DATA STRUCTURES LAB

II B. Tech. –III Semester (Code: 18CSL302)

Lectures	:	3 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Understand and program basic data structures like arrays and linked lists with their applications.
CO2	Understand and Program data structures like stacks and queues with their applications. Understand and implement sorting algorithms.
CO3	Understand and program on trees, binary trees, binary search trees, avl trees, expression trees and their traversal methods.
CO4	Understand and program on priority queues, hashing and their mechanisms. Basic knowledge of graphs representations and traversing methods.

Course Outcomes: Students will be able to:

CLO-1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
CLO-2	Understand basic data structures such as arrays, linked lists, stacks and queues.
CLO-3	Describe the hash function and concepts of collision and its resolution methods
CLO-4	Solve problem involving graphs, trees and heaps
CLO-5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

LIST OF EXPERIMENTS

1. Write a program to perform the following operations on Array List 1.Creation, 2.Insertion, 3.Deletion, 4.Search, 5.Display.
2. Write a program that reads two lists of elements, prints them, reverses them, prints the reverse list, sort the lists, print the sorted lists, merges the list, prints merge list using array list.
3.Write a program to perform the following operations on Single Linked List.
a).Creation b).Insertion c).Deletion d).Search e).Display.
4. Write a program to perform the following operations on Doubly Linked List.
a).Creation b).Insertion c).Deletion d).Search e).Display.
5.Write a program to perform addition and multiplication of two polynomials using single Linked List.
6. Write a program to convert the given infix expression into postfix expression using stack.
7. Write a program to evaluate the postfix expression using stack.
8. Write a program that performs Radix sort on a given set of elements using queue.
9. Write a program to read n numbers in an array. Redisplay the arraylist with elements being sorted in ascending order using the following techniques
(a) Bubble Sort (b) Selection Sort (c) Insertion Sort (d) Shell Sort.
10. Write a program to demonstrate Binary Expression tree.
11. Write a program to perform Binary Search tree operations and traversals.
12. Write a program to implement AVL tree that interactively allows (a) Insertion (b) Deletion (c) Find_min (d) Find_max.
13. Write a program to read n numbers in an array. Redisplay the arraylist with elements being sorted in ascending order using Heap Sort.
14. Write a program to find an element using Open Addressing.
15. Write a program to perform the following operations on Disjoint Set. a).

Make-Set b). Find-Set c). Union.	
Text Books :	1. Mark Allen Weiss, –Data Structures and Algorithm Analysis in C‖, Second Edition, Pearson Education
References :	1. Y.Langsam, M.J.Augeustein and A.M.Tenenbaum, –DataStructures Using C‖, Pearson Education Asia, 2004. 2. Richard F.Gilberg, Behrouz A. Forouzan, –Data Structures – A Pseudocode Approach with C‖, ThomsonBrooks / COLE, 1998.

OBJECT ORIENTED PROGRAMMING LAB II B.Tech –III Semester (Code: 18CSL303)					
Lectures	:	3 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Write and implement programs using variables, operators, control statements, arrays, strings, classes and objects.
CO2	Write and implement programs on Operator Overloading, Indexers, Properties, Inheritance, Interfaces, Structures, and Enumerations.
CO3	Understand and write programs on Exception Handling, I/O, Delegates and Events.
CO4	Write programs on Namespaces, Preprocessors, Assemblies, Generics, Collections, Enumerators, and Iterators.

Course Outcomes: Students will be able to:

CLO-1	Apply Object oriented approach to design software and Implement programs using classes and objects
CLO-2	Develop programs using thread concepts and exception handling
CLO-3	Design and implement Applet and event handling mechanisms in application programs.
CLO-4	Design and develop GUI programs.

LIST OF EXPERIMENTS

1. Write a Java program to declare, initialize and accessing the elements of Single dimensional Arrays, Multidimensional Arrays.
2. Write a Java program to demonstrate recursion.
3. Write a Java program to demonstrate static member, static method and static block.
4. Write a Java program to demonstrate method overloading and method overriding using simple inheritance.
5. Write a Java program to demonstrate multiple inheritance using interfaces.
6. Write a Java program to demonstrate packages.
7. Write a Java program to demonstrate String class methods.
8. Write a Java program to create user defined exception class, use couple of built-in Exception classes.
9. Write a Java program to demonstrate inter-thread communication.
10. Write an Applet program passing parameters to Applet, using Graphics, Color and Font classes.
11. Write a Java program to demonstrate handling Action events, Item events, Key events, Mouse events, Mouse Motion events.
12. Write a GUI application which uses AWT components Label, Text Field, Text Area, Checkbox, Checkbox Group, Button.
13. Write a GUI application using JTable, JTree, JCombo Box.

Text Books :	1. –Java The Complete Reference‖, 9th Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.
References :	

OPERATION RESEARCH

(Common for all branches)

II B. Tech. –IV Semester(Code: 18MA05)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Identify and develop operational research models from the verbal description of the real system.
CO2	Understand the mathematical tools that are needed to solve optimization problems.
CO3	Use mathematical software to solve the proposed models.
CO4	Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.

Course Outcomes: Students will be able to:

CLO-1	To derive the best and most economical solution to the given LPP within all of it‘s limitations in the fields of Engineering, Agricultural and manufacturing etc.
CLO-2	To apply these techniques constructively to make effective decisions in various competitive game fields.
CLO-3	To impart the knowledge of Operations Research in the concepts of Integer Programming and Dynamic Programming Problems.
CLO-4	To understand various mathematical models of Queuing systems used in Operations Research.

UNIT-1 (12 Periods)

LINEAR PROGRAMMING PROBLEM:

Introduction; Graphical Solution Method; Some exception cases; General Linear Programming Problem; Canonical and Standard Forms of L.P.P; The Simplex Method: Introduction, Fundamental Properties of Solutions(without Proofs); the Computations Procedure, Artificial Variable Techniques(Big-M method), Problem of Degeneracy.

[Sections:2.1;2.3;2.4;2.5;2.6;3.1;3.2;3.3;3.5;3.6]

UNIT-2 (12 Periods)

GAMES AND STRATEGIES: Introduction; Two-person Zero–Sum Games; The Maximin-Minimax Principle; Games Without Saddle Points-Mixed Strategies; Solution of 2x2 Rectangular Games; Graphical Method; Dominance Property; Algebraic Method for mxn Games; Limitations and Extensions.

[Sections:9.1;9.2;9.3;9.4;9.5;9.6;9.7;9.8;9.12]

UNIT-3 (12 Periods)

INTEGER PROGRMMING PROBBLEM: Introduction, Gomory‘s All-Integer Programming

Problem Method; Branch and Bound Method.

DYNAMIC PROGRAMMING: Introduction, the Recursive Equation Approach, Characteristics of Dynamic Programming, Dynamic Programming Algorithm, Solution of Discrete Dynamic Programming Problem.

[Sections:11.1;11.2;11.4;12.1;12.2;12.3;12.4;12.5]

UNIT-4	(12 Periods)
QUEUING THEORY: Introduction, Queuing System, Characteristic of Queuing System, Symbols and Notations, Poisson Process and Exponential Distribution, Classification of Queues, Definition of Transient and Steady States, Poisson Queues; The M/M/I Queuing System: Model-I (M/M/I): (∞/FIFO) , Model-II (M/M/I): (∞/ SIFO) , Model-III (M/M/I):(N/FIFO), Model-IV(Birth-Death Process). [Sections:17.1;17.2;17.3;17.4;17.5;17.6;17.7;17.8;17.8.1]	
Text Books :	1. Kanthi Swarup, P.K Gupta &Man Mohan, _Operations Research‘
References :	1. SD.Sharma,―Operations Research‖,Kedarnath, Ramnath &Co., 2. HamdyA.*Taha*,*Operations Research*: An introduction, Pearson Prentice Hall, New Jersey.

WEB TECHNOLOGIES

II B.Tech–IV Semester (Code: 18CS402)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Know elements and tags of HTML and apply Styles using Cascading Style Sheets.
CO2	Know basics of Java Script, Functions, Events, Objects and Working with browser objects.
CO3	Know basics of XML, DOM and advanced features of XML.
CO4	To convert XML documents into other formats and XSLT.

Course Outcomes: Students will be able to:

CLO-1	Analyze a web page and identify its elements and attributes
CLO-2	Create web pages using XHTML and Cascading Styles sheets.
CLO-3	Build dynamic web pages using JavaScript (client side programming).
CLO-4	Students will be able to write a well formed / valid XML documents
CLO-5	Understand Web server and its working
CLO-6	Design and implement a client server internet application that accommodates specific requirements and constraints.

UNIT-1 (16 Periods)

HTML5: Fundamentals of HTML, Working with Text, Organizing Text in HTML, Working with Links and URLs, Creating Tables, Working with Images, Colors, and Canvas, Working with Forms.

UNIT-2 (14 Periods)

CSS: Overview of CSS, Backgrounds and Color Gradients in CSS, Fonts and Text Styles, Creating Boxes and Columns Using CSS, Displaying, Positioning, and Floating an Element, List Styles, Table Layouts.

Dynamic HTML: Overview of JavaScript, JavaScript Functions, Events, Image Maps, and Animations.

UNIT-3 (14 Periods)

Dynamic HTML (Cont..): JavaScript Objects, Working with Browser Objects, Working with Document Object.

Document Object Model: Understanding DOM Nodes, Understanding DOM Levels, Understanding DOM Interfaces- Node, Document, Element, Attribute.

UNIT-4 (16 Periods)

XML: Working with Basics of XML, Implementing Advanced Features of XML, Working with XSLT.

AJAX: Overview of AJAX, Asynchronous Data Transfer with XML Http Request, Implementing AJAX Frameworks, Working with jQuery.

Text Books :	1. KogentLearningSolutionsInc.,HTML5BlackBook:CoversCSS3,Javascript, XML, XHTML, Ajax, PHP and Jquery
References :	1. HarveyM.DeitelandPaulJ. Deitel,―Internet &World Wide Web How toProgram‖,4/e,Pearson Education. 2. Jason Cranford Teague, –Visual Quick Start Guide CSS, DHTML&AJAX‖,4e,Pearson Education.

	3. Tom Nerino Doli smith,-Java Script& AJAX for the web‖, Pearson Education2007. 4. Joshua Elchorn,—Understanding AJAX‖,PrenticeHall2006.

DATABASE MANAGEMENT SYSTEM II B.Tech–IV Semester(Code:18CS403)					
Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Familiarize with fundamental concepts of database and various database architectures and Design relations for Relational databases using conceptual data modeling.
CO2	Implement formal relational operations in relational algebra and SQL.
CO3	Identify the Indexing types and normalization process for relational databases
CO4	Use mechanisms for the development of multi user database applications.

Course Outcomes: Students will be able to:

CLO-1	Ability to apply knowledge of database design methodology which give a good formal foundation in relational data model and Understand and apply the principles of data modeling using ER Model.
CLO-2	Familiar with relational DB theory and will able to write relational algebra expressions, Relational Calculus and SQL.for query
CLO-3	Design database schema and Identify and solve the redundancy problem in database tables using normalization.
CLO-4	Understand transaction processing, concurrency control and recovery techniques.

UNIT-1 (16 Periods)

Databases and Database Users: Introduction - An Example - Characteristics of the Database Approach–Actors on the Scene- Workers behind the Scene-Advantages of Using the DBMS Approach.

Database System Concepts and Architecture: Data Models, Schemas, and Instances- Three-Schema Architecture and Data Independence- Database Languages and Interfaces- The Database System Environment -Centralized and Client/Server Architectures for DBMSs.

Data Modeling Using the Entity-Relationship(ER)Model: Using High-Level Conceptual Data Models for Database Design-An Example Database Application-Entity Types, Entity Sets, Attributes, and Keys-Relationship Types, Relationship Sets, Roles, and Structural Constraints-Weak Entity Types-Refining the ER Design for the COMPANY Database-ER Diagrams, Naming Conventions, and Design Issues

UNIT-2 (15 Periods)

The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT -Relational Algebra Operations from Set Theory-Binary Relational Operations: JOIN and DIVISION–Additional Relational Operations-The Tuple Relational Calculus-The Domain Relational Calculus

Schema Definition, Constraints, Queries, and Views: SQL Data Definition and Data Types –Specifying Constraints in SQL-Schema Change Statements in SQL-Basic Queries in SQL – More Complex SQL Queries-INSERT, DELETE, and UPDATE Statements in SQL- Views (VirtualTables) in SQL

UNIT-3 (15 Periods)

The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT -Relational Algebra Operations from Set Theory-Binary Relational Operations: JOIN

and DIVISION–Additional Relational Operations-The Tuple Relational Calculus-The Domain Relational Calculus

Schema Definition, Constraints, Queries, and Views: SQL Data Definition and Data Types –Specifying Constraints in SQL-Schema Change Statements in SQL-Basic Queries in SQL – More Complex SQL Queries-INSERT, DELETE, and UPDATE Statements in SQL- Views (VirtualTables) in SQL

UNIT-4	(14 Periods)

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing-Transaction and System Concepts-Desirable Properties of Transactions-Characterizing Schedules Based on Recoverability –Characterizing Schedules Based on Serializability

Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control –Concurrency Control Based on Time stamp Ordering– Multi version Concurrency Control Techniques- Validation(Optimistic) Concurrency Control Techniques-Granularity of Data Itemsand Multiple Granularity Locking

Database Recovery Techniques: Recovery Concepts-Recovery Techniques Based on Deferred Update - Recovery Techniques Based on Immediate Update-Shadow Paging

Text Books :	1. Fundamentals of Database Systems, Ramez Elmasri and Navathe Pearson Education, 6thedition
References :	1. Introduction to Database Systems, C.J. Date Pearson Education 2. Database Management Systems, Raghu Rama krishnan, Johannes Gehrke, TATA McGraw Hill3rdEdition 3. Database System Concepts, Silberschatz, Korth, McGraw hill,5thedition

COMPUTER ORGANIZATION

I B.Tech –IV Semester (Code: 18CS404)

Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Understand the basic structure, operation of a digital computer, machine instruction and programs.
CO2	Understand the execution of instructions, Hardwired control and Micro programmed control unit design.
CO3	Understand basic computer arithmetic algorithms and operations..
CO4	Understand the hierarchical memory system including cache memories and virtual memory. Identify where, when and how enhancements of computer performance can be accomplished

Course Outcomes: Students will be able to:

CLO-1	Identify Computer system components
CLO-2	Design I/O mechanisms to connect computers to their external environments
CLO-3	Understand the design of a basic processing unit and generation of control signals
CLO-4	Analyze the memory organization and various hazards in pipelining

UNIT-1 (13 Periods)

DATAREPRESENTATION: Data Types, Complements, Fixed-Point Representation, Floating- Point Representation, Other Binary Codes**.**

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro operations, Shift Micro Operations, Arithmetic Logic Shift Unit**.**

UNIT-2 (13 Periods)

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-OutputandInterrupt,CompleteComputerDescription,DesignofBasic Computer, Design of Accumulator Logic.

MICROPROGRAMMEDCONTROL: ControlMemory,AddressSequencing,Microprogram Example, Design of Control Unit.

UNIT-3 (12 Periods)

CENTRAL PROCESSING UNIT: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

COMPUTERARITHMETIC: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations, Decimal Arithmetic Unit, Decimal Arithmetic Operations.

UNIT-4 (12 Periods)

THEMEMORYSYSTEM: MemoryHierarchy,MainMemory,AuxiliaryMemory,Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor

Text Books :	1. Computer SystemArchitecture,M.MorrisMano,3rdEdition, Pearson/PHI. 2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson. 3. Fundamentals of Computer Organization and Design, Sivarama Dandamudi, Springer International Edition. 4. Fundamentals of Computer Organization and Design, Sivarama Dandamudi, Springer International Edition.
References :	

TECHNICAL ENGLISH I B.Tech –IV Semester (Code: 18EL002)					
Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	At enhancing the vocabulary competency of the students
CO2	To enhance the understanding of the elements of grammar
CO3	To enable the students to use proper spelling, grammar in constructing the sentences
CO4	To enhance the learner‘s ability to communicate accurately

Course Outcomes: Students will be able to:

CLO-1	To comprehend the importance, barriers and strategies of listening skills in English.
CLO-2	To illustrate and impart practice Phonemic symbols, stress and intonation.
CLO-3	To practice oral skills and receive feedback on learners‘ performance.
CLO-4	To practice language in various contexts through pair work, role plays, group work and dialogue conversations

UNIT-1	(12 Periods)
1.1 Vocabulary Development: Familiarizing Idioms &Phrases 1.2 Grammar for Academic Writing: Making Requests 1.3 Language Development: Using Transition & Link words 1.4 Technical Writing: Letter Writing &Email Writing	

UNIT-2	(12 Periods)
2.1 Vocabulary Development: Analogous words, Gender Sensitive language 2.2 Grammar for Academic Writing: Tenses: Simple Past /Present Perfect, The Future: Predicting &Proposing 2.3 Language Development: Cloze tests 2.4 Technical Writing: Technical Reports	

UNIT-3	(12 Periods)
3.1 Vocabulary Development: Abbreviations &Acronyms 3.2 Grammar for Academic Writing: Describing(People/Things/Circumstances) : Adjectival &Adverbial groups 3.3 Language Development: Transcoding (Channel conversion from chart to text) 3.4 Technical Writing: Circular, Memos, Minutes of Meeting	

UNIT-4	(12 Periods)
4.1 Vocabulary Development: Corporate vocabulary 4.2 Grammar for Academic Writing: Inversions &Emphasis 4.3 Language Development: Reading Comprehension 4.4 Technical Writing: Resume Preparation	

Text Books :	
References :	1. Communication Skills, Sanjay Kumar & Pushpa Latha. Oxford UniversityPress:2011. 2. Technical Communication Principles and Practice. Oxford

	UniversityPress:2014. 3. Advanced Language Practice, Michael Vince. Macmillan Publishers:2003. 4. Objective English (Third Edition), Edgar Thorpe & Showick. Pearson Education:2009 5. English Grammar: A University Course (Second Edition), Angela Downing Philip Locke, Routledge Taylor & Francis Group 2016

DESIGN AND ANALYSIS OF ALGORITHMS II B.Tech–IVSemester (Code:18CS406)					
Lectures	:	4 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Understand about designing and effectiveness of an algorithm, and divide and conquer method.
CO2	Know the optimal solution finding with the greedy and dynamic programming method.
CO3	Easy know the major graph algorithms and their analyses, and backtracking information.
CO4	Get the ability to branch with bound value and NP problems.

Course Outcomes: Students will be able to:

CLO-1	Understand concepts of Algorithm complexities. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and conquer algorithms. Derive and solve recurrences describing the performance of divide and conquer algorithms.
CLO-2	Understand the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them. Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms, and analyze them.
CLO-3	Understand the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them. Understand the concepts of Back tracking with suitable examples.
CLO-4	Understand a linear program and cite problems that can be solved using linear programming. Reduce problems to linear programming formulations. Understand the complexity of various linear programming approaches. Explain basic complexity classes such as P, NP, and NP-complete, and be able to use analysis and reduction techniques to show membership or non-membership of a problem in these classes. Understand and explain approaches to dealing with problems that are NP-complete such as the design of heuristic, approximation, or fixed-parameter algorithms.

UNIT-1 (13 Periods)

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation-Bigoh-notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis. **Master Theorem**: Introduction, Generic Form- Case1, Case2, Case3, Inadmissible equations, Application to common algorithms.

UNIT-2 (13 Periods)

Divide and conquer: General method, applications-Quicksort, Merge sort, Stassen‘s matrix multiplication.

Greedy method: General method, applications-Job sequencing with deadlines, Fractional knapsack problem, Minimum cost spanning trees-Prims, Kruskal, Single source shortest path

problem- Dijkstra.

UNIT-3	(12 Periods)

Dynamic Programming: General method, applications-0/1 knapsack problem, Travelling salesperson problem, Longest common sequence algorithm, Multi stage graphs using Forward& Backward approach, Reliability design.

Graph Applications: Graph traversals – Depth first, Breadth first, Bio Connected Components, Strongly Connected Components.

UNIT-4	(12 Periods)

Backtracking: General method, applications-n-queen problem, sum of subsets problem. Branch and Bound: General method, applications- 0/1 knapsack problem-LC Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP-Hardand NP Complete classes, Cook‘s theorem.

Text Books :	1. E. Horowitz, S.SahniandS. Rajasekaran,–Fundamentalsof Computer Algorithms‖,GalgotiaPublication.
References :	1. T. H. Cormen, Leiserson,RivestandStein,―Introduction of ComputerAlgorithm‖,PHI. 2. SaraBasse,A.V.Gelder,―ComputerAlgorithms‖,AddisonWesley.

PYTHON PROGRAMMING LAB

II B.Tech–IVSemester(Code: 18CSL41)

Lectures	:	: **2**Periods,Practical:**3**Periods	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Understand and write code using the basics of Python, Statements, Expressions, Conditional Executions, and Functions.
CO2	Write code for Iteration, Strings, File I/O.
CO3	Write code in creating, usage of Lists, Dictionaries, and Tuples.
CO4	Understand the concepts of Object Orientation, Databases and write code implementing them.

Course Outcomes: Students will be able to:

CLO-1	Understanding of scripting and the contributions of python language.
CLO-2	Understanding of Python especially the object-oriented concepts, using databases.
CLO-3	Able to design and implement machine learning solutions to classification, regression.
CLO-4	Able to design and implement machine learning solutions to clustering problems and features of various data.

UNIT-1 (13 Periods)

Introduction: Overview, History of Python, Python Features, Environment Setup. Variables, expressions, and statements: values and types, variables, names and keywords, statements, operators and operands, expressions, order of operations, modulus operator, string operations, asking the user for input, comments, choosing mnemonic variable names.

Conditional execution: Boolean expressions, logical operators, conditional execution, Alternative execution, chained conditionals, nested conditionals, catching exceptions using try and except, short-circuit evaluation of logical expressions.

Functions: function calls, built-in functions, type conversion functions, random numbers, math functions, adding new functions, definitions and uses, flow of execution, parameters and arguments, fruitful functions and void functions.

Iteration: updating variables, the while statement, infinite loops and break, finishing iterations with continue, definite loops using for, loop patterns.

Strings: string is a sequence, getting the length of a string using len, traversal through a string with a loop, string slices, strings are immutable, looping and counting, the in operator, string comparison, string methods, parsing strings, format operator.

Files I/O:persistence, opening files, text files and lines, reading files, searching through a file, letting the user choose the file name, using try except and open, writing files.

Lists: a list is a sequence, lists are mutable, traversing, operations, slices, methods, deleting elements, functions, strings, parsing lines, objects and values, aliasing, arguments.

Dictionaries: dictionary as a set of counters, dictionaries and files, looping and dictionaries, advanced text parsing.

Tuples: tuples are immutable, comparing tuples, tuple assignment, dictionaries and tuples, multiple assignment with dictionaries, the most common words, using tuples as keys in dictionaries, sequences.

Object-Oriented Programming: Managing Larger Programs, Using Objects, starting with Programs, Subdividing a Problem–Encapsulation, First Python Object, Classes as Types, Object Lifecycle, Many Instances, Inheritance.

Using Databases and SQL: Database concepts, Database Browser for SQLite, creating a database table, Structured Query Language summary, Basic data modeling, Programming with

multiple tables, three kinds of keys, Using JOIN to retrieve data.

LIST OF EXPERIMENTS

1. Write a python program to check if the number is positive or negative or zero and display an appropriate message.
2. Write a python program to take a string from user and count number of vowels present and percentage of vowels in it.
3. Write a python program to find the most frequent words in a text file.
4. Write a Python Program to Find the Sum of first n Natural Numbers.
5. Write a python program to find those number which are divisible by 7 and multiple of 5 between 1500 and 2700.
6. Write a Python Program to Solve Quadratic Equation.
7. Create a program that ask the user for a number and then prints out a list of all the divisors of that number.
8. Write a Python Program to Find HCF or GCD.
9. Write a Python Program to Find LCM.
10. Write a Python program to construct the following pattern, using a nested loop number.

    1
    22
    333
    4444
    55555
    666666
11. Write a Python Program to Sort Words in Alphabetic Order.
12. Write a Python function to create the HTML string with tags around the word(s).
13. Write a Python program to reverse words in a string.
14. Write a Python program to strip a set of characters from a string.
15. Write a python function to find the maximum and minimum of a list of numbers.
16. Write a Python Program to Find the Square Root.
17. Write a Python Program to Convert Decimal to Binary Using Recursion.
18. Write a python recursive function to a find the factorial of a given number.
19. Write a python program to find the longest word in each line of given file.
20. Write a Python program to combine each line from first file with the corresponding line in second file.
21. Write a Python program to read a random line from a file.
22. Write a Python program to create a list by concatenating a given list which range goes from 1 to n.

    Sample list : ['p', 'q'] n =5
    Sample Output : ['p1', 'q1', 'p2', 'q2', 'p3', 'q3', 'p4', 'q4', 'p5', 'q5']
23. Write a Python program to split a list every Nth element.

    Sample list: ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n']
    Expected Output: [['a', 'd', 'g', 'j', 'm'], ['b', 'e', 'h', 'k', 'n'], ['c', 'f', 'i', 'l']]
24. Write a Python program to compute the similarity between two lists.

    Sample data: ["red", "orange", "green", "blue", "white"], ["black", "yellow", "green", "blue"]
    Expected Output:
    Color1-Color2: ['white', 'orange', 'red']
    Color2-Color1: ['black', 'yellow']
25. Write a Python program to replace the last element in a list with another list.

    Sample data: [1, 3, 5, 7, 9, 10], [2, 4, 6,
    8] Expected Output: [1, 3, 5, 7, 9, 2, 4, 6,
    8]
26. Write a Python program to find the repeated items of a tuple.
27. Write a Python program to convert a list with duplicates to a tuple without duplicates.
28. Write a Python program to reverse the elements of a tuple.

29. Write a Python program to replace last value of tuples in a list.
Sample list: [(10, 20, 40), (40, 50, 60), (70, 80, 90)]
Expected Output: [(10, 20, 100), (40, 50, 100), (70, 80, 100)]
30. Write a python program to find the most frequent words in a text file.
31. Write a Python program to combine two dictionary adding values for common keys.
d1 = {'a': 100, 'b': 200, 'c':300}
d2 = {'a': 300, 'b': 200, 'd':400}
Sample output: Counter({'a': 400, 'b': 400, 'd': 400, 'c': 300})
32. Write a Python program to print all unique values in a dictionary.
Sample Data : [{"V":"S001"}, {"V": "S002"}, {"VI": "S001"}, {"VI": "S005"}, {"VII":"S005"}, {"V":"S009"},{"VIII":"S007"}]
Expected Output : Unique Values: {'S005', 'S002', 'S007', 'S001', 'S009'}
33. Write a Python program to create and display all combinations of letters, selecting each letter from a different key in a dictionary.
Sample data : {'1':['a','b'], '2':['c','d']}
Expected Output:
ac
ad
bc
bd
34. Write a Python program to get the top three items in a shop.
Sample data: {'item1': 45.50, 'item2':35, 'item3': 41.30, 'item4':55, 'item5': 24}
Expected Output:
item4 55
item1 45.5
item3 41.3
35. Write a Python program to match key values in two dictionaries.
Sample dictionary: {'key1': 1, 'key2': 3, 'key3': 2}, {'key1': 1, 'key2': 2} Expected output: key1: 1 is present in both x and y
36. Write a Python class named Rectangle constructed by a length and width and a method which will compute the area of a rectangle.
37. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.
38. Write a Python program to create a class of Single Linked List.
39. Write a Python program to create a class of FIFO queue.
40. Predict the output of following Python programs and write the justification.

```
class X(object):
    def __init__(self,a):
        self.num = a
    def doubleup(self):
        self.num *= 2

class Y(X):
    def __init__(self,a):
        X.__init__(self,
        a)
    def tripleup(self):
        self.num *= 3
```

```
obj = Y(4)
print(obj.num)

obj.doubleup()
print(obj.num)

obj.tripleup()
print(obj.num)
```

41. Predict the output of following Python programs and write the justification.

```
# Base or Super class
class Person(object):
   def__init__(self, name):
      self.name = name

   def getName(self):
      return self.name

   def isEmployee(self):
      return False

# Inherited or Subclass (Note Person in bracket)
class Employee(Person):
  def__init__(self, name, eid):
  ''' In Python 3.0+, "super().__init__(name)" also works'''
      super(Employee, self).__init__(name)
      self.empID = eid

   def isEmployee(self):
      return True

   def getID(self):
      return self.empID

# Driver code
emp = Employee("Geek1", "E101")
print(emp.getName(), emp.isEmployee(), emp.getID())
```

42. Create a employees database with the following attributes and insert rows. employee_id, first_name, last_name, email, phone_number, hire_date, job_id, salary, commission_pct, manager_id, department_id
43. Write a query to get the highest, lowest, sum, and average salary of all employees.
44. Write a query to get the average salary for all departments employing more than 10 employees.
45. Write a query to find the names (first_name, last_name), the salary of the employees whose salary is greater than the average salary.
46. Write a query to get nth max salaries of employees.

Text Books :	1. A Python Book: Beginning Python, Advanced Python, and Python Exercises, Dave Kuhlman, Open Source MIT License. 2. Python for Data Analysis, Wes McKinney, O‘ Reilly.
References :	1. Python Data Science Handbook-Essential Tools for Working with 2. Data Science from Scratch, JoelGrus, O‘Reilly.

WEB TECHNOLOGIES LAB

II B.Tech–IV Semester (Code: 18CSL42)

Lectures	:	3Periods	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Know elements and tags of HTML and apply Styles using Cascading Style Sheets.
CO2	Know basics of Java Script, Functions, Events, Objects and Working with browser objects.
CO3	Know basics of XML, DOM and advanced features of XML.
CO4	To convert XML documents into other formats and XSLT.

Course Outcomes: Students will be able to:

CLO-1	Analyze a web page and identify its elements and attributes
CLO-2	Create web pages using XHTML and Cascading Styles sheets.
CLO-3	Build dynamic web pages using JavaScript (client side programming).
CLO-4	Students will be able to write a well formed / valid XML documents
CLO-5	Understand Web server and its working
CLO-6	Design and implement a client-server internet application that accommodates specific requirements and constraints.

LIST OF EXPERIMENTS

1. Write HTML5 document to design a webpage. (Using all fundamental elements, Organizing text, Links, URLs and Tables).
2. Write HTML5 document to design a webpage. (Using Images, Colors, Canvas & Forms).
3. Write codes for different types of styles in CSS3.
4. Write java scripts covering Function, Arrays and Events.
5. Demonstrate JavaScript objects.
6. Demonstrate browser objects.
7. Demonstrate Document Object Model for an HTML document.
8. Write well-formed and valid XML documents.
9. Write code for converting XML document to HTML using XSLT.
10. Build a webpage using JQuery and its components.

Text Books :	1. Kogent Learning Solutions Inc.,HTML5 Black 2.Book:CoversCSS3,Javascript,XML,XHTML,Ajax,PHPandJquery.
References :	1.Harvey M. DeitelandPaulJ.Deitel,―Internet &World Wide Web How toProgram‖,4/e, Pearson Education. 2.Joshua Elchorn,―Understanding AJAX‖,PrenticeHall2006.

RDBMS LAB

II B.Tech–IV Semester(Code: 18CSL43)

Lectures	:	3Periods	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

Pre-Requisite: None.

Course Objectives:

CO1	Familiarize with fundamental concepts of database and various database architectures and Design relations for Relational databases using conceptual data modeling.
CO2	Implement formal relational operations in relational algebra and SQL.
CO3	Identify the Indexing types and normalization process for relational databases
CO4	Use mechanisms for the development of multi user database applications.

Course Outcomes: Students will be able to:

CLO-1	Ability to apply knowledge of database design methodology which give a good formal foundation in relational data model and Understand and apply the principles of data modeling using ER Model.
CLO-2	Familiar with relational DB theory and will able to write relational algebra expressions, Relational Calculus and SQL.for query
CLO-3	Design database schema and Identify and solve the redundancy problem in database tables using normalization.
CLO-4	Understand transaction processing, concurrency control and recovery techniques.

LIST OF EXPERIMENTS

Experiment 1: Working with ER Diagram and Normalization

Example: ER Diagram for Sailors Database

Entities:

1. Sailor
2. Boat

Relationship:

Reserves

Primary Key

Atributes:

1. SID (Sailor Entity)
2. BID (Boat Entity)

Experiment 2: Working with DDL, DML, DCL and Key Constraints

Creation, Altering and Dropping of Tables and Inserting Rows into a Table (Use Constraints While Creating Tables) Examples Using Select Command.

Experiment 3: Working with Queries and Nested QUERIES

Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints

Expriment 4: Working with Queries USING Aggregate Operators & views

Queries using Aggregate Functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and Dropping of Views

Experiment 5: Working with Conversion Functions & String Functions

Queries using Conversion Functions (TO_CHAR, TO_NUMBER AND TO_DATE), String Functions (CONCATENATION, LPAD, RPAD, LTRIM, RTRIM, LOWER, UPPER,

INITCAP, LENGTH, SUBSTR AND INSTR), Date Functions (SYSDATE, NEXT_DAY, ADD_MONTHS, LAST_DAY, MONTHS_BETWEEN), LEAST, GREATEST, TRUNC, ROUND, TO_CHAR, TO_DATE

Experiment 6: Working with Triggers using PL/SQL

Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

Experiment 7: Working with PL/SQL Procedures

Programs Development using Creation of Procedures, Passing Parameters IN and OUT of PROCEDURES

Experiment 8: Working with LOOPS using PL/SQL and Exception Handling

Program Development using WHILE LOOPS, Numeric FOR LOOPS, Nested Loops using ERROR Handling, BUILT-IN Exceptions, USE Defined Exceptions, RAISE-APPLICATION ERROR

Experiment 9: Working with Functions Using PL/SQL

Program Development using Creation of Stored Functions, Invoke Functions in SQL Statements and Write Complex Functions.

Experiment 10: Working CURSORS

Develop Programs using Features Parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of Clause and CURSOR Variables

Experiment11: Installation of SQL

Text Books :	Oracle PL/SQL by Example, Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rdEd 2. Oracle Database Logic PL/SQL Programming, ScottUrman, TataMc-Graw Hill. 3. SQL and PL/SQL for Oracle 10g, Black Book, Dr.P.S.Deshpande
References :	

SOFTWARE ENGINEERING III B.Tech – V Semester (Code: 18CS501)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			16 Periods
INTRODUCTION TO SOFTWARE ENGINEERING: The Evolving Role of Software, Software, the Changing Nature of Software, Legacy Software, Software Myths. **A GENERIC VIEW OF PROCESS:** Software Engineering - A Layered Technology, a Process Framework, the CMMI, Process Patterns, Process Assessment, Personal and Team Process Models, Product and Process. **PROCESS MODELS:** Prescriptive Models, the Waterfall Model, Incremental Process Models, Evolutionary Models, the Unified Process. **AN AGILE VIEW OF PROCESS:** What Is Agility? What Is an Agile Process? , Agile Process Models.			
UNIT-II			14 Periods
SOFTWARE ENGINEERING PRACTICE: Software Engineering Practice, Communication Practices, Planning Practices, Modeling Practices, Construction Practice, Deployment. **REQUIREMENTS ENGINEERING**: A Bridge To Design and Construction, Requirements Engineering Tasks, Initiating the Requirements Engineering Process, Eliciting Requirements, Developing Use-cases, Building the Analysis Model, Negotiating Requirements, Validating Requirements. **BUILDING THE ANALYSIS MODEL**: Requirements Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Flow-Oriented Modeling, Class Based Modeling Creating a Behavioral Model.			
UNIT-III			16 Periods
DESIGN ENGINEERING: Design within the Context of Software Engineering, Design Process and Design Quality, Design Concepts The Design Model, Pattern Based Software Design. **CREATING AN ARCHITECTURAL DESIGN**: Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Assessing Alternative Architectural Designs. **MODELING COMPONENT-LEVEL DESIGN**: What Is a Component? , Designing Class-Based Components, Conducting Component-Level Design, Designing Conventional Components. **PERFORMING USER INTERFACE DESIGN**: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.			
UNIT-IV			14 Periods
SOFTWARE PROCESS AND PROJECT METRICS: Introduction: Metrics Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics with Process.			

SOFTWARE QUALITY ASSURANCE: Quality Concepts, Quality Movement, SQA, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Software Reliability, ISO 9000 Quality Standards, SQA Plan. **SOFTWARE TESTING STRATEGIES:** Strategic Approach, Strategic Issues, Test strategies for Conventional Software, Test strategies for Object Oriented Software, Validation Testing, System Testing, The Art of Debugging.	
Text Book(s) :	1. Roger S.Pressman, –Software Engineering- A Practitioner's Approach‖, Sixth Edition, McGraw- Hill International.
References :	1. Ian Sommerville, –Software Engineering‖, Sixth Edition, Pearson Education. 2. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, –Fundamentals of Software Engineering‖, Second Edition, PHI. 3. RajibMall, —Fundamentals of Software Engineering‖, Second Edition, PHI.

AUTOMATA THEORY & FORMAL LANGUAGES III B.Tech – V Semester (Code: 18CS502)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			16 Periods
Automata: Why Study Automata Theory, The central concepts of automata theory - Alphabets, Strings, Languages, Problems. **Finite Automata:** An Informal picture of finite automata, Deterministic finite automata (DFA) - Definition of DFA, DFA processing strings, Notations for DFA, Extended transition function, the language of DFA, Non deterministic finite automata (NFA) – Definition of NFA, Extended transition function, the language of NFA, Equivalence of DFA and NFA. **Automata with Î transitions:** Use of Î - transition, notation for an Î - NFA, Epsilon closures, extended transitions and languages, Eliminating Î - transitions.			
UNIT-II			14 Periods
Regular Expressions and Languages: Regular expressions, finite automata and regular expressions, Algebraic laws of regular expressions. **Properties of Regular Languages:** Proving languages are not regular – Pumping lemma for regular languages, Applications of the pumping lemma, Closure Properties of Regular Languages, Equivalence and minimization of automata – Minimization of DFA.			
UNIT-III			16 Periods
(Construction based treatment & proofs are excluded) **Context Free Grammars:** Context Free Grammars, Parse Trees, ambiguous grammars. **Pushdown Automata:** Definition of the Pushdown automata, the languages of PDA, Equivalences of PDA‘s and CFG‘s. **Context free languages:** Normal form‘s for context- Free grammars, the pumping lemma for context free languages.			
UNIT-IV			14 Periods
Properties of Context free languages: closure properties for context free languages, Decision properties for CFL‘s. **Introduction to Turing Machines:** The Turing Machine, programming techniques for Turing machines. **Undecidability:** a language that is not recursively enumerable, an undecidable problem that is RE, Undecidability problems about TM, Post‘s Correspondence problem.			
Text Book(s) :	1. John E.Hopcroft, Rajeev Motwani, & Jeffery D. Ullman, ‒Introduction to Automata Theory Languages and Computations‖, Third Edition, Pearson Education, 2008.		
References :	1. Cohen, ‒Computer Theory‖, KLP Mishra &N.Chandrasekharan, ‒Theory of Computation‖, PHI. 2. H.R.Lewis, C.H.Papadimitriou, ‒Elements of The theory of Computation‖, Second Edition, Pearson Education, 2003.		

	3. J.Martin, –Introduction to Languages and the Theory of Computation‖, Third Edition, Tata McGraw Hill, 2003. 4. MichealSipser, –Introduction of the Theory and Computation‖, Thomson Brokecole, 1997. 5. Ragade, –Automata and Theoretical Computer Science‖, First Edition, Pearson Education, 2004.

ENTERPRISE PROGRAMMING III B.Tech – V Semester (Code: 18CS503)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			16 Periods
.**The Big Picture :** Java EE Architecture, The Many Variations of Java EE Applications, Packaging and Deploying the Java EE Application, Java EE Platform and Implementations. **Classic Memories : JDBC -** Introduction to JDBC, Structured Query Language, The JDBC APIs. **Java Servlets and Web Applications: Foundations of the Web Tier :** The HTTP Protocol, Introducing Java Servlets, Understanding the Java Servlet API, Web Applications, Java Servlets: The Good and the Bad			
UNIT-II			14 Periods
Dynamic Web Pages : JSP - JSP Runtime Architecture, JSP Syntax, The Java Environment for JSPs, JSP Standard Tags, Custom Tag Libraries, Expression Language. **Assembling Dynamic Web Pages: JavaServer Faces -** Architecture of a JSF Application, JavaServer Faces Tags, Java EE Managed Beans, f: Core Tags, JSTL Core Tags, Extensibility and Modularity.			
UNIT-III			14 Periods
Web Sites for Non-browsers: JAX-RS - What Are RESTful Web Services, The Java API for RESTful Web Services, Deploying JAX-RS Resources, Content Production, Content Consumption, Accessing Web Service Context, Exception Mapping, Number of Instances of Resource Classes, Path Mapping. **JSON Processing :** Streaming API : Consuming JSON Using the Streaming API, Producing JSON Using the Streaming API; Object Model API : Consuming JSON Using the Object Model API , Producing JSON Using the Object Model API. **Adding Sparkle : Java WebSockets -** Introduction to the WebSocket Protocol, The WebSocket Lifecycle, Overview of the Java WebSocket API, Java WebSocket Encoders and Decoders, Message Processing Modes, Path Mapping, Deployment of Server Endpoints.			
UNIT-IV			16 Periods
The Fundamentals of Enterprise Beans : Introduction to Enterprise Beans, Hello Enterprise Beans, Flavors of Enterprise Beans, Exposing Enterprise Beans, Finding Enterprise Beans, EJB Lifecycle, Packaging Enterprise Beans. **Advanced Thinking with Enterprise Beans :** Multithreading and Enterprise Beans, Asynchronous Enterprise Beans, Enterprise Bean Contexts, The Timer Service, Transactions and Enterprise Beans, Interceptors. **Modern Memories : The Java Persistence API -** Persistence Entities, The Entity Manager, Java Persistence Query Language, Configuring JPA Applications.			
Text Book(s) :	1. Dr. Danny Coward, **–Java EE 7: The Big Picture",** oracle press. 2. Arun Gupta **–Java EE 7 Essentials‖** O'Reilly.		
References :	1. Antonio Goncalves **–Beginning Java EE 7 ‖** apress.		

COMPUTER NETWORKS III B.Tech – VI Semester (Code: 18CS504)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			14 Periods
Data Communications & Networking Overview: A Communications Model, Data Communications, Data Communication Networking. **Protocol Architecture:** The Need for a Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture. **Digital Data Communication Techniques:** Asynchronous & Synchronous Transmission, Types of Errors, Error Detection, Error Correction.			
UNIT-II			16 Periods
Data Link Control: Flow Control, Error Control. **Network Layer:** **Network Layer Design Issues:** Store-and-Forward Packet Switching, Services Provided to the Transport Layer, Implementation of Connectionless Service, Implementation of Connection-Oriented Service, Comparison of Virtual-Circuit & Datagram Subnets. **Routing Algorithms:** The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing. **Congestion Control Algorithms:** General Principles of Congestion Control, Congestion Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnets, Load Shedding, Jitter Control.			
UNIT-III			16 Periods
Quality of Service: Requirements, Techniques for Achieving Good Quality of Service The **Network Layer in the Internet:** The IP Protocol, IP Addresses, Internet Control Protocols. **The Transport Layer:** **The Transport Service:** Services Provided to the Upper Layers, Transport Service Primitives, Berkeley sockets **Elements of Transport Protocols:** Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery.			
UNIT-IV			14 Periods
The Internet Transport Protocol (UDP): Introduction to UDP, Remote Procedure Call, The Real-Time Transport Protocol. **The Internet Transport Protocols (TCP):** Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Transmission Policy, TCP Congestion Control, TCP Timer Management. **Application Layer:** **The Domain Name System(DNS):** The DNS Name Space, Resource Records, Name Servers.			
Text Book(s) :	1. Behrouz A.Forouzan, –Data Communications and Networking‖, 4th edition, TMH.		

	2. Tanenbaum, ―Computer Networks‖, 4th Edition, (Pearson Education / PHI).
References :	1. Wayne Tomasi, –Introduction to Data Communications and Networking‖, PHI. 2. GodBole, –Data Communications & Networking‖, TMH. 3. Nader F.Mir, –Computer and Communication Networks‖, PHI

INDIAN TRADITIONAL KNOWLEDGE
(Common for all branches)
III B.Tech – V Semester (Code: 18CS505)

Lectures :	**3** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

UNIT-I	10 Periods

1. Historical Background: TKS during the Pre-colonial and Colonial Period

2. Indian Traditional Knowledge System
3. Traditional Medicine: Ayurveda, Simple Definition, Origin, Texts, The Great Three Classics of Ayurveda, The Lesser Three Classics of Ayurveda, The Branches of Ayurveda, Basic Concepts of Ayurveda, Purusha/Prakruti, Manifestation of Creation, Space, Air, Fire, Water, Earth, Mental Constitution, Satvic Mental Constitutions, Rajasic Mental Constitutions, Tamasic Mental Constitutions, Vata, Pitta and Kapha: The Three Doshas

UNIT-II	10 Periods

4. Traditional Production and Construction Technology: Social Conditions and Technological Progress, The Impetus for Metallurgy, Social Needs and Technological Applications, Scientific Rationalism and Technological Efficacy, Cultural Mores and Technological Innovation, State Support of Technology, Limitations of Pre-Industrial Manufacturing, India and the Industrial Revolution.

5. History of Physics and Chemistry: Philosophy and Physical Science, Particle Physics, Optics and Sound, Astronomy and Physics, The Laws of Motion, Experimentation versus Intuition, The Social Milieu, The Five Basic Physical Elements, Indian Ideas about Atomic Physics.
6. Traditional Art and Architecture and Vastu Shashtra: Vastu, The Principles of Vastu are Simple.

UNIT-III	10 Periods

7. Origin of Mathematics

8. Astronomy and Astrology
12. TKS and the Indian Union: Protection and the Legislative Frameworks in India, Comment, Sui Generis System, Trade Secrets and Know-how, Geographical Indications Bill, Protection of Plan varieties and Farmers Rights Bill, Rights of Communities, Monitoring Information on Patent Applications World-wide, Frameworks for Supporting R&D Activities in the Area of TKS

UNIT-IV	10 Periods

Common Yoga Protocol: Introduction, What is Yoga? Brief History and Development of Yoga, The fundamentals of Yoga, Traditional Schools of Yoga, **Yogic practices for health**

and wellness **General Guidelines for Yoga Practice:** Before the practice, During the Practice, After the Practice, Food for Thought, How Yoga can Help. **1. Invocation, 2. Sadilaja/Cālana Kriyās /Loosening Practices**, **3. Yogāsanas: A. Standing Postures: Tāḍāsana** (Palm Tree Posture), **Vṛkṣāsana** (The Tree Posture), **Pāda-Hastāsana** (The Hands to Feet Posture), **Ardha Cakrāsana** (The Half Wheel Posture), **Trikonāsana** (The Triangle Posture) **B. Sitting Postures: Bhadrāsana** (The Firm/Auspicious Posture), **Vajrāsana** (Thunderbolt Posture), **Uṣṭrāsana** (Camel Posture), **Śaśakāsana** (The Hare Posture), **Vakrāsana** (The Spinal Twist Posture), **C. Prone Postures: Makarāsana** (The Crocodile Posture), **Bhujaṅgāsana** (The Cobra Posture), **Śalabhāsana** (The Locust Posture), **D. Supine Postures: Setubandhāsana** (The Bridge Posture), **Uttāna Pādāsana** (Raised feet posture), **Pavana Muktāsana** (The Wind Releasing Posture), **Śavāsana** (The Corpse/ Dead Body Posture) **4. Kapālabhāti 5. Prānāyāma: naḍīśodhana or anuloma viloma prānāyāma** (Alternate Nostril Breathing), **Śītalī Prāṇāyāma, Bhrāmarī Prāṇāyāma** (Bhrāmarī Recaka) **6. Dhyāna 7. *Sankalpa* 8. Śantih pātha**	
Text Book(s) :	1. Traditional Knowledge System in India, Amit Jha, 2009 2. Common YOGA Protocol, Ministry of Ayush
References:	1. Traditional Knowledge System & Technology in India, Basanta Kumar Mohanta, Vipin Kumar Singh, 2012

ADVANCED COMPUTER ARCHITECTURE

Department Elective-I

III B.Tech – V Semester (Code:18CSD11)

Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

UNIT-I	16 Periods

Parallel Computer Models: The state of computing, Classification of parallel computers, Multiprocessors and Multi computers, Multi-vector and SIMD computers.

Program and network properties: Conditions of parallelism, Data and resource Dependencies, Hardware and Software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms.

System Interconnect Architectures: Network properties and routing, Static interconnection Networks, Dynamic interconnection Networks, Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network.

UNIT-II	16 Periods

Principles of Scalable Performance: Performance Metrics and Measures: Parallelism Profile in Programs, Efficiency, Utilization and Quality, Standard Performance Measures, Speedup Performance Laws: Amdahl‘s law for fixed load, Gustafson‘s law for scaled problems, Memory Bounded Speedup Model.

Pipelining: Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design- Instruction Execution Phases, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, Arithmetic Pipeline Design: Computer Arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines.

UNIT-III	16 Periods

MULTI Processors: Multiprocessor System Interconnect: Hierarchical Bus Systems, Crossbar Switch and Multiport Memory, Multistage and Combining Networks, Cache Coherence and Synchronization Mechanisms: The Cache Coherence problem, Snoopy Bus Protocols, Directory Based Protocols, Hardware Synchronization Mechanisms, Message-passing Mechanism: Message Routing Schemes, Deadlock and Virtual Channels, Flow Control Strategies, Multicast Routing Algorithms.

Scalable, Multithreaded and Dataflow Architectures: Latency-Hiding Techniques, Principles of Multithreading, Scalable and Multithreaded Architectures.

UNIT-IV	16 Periods

Thread Based Parallelism: Introduction, Using the python threading model, How to define a Thread, How to determine a current Thread, How to use a thread in subclass, Thread Synchronization with Lock and RLock, Thread Synchronization with RLock, Thread Synchronization with Semaphores, Thread Synchronization with a Condition, Thread Synchronization with an Event, Using a with Statement, Thread Communication with a Queue, Evaluating the performance of Multithreaded applications.

Process Based Parallelism: Introduction, How to spawn a process, How to name a Process, How to run a Process in the background, How to kill a process, How to use a process in subclass, how to exchange objects between processes, How to synchronize the Processes, How to manage a state between Processes, How to use a Process pool, Using the mpi4py python module, Point-to-Point to Communications, Avoiding Dedalock problems, Collective communication using Broadcast, Collective Communication using a Scatter, Collective Communication using Gather, Collective Communication using Alltoall, The reduce operation, How to Optimize an Operation.	
Text Book(s) :	1. Kai Hwang, –Advanced Computer Architecture‖, TMH. 2. –Python Parallel Programming cookbook‖, Giancarlo Zaccone, Packt Publishing.
References :	1. D.A. Patterson and J.L.Hennessy, –Computer organization and Design‖, Morgan Kaufmann, 2nd Edition. 2. V.Rajaram & C.S.R.Murthy, –Parallel Computer‖, PHI. 3. Barry Wilkinson and Michael Allen, –Parallel Programming‖, Pearson Education. 4. Parallel Programming with Python, Jan Palach, Packt Publishing

DATA WAREHOUSING & DATA MINING Department Elective-I III B.Tech – V Semester (Code: 18CSD12)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			15 Periods
Data Mining: Introduction, Kinds of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining **Data Pre-processing:** Importance of Data Process, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation			
UNIT-II			15 Periods
Data Warehouse and OLAP Technology: Introduction, A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Warehouse Implementation, From Data Warehousing to Data Mining. **Data Cube Computation and Data Generalization:** Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction—An Alternative Method for Data Generalization and Concept Description			
UNIT-III			15 Periods
Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and a Road Map, Efficient and Scalable Frequent Item-set Mining Methods, Mining Various Kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining			
UNIT-IV			15 Periods
Cluster Analysis: Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods- k-Means and k-Medoids, Hierarchical Methods- Agglomerative and Divisive Hierarchical Clustering, Density-Based Methods- DBSCAN, Grid-Based Methods- STING, Outlier Analysis.			
Text Book(s) :	1. Jiawei Han Micheline Kamber – "Data Mining Concepts & Techniques", 2nd ed., Morgan Kaufmann Publishers		
References :	1. "Data Warehousing in the real world – A Practical guide for Building decision support systems", Sam Anahory, Dennis Murray, Pearson Education. 2. "Data Mining (Introductory and Advanced Topics)", Margaret H. Dunham, Pearson Education.		

DISTRIBUTED COMPUTING IV B.Tech – VII Semester (Code: 18CSD13)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			12 Periods
Introduction: What is a distributed system? Design goals, Types of distributed systems. **Architectures:** Architectural styles, Middleware organization, System architecture, Example architectures.			
UNIT-II			13 Periods
Processes: Threads, Virtualization, Clients, Servers, Code migration. **Communication**: Types of Communication, Remote procedure call, Message-oriented communication, Multicast communication.			
UNIT-III			12 Periods
Naming: Names, identifiers, and addresses, Flat naming, Structured naming, Attribute-based naming. **Coordination**: Clock synchronization, Logical clocks, Mutual exclusion, Election algorithms, Location systems.			
UNIT-IV			13 Periods
Consistency and replication: Introduction, Data-centric consistency models, Client-centric consistency models, Replica management, Consistency protocols. **Fault tolerance**: Introduction to fault tolerance, Process resilience, Reliable client-server communication, Reliable group communication, Distributed commit, Recovery.			
Text Book(s) :	1. Andrew S.Tanenbaum, Maarten Van Steen, ‑Distributed Systems‖, Third Edition (2017), Pearson Education/PHI.		
References :	1. Coulouris, Dollimore, Kindberg, ‑Distributed Systems-Concepts and Design‖, 3rd edition, Pearson Education. 2. Mukesh, Singhal & Niranjan G.Shivarathri, ‑Advanced Concepts in Operating Systems‖, TMH. 3. Sinha, ‑Distributed Operating System – Concepts and Design‖, PHI.		

C# PROGRAMMING LAB III B.Tech – V Semester (Code:18CSL51)		
Lecture: **2** Periods, Practical:**3** Periods	Continuous Internal Assessment :	**50** Marks
Final Exam : **3** hours	Semester End Exam :	**50** Marks
UNIT-I		8 Periods
Elements of C#: The C# keywords, Identifiers, Data Types, Literals, Variables, Operators & Program Control Statements. **Arrays and Strings:** Arrays, Multidimensional Arrays, Jagged Arrays, Assigning Array References, Using the Length Property, Implicitly Typed Arrays, The foreach Loop, Exploring String Class Methods.		
LIST OF EXPERIMENTS		
Write a program to demonstrate Arrays (2-D and jagged). Design a class to demonstrate String class methods.		
UNIT-II		10 Periods
Introducing Classes and Objects: Class Fundamentals, How Objects Are Created, Reference Variables and Assignment, Methods, Constructors, the new Operator Revisited, Garbage Collection and Destructors. _this' Keyword. **A Closer Look at Methods and Classes:** Controlling Access to Class Members, Pass References to Methods, Use ref and out Parameters, Use a Variable Number of Arguments, Return Objects, Method Overloading, Overload Constructors, Object Initializers, Optional Arguments, Named Arguments, The Main( ) Method, Recursion, Understanding static, Static Classes, Properties.		
LIST OF EXPERIMENTS		
Implement a class List and the list operations. Use all possible basic features of C#. Write a c# program to demonstrate Ref, Out & Variable No. of Arguments.		
UNIT-III		8 Periods
Inheritance: Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Inheritance and Name Hiding, Creating a Multilevel Hierarchy, When Are Constructors Called, Base Class References and Derived Objects, Virtual Methods and Overriding, Applying Virtual Methods, Using Abstract Classes. **Interfaces:** Interfaces, Implementing Interfaces.		
LIST OF EXPERIMENTS		
Implement a class hierarchy with Abstract Classes, Virtual methods & Overriding. Write a C# program to demonstrate interfaces.		
UNIT-IV		8 Periods
Exception Handling: Exception-Handling Fundamentals, A Simple Exception Example		

Using following Keywords: try, catch, finally & throw.
Delegates & Events: Delegates, Events-Delegates, Events, Namespaces.

LIST OF EXPERIMENTS

Write a C# program to create and handle user defined exception.
Implement a class clock that publishes seconds change event. Design classes that subscribe to the event with respective behaviours.

Text Book(s) :	1. C# 4.0 The Complete Reference by Herbert Schildt, Tata McGraw Hill, 2010.
References :	1. Programming C# 5.0 by Ian Griffiths, O'REILLY, 2012. 2. Programming C#, 2nd Edition, O'REILLY, 2002. 3. Programming C# 3.0, Fifth Edition, Jesse Liberty & Donald Xie, O'Reilly Publ.

ENTERPRISE PROGRAMMING LAB

III B.Tech – V Semester (Code: 18CSL52)

Practicals :	**3** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

LIST OF EXPERIMENTS

1. Write a JDBC application to implement DDL and DML commands.
2. Write an application to demonstrate HTTP Servlets.
3. Write an application to demonstrate cookie & Sessions.
4. Write an application to integrate JSP & Servlets.
5. Write an application to demonstrate custom tags and standard tags in JSP.
6. Write an application to demonstrate JSF validators, event handlers and convertors.
7. Write an application to demonstrate web service.
8. Write a chat application using Web sockets.
9. Write an application to demonstrate Session Bean and Entity Bean (persistence).
10. Write an application to demonstrate Asynchronous and Timer services of Enterprise Bean.

Text Book(s) :	1. Dr. Danny Coward, –**Java EE 7: The Big Picture",** oracle press. 2. Arun Gupta –**Java EE 7 Essentials**‖ O'Reilly.
References :	1. Antonio Goncalves –**Beginning Java EE 7** ‖ apress.

SOFT SKILLS LAB
(Common for all branches)
III B.Tech – V Semester (Code: 18ELL02)

Practicals :	**3** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

LIST OF EXPERIMENTS

1. BODY LANGUAGE
   a. Facial Expressions.
   b. Kinesics.
   c. Oculesics.
   d. Haptics.
   e. Proxemics.
   f. Para Linguistics.

2. LIFE SKILLS
   a. Positive Attitude
   b. Social Behaviour & Social Norms.
   c. Ethics, Values and Positive Work Ethics.
   d. Time Management
   e. Goal Setting, Vision, Mission.

3. EMOTIONAL INTELLIGENCE
   a. Self-Awareness through Johari Window and SWOT analysis.
   b. Self-Control.
   c. Self-Motivation.
   d. Empathy.
   e. Social Skills.
   f. Self Esteem.
   g. Managing stress.
   h. Assertiveness.

4. PROBLEM SOLVING SKILLS
   a. Critical Thinking and Brain Storming
   b. Lateral Thinking and Six Thinking Hats.
   c. Creative Thinking.
   d. Conflict Management.

5. EMPLOYABILITY SKILLS
   a. Group Discussion.
   b. Team Building and Leadership Qualities
   c. Interview Skills.

Text Book(s) :

References :

1. –The Definitive Book Of Body Language‖, Allan & Barbara Pease
2. –You Can Win‖, Shiv Khera.
3. –Lateral Thinking‖, Edward De Bono.
4. –How To Prepare For Group Discussions And Interview‖, Hari Mohan
5. Prasad, Rajnish Mohan, 2nd Edition, TMH.
6. –Emotional Intelligence‖, Daniel Goleman.
7. – The 7 Habits Of Highly Effective People–, Stephen R. Covey
8. –Working in Teams‖, Sandy Pokras.

MACHINE LEARNING III B.Tech – VI Semester (Code:18CS601)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			13 Periods
Machine learning: Introduction. **Linear Regression:** Simple linear regression. Multiple linear regression**,** Batch Gradient descent algorithm, Stochastic gradient descent algorithm, Locally weighted linear regression. **Decision Tree Learning:** Decision Tree representation, appropriate problems for Decision Tree learning, hypothesis space search in Decision Tree learning, inductive bias in Decision Tree learning and issues in Decision Tree learning.			
UNIT-II			13 Periods
Artificial Neural Networks: Neural Network representations, appropriate problems for Neural Network learning, Perceptron, Multilayer Networks and the Backpropagation Algorithm and remarks on the Back propagation algorithm. **Evaluating Hypotheses**: Estimating hypothesis accuracy, basics of sampling theory, general approach for deriving confidence intervals, difference in error of two hypotheses and comparing learning algorithms.			
UNIT-III			12 Periods
Generative Classifiers::Learning Classifiers based on Bayes Rule, Naïve Bayes Algorithm, Conditional Independence, Derivation of Naïve Bayes Algorithm, Naïve Bayes For discrete-valued Inputs, Naïve Bayes For continuous inputs. **Discriminative Classifiers**:: Logistic Regression, Estimating Parameters For Logistic Regression, Regularization in Logistic Regression, Logistic Regression for functions with many discrete values, Relationship between Naïve Bayes classifiers and Logistic Regression.			
UNIT-IV			12 Periods
Computational learning theory: Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis spaces, and sample complexity for infinite hypothesis spaces. **Instance Based Learning:** Introduction, k-Nearest Neighbor learning. **Unsupervised Learning:** K-means clustering algorithm**.**			
Text Book(s) :	1. Tom M. Mitchell, ‒Machine Learning‖, Mc. Graw Hill Publishing.		
References :	1. Lecture Notes by Mr. Andrew Ng, Stanford University (cs229.stanford.edu/notes/)		

COMPILER DESIGN III B.Tech – VI Semester (Code: 18CS602)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			16 Periods
Introduction to compiling: Compilers, The Phases of a compiler, The grouping of phases, Compiler construction tools. **Lexical Analysis**: The role of the lexical analyzer, input buffering, simplification of tokens, Recognition of tokens, implementing transition diagrams, a language for specifying lexical analyzers. **Syntax analysis:** Writing a grammar-elimination of left recursion, left factoring. Top down parsing - Recursive descent parsing, Predictive parsers.			
UNIT-II			14 Periods
Syntax Analysis: Bottom up parsing - Shift Reduce parsing, LR Parsers – LR parsing algorithm, Construction of SLR, Canonical LR and LALR parsing techniques, Parser generators – Yacc Tool. **Syntax – Directed Translation:** Syntax Directed definition, construction of syntax trees, Bottom-up evaluation of S – attributed definitions.			
UNIT-III			16 Periods
Intermediate code Generation: Intermediate languages, Declarations-Declarations in procedures, Assignment statements-Names in symbol table, Re-using Temporary Names, Boolean expressions- Numerical representation, short circuit code, Back patching. **Code Generation**- Issues in the design of code generator, the target machines, Basic blocks and flow graphs, Next use information, A simple code generator.			
UNIT-IV			14 Periods
Runtime Environment: Source language issues, Storage organization, Storage-allocation strategies. **Symbol Tables:** Symbol table entries, Data structures to symbol tables, representing scope information.			
Text Book(s) :	1. Alfred V.Aho, Ravi Sethi, JD Ullman, ‑Compilers Principles, Techniques and Tools‖, Pearson Education, 2013.		
References :	1. Alfred V.Aho, Jeffrey D. Ullman, ‑Principles of Compiler Design‖, Narosa publishing. 2. Lex Yacc‖, John R. Levine, Tony Mason, Doug Brown, O'reilly. 3. Modern Compiler Implementation in C‖, Andrew N. Appel, Cambridge University Press		

CRYPTOGRAPHY & NETWORK SECURITY III B.Tech – VI Semester (Code:18CS603)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			**16** Periods
Introduction: The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security. **Classical Encryption Techniques**: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. **Block cipher and the Data Encryption Standard:** Block Cipher Principles, The Data Encryption Standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Multiple Encryption and Triple DES, Block Cipher modes of Operation. **Advanced Encryption Standard:** Evaluation criteria for AES, The AES cipher			
UNIT-II			**14** Periods
Introduction to Number Theory: Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithm. **Public key and RSA:** Principles of Public –Key Cryptosystems, The RSA algorithm. **Key Management:** Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography. **Message Authentication and Hash function:** Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security Hash Functions, and MACs.			
UNIT-III			**16** Periods
Hash Algorithms: Secure Hash Algorithm, HMAC. **Digital Signatures and authentication protocols:** Digital Signatures, Authentication Protocols, Digital Signature Standard. **Authentication Application:** Kerberos,X-509 Authentication Service. **Electronic Mail Security:** Pretty Good Privacy (PGP).			
UNIT-IV			**14** Periods
IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Pay Load. **WEB Security:** Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction. **Intuders:** Intruders, Intrusion Detection, Password Management. **Firewalls:** Firewall Design Principles.			
Text Book(s) :	1. Cryptography and network security -Behrouz A. Forouzan . 2. William Stallings ―Cryptography and Network Security‖ 4th Edition, (Pearson Education/PHI).		

References :	1. Kaufman, Perlman, Speciner, –NETWORK SECURITY‖, 2nd Edition, (PHI / Eastern Economy Edition) 2. Trappe & Washington, –Introduction to Cryptography with Coding Theory‖, 2/e, Pearson.

MIDDLEWARE TECHNOLOGIES III B.Tech – VI Semester (Code: 18CS604)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			18 Periods
The .NET Framework: C#, VB, and the .NET Languages, Intermediate languages, Common language runtime, the .NET class library. **Web Form Fundamentals:** Understanding the anatomy of an ASP.NET application, Introducing server controls, improving the currency converter, taking a deeper Look at HTML control classes, using the page class, using Application events. **Web Controls:** Stepping up to web controls, web control classes, List controls, Table controls, Web control events and AutoPostBack, An interactive web page. **Tracing:** Enabling Tracing, Writing Trace Information, Performing Application-Level Tracing.			
UNIT-II			15 Periods
State Management: Understanding the problem of the state, using View State, Transferring information between pages, using cookies, managing session state Configuring session state, using application state **Validation:** understanding the validation, using the validation controls. **Rich Controls**: The calendar, The Ad Rotator, pages with multiple views: Multiview, Wizard Control. **Styles, Themes, and Master Pages:** Styles, Themes, master page basics, advanced master pages.			
UNIT-III			15 Periods
ADO.NET Fundamentals: Understanding databases, configuring your database, Understanding SQL basics, Understanding the data provider model, using direct data Access, using disconnected data access. **Data Binding:** Introducing data binding, using single valued data binding, using repeated value data binding, working with data source controls. **The Data Controls:** The grid view, formatting the gridview, selecting a grid view row, Editing with a grid view row, sorting and paging in gridview, using grid view templates The details view and form view.			
UNIT-IV			15 Periods
LINQ and the Entity Framework: understanding LINQ, LINQ basics, using entity framework, Getting more advanced with entity framework, using the entity data source. **Working with Services:** What is WCF Web Service, Application for Creating and Consuming a WCF Web Service? **Putting ASP.NET MVC in Context:** Understanding the history of ASP.NET, Key Benefits of ASP.NET MVC. **Your First MVC Application:** Preparing Visual Studio, Creating a new ASP.NET MVC Project, Rendering Web Page, Creating a simple Data Entry Application.			

Text Book(s) :	1. ‒Beginning ASP.NET 4.5 in C#‖, Matthew MacDonald, Apress Publishing Company. 2. ‒Professional ASP.NET 4.5 in C# and VB‖, Jason N. Gaylord, Christian Wenz , Pranav Rastogi, Todd Miranda, Scott Hanselman, John Wiley & Sons, Inc., Indianapolis, Indiana 3. ‒Pro ASP.NET MVC 5‖, Adam Freeman, Apress Publishing Company.
References :	1. ‒Microsoft Windows Communication Foundation Step by Step‖, john sharp, Microsoft Press.

MOBILE APPLICATION DEVELOPMENT Department Elective-II III B.Tech – VI Semester (Code:18CSD21)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			[12] Periods
Hello, Android, Getting Started			
UNIT-II			[13] Periods
Creating Applications and Activities, Building User Interfaces			
UNIT-III			[15] Periods
Intents and Broadcast Receivers, Using Internet Resources, Files, Saving State, and Preferences			
UNIT-IV			[20] Periods
Databases and Content Providers, Working in the Background, Expanding the User Experience			
Text Book(s) :	1. ―Professional Android 4 Application Development‖, Reto Meier, John Wiley & Sons, Inc.		
References :	1. ―Android Programming The Big Nerd Ranch Guide‖, Brian Hardy & Bill Phillips, Big Nerd Ranch, Inc. 2. ―Head First: Android Development‖, Dawn Griffiths & David Griffiths, O'Reilly Publications.		

CLOUD PROGRAMMING Department Elective-II III B.Tech – VI Semester (Code:18CSD22)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			15 Periods
What is Amazon Web Services? A simple example: WordPress in five minutes Using virtual machines: EC2 Programming your infrastructure: the command line, SDKs, and CloudFormation			
UNIT-II			15 Periods
Automating deployment: CloudFormation, Elastic Beanstalk, and OpsWorks Securing your system: IAM, security groups, and VPC Storing your objects: S3 and Glacier Storing your data on hard drives: EBS and instance store			
UNIT-III			15 Periods
Using a relational database service: RDS Programming for the NoSQL database service: DynamoDB Achieving high availability: availability zones, auto-scaling, and CloudWatch			
UNIT-IV			15 Periods
Decoupling your infrastructure: ELB and SQS Designing for fault-tolerance Scaling up and down: auto-scaling and CloudWatch			
Text Book(s) :	1. –Amazon Web Services in Action‖, MICHAEL WITTIG & ANDREAS WITTIG, Manning Publications Co.		
References :	1. –Learning AWS‖, Aurobindo Sarkar & Amit Shah, Packt Publishing.		

STATISTICS WITH R
Department Elective-II
III B.Tech –VI Semester (Code:18CSD23)

Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

UNIT-I	[12] Periods

Introduction, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.
R Programming Structures, Control Statements, Loops, - Looping Over Nonvector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion, A Quicksort Implementation- Extended Extended Example: A Binary Search Tree.

UNIT-II	[12] Periods

Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability- Cumulative Sums and Products-Minima and Maxima- Calculus, Functions Fir Statistical Distribution, Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Extended Example: Finding Stationary Distribution of Markov Chains, Set Operation, Input /output, Accessing the Keyboard and Monitor, Reading and writer Files,
Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot() Function ; Customizing Graphs, Saving Graphs to Files.

UNIT-III	[12] Periods

Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance,Testing of Hypothesis(T-Test,F-Test, ANOVA Test).

UNIT-IV	[12] Periods

Linear Models, Simple Linear Regression, -Multiple Regression Generalized Linear Models, Logistic Regression, - Poisson Regression- other Generalized Linear Models-Survival Analysis, Nonlinear Models, Splines- Decision- Random Forests

Text Book(s) :	1. The Art of R Programming, Norman Matloff, Cengage Learning 2. R for Everyone, Lander, Pearson
References :	1. R Cookbook, Paul Teetor, O'reilly. 2. R in Action,Robert Kabacoff, Manning

ARTIFICIAL INTELLIGENCE
Department Elective-III
III B.Tech – VI Semester (Code: 18CSD31)

Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

UNIT-I — 16 Periods

Introduction to AI: What is AI? , Foundations of AI, History of AI, State of the Art.
Intelligent Agents: Agents and Environments, Good Behavior: Concept of Rationality, The Nature of Environments And The Structure of Agents.
Solving Problems by Searching: Problem Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth First Search, Uniform Cost Search, Depth First Search, Iterative Deepening DFS and Bi-directional Search.
Informed (Heuristics) Search Strategies: Greedy BFS, A* Algorithm, Heuristics Functions.
Beyond Classical Search: Local Search Algorithms and Optimization Problems-Hill Climbing, Simulated Annealing, Searching with Non Deterministic Actions: AND-OR Graphs, Online Search Agents and Unknown Environments.
Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Local Search in CSPs, Structure of Problems.

UNIT-II — 18 Periods

Logical Agents: Knowledge Based Agents, The Wumpus World, Logic and Propositional Logic: Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and Backward chaining, Agents Based on Propositional Logic.
First Order Logic: Representation, Revisited Syntax and Semantics of First Order Logic, Using First Order Logic, Knowledge Engineering in First Order Logic.
Inferences in First Order Logic: Propositional vs. First Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.
Knowledge Representation: Ontological Engineering, Categories and Objects, Events, Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

UNIT-III — 14 Periods

Classical Planning: Definition of Classical Planning, Algorithms for Planning as State-Space Search, Planning Graphs, Other Classical Planning Approaches, Analysis of Planning Approaches.
Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multi agent Planning.

UNIT-IV — 16 Periods

Uncertain Knowledge & Reasoning
Uncertainty: Acting under Uncertainty, Basic Probability Notation, and Inference Using Full Joint Distributions, Independence, Bayes‘ Rule and Its Use.
Probabilistic Reasoning: Representing Knowledge in an uncertain Domain, The Semantics of Bayesian Networks, Exact Inference in Bayesian Networks, Approximate Inference in Bayesian Network, and Other Approaches to Uncertain Reasoning.

Learning **Learning from Examples:** Forms of learning, Supervised learning, Learning Decision Trees, **Knowledge in Learning:** A Logical Formulation of learning, Knowledge in learning, Explanation Based Learning, Learning using Relevance Information, Inductive Logic Programming.	
Text Book(s) :	1. Artificial Intelligence- A Modern Approach, Stuart Russell and Peter Norvig, 3rd Edition Pearson Education/ PHI. 2. Artificial Intelligence, 3rd Edn., E. Rich and K. Knight (TMH). 3. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning. 4. Introduction to Artificial Intelligence, Patterson, PHI
References :	1. Artificial Intelligence, 3rd Edition, Patrick Henry Winston, Pearson Education. 2. Artificial Intelligence, Shivani Goel, Pearson Education. 3. Artificial Intelligence and Expert systems – Patterson, Pearson Education. 4. Artificial intelligence, structures and Strategies for Complex problem solving, -George F Lugar, 5thed, PEA 5. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer 6. Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier

SOFTWARE PROJECT MANAGEMENT
Department Elective-III
III B.Tech – VI Semester (Code:18CSD32)

Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

UNIT-I	13 Periods

Managing Software Projects: Processes and Project Management, Project Management and the CMM, Project Management at Infosys, Overview of the ACIC Case Study.
Process Planning: The Infosys Development Process, Requirement Change Management, Process Planning for the ACIC Project.
Effort Estimation and Scheduling: Estimation and Scheduling Concepts, Effort Estimation, Scheduling.

UNIT-II	13 Periods

Quality Planning: Quality Concepts, Quantitative Quality Management Planning. Defect Prevention Planning. The Quality Plan of the ACIC Project.
Risk Management: Concepts of Risks and Risk Management, Risk Assessment, Risk Control, Examples.
Configuration Management: Concepts in Configuration Management, The Configuration Management Process, The ACIC Configuration Management Plan.

UNIT-III	12 Periods

Measurement and Tracking Planning: Concepts in Measurement, Measurements, Project Tracking, The ACIC Measurement and Tracking Plan.
The Project Management Plan: The Process databases, The Process capability baseline, Process assets and the body of knowledge system, The Project Management Plan, Team Management, Customer Communication and Issue Resolution, The Structure of the Project Management Plan, The ACIC Project Plan.

UNIT-IV	12 Periods

Project Monitoring and Control: Project Tracking, Milestone Analysis, Activity-Level Analysis Using SPC, Defect Analysis and Prevention, Process Monitoring and Audit.
Project Closure: Project Closure Analysis, The ACIC Closure Analysis Report.

Text Book(s) :	1. Software Project management in Practices by Pankaj Jalote, Pearson Education India (2015).
References :	1. Software Project Management by Bob Hughes, Mike Cotterell, Rajib Mall, McGraw Hill Education; 5th edition (2017). 2. Software Project Management: A Unified Framework by Walker Royce, Pearson Education (2002).

BLOCKCHAIN TECHNOLOGIES Department Elective - III III B.Tech – VI Semester (Code: 18CSD33)			
Lectures :	**4** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks
UNIT-I			16 Periods
Introduction, Structure of a Block, The Genesis Block , Linking Blocks in the Blockchain.Tiers of blockchain technology ,Types of blockchain, Features of a blockchain Applications of blockchain technology			
UNIT-II			18 Periods
Bitcoin Bitcoin definition, Transactions, The transaction life cycle, The transaction structure, Types of transaction, Bitcoin network, Mining, Wallets Bitcoin payments, Bitcoin improvement proposals (BIPs) Alternative Coins, Namecoin, Litecoin, Primecoin, Zcash, Trading Zcash, Mining guide, Bitcoin installation, Bitcoin programming and the command-line interface, Bitcoin limitations , Privacy and anonymity			
UNIT-III			18 Periods
Hyperledger, a Linux Foundation Project ,Ten Steps to Your First Blockchain application Ethereum Intr Contract creation transaction ,Message call transaction Elements of the Ethereum blockchain, Ethereum virtual machine (EVM) Execution environment, Applications developed on Ethereum oduction , Ethereum blockchain, The consensus mechanism ,The world state Transactions,			
UNIT-IV			14 Periods
Blockchain-Outside of Currencies: Internet of Things , Government , Health , Finance, Insurance, Media , Scalability and Other Challenges: Scalability , Proof of Stake , Privacy , Security **,** Benefits and limitations of blockchain.			
Text Book(s) :	1. Mastering Blockchain ,Packt Publishing by Imran Bashir 2. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas Antonopoulos 3. Blockchain, IBM Limited Edition, Published by John Wiley & Sons, Inc. www.wiley.com		
References :	1. Blockchain by Melanie Swa, O'Reilly 2. Hyperledger Fabric - https://www.hyperledger.org/projects/fabric 3. Zero to Blockchain - An IBM Redbooks course, by Bob Dill, David Smits https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.html		

MACHINE LEARNING LAB
III B.Tech –VI Semester (Code:18CSL61)

Practicals :	**3** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

LIST OF EXPERIMENTS

1. Write a program to implement the linear regression using stochastic gradient descent approach of training for a sample training data set stored as a .CSV file.
2. Write a program to implement the linear regression using Batch gradient descent approach of training for a sample training data set stored as a .CSV file.
3. Write a program to implement the Logistic regression for a sample training data set stored as a .CSV file and test the same using appropriate data sets
4. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
5. Build an perceptron training model to learn linearly separable datasets and test the same using appropriate data sets.
6. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
7. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering.
9. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions.
10. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

Text Book(s) :	1. Tom M. Mitchell, ‐Machine Learning‖, First Edition, Mc. Graw Hill Publishing. 2. Python for Everybody, 2016 Edition by Charles R. Severance. 3. Introduction to Machine Learning with Python by Andreas C. Mueller and Sarah Guido, O‘Reilly Media, Inc.
References :	1. Core Python Programming Paperback – 2016 by R. Nageswara Rao, Dreamtech Press. 2. Python Programming: A Modern Approach by VamsiKurama, Pearson. 3. Machine Learning in Python by Michael Bowles, Wiley.

MIDDLEWARE TECHNOLOGIES LAB
III B.Tech –VI Semester (Code:18CSL62)

Practicals :	**3** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

LIST OF EXPERIMENTS

1. Design an ASP.NET application to demonstrate Web Form markup and redirection.
2. Design an ASP.NET application to demonstrate Web Controls and Html controls.
3. Design an ASP.Net application to demonstrate List Controls and to display a table dynamically.
4. Design an ASP.Net application to demonstrate Cross page Postback and QueryString to transfer data between Web pages.
5. Design an ASP.Net application to demonstrate the use of Cookies and using cookies how to transfer data between web pages.
6. Design an ASP.Net application to demonstrate use of session state and using session state how to transfer data between Web Pages.
7. Design an ASP.NET application to demonstrate Validating ASP.NET Web Pages using Validation Controls.
8. Design an ASP.NET application to demonstrate Rich Controls.
9. Design an ASP.NET Web Site with Styles, Themes and Master Pages.
10. Design an ASP.NET application to work with SQL Server Database using ADO.NET.
11. Design an ASP.NET application to work with SQL Server Database using Data Controls.
12. Design an ASP.NET application to work with SQL Server Database using LINQ Queries.
13. Design an application to demonstrate a Web Service Creation and Consumption.
14. Design a Simple MVC Web Pages Application.

Text Book(s) :	1. ‒Beginning ASP.NET 4.5 in C#‖, Matthew MacDonald, Apress Publishing Company. 2. ‒Professional ASP.NET 4.5 in C# and VB‖, Jason N. Gaylord, Christian Wenz , Pranav Rastogi, Todd Miranda, Scott Hanselman, John Wiley & Sons, Inc., Indianapolis, Indiana 3. ‒Pro ASP.NET MVC 5‖, Adam Freeman, Apress Publishing Company.
References :	1. ‒Microsoft Windows Communication Foundation Step by Step‖, john sharp, Microsoft Press.

MOBILE APPLICATION DEVELOPMENT LAB

Dept. Elective-II Lab

III B.Tech – VI Semester (Code: 18CSLD21)

Practicals :	**3** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

LIST OF EXPERIMENTS

1. Downloading and Installing the Android SDK. Downloading and Installing Updates to the SDK.
2. Creating and understanding Hello World application.
3. Develop an Android application to demonstrate the usage of resources and animations.
4. Develop an Android application to demonstrate Activity lifecycle.
5. Develop To-Do List Android application to demonstrate Different Layout Managers.
6. Develop an Android application to create and use custom controls.
7. Develop an Android application to demonstrate Intents.
8. Develop Earthquake Viewer Android application to demonstrate the usage of Internet Resources.
9. Develop an Android application to demonstrate working with SQLITE Databases.
10. Develop Earthquake-Monitoring Service.

Text Book(s) :	1. –Professional Android 4 Application Development‖, Reto Meier, John Wiley & Sons, Inc.

CLOUD PROGRAMMING LAB

Dept. Elective-II Lab

III B.Tech – VI Semester (Code: 18CSLD22)

Practicals :	**3** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

LIST OF EXPERIMENTS

1. Creating an AWS Account. Setting up a key pair. Creating a billing alarm.
2. Demonstrate Creating, Configuring, Debugging, monitoring and shutting down a virtual machine.
3. Deploy a simple web application with AWS Elastic Beanstalk.
4. Deploy a multilayer application with AWS OpsWorks Stacks.
5. Demonstrate installing security updates on running virtual machines.
6. Demonstrate controlling network traffic to and from your virtual machine.
7. Demonstrate creating a private network in the cloud: Amazon Virtual Private Cloud.
8. Write a Java application to store and retrieve objects from S3.
9. Demonstrate backing up and restoring your database using RDS.
10. Demonstrate setting up a load balancer with virtual machines.
11. Design an application to add and consume messages to Simple Queue Service.

Text Book(s) :	1. ‑Amazon Web Services in Action‖, MICHAEL WITTIG & ANDREAS WITTIG, Manning Publications Co.

STATISTICS WITH R LAB

Dept. Elective-II Lab

III B.Tech – VI Semester (Code:18CSLD23)

Practicals :	**3** Periods / Week	Continuous Internal Assessment :	**50** Marks
Final Exam :	**3** hours	Semester End Exam :	**50** Marks

LIST OF EXPERIMENTS

1. a). Write R Code using R as a calculator.
   b). Write R Code on Vector Operation.
   c). Write R code which demonstrate i) Array ii) List iii) Matrix iv) stack v) Data Frames
2. Write R Code to Importing & Exporting data from i) CSV file ii) Excel file
3. Write R code Which Demonstrate i) Missing Value Treatment ii) Outliers
4. Write R code to demonstrate i) Character functions ii) SQL operations using R.
5. Write R code which demonstrate functions and control loops.
6. Write R code which demonstrate plotting of graphs i) Histogram ii) Pie Graph iii) Plot Graph iv) Box Plot v) Dot Plot vi) Kernel Density Plots
7. Write R code which demonstrates descriptive statistical functions.
8. Write R code which demonstrates frequency and contingency tables.
9. Write R code which demonstrates Correlations.
10. Write R code which demonstrates T-Tests (Independent and Dependent).
11. Write R code which demonstrates Nonparametric tests of group differences.
12. Write R code which demonstrates i) Simple Linear Regression ii) Multiple Linear Regression
13. Write R code which demonstrates One-way ANOVA.
14. Write R code which demonstrates Two-way factorial ANOVA.

Text Book(s) :	1. R for Everyone, Lander, Pearson. (UNIT-I) 2. R in Action, Robert Kabacoff, Manning. (UNIT-II, III, and IV)
References :	1. R Cookbook, Paul Teetor, O'reilly. 2. The Art of R Programming, Norman Matloff, Cengage Learning.